Different waves of effector genes with contrasted genomic location are expressed by Leptosphaeria maculans during cotyledon and stem colonization of oilseed rape

Julie Gervais, Thierry T. Rouxel, Marie-Helene Balesdent, Isabelle Fudal-Grolier Fudal, Clémence Plissonneau

PROGRAM BOOK

2016 IS-MPMI

XVII CONGRESS

PORTLAND, OREGON • JULY 17–21

#ICMPMI2016

Join at ismpmi.org/members

Keep on top of leading research in molecular plant interactions and build lifelong relationships with scientists from around the globe – over 1,000 members from 50+ countries!

Member-Only Benefits:

- Subscription to *Molecular Plant-Microbe Interactions* (*MPMI*)
- IS-MPMI Job and Networking Community
- International Congress Event Member Rate
- Online Member Directory
- And more!

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Connect with us!

WELCOME LETTER

from the Local Organizing Committee Chair

Welcome to Portland, the City of Roses, and the XVII International Congress on Molecular Plant-Microbe Interactions! We have put together a diverse and forward-looking program that highlights some of the most exciting upcoming research areas, such as the microbiome, tritrophic interactions, RNA-mediated interactions, and systems biology, as well as perennial favorites such as resistance mechanisms, mutualism, and microbial virulence functions. There is also a rich selection of special sessions on Sunday to serve as appetizers, including new training sessions on bioinformatics. Attendees and experts from nearly 50 countries around the world are here to discuss the future of molecular plant-microbe interactions. Seventy young scientist travel awardees will be networking with speakers and tweeting about their favorite talks.

The main program opens on Sunday with the IS-MPMI Award lecture by Sharon Long, "Bacterial Cell Dynamics and Molecular Differentiation in Symbiosis." Monday will begin with the EMBO Keynote lecture by Ulla Bonas on "How Xanthomonas Manipulates the Plant," while Tuesday will begin with a talk by the inaugural IS-MPMI Young Investigator Awardee Dong Wang, "Specialised Protein Secretion in Plant-Microbe Symbioses." On Thursday morning, EMBO Young Investigator Awardee Lionel Navarro will give a talk on "Mechanisms of Bacterial Suppression of AGO1-RISC Activity and of Host Counter-Counter Defense". Also on Thursday, we've added a new final day, lunch-time poster session so you can catch those posters you missed earlier in the meeting.

As the chair of the Local Scientific Committee, I encourage you to make the most of your time here in Portland and take advantage of all the unique cultural, social, and recreational activities this city has to offer. Portland is young and vibrant city on the Pacific rim that offers a vast diversity of food experiences including beer, wine and coffee, and is an indie rock mecca for music buffs. July is a beautiful time to be in Oregon with sunshine, mild temperatures and low humidity.

Finally, I would like to take this opportunity to thank my fellow members of the Local Scientific Committee and members of the Board of Directors, and also the IS-MPMI headquarters staff, for their help with the careful planning of the XVII Congress. Although the congress will be over in five short days, it has been nearly four years in the making and could not have happened without the many volunteers who helped pull it all together.

Welcome to Portland,

Brett Tyler, Oregon State University
Local Scientific Committee Chair
XVII International Congress on Molecular Plant-Microbe Interactions

Courtesy of Travel Oregon

Local Scientific Committee

Program Chair, Brett Tyler, Oregon State University
Barbara Baker, USDA-ARS, Albany
Andrew Bent, University of Wisconsin-Madison
Jeff Chang, Oregon State University
Lynda Ciuffetti, Oregon State University
Shouwei Ding, University of California-Riverside
Valerian Dolja, Oregon State University
Nik Grunwald, USDA-ARS, Corvallis
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Jan Leach, Colorado State University
Joyce Loper, USDA-ARS, Corvallis
Sharon Long, Stanford University
Wenbo Ma, University of California-Riverside
Richard Michelmore, University of California-Davis
Shauna Somerville, Stanford University
Brian Staskawicz, University of California-Berkeley
Guoliang Wang, The Ohio State University
Valerie Williamson, University of California-Davis
Mary Wildermuth, University of California-Berkeley
Tom Wolpert, Oregon State University

Plenary Session Chairs

Andrew Bent
Jeff Chang
Regine Kahmann
Jan Leach
Sharon Long
Joyce Loper
Brian Staskawicz

IS-MPMI Board of Directors

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TABLE OF CONTENTS

Connect with IS-MPMI
Social Media and Mobile App 4
Wi-Fi/Internet 4

General Information
Instructions for Poster Presenters and Speakers 6
Boxed Lunches (prepurchased) 7
Lunch Options 7
Registration Hours 7
Exhibit and Poster Hours 7
IS-MPMI Central 7
- Learn About Publishing in *MPMI*
- Catch Up with the 2016 Awardees
- Get *Involved* with *Interactions*

Job Board 7
Notice/Message Board 7
Guest Program 7
Photo Release 7
Dress 7
Safety Tips 8
Procedures in Case of a Fire 8
Emergency Information 8
Congress Facilities 8

Exhibit Hall 9

Maps
Oregon Convention Center Levels 1 and 2 10
Downtown Portland 11

Transportation
MAX Light Rail Info 12

Program
Congress Highlights 13
Program-at-a-Glance 14

Daily Program Schedule and Sessions
Saturday, July 16 15
Sunday, July 17
- Program 15
- Sessions – Sunday Morning 15
- Sessions – Sunday Afternoon 17

Monday, July 18
- Program 19
- Sessions – Monday Morning 19
- Sessions – Monday Afternoon 21

Tuesday, July 19
- Program 23
- Sessions – Tuesday Morning 23
- Sessions – Tuesday Afternoon 24

Wednesday, July 20
- Program 27
- Sessions – Wednesday Morning 27

Thursday, July 21
- Program 29
- Sessions – Thursday Morning 29
- Sessions – Thursday Afternoon 32

Posters
Poster Schedule and Poster Titles by Category 34
Poster Titles and Authors 35

Author Index 79

Notes 91

U.S. Food Waste Challenge

On June 4, 2013, the U.S. Department of Agriculture (USDA), in collaboration with the U.S. Environmental Protection Agency (EPA) launched the U.S. Food Waste Challenge, calling on others across the food chain—including producer groups, processors, manufacturers, retailers, communities, and other government agencies—to join the effort to reduce, recover, and recycle food waste. IS-MPMI supports this effort by working with the hotels and convention centers to donate food from IS-MPMI meetings to food shelves in the local area.

CONNECT WITH IS-MPMI

Connect at the Congress and All Year Long

Get Social—Share Your Congress Experience

Follow and join our social media groups so you can connect now and after the meeting.

On Twitter? Use #ICMPMI2016 throughout the meeting and follow @ISMPMI

Like The International Society for Molecular Plant-Microbe Interactions on Facebook

Join The International Society for Molecular Plant-Microbe Interactions (IS-MPMI) group on LinkedIn

Where IS-MPMI Members Are From

IS-MPMI is a truly global society with membership representing more than 45 countries throughout the world. Find your country's flag and find out more about where your peers are practicing science. Don't forget to take your picture and share it on Twitter using #ICMPMI2016.

Propel the Online Congress Conversations

We want to hear from you online! **Tweet** about your favorite presentation moments using #ICMPMI2016; **share** your photos on Facebook at facebook.com/ISMPMI and tag your friends; and **publish** updates to your personal blogs to share your favorite moments. Get excited and get connected at this year's Congress!

Complimentary Wi-Fi/Internet

IS-MPMI has provided complimentary Wi-Fi Internet throughout the Oregon Convention Center. Select Network: "IS-MPMI WiFi" on your personal device. No password or authentication is necessary.

App into the 2016 Congress!

Mobile App—The Meeting at Your Fingertips!

Why use the app? Same content plus more features than the Program Book. It is quick, easy to use, a green effort for the environment…and it is FREE!

Here are the best features:

- Browse the program schedule, posters, and general information
- Customize your schedule and add appointments
- Access session information, including full abstracts
- Connect with other attendees: send messages and make appointments
- Connect with your iPad-specific version
- Schedule Posters by Appointment by connecting with poster authors to make appointments to meet and discuss poster content (in addition to the poster author time)

Get the app…it's free! Available for iOS (iPhone and iPad) and Android devices; Blackberry and Windows phone users have access to a mobile website that will offer the same functionality.

Go to **www.ismpmi.org/mobileapp** to find links to the mobile app.

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INSTRUCTIONS FOR POSTER PRESENTERS AND SPEAKERS

Poster Presenters

Presenting authors must be in attendance at their posters during their assigned times.

Posters will be numbered as indicated in the Program Book. Posters should be placed on the corresponding numbered poster board during poster set-up time. Velcro will be provided on each board for attaching a poster.

Poster set-up time is Sunday, July 17, 12:00 – 15:00, Exhibit Hall A–A1.

Poster authors present:

Monday, July 18 • 17:00 – 19:00
17:00 – 18:00 Even-numbered poster authors: Posters 1–360
18:00 – 19:00 Odd-numbered poster authors: Posters 1–360

Tuesday, July 19 • 17:00 – 19:00
17:00 – 18:00 Even-numbered poster authors: Posters 361–722
18:00 – 19:00 Odd-numbered poster authors: Posters 361–722

Thursday, July 21 • 12:50 – 14:50
12:50 – 13:50 Even-numbered poster authors: Posters 1–722
13:50 – 14:50 Odd-numbered poster authors: Posters 1–722

Poster take-down time is Thursday, July 21, from 14:50 – 15:30.

See page 34 for more information on the posters.

Instructions for Plenary and Concurrent Speakers

- Presentations should be uploaded prior to attendance at the congress using the Confex system
- **The Speaker Ready Room (Room A109, Convention Center) will be available for speakers to make changes to their presentations and to upload presentations that were not uploaded prior to arrival at the congress. Changes and uploads should be done at least one day prior to the assigned presentation day.**
- The moderator for each assigned session will ensure that your presentation is on the screen at the assigned time of the presentation.

GENERAL INFORMATION

Boxed Lunches (*prepurchased only*)

For those purchasing box lunches when registering for the congress, these lunches are available in the Exhibit Hall during the scheduled lunch times Monday – Thursday. Tickets are included with your registration and will be collected when picking up your boxed lunch.

Lunch Options—Cafes and Food Trucks (*for those who did not purchase a pre-boxed lunch*)

Several cafes/concession areas are located in the convention center where meals can be purchased. There will also be multiple food trucks parked outside the convention center daily from 11:00 – 14:00, if you wish to experience a variety of local foods for purchase.

Registration Hours

Prefunction Area A, Level 1, Convention Center

Saturday, July 16	15:00 – 19:00
Sunday, July 17	8:00 – 17:00
Monday, July 18	8:00 – 17:00
Tuesday, July 19	8:00 – 17:00
Wednesday, July 20	8:00 – 13:00
Thursday, July 21	8:00 – 15:00

Exhibit and Poster Hours

Sunday, July 17

12:00 – 15:00	Exhibit Set-Up
12:00 – 15:00	Poster Set-Up

Monday, July 18

9:45 – 21:00	Poster Viewing
17:00 – 19:00	Exhibits Open
17:00 – 19:00	**Poster Viewing with Authors Present**
17:00 – 18:00	Even-numbered posters 1–360
18:00 – 19:00	Odd-numbered posters 1–360

Tuesday, July 19

9:45 – 21:00	Poster Viewing
17:00 – 19:00	Exhibits Open
17:00 – 19:00	**Poster Viewing with Authors Present**
17:00 – 18:00	Even-numbered posters 361–722
18:00 – 19:00	Odd-numbered posters 361–722

Wednesday, July 20

10:10 – 21:00	Poster Viewing
10:10 – 21:00	Exhibits Open

Thursday, July 21

12:20 – 14:50	Exhibits Open
12:50– 14:50	Poster Viewing
12:50 – 14:50	**Poster Viewing with Authors Present**
12:50 – 13:50	Even-numbered posters 1–722
13:50 – 14:50	Odd-numbered posters 1–722
14:50 – 15:30	Poster Take-Down
14:50 – 16:00	Exhibit Take-Down

IS-MPMI Central

Visit us in the Exhibit Hall to experience all that IS-MPMI has to offer! IS-MPMI Central will have several activities for attendees to take part in.

Learn About Publishing in *Molecular Plant-Microbe Interactions*
Meet with *MPMI* Editor-in-Chief John McDowell and his Editorial Board about publishing your research in the IS-MPMI community's dedicated journal. *MPMI* is indexed by PubMed, Scopus, Web of Science, and others. Sign up for *MPMI* alerts specific to your research area.

Catch up with the 2016 Awardees
An IS-MPMI Central video will feature this year's IS-MPMI Awardee and the first-ever Young Investigator Awardee. This year's 70 travel awardees will also be featured; get to know these up- and-coming IS-MPMI scientists.

Get *Involved* with *Interactions*
Are you working on a project that you want to share with the rest of the IS-MPMI community? Did you recently graduate? Do you know someone leading the field in the latest research? Share your news with *Interactions*! You can view a video of who has been featured on *Interactions* and submit your ideas at IS-MPMI Central in the Exhibit Hall and be entered into a drawing for a free Portland gift basket!

Job Boards

This year's Job Boards offer more space and job postings by location. Post your jobs according to global geographic regions, or weave your way through the Job Boards to discover a new opportunity in a new location.

Notice/Message Board

A notice/message board will be positioned in the main lobby, where you can post/receive messages and learn about any changes in the program.

Guest Program

Guests should pick up registration packets at the registration desk.

Photo Release

Photographs will be taken at the XVII Congress. By registering for this congress, you agree to allow IS-MPMI to use your photo in any of their publications or websites.

Dress

The official dress of the Congress is business casual.

continued

GENERAL INFORMATION

Safety Tips

Do not travel alone—stay in groups and travel in well-lit areas. ***Remove name badges when outside your hotel and the convention center unless you are participating in a congress event.***

Do not give your room number out to anyone you do not know and avoid giving out your room number in conversations where strangers may hear you talking.

Bolt your hotel room door and only open it when you know who is on the other side. (Note: hotel personnel wear uniforms and have identification badges. If in doubt, call hotel security to verify an employee's identity.)

Do not leave your door ajar if you are going down the hall for ice. Someone may enter when you are not looking. Know where the stairs are located in case of fire (do not use elevators). Also count the number of doors to the nearest exit in case you cannot see in a smoke-filled hallway. Valuables, airline tickets, and money should be kept in a hotel safety deposit box or in a room safe, if available.

Procedures in Case of a Fire

Try to leave the hotel as quickly as possible. If you cannot, stay in your room and call the operator or security to let them know you are in your room.

Put your hand on the room door to see if it is hot before opening it. If it is, do not open quickly. Open it just a crack to see what is on the other side and be prepared to slam it shut quickly if necessary.
If you leave the room, take your room key with you! Shut your room door to keep smoke out. You may have to return if the exit is blocked. Remember the way back to your room as you go to the exit in case you need to return.

If necessary, drop to your knees to avoid smoke. Tie a wet towel around your nose and mouth to act as a smoke filter. Fold it into a triangle and put the corner in your mouth. Do not take the elevator when you smell smoke or if you know that there is a fire in the building.

Emergency Information

Medical emergencies should be communicated to an IS-MPMI staff member at the registration desk or an employee of the Oregon Convention Center. The convention center staff is equipped to handle medical emergencies. In your hotel, dial the operator.

The hospital facility located closest to the congress is:

Legacy Emanuel Medical Center
2801 N. Gantenbein Avenue, Portland, Oregon 97227
Phone:+1.503.413.2200

Congress Facilities

Oregon Convention Center
777 NE Martin Luther King, Jr. Blvd.
Portland, Oregon 97232
+1.503.235.7575

DoubleTree by Hilton Portland (headquarters hotel)
1000 NE Multnomah Street
Portland, Oregon 97232
+1.503.281.6111

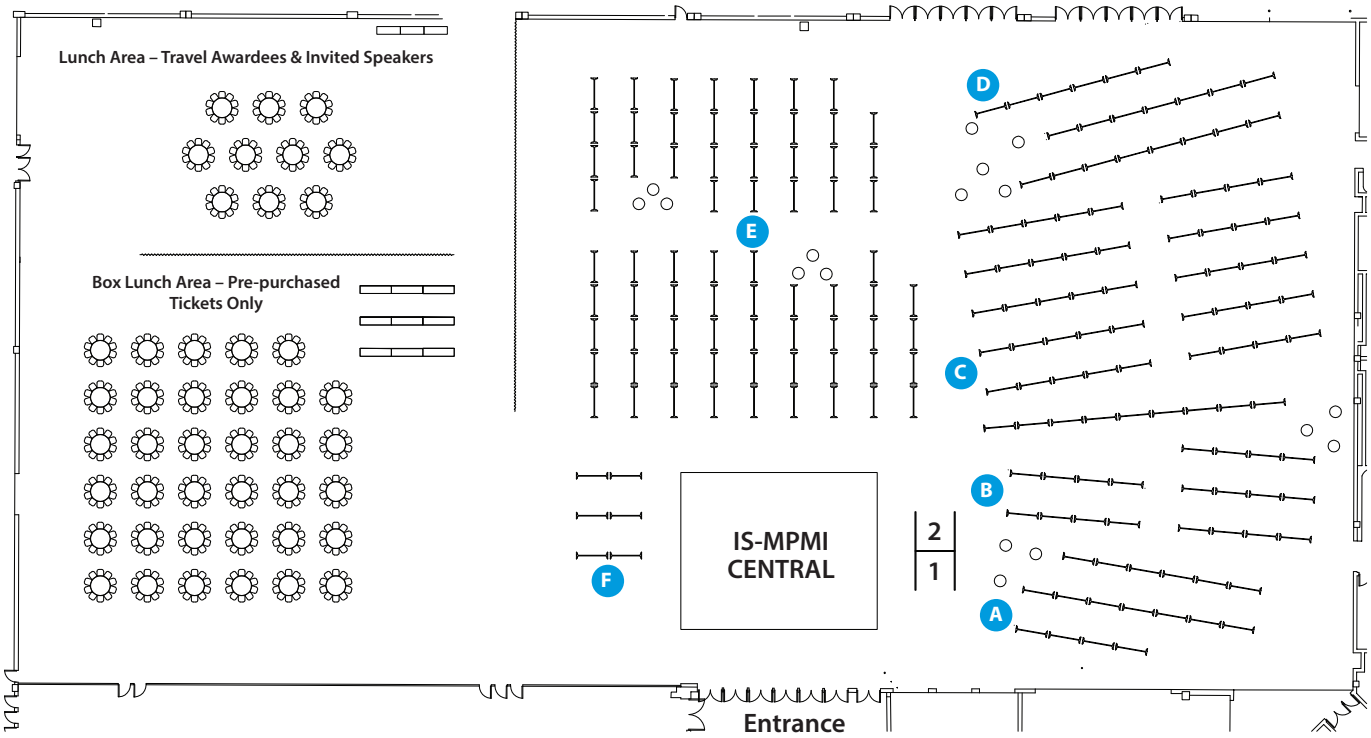
Quality Inn Downtown Convention Center
431 NE Multnomah Street
Portland, Oregon 97232
+1.503.233.7933

Hotel Rose
50 Southwest Morrison Street
Portland, Oregon 97201
+1.503.221.0711

University Place Hotel
310 SW Lincoln Street
Portland, Oregon 97201
+1.503.221.0140

Portland State University Lodging
625 Jackson Street
Portland, Oregon 97201
+1.503.725.4336

EXHIBIT HALL



Key: Poster Boards

Poster Areas:

A – Symbiosis and Mutualism
B – Phytobiome
C – Microbes
D – Genomics and Systems Biology
E – Host Resistance
F – Translational and Emerging Systems

Exhibitors

Booth #1: *New Phytologist*
Web: www.newphytologist.org

New Phytologist is an international journal offering rapid publication of high-quality, original research in plant science.
Owned by the non-profit-making New Phytologist Trust, we are dedicated to the promotion of plant science. Our activities range from funding symposia and workshops to ensuring free access for our prestigious Tansley reviews.

Booth #2: 11th International Congress of Plant Pathology
Mark your calendars for ICPP 2018 which will be held in Boston, Massachusetts, U.S.A. from July 29 – August 3, 2018! This once-every-five-years congress will focus on "Plant Health in a Global Economy."

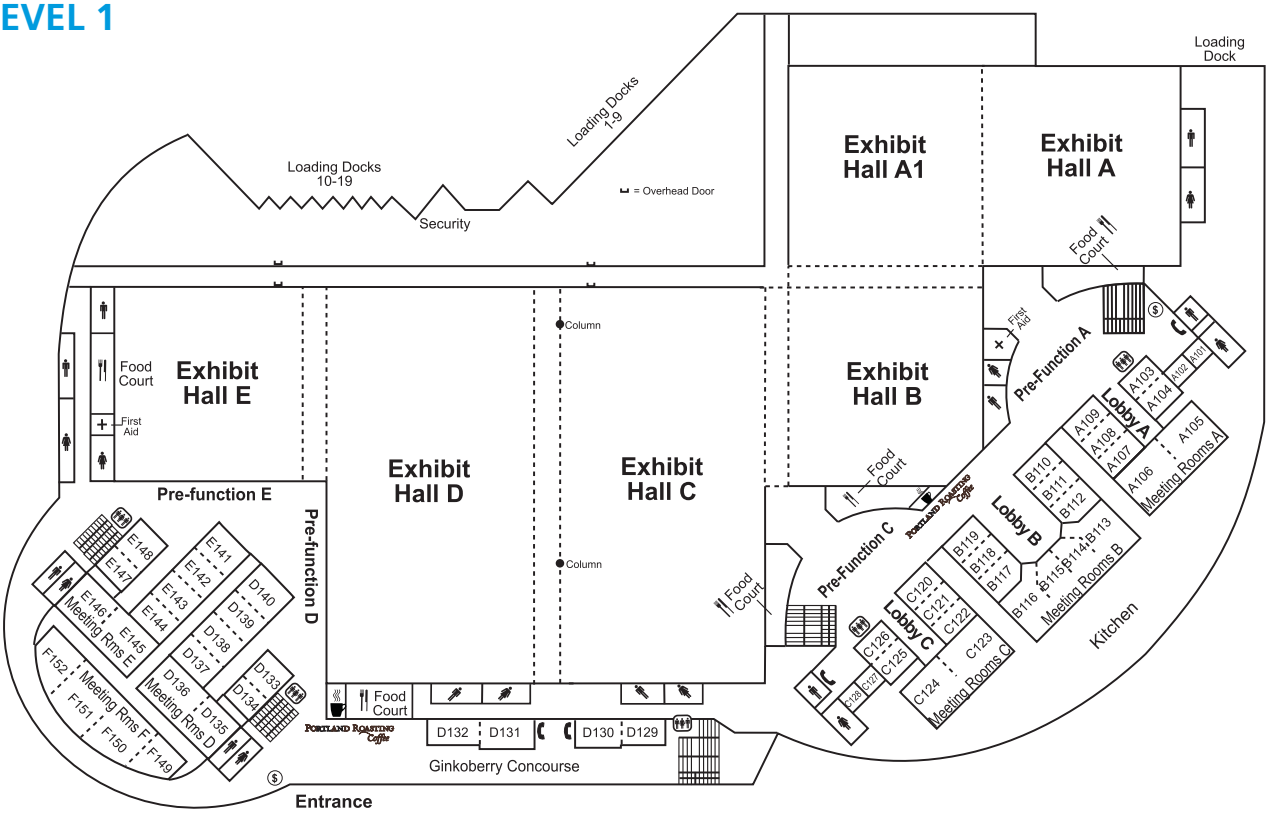
The American Phytopathological Society
The International Society for Plant Pathology
Learn more at icpp2018.org.

2019 IS-MPMI Congress Bookmarks

Use your eco-friendly bookmark (made from recycled tires) provided at registration as a reminder for the next IS-MPMI Congress in Glasgow, Scotland!

OREGON CONVENTION CENTER

LEVEL 1



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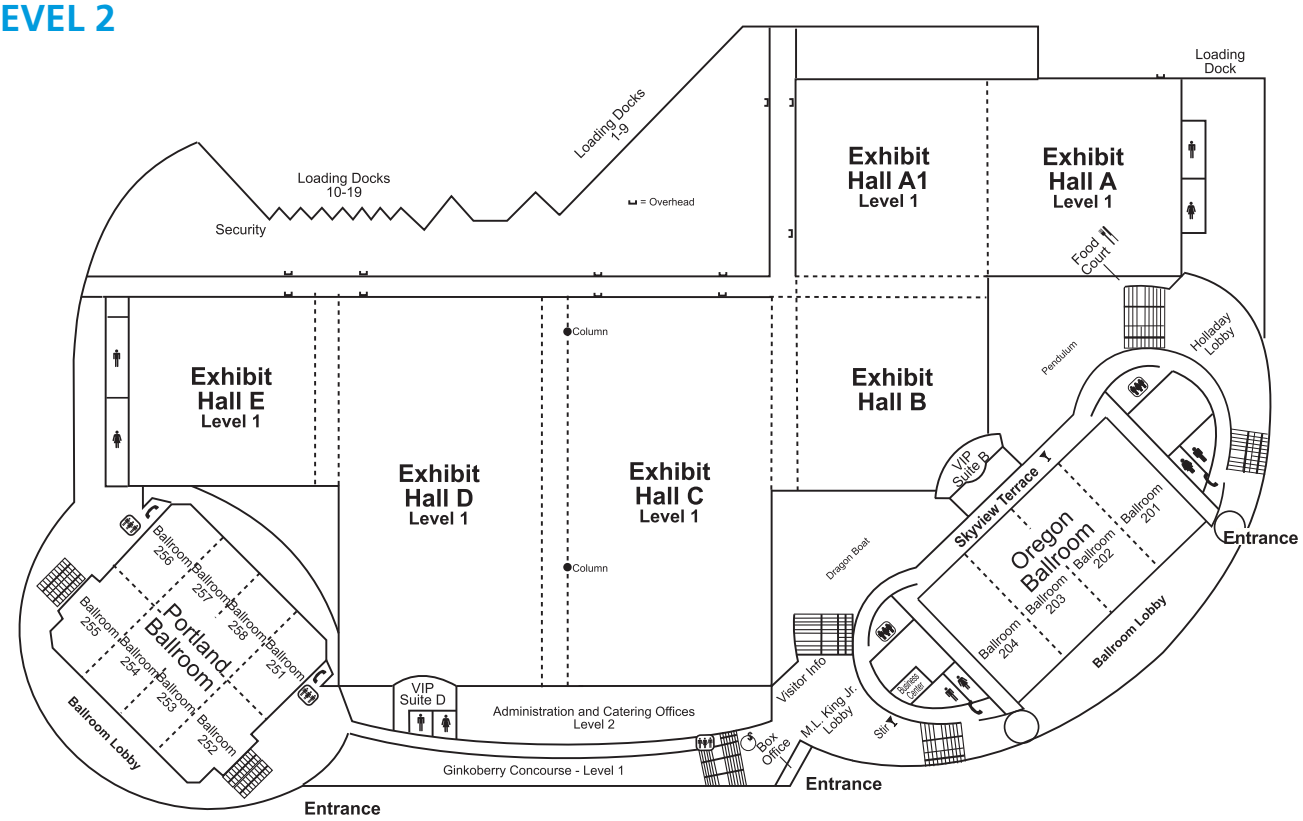
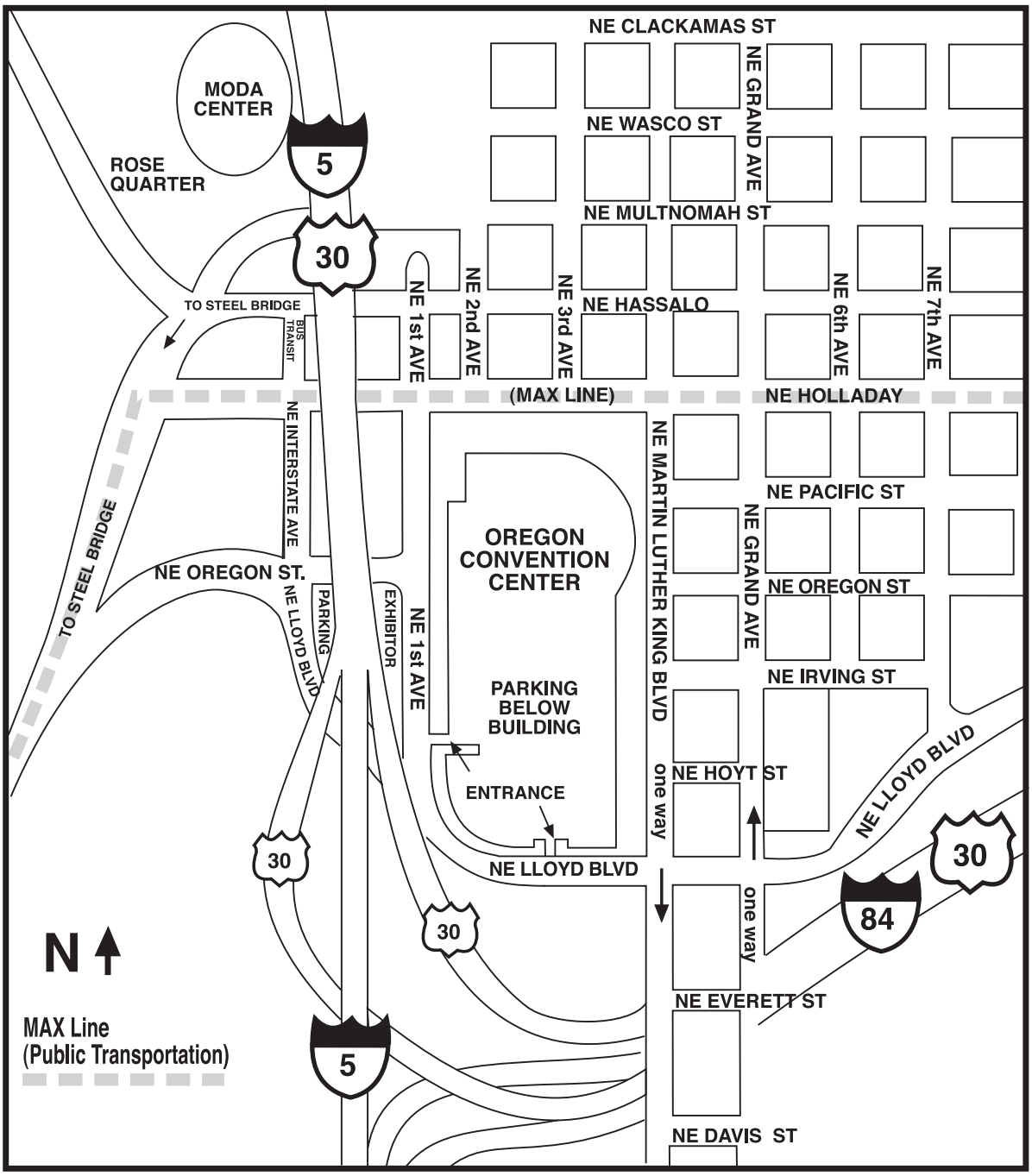


DOWNTOWN PORTLAND



PORTLAND LIGHT RAIL

HOTELS

1. Oregon Convention Center
2. DoubleTree by Hilton Portland
3. Hotel Rose
4. Portland State University – Residence Halls
5. The Quality Inn
6. University Place Hotel

Transportation

Portland's MAX light rail stops 300 times a day at the Oregon Convention Center, connecting riders to downtown, the Hotel Rose, University Place Hotel, Portland State University, and Portland International Airport. The Streetcar's Central Loop stops at the Oregon Convention Center MLK lobby entrance every 15 minutes. Also at the MLK lobby entrance, TriMet's Bus Line No. 6 provides access to downtown stops and outlining areas.

CONGRESS HIGHLIGHTS

Sunday, July 17

Opening Ceremony and Keynote/Award • *15:00 – 16:30*

Plenary Session 1 • *17:00 – 18:40*

The Opening Ceremony features the IS-MPMI Award lecture by Sharon Long on "Bacterial Cell Dynamics and Molecular Differentiation in Symbiosis." This will be followed by Plenary Session I with presentations from Jeff Dangl, Uta Paskowski, Sally Miller, and Giles Oldroyd.

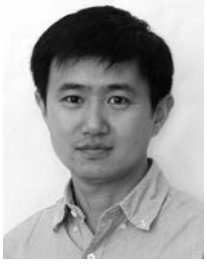
IS-MPMI Awardee: Sharon Long is a professor of biology at Stanford University. She received her bachelor's degree from the California Institute of Technology and carried out her Ph.D. studies at Yale University, studying plant development with Ian Sussex. As a post-doctoral fellow, she trained with Fred Ausubel at Harvard, where she began her work on *Rhizobium*-legume symbiosis. She joined the Stanford faculty in 1982. She was appointed an investigator of the Howard Hughes Medical Institute from 1994 to 2001, stepping out of that position to serve Stanford as dean of the School of Humanities and Sciences from 2001 to 2007. She returned to regular faculty research and teaching in autumn 2007. Her research group employs a spectrum of approaches, including microbial and plant molecular biology, biochemistry, and genetics, to study the symbiosis of *Rhizobium* bacteria and plant hosts. They are especially interested in the signals and signal transduction pathways used by nitrogen-fixing bacteria and plants.

Welcome Reception • *19:00 – 21:30*

Join friends and colleagues for food, drinks, and conversation at the XVII International Congress's official Welcome Reception, located outside on the Convention Center Plaza. Enjoy connecting with colleagues, savor the food, and sample several Oregonian beers by visiting one of several Beer Flight stations, then vote for your favorite on the IS-MPMI Mobile App!

Tuesday, July 19

Plenary Session 4 • *8:10 – 9:50*



Dong Wang, Young Investigator Awardee: Dong Wang received his Ph.D. training with Xinnian Dong at Duke University and conducted post-doctoral research with Sharon Long at Stanford University. Currently, he is a faculty member at the University of Massachusetts–Amherst, where he studies the symbiotic interactions between plants and beneficial microbes.

Wednesday, July 20

Open Afternoon
IS-MPMI organizers have scheduled Wednesday afternoon, July 20, as an "open afternoon" for meeting attendees to explore Portland!

Still Waiting to Register for a Tour?

IS-MPMI is pleased to offer a variety of tours for those attendees interested in exploring more of what the Portland area has to offer. Your congress organizers have selected the most popular attractions that bring visitors from around the world to experience the Best of the Pacific Northwest:

Portland City Tour
Multnomah Falls and Gorge Waterfalls
Oregon Wine Tour
Oregon Half-Day Agricultural Tour

On-site Tour Desk
If you have not yet had the chance to preregister for a tour, visit the America's Hub World Tour desk located near registration. The booth will be staffed during the following days and times:

Saturday, July 16	15:00 – 19:00
Sunday, July 17	8:00 – 16:00
Monday, July 18	8:00 – 16:00
Tuesday, July 19	8:00 – 16:00
Wednesday, July 20	8:00 – 13:00

Thursday, July 21

Closing Event – Taste of Portland • *19:30 – 23:30*

New Format!

This year's closing event takes on a new format that will be the perfect close to the 2016 Congress. Located in the Portland Ballroom, the evening includes food stations and beverages, including the opportunity to sample wines from local wineries at the Wine Flight stations. Adding to the fun, there will be a photo booth and live entertainment by the Blue Wave Band. This event will be the perfect place for one last mix and mingle with congress attendees and their guests before heading home. ***Preregistration is required.***

PROGRAM-AT-A-GLANCE

Posters can be viewed on Monday 9:45 – 21:00, Tuesday 9:45 – 21:00, Wednesday 10:10 – 21:00, and Thursday 10:10 – 14:50

Sunday, July 17	Monday, July 18	Tuesday, July 19	Wednesday, July 20	Thursday, July 21
8:00 – 17:00 Registration open	**8:10 – 9:45** **Plenary Session 2** The EMBO Keynote Lecture *Oregon Ballroom 201-203* *2nd Floor*	**8:10 – 9:50** **Plenary Session 4** IS-MPMI Young Investigator Award Presentation *Oregon Ballroom 201-203* *2nd Floor*	**8:30 – 10:10** **Plenary Session 6** *Oregon Ballroom 201-203* *2nd Floor*	**8:30 – 10:10** **Concurrent 16** Tritrophic Interactions and Biocontrol *Room C123-124* **Concurrent 17** Microbial Manipulation of the Host II *Room B113-116* **Concurrent 18** Cell Wall-Mediated Resistance *Room A105-106*
	9:45 – 10:15 Coffee Break	**9:50 – 10:20** Coffee Break	**10:10 – 10:40** Coffee Break	**10:10 – 10:30** Coffee Break
10:20 – 12:00 **Special Sessions** **Huanglongbing** *Room C123* **Rice and Pathogen Interactions** *Room B115-116* **Bioinformatics Training Workshop I** *Room B113-114* **Rust Fungi** *Room A106*	**10:15 – 11:30** **Plenary Session 3** *Oregon Ballroom 201-203* *2nd Floor*	**10:20 – 11:35** **Plenary Session 5** *Oregon Ballroom 201-203* *2nd Floor*	**10:40 – 12:20** **Concurrent 13** Symbiosis & Mutualism II *Room B113-116* **Concurrent 14** RNA-mediated Interactions *Room C123-124* **Concurrent 15** Signal Transduction for Systemic Defense *Room A105-106*	**Posters & Exhibits Open** **10:10 – 14:50** *Exhibition Hall A-A1* **10:40 – 12:20** **Concurrent 19** Microbiome & Phytobiome II *Room B113-116* **Concurrent 20** Apoplastic Interactions *Room C123-124* **Concurrent 21** Emerging Systems *Room A105-106*
13:00 – 15:00 **Recent Advances in Agrobacterium Biology** *Meeting Room B115-116* **Molecular Dissection of Wheat Diseases** *Room C123* **Bioinformatics Training Workshop II** *Room A113-114*	**Lunch Break** **12:50 – 14:50** **Concurrent 1** Symbiosis & Mutualism I *Room B113-116* **Concurrent 2** Genomes, Genomics and Epigenomics *Room C123-124* **Concurrent 3** Translational Research; Developing World Needs *Room A105-106*	**Lunch Break** **12:50 – 14:50** **Concurrent 7** Commonalities between Mutualists and Pathogens *Room C123-124* **Concurrent 8** Host-Microbe Co-evolution *Room A105-106* **Concurrent 9** Recognition in Plant Immunity I *Room B113-116*	**Free Afternoon**	**Lunch Break** **14:50 – 16:30** **Concurrent 22** Inter-kingdom Signaling *Room C123-124* **Concurrent 23** Population Genomics *Room A105-106* **Concurrent 24:** Recognition in Plant Immunity II *Room B113-116*
15:00 – 16:30 **Opening Ceremony and Keynote/Award** *Oregon Ballroom 201-203, 2nd Floor* **16:30 – 17:00** Coffee Break	**14:50 – 15:20** Coffee Break **15:20 – 17:00** **Concurrent 4** Molecular Ecology of Host-Microbe Interactions *Room C123-124* **Concurrent 5** Microbial Manipulation of the Host I *Room B113-116* **Concurrent 6** Systems Biology and Modeling *Room A105-106*	**14:50 – 15:20** Coffee Break **15:20 – 17:00** **Concurrent 10** Microbiome & Phytobiome I *Room B113-116* **Concurrent 11** Cell Biology of Microbe- Host Interactions *Room C123-124* **Concurrent 12** Plant Hormones & Regulators in Symbiosis and Defense *Room A105-106*		**16:30 – 17:00** Coffee Break **17:00 – 18:40** **Plenary Session 7** *Oregon Ballroom 201-203* *2nd Floor*
17:00 – 18:40 **Plenary Session 1** *Oregon Ballroom 201-203, 2nd Floor* **19:00 – 21:30** **Welcome Reception** *Convention Center Plaza (outdoor)*	**Posters with Authors Present & Exhibits Open** **17:00 – 19:00** *Exhibition Hall A-A1*	**Posters with Authors Present & Exhibits Open** **17:00 – 19:00** *Exhibition Hall A-A1*		**18:40 – 19:30** **Closing Ceremony** **19:30 – 23:30** **Closing Event – Taste of Portland** *Portland Ballroom 251*

DAILY PROGRAM SCHEDULE AND SESSIONS

All sessions take place in the Oregon Convention Center unless otherwise noted.

SATURDAY, JULY 16

15:00 – 19:00	Registration Open	Prefunction Area A
15:00 – 19:00	Speaker Ready Room Open	Room A109

SUNDAY, JULY 17

8:00 – 13:00	Board of Directors Meeting	Roosevelt Room, DoubleTree Hotel
8:00 – 17:00	Registration Open	Prefunction Area A
9:00 – 14:00	Speaker Ready Room Open	Room A109
10:00 – 12:00	Special Session: Huanglongbing (Citrus Greening): Insect, Bacterial, and Host Interactions	Room C123
10:00 – 12:00	Special Session: Rice and Pathogen Interactions	Room B115–116
10:00 – 12:00	Special Session: Bioinformatics Training I: Beginning Bioinformatics on the Web	Room B113–114
10:00 – 12:00	Special Session: Spotlight on Rust Fungi—Molecular Mechanisms Underlying Disease and Resistance, *sponsored by DuPont Pioneer*	Room A106
12:00 – 15:00	Poster Set-Up by Authors	Exhibit Hall A–A1
12:00 – 15:00	Exhibit Set-Up	Exhibit Hall A–A1
13:00 – 14:30	Travel Awardee Meeting	Multnomah Room, DoubleTree Hotel
13:00 – 15:00	Special Session: Recent Advances in *Agrobacterium* Biology	Room B115–116
13:00 – 15:00	Special Session: Molecular Dissection of Wheat Diseases	Room C123
13:00 – 15:00	Special Session: Bioinformatics Training II: So You've Got Your High Throughput Data – Now What?	Room A113–114
15:00 – 16:30	**Opening Ceremony and Keynote/Award**	Oregon Ballroom 201–203, Level 2
16:30 – 17:00	Coffee Break	
17:00 – 18:40	**Plenary Session 1**	Oregon Ballroom 201–203, Level 2
19:00 – 21:30	**Welcome Reception**	Convention Center Plaza (outdoors)

SPECIAL SESSIONS – Sunday Morning • 10:00 – 12:00

Key: S = Special Session, C = Concurrent Session, PL = Plenary Session

HUANGLONGBING (CITRUS GREENING): INSECT, BACTERIAL, AND HOST INTERACTIONS

Room C123

Chair: Gitta Coaker, University of California, Davis, U.S.A.

S1-1. The problems and strategies of working with HLB
B. DAWSON (1). (1) University of Florida, U.S.A.

S1-2. Genome sequence and genetic diversity of the Huanglongbing pathogen Cadidatus liberibacter asiaticus
S. THAPA (1), W. Ma (2), N. Wang (3), J. Franco (1), G. Coaker (1) (1) University of California Davis, U.S.A.; (2) University of California Riverside, U.S.A.; (3) University of Florida, U.S.A.

S1-3. Effectoromics of Huanglongbing (HLB)-associated pathogen
W. MA (1), D. Pagliaccia (1), K. Clark (1), J. Liu (1), E. Hawara (1), G. Vidalakis (1), X. Ge (1), G. Coaker (2), N. Wang (3) (1) University of California, U.S.A.; (2) University of California, U.S.A.; (3) University of Florida, U.S.A.

S1-4. *Sinorhizobium* as a model system to study *Liberibacter* gene regulators
S. LONG (1), M. Barnett (1). (1) Department of Biology, Stanford University, U.S.A.

S1-5. Insights into the Sec-dependent effectors of *Candidatus* Liberibacter asiaticus and development of novel control strategy against citrus HLB
N. WANG (1). (1) University of Florida, U.S.A.

S1-6. Molecular and genetic interactions between *Diaphorina citri* and *Candidatus* Liberibacter asiaticus
M. CILIA (1). (1) USDA ARS, U.S.A.

DAILY PROGRAM SCHEDULE AND SESSIONS

Key: S = Special Session, C = Concurrent Session, PL = Plenary Session

RICE AND PATHOGEN INTERACTIONS

Room B115–116

Chair: Guoliang Wang, Ohio State University, Columbus, U.S.A.

S2-1. Investigating the cell biology of appressorium-mediated plant infection and tissue invasion by the rice blast fungus *Magnaporthe oryzae*
N. TALBOT (1), L. Ryder (1), X. Yan (1), M. Oses-R. (1) University of Exeter, United Kingdom

S2-2. *Rice stripe virus* overcomes NbREM-mediated inhibition of movement through interference of S-acylation
X. ZHOU (1), S. Fu (2), Y. Xu (2), C. Li (2). (1) Institute of Plant Protection, Chinese Academy of Agricultural Sciences, China; (2) Zhejiang university, China

S2-3. Durable and broad spectrum disease resistance to bacterial blight and bacterial leaf streak of rice
A. BOSSA-CASTRO (1), E. Delorean (2), C. Raghavan . (1) Colorado State University, U.S.A.; (2) Colorado State University, U.S.A.; (3) International Rice Research Institute (IRRI), Philippines; (4) Université des Sciences Techniques et Technologiques, Faculté des Sciences et Techniques, LBMA, Mali; (5) IRD

S2-4. Biological functions of rice immune factors targeted by Xanthomonas oryzae effectors
T. KAWASAKI (1), K. Yamaguchi (2) (1) Kindai University, Japan; (2) Kindai University, Japan

S2-5. Dissection of the APIP6-mediated ubiquitin-proteasome pathway in rice immunity against *Magnaporthe oryzae*
Y. NING (1), X. Shi (1), R. Wang (1), J. Fan (2), . (1) Institute of Plant Protection, Chinese Academy of Agricultural Sciences, China; (2) Institute of Plant Protection, Chinese Academy of Agricultural Sciences; Department of Plant Pathology, Ohio State University, China; (3) Department of Plant Pathology

S2-6. Fungal genetic tools in Magnaporthe oryzae for reactive oxygen species detection and identification of host basal immunity components
N. DONOFRIO

BIOINFORMATICS TRAINING I: BEGINNING BIOINFORMATICS ON THE WEB

Room B113–114

Chairs: Daniel Maclean, The Sainsbury Laboratory, Norwich, United Kingdom, and Adelaide Rhodes, Oregon State University, Corvallis, U.S.A.

10:00 Databases: iPlant/CyVerse. A. RHODES, Oregon State University, U.S.A.
10:15 Databases: FungiDB; DOE JGI. B. TYLER, Oregon State University, U.S.A.
10:30 Databases: ENSEMBL; SolGenomics; TAIR; Araport. D. MACLEAN, Sainsbury Laboratory, UK
10:45 Annotation, and Its Challenges: Tools Like Web BLAST, PFAM, Interpro, SignalP. A. RHODES, Oregon State University, U.S.A.
11:00 Ontologies; PAMGO, B. TYLER. Oregon State University, U.S.A.
11:15 Useful Features in NCBI and Uniprot. A. RHODES, Oregon State University, U.S.A.
11:30 Training Resources. A. RHODES, Oregon State University, U.S.A.
11:45 Software Carpentry. D. MACLEAN, Sainsbury Laboratory, UK

RUST FUNGI—MOLECULAR MECHANISMS UNDERLYING DISEASE AND RESISTANCE

Room A106

Chairs: Peter van Esse, The Sainsbury Laboratory, Norwich, United Kingdom, and Gusui Wu, DuPont Pioneer, Johnston, Iowa, U.S.A.

S4-1. Transfer of a NLR gene from pigeonpea into soybean confers resistance to Asian soybean rust
H. VAN ESSE (1), C. Kawashima (2), J. Jones (3), S. Brommonschenkel (4), E. al (5) (1) The 2Blades Foundation - The Sainsbury Laboratory, United Kingdom; (2) The 2Blades Foundation -The Sainsbury Laboratory, United Kingdom; (3) The Sainsbury Laboratory, United Kingdom; (4) Universidade Federal de Viçosa, Brazil; (5) N/A, United Kingdom

S4-2. A multi-pronged approach to elucidate the molecular basis of rust virulence and non-host resistance in *Brachypodium distachyon*
M. FIGUEROA (1), F. Li (1), V. Omidvar (1), S. Rot. (1) University of Minnesota, U.S.A.; (2) CSIRO Agriculture, Australia; (3) Plant Breeding Institute, University of Sydney, Australia; (4) CSIRO Agriculture, U.S.A.; (5) The Sainsbury Laboratory, United Kingdom; (6) USDA-ARS Cereal Disease Laboratory, U.S.

S4-3. EffectorP: Using Machine Learning to Predict Fungal Effector Proteins and Their Subcellular Localization in the Plant Cell
J. SPERSCHNEIDER (1), D. Gardiner (1), P. Dodds (1. (1) CSIRO, Australia

S4-4. Deciphering host specificity in poplar rust fungi through life-cycle transcriptomics and comparative genomics
S. DUPLESSIS (1), E. Morin (2), I. Grigoriev (3), S. De Mita (2), F. Halkett (2), P. Frey (2) (1) INRA, France; (2) INRA, France; (3) US DoE Joint Genome Institute, U.S.A.

SPECIAL SESSIONS – Sunday Afternoon • 13:00 – 15:00

RECENT ADVANCES IN *AGROBACTERIUM* BIOLOGY

Room B115–116

Chair: Kirankumar Mysore, Samuel Roberts Noble Foundation, Ardmore, Oklahoma, U.S.A.

S5-1. Molecular mechanisms of the Agrobacterium Type VI DNase effector secretion and antibacterial activity during plant colonization
E. LAI (1) (1) Institute of Plant and Microbial Biology, Academia Sinica, Taiwan

S5-2. Modulation of host defenses by the Type VI Secretion System (T6SS) of Agrobacterium tumefaciens
L. BANTA (1), M. Wang (2), A. Kenefick (2), B. Nguyen (2), J. Kim (2), R. Froom (2), A. Resnick (2), J. Bravo (1) (1) Williams College, U.S.A.; (2) Williams College, U.S.A.

S5-3. *Agrobacterium tumefaciens*: A model system to investigate polar growth in bacteria
P. ZAMBRYSKI (1), J. Zupan (2), R. Grangeon (3), J. (1) University of California, U.S.A.; (2) University of California, U.S.A.; (3) University of California, U.S.A.

S5-4. Potential novel role for the *Agrobacterium* virulence effector protein VirE2 in modulating plant gene expression
S. GELVIN (1), R. Lapham (1), L. Lee (1). (1) Purdue University, U.S.A.

S5-5. Activity of plant non-homologous end-joining DNA repair proteins is not required for *Agrobacterium* T-DNA integration
K. MYSORE (1), Z. Vaghchipawala (2), B. Vasudevan . (1) The Samuel Roberts Noble Foundation, U.S.A.; (2) The Samuel Roberts Noble Foundation, U.S.A.; (3) Purdue University, U.S.A.; (4) University of Leeds, United Kingdom; (5) University of Missouri, U.S.A.; (6) University of Leeds, U.S.A.

S5-6. A functional bacterium-to-plant DNA transfer machinery of Rhizobium etli
V. CITOVSKY (1). (1) State University of New York at Stony Brook, U.S.A.

MOLECULAR DISSECTION OF WHEAT DISEASES

Room C123

Chair: Peter Solomon, The Australian National University, Canberra, Australia

S6-1. Harnessing plant immune receptors for resistance to wheat stem rust
P. DODDS (1), S. Cesari (1), R. Mago (1), N. Upadh. (1) CSIRO Agriculture, Australia; (2) CSIRO Agirculture, Australia; (3) University of Queensland, Australia; (4) Univeristy of Sydney, Australia; (5) University of Sydney, Australia

S6-2. Exploring the *Fusarium graminearum* genome and the compatible interaction with wheat floral tissue
K. HAMMOND-KOSACK (1), W. Lee (1), N. Brown (1), A. (1) Rothamsted Research, United Kingdom

S6-3. Next generation sequencing (NGS) based approaches for identification of virulence genes and host specificity determinants in the wheat pathogen *Zymoseptoria tritici*.
G. KETTLES (1), R. King (2), J. Hooper (2), W. Skinne. (1) Rothamsted Research, United Kingdom; (2) Rothamsted Research, United Kingdom; (3) Long Ashton Resaerch Station, United Kingdom; (4) Long Ashton Research Station, United Kingdom

S6-4. Blast: a serious wheat disease
B. VALENT (1), M. Farman (2), K. Pedley (3), G. Peterson (3), C. Cruz (1), W. Bockus (1), R. Whitley (2), M. Navia-Urrutia (1), H. Trick (1), J. Nunes-Maciel (4), P. Paul (5), E. Oliveira-Garcia (1), J. Stack (1) (1) Kansas State University, U.S.A.; (2) University of Kentucky, U.S.A.; (3) USDA-ARS Foreign Disease-Weed Science Research Unit, U.S.A.; (4) EMBRAPA-Trigo, Brazil; (5) The Ohio State University, U.S.A.

S6-5. Resistance gene cloning in wheat by mutational genomics
B. WULFF (1), B. Steuernagel (1), S. Periyannan (2. (1) John Innes Centre, United Kingdom; (2) CSIRO, Australia; (3) The Sainsbury Laboratory, Australia; (4) The Sainsbury Laboratory, United Kingdom; (5) USDA, U.S.A.; (6) University of Sydney, Australia

S6-6. Understanding the *Parastagonospora nodorum* – wheat interaction; is it as simple as we think?
S. BREEN (1), S. Williams (2), M. Outram (2), B. K. (1) The Australian National University, Australia; (2) University of Queensland, Australia

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DAILY PROGRAM SCHEDULE AND SESSIONS

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BIOINFORMATICS TRAINING II: SO YOU'VE GOT YOUR HIGH THROUGHPUT DATA – NOW WHAT?

Room A113–114

Chairs: Daniel Maclean, The Sainsbury Laboratory, Norwich, United Kingdom, and Adelaide Rhodes, Oregon State University, Corvallis, U.S.A.

13:00 Genome assembly and annotation: best practices, best tools. D. MACLEAN, Sainsbury Laboratory, UK
13:30 RNAseq: Best Practices, Best Tools. D. MACLEAN, Sainsbury Laboratory, UK and A. RHODES, Oregon State University, U.S.A.
14:00 ᴍetagenomics: Best Practices, Best Tools. D. MACLEAN, Sainsbury Laboratory, UK
14:30 Data Carpentry. A. RHODES, Oregon State University, U.S.A.

OPENING CEREMONY AND KEYNOTE AWARD

15:00 – 16:30
Oregon Ballroom 201–203, Level 2

Bacterial cell dynamics and molecular differentiation in symbiosis
S. LONG (1). (1) Department of Biology, Stanford University, U.S.A.

PLENARY SESSION 1

17:00 – 18:40
Oregon Ballroom 201–203, Level 2
Moderator: Brian Staskawicz, University of California, Berkeley, California, U.S.A.

17:00 PL-1. Understanding NLR Function and Biology. J. DANGL (1) (1) HHMI and UNC-Chapel Hill, U.S.A.
17:25 PL-2. Molecular genetics of arbuscular mycorrhizal symbiosis in cereals. U. PASZKOWSKI (1) (1) University Cambridge, United Kingdom
18:00 PL-3. Translational Plant Pathology to Improve Food Security in an Increasingly Insecure World. S. MILLER (1) (1) The Ohio State University, U.S.A.
18:25 PL-4. Dissecting and engineering symbiosis signaling. G. OLDROYD (1) (1) John Innes Centre, United Kingdom

MONDAY, JULY 18

8:00 – 17:00	Registration Open	Prefunction Area A
8:10 – 9:45	**Plenary Session 2:** Featuring the EMBO Keynote Lecture	Oregon Ballroom 201–203
9:00 – 14:00	Speaker Ready Room Open	Room A109
9:45 – 10:15	Coffee Break	
9:45 – 21:00	Posters available for viewing	Exhibit Hall A–A1
10:15 – 11:30	**Plenary Session 3**	Oregon Ballroom 201–203
11:30 – 12:30	Student Travel Awardees and Speaker Lunch, *invitation only*	Exhibit Hall A–A1
11:30 – 12:50	Box Lunches, *prepurchased only*	Exhibit Hall A–A1
11:30 – 12:50	Lunch Break (*concessions & food trucks*)	
12:50 – 14:50	**Concurrent Session 1:** Symbiosis & Mutualism I	Room B113–116
	Concurrent Session 2: Genomes, Genomics and Epigenomics	Room C123–124
	Concurrent Session 3: Translational Research: Developing World Needs	Room A105–106
14:50 – 15:20	Coffee Break	
15:20 – 17:00	**Concurrent Session 4:** Molecular Ecology of Host-Microbe Interactions	Room C123–124
	Concurrent Session 5: Microbial Manipulation of the Host I	Room B113–116
	Concurrent Session 6: Systems Biology and Modeling	Room A105–106
17:00 – 19:00	Exhibits Open	Exhibit Hall A–A1
17:00 – 19:00	**Poster Viewing with Authors Present** 17:00 – 18:00 *Posters 1–360: Even-numbered poster authors* 18:00 – 19:00 *Posters 1–360: Odd-numbered poster authors*	Exhibit Hall A–A1
19:00	Dinner, *on your own*	

SESSIONS – Monday Morning

Key: S = Special Session, C = Concurrent Session, PL = Plenary Session

PLENARY SESSION 2

8:10 – 9:45; Oregon Ballroom 201–203, Level 2
Moderator: Regine Kahmann, Max Planck Institute, Marburg, Germany

8:10 PL2-1. How Xanthomonas manipulates the plant
The EMBO Keynote Lecture: U. BONAS (1) (1) University of Halle, Germany

8:55 PL2-2. Dynamics, mechanisms, and evolution of a highly robust plant immune signaling network
F. KATAGIRI (1), R. Hillmer (2), K. Mase (2), N. H. (1) University of Minnesota, U.S.A.; (2) University of Minnesota, U.S.A.

9:20 PL2-3. Dissecting wilt diseases using the Fusarium oxysporum–Arabidopsis pathosystem
L. MA (1) (1) university of Massachusetts Amherst, U.S.A.

PLENARY SESSION 3

10:15 – 11:30; Oregon Ballroom 201–203, Level 2
Moderator: Joyce Loper, Oregon State University, Corvallis, Oregon, U.S.A.

10:15 PL3-1. Fine tuning plant innate immunity
B. BAKER (1). (1) UC Berkeley, U.S.A.

10:40 PL3-2. Biological control of Pierce's disease of grape caused by *Xylella fastidiosa* achieved by various strategies leading to pathogen confusion
S. LINDOW (1). (1) University of California, Berkeley, U.S.A.

continued

DAILY PROGRAM SCHEDULE AND SESSIONS

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11:05 PL3-3. Reductionist approaches to explore plant microbiota functions
P. SCHULZE-LEFERT (1), R. Zgadzay (2), R. Garrido-Oter (2), S. Hacquard (2), P. Duran (2), S. Spaepen (2), T. Thiergart (2), Y. Bai (2), R. Nakano (2), M. Hashimoto (2), A. Hassani (2), S. Radutiou (3) (1) Department of Plant Microbe Interactions, Max Planck Institute for Plant Breeding Research, Germany; (2) Department of Plant Microbe Interactions, Max Planck Institute for Plant Breeding Research, Germany; (3) Department of Molecular Biology and Genetics, Faculty of Science and Technology, Aarhus University, Denmark, Denmark

CONCURRENT SESSION 1: SYMBIOSIS & MUTUALISM I

12:50 – 14:50; Room B113–116
Cochair: Mike Sadowsky, University of Minnesota, St. Paul, Minnesota, U.S.A.
Cochair: Jens Stougaard, Aarhus University, Aarhus, Denmark

12:50 C1-1. Receptor mediated recognition controls rhizobial infection of legumes
J. STOUGAARD (1), (1) Aarhus University, Denmark

13:10 C1-2. Karrikin signaling in arbuscular mycorrhiza development
C. GUTJAHR (1), S. Carbonnel (1), V. Basso (1), M. (1) LMU Munich, Faculty of Biology Genetics, Germany; (2) John Innes Center, Metabolic Biology, United Kingdom

13:30 C1-3. Identification of genes involved in the *Burkholderia tuberum* nodulating symbiosis
M. LUM (1), A. Arnell (2), B. Kwak (2), N. Behnken. (1) Loyola Marymount University, U.S.A.; (2) Loyola Marymount University, U.S.A.

13:50 C1-4. A novel interactor of symbiotic RLKs is involved in nodulation in *Lotus japonicus*
A. YAMAZAKI (1), Y. Shimoda (2), M. Hayashi (1). (1) Center for Sustainable Resource Science, Riken, Japan; (2) NIAS, Japan

14:10 C1-5. *Medicago truncatula* MtLAX2, an orthologue of the AtAUX1 auxin influx transporter, mediates auxin control of nodulation
S. ROY (1), J. Murray (2), A. Downie (2), J. Lille. (1) The Samuel Roberts Noble Foundation, U.S.A.; (2) John Innes Centre, United Kingdom; (3) University of Sheffeild, United Kingdom; (4) Babraham Institute, United Kingdom

14:30 C1-6. Use of Crispr/Cas genome editing demonstrates a critical role for uricase and xanthine dehydrogenase in soybean nitrogen fixation and nodule development.
C. NGUYEN (1), M. Stacey (2). (1) Divisions of Plant Sciences and Biochemistry, National Center for Soybean Biotechnology University of Missouri, U.S.A.; (2) Divisions of Plant Sciences and Biochemistry, National Center for Soybean Biotechnology University of Missouri, U.S.A.

CONCURRENT SESSION 2: GENOMES, GENOMICS AND EPIGENOMICS

12:50 – 14:50; Room C123–124
Cochair: Bart Thomma, Wageningen University, Gelderland, Netherlands
Cochair: Valerie Geffroy, Université Paris-Sud, Paris, France

12:50 C2-1. Unusual features of NB-LRR sequences in common bean genome
V. GEFFROY (1) M. Richard (1), A. Gratias (1), V. Thareau (1), M.. (1) Institute of Plant Sciences Paris-Saclay IPS2, CNRS, INRA, Univ Paris Sud, Univ Evry, Univ Paris-Diderot, Orsay, France; (2) Center for Applied Genetic Technologies, University of Georgia, Athens, GA 30602, U.S.A.

13:10 C2-2. Regulating fungal pathogenesis through chromatin modifications
D. COOK (1), M. Seidl (2), M. Kramer (2), B. Thomm. (1) Wageningen University, Netherlands; (2) Wageningen University, Netherlands

13:30 C2-3. Epigenetic regulation during infection for rust pathogens

13:50 C2-4. Comparative & Evolutionary Genomics of the Pseudomonas syringae Species Complex
D. GUTTMAN (1), S. Thakur (1), B. Weir (2). (1) University of Toronto, Canada; (2) Landcare Research, New Zealand

14:10 C2-5. Different waves of effector genes with contrasted genomic location are expressed by *Leptosphaeria maculans* during cotyledon and stem colonisation of oilseed rape
J. GERVAIS (1), T. Rouxel (1), M. Balesdent (1), I. (1) INRA BIOGER, France

14:30 C2-6. Variation in genome size and ploidy levels in plant pathogenic oomycetes, particularly the downy mildews.
L. BERTIER (1), J. Gil (1), S. Reyes-Chin-Wo (1), . (1) UC Davis Genome Center, U.S.A.

CONCURRENT SESSION 3: TRANSLATIONAL RESEARCH: DEVELOPING WORLD NEEDS

12:50 – 14:50; Room A105–106

Cochair: Leena Tripathi, International Institute of Tropical Agriculture, Oyo State, Kenya
Cochair: Ricardo Oliva, International Rice Research Institute, Laguna, Philippines

12:50 C3-1. Improving bananas for resistance against Xanthomonas campestris pv. Musacearum
See Addendum (1), J. Tripathi (2), J. Kubiriba (3), W. Tushemereirwe (3) (1) International Institute of Tropical Agriculture, Kenya; (2) International Institute of Tropical Agriculture, Kenya; (3) National Agriculture Research Laboratories, Uganda

13:10 C3-2. Exploiting bacterial genomics to develop tools for effective pathogen monitoring in rice
R. OLIVA (1). (1) IRRI, Philippines

13:30 C3-3. High-throughput assay for small molecules targeting the Type I efflux pump of *Xylella fastidiosa*.
D. GABRIEL (1), M. Jain (1), L. Fleites (1), S. Zh. (1) University of Florida, U.S.A.

13:50 C3-4. TILLING for effective powdery mildew resistance: A non-transgenic approach aimed at the generation of hexaploid wheat mlo mutants
R. PANSTRUGA (1), J. Acevedo (1), H. Thieron (1), . (1) RWTH Aachen University, Germany; (2) Rothamsted Research, United Kingdom

14:10 C3-5. Expanding the recognition specificity of NLR proteins to confer disease resistance to the Soybean Mosaic Virus
M. HELM (1), R. Innes (1). (1) Indiana University, U.S.A.

14:30 C3-6. Dissecting the disease triangle of plant pathology
R. BART (1). (1) Donald Danforth Plant Science, U.S.A.

SESSIONS – Monday Afternoon

CONCURRENT SESSION 4: MOLECULAR ECOLOGY OF HOST-MICROBE INTERACTIONS

15:20 – 17:00; Room C123–124

Cochair: Dmitri Mavrodi, University of Southern Mississippi, Gulfport, Mississippi, U.S.A.
Cochair: Choong-Min Ryu, Korea Research Institute of Bioscience & Biotechnology, Daejeon, South Korea

15:20 C4-1. Phenazine-mediated community morphogenesis in the model biocontrol strain Pseudomonas fluorescens 2-79
D. MAVRODI (1), O. Mavrodi (1), L. Elbourne (2), J. (1) The University of Southern Mississippi, U.S.A.; (2) Macquarie University, Australia; (3) USDA-ARS Wheat Health, Genetics and Quality Research Unit, U.S.A.

15:40 C4-2. An air battle between good and bad bacteria: Airborne attenuation of Pectobacterium carotovorum virulence
C. RYU (1) (1) Korea Research Institute of Bioscience and Biotechnology, Korea

16:00 C4-3. Indole Antibiotic Biosynthesis in Edible Plants: *From Genomes to Bioactive Molecules*
A. KLEIN (1), E. Sattely (2). (1) Stanford University, U.S.A.; (2) Stanford University, U.S.A.

16:20 C4-4. Mutations conferring bacteriocin resistance in *Pseudomonas syringae* reduce virulence toward host plants.
K. HOCKETT (1), E. Carlson (2), D. Baltrus (3). (1) University of Arizona, School of Plant Sciences, U.S.A.; (2) University of Arizona, Dept. of Ecology and Evolutionary Biology, U.S.A.; (3) University of Arizona, School of Plant Sciences, U.S.A.

16:40 C4-5. A combination of comparative genomics and LAESI-MS facilitates the discovery of amino acid analogs produced by plant-associated bacteria
R. OKRENT (1), K. Trippe (1), V. Manning (1), E. D. (1) USDA-ARS, U.S.A.; (2) Oregon State University, U.S.A.; (3) Protea Biosciences, Inc., U.S.A.

CONCURRENT SESSION 5: MICROBIAL MANIPULATION OF THE HOST I

15:20 – 17:00; Room B113–116

Cochair: Thomas Baum, Iowa State University, Ames, Iowa, U.S.A.
Cochair: Lindsay Triplett, Connecticut Agricultural Experiment Station, New Haven, Connecticut, U.S.A.

15:20 C5-1. Mechanisms of host manipulations by Heterodera cyst nematodes
T. BAUM (1). (1) Department of Plant Pathology and Microbiology; Iowa State University, U.S.A.

15:40 C5-2. Microbial manipulation of host primary metabolism using a type III secreted effector
L. TRIPLETT (1), T. Shidore (2), C. Broeckling (3). (1) The Connecticut Agricultural Experiment Station, U.S.A.; (2) The Connecticut Agricultural Experiment Station, U.S.A.; (3) Colorado State University, U.S.A.; (4) Colorado State University, U.S.A.

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DAILY PROGRAM SCHEDULE AND SESSIONS

Key: S = Special Session, C = Concurrent Session, PL = Plenary Session

16:00 C5-3. Delivery of *Phytophthora sojae* effector Avr1b *in planta* requires PI3P-binding, but does not require N-terminal cleavage
B. TYLER (1), Q. Wang (1), F. Arredondo (1), Y. Fa. (1) Center for Genome Research and Biocomputing, Oregon State University, U.S.A.

16:20 C5-4. A Land Plant-specific Transcription Factor Directly Enhances DNA-dependent RNA Polymerase II Transcribing A Pathogenic Noncoding RNA Template
Y. WANG (1), J. Qu (2), S. Ji (3), A. Wallace (2), J. Wu (2), Y. Li (3), V. Gopalan (2), B. Ding (2) (1) The Ohio State University, U.S.A.; (2) The Ohio State University, U.S.A.; (3) Peking University, China

16:40 C5-5. Mimicry of The Plant Hormone PSY1 by A Sulfated Bacterial Peptide, RaxX
A. JOE (1), R. Pruitt (1). (1) Department of Plant pathology the Genome Center, University of California Davis, USA, U.S.A.

CONCURRENT SESSION 6: SYSTEMS BIOLOGY AND MODELING

15:20 – 17:00; Room A105–106
Cochair: Katherine Denby, University of Warwick, Coventry, England, United Kingdom
Cochair: Dan Kliebenstein, University of California, Davis, California, U.S.A.

15:20 C6-1. Elucidating and re-designing regulatory networks underlying plant defence
K. DENBY (1), P. Consortium (2), K. Polanski (1), . (1) University of Warwick, United Kingdom; (2) http://warwick.ac.uk/presta, United Kingdom; (3) University of Cambridge, United Kingdom

15:40 C6-2. How lineage selection and domestication in eudicot plants structures virulence and genomic variation in the fungus, Botrytis cinerea, and vice versa
D. KLIEBENSTEIN (1). (1) University of California, Davis, U.S.A.

16:00 C6-3. Cell surface receptors networks control plant development and defenses
E. SMAKOWSKA (1), A. Mott (2), M. Stegmann (3), C. Zipfel (3), D. Desveaux (4), D. Guttman (4), Y. Belkhadir (1) (1) Gregor Mendel Institute of Molecular Plant Biology (GMI), Austria; (2) Department of Cell & Systems Biology, University of Toronto, Canada; (3) The Sainsbury Laboratory, Norwich Research Park, United Kingdom; (4) Department of Cell & Systems Biology, Centre for the Analysis of Genome Evolution & Function, University of Toronto, Canada

16:20 C6-4. Integration of resistance QTL, expression QTL and co-expression modules reveals molecular responses of maize to the fungal pathogen *Cercospora zeina*
D. BERGER (1), N. Christie (2), A. Myburg (2). (1) Plant Science Department, Forestry and Agricultural Biotechnology Institute, University of Pretoria, South Africa; (2) Genetics Department, Forestry and Agricultural Biotechnology Institute, University of Pretoria, South Africa

16:40 C6-5. Integrating host-pathogen signaling networks during barley-powdery mildew interactions
J. ELMORE (1), P. Surana (2), W. Xu (2), M. Hunt (. (1) USDA-ARS/Iowa State University, U.S.A.; (2) Iowa State University, U.S.A.

TUESDAY, JULY 19

8:00 – 17:00	Registration Open	Prefunction Area A
8:10 – 9:50	**Plenary Session 4**	Oregon Ballroom 201–203
9:00 – 14:00	Speaker Ready Room Open	Room A109
9:45 – 21:00	Posters available for viewing	Exhibit Hall A–A1
9:50 – 10:20	Coffee Break	
10:20 – 11:35	**Plenary Session 5**	Oregon Ballroom 201–203
11:35 – 12:30	Student Travel Awardees and Speaker Lunch, *invitation only*	Exhibit Hall A–A1
11:35 – 12:50	Lunch Break (*concessions & food trucks*)	
11:35 – 12:50	Box Lunches, *prepurchased only*	Exhibit Hall A–A1
12:50 – 14:50	**Concurrent Session 7:** Commonalities Between Mutualists and Pathogens	Room C123–124
	Concurrent Session 8: Host-Microbe Co-Evolution	Room A105–106
	Concurrent Session 9: Recognition in Plant Immunity I	Room B113–116
14:50 – 15:20	Coffee Break	
15:20 – 17:00	**Concurrent Session 10:** Microbiome & Phytobiome I	Room B113–116
	Concurrent Session 11: Cell Biology of Microbe-Host Interactions	Room C123–124
	Concurrent Session 12: Plant Hormones & Regulators in Symbiosis and Defense	Room A105–106
17:00 – 19:00	Exhibits Open	Exhibit Hall A–A1
17:00 – 19:00	**Poster Viewing with Authors Present** 17:00 – 18:00 *Posters 361–722: Even-numbered poster authors* 18:00 – 19:00 *Posters 361–722: Odd-numbered poster authors*	Exhibit Hall A–A1
19:00	Dinner, *on your own*	

SESSIONS – Tuesday Morning

Key: S = Special Session, C = Concurrent Session, PL = Plenary Session

PLENARY SESSION 4

8:10 – 9:50; Oregon Ballroom 201–203, Level 2
Moderator: Sharon Long, Stanford University, Stanford, California, U.S.A.

8:10 PL4-1. Specialised protein secretion in plant-microbe symbioses
D. WANG, **IS-MPMI Young Investigator Awardee** (1), O. Oztas (2), H. Pan (2), M. Kim (2), C. Stonoha (2), X. Wu (3), B. Wang (3) (1) University of Massachusetts, Amherst, U.S.A.; (2) University of Massachusetts, U.S.A.; (3) Nanjing University, China ***(Special thanks to our industry partner BASF for making this award possible.)***

8:35 PL4-2. Inter-organellar communication during innate immunity
S. DINESH-KUMAR (1), E. Park (1), A. Kumar (2), A. Alqarni (2), A. Nedo (2), L. Ren (2), K. Hoban (2), M. Padmanabhan (1), S. Modla (2), C. Kambhamettu (2), J. Caplan (2) (1) University of California, Davis, U.S.A.; (2) University of Delaware, U.S.A.

9:00 PL4-3. Plant Elicitor Peptides: conserved mediators of immunity to pathogens and insects in higher plants
A. HUFFAKER (1), P. Weckwerth (2), K. Dressano (2), Z. Shen (2) (1) UC San Diego, U.S.A.; (2) UC San Diego, U.S.A.

9:25 PL4-4. Supercharging the radars for pathogen surveillance
D. SAUNDERS (1). (1) The Genome Analysis Centre & John Innes Centre, United Kingdom

PLENARY SESSION 5

10:20 – 11:35; Oregon Ballroom 201–203, Level 2
Moderator: Jeff Chang, Oregon State University, Corvallis, Oregon, U.S.A.

10:20 PL5-1. Nod factor recognition at root epidermis and its impact on microbiota assembly in *Lotus japonicus*
S. RADUTOIU (1), E. Murakami (2), R. Zgadzaj (3), . (1) Department of Molecular Biology and Genetics, Aarhus University, Denmark, Denmark; (2) Department of Molecular Biology and Genetics, Aarhus University, Denmark; (3) Max Plack Institute for Plant Breeding, Cologne, Germany; (4) Department of Molecular

continued

Key: S = Special Session, C = Concurrent Session, PL = Plenary Session

10:45 PL5-2. Salicylic acid and jasmonic acid signal through a noncanonical pathway to promote effector-triggered immunity
X. DONG (1), L. Liu (1), F. Sonbol (2), Y. Gu (3),. (1) Duke University, U.S.A.; (2) Sinai University, Egypt; (3) Duke University, U.S.A.; (4) Western Michigan University, U.S.A.

11:10 PL5-3. Effectors that alter plant development and attract insect vectors are conserved among diverse phytoplasmas
S. HOGENHOUT (1) (1) John Innes Centre, United Kingdom

SESSIONS – Tuesday Afternoon

CONCURRENT SESSION 7: COMMONALITIES BETWEEN MUTUALISTS AND PATHOGENS

12:50 – 14:50; Room C123–124
Cochair: Shin Okazaki, Tokyo University A&T, Tokyo, Japan
Cochair: Catherine Masson-Boivin, INRA Toulouse, Toulouse, France

12:50 C7-1. Rhizobial type III secretion system and symbiosis with legumes
S. OKAZAKI (1) (1) Graduate School of Agriculture, Tokyo University of Agriculture and Technology, Japan

13:10 C7-2. Rewiring a plant pathogen into a legume symbiont by lab-evolution
C. MASSON-BOIVIN (1). (1) INRA, France

13:30 C7-3. Plant and microbial proteins contributing to beneficial and detrimental root colonisation by filamentous microbes
S. SCHORNACK (1), C. Quan (1), T. Rey (1), M. Bonh. (1) University of Cambridge, Sainsbury Laboratory, United Kingdom; (2) LRSV, University Paul Sabatier, France

13:50 C7-4. Metabolic consequences of the introduction of a *Populus trichocarpa* lectin receptor-like kinase into *Arabidopsis thaliana*, a non-ectomycorrhizal host species
T. TSCHAPLINSKI (1), Z. Zhang (2), J. Labbe (2), W. (1) Oak Ridge National Laboratory, U.S.A.; (2) Oak Ridge National Laboratory, U.S.A.; (3) University of Tennessee, U.S.A.

14:10 C7-5. The plant microbiome at the intersection of metabolism and defense
C. HANEY (1), L. Shapiro (2), J. Bush (3), N. Pier. (1) The University of British Columbia, Canada; (2) Harvard University, U.S.A.; (3) Massachusetts General Hospital, U.S.A.

14:30 C7-6. Aboveground activation of defense leads to recruitment of bacteria into the rhizosphere of *Arabidopsis thaliana*
R. BERENDSEN (1), K. Yu (1), C. Pieterse (1), P. B. (1) Utrecht University, Netherlands

CONCURRENT SESSION 8: HOST-MICROBE CO-EVOLUTION

12:50 – 14:50; Room A105–106
Cochair: Laura Rose, University Dusseldorf, Dusseldorf, Germany
Cochair: Suomeng Dong, Nanjing Agricultural University, Nanjing, China

12:50 C8-1. The interplay of pathogens, microRNAs, and regulation of resistance gene transcript abundance in tomatoes
L. ROSE (1), S. de Vries (1), T. Kloesges (1), J. von Dahlen (1), A. Kukuk (1) (1) University of Duesseldorf, Germany

13:10 C8-2. Effector evolution during arm race between Soybean and Phytophthora
S. DONG (1). (1) Department of Plant Pathology, Nanjing Agricultural University, China

13:30 C8-3. Maintenance of a stem loop structure is essential for the translation of the Potato leafroll virus minor capsid protein that regulates local virus movement in phloem tissues
Y. XU (1), S. Gray (2). (1) Cornell University, U.S.A.; (2) Cornell University; USDA-ARS, Robert W. Holley Center for Agriculture and Health, U.S.A.

13:50 C8-4. Code-cracking TAL effector function and evolution in the rice-*Xanthomonas oryzae* system
A. PEREZ-QUINTERO (1), M. Hutin (2), T. Tran (3), . (1) UMR IPME, IRD-CIRAD-Université Montpellier 2, France; (2) Department of Plant Pathology and Plant-Microbe Biology, Cornell University, U.S.A.; (3) Agricultural Genetics Institute, Vietnam; (4) UMR IPME, IRD-CIRAD-Université Montpellier 2, France

14:10 C8-5. Sequential expression of *Sclerotinia sclerotiorum* pathogenicity factors during infection of *Brassica napus* as revealed by RNA-Seq analysis
S. Seifbarghi (1), M. Borhan (2), Y. Wei (3), D. H. (1) Agriculture and Agri-Food Canada, Saskatoon SK, S7N 0X2, Canada, Canada; (2) Agriculture and Agri-Food Canada, Saskatoon SK, S7N 0X2, Canada, Canada; (3) Department of Biology, University of Saskatchewan, Saskatoon, Canada, Canada

14:30 C8-6. Natural variation in the Arabidopsis AGO2 gene alters antiviral activity
P. MOFFETT (1), A. Adurogbangba (1), C. Roussin-Léveillé (1), C. Brosseau (1) (1) Université de Sherbrooke, Canada

CONCURRENT SESSION 9: RECOGNITION IN PLANT IMMUNITY I

12:50 – 14:50; Room B113–116

Cochair: Mark Banfield, John Innes Centre, Norwich, United Kingdom
Cochair: Jijie Chai, Tsinghua University, Beijing, China

12:50 C9-1. An integrated domain in a rice NLR confers specificity for pathogen effector recognition
M. BANFIELD (1). (1) John Innes Centre, United Kingdom

13:10 C9-2. Molecular Mechanism for Fungal Cell Wall Recognition by Rice Chitin Receptor OsCEBiP
J. CHAI (1), S. Liu (1), J. Wang (1) (1) Tsinghua University, China

13:30 C9-3. RECEPTOR-LIKE PROTEIN REQUIRED FOR CSP22 RESPONSIVENESS (NbCSPR) underlies age-dependent immune responses to bacterial cold shock protein in *Nicotiana benthamiana*.
I. SAUR (1), Y. Kadota (2), N. Holton (3), J. Skle. (1) Department of Plant-Microbe Interactions, Max Planck Institute for Plant Breeding Research, Germany; (2) Plant Immunity Research Group, RIKEN Center for Sustainable Resource Science, Japan; (3) The Sainsbury Laboratory, United Kingdom; (4) Gregor Mend

13:50 C9-4. Two redundant plant TRAF proteins participate in NLR immune receptor turnover
S. HUANG (1), X. Chen (2), X. Zhong (2), M. Li (2). (1) University of British Columbia, Canada; (2) University of British Columbia, Canada

14:10 C9-5. The Arabidopsis leucine-rich repeat receptor kinase BIR3 has a dual function in the negative regulation of BAK1 receptor complex formation and stabilization of BAK1
S. SCHULZE (1), T. Halter (2), J. Imkampe (3), S. . (1) ZMBP-Centre for Plant Molecular Biology, Germany; (10) The Sainsbury Laboratory, Norwich Research Park, Norwich, England; (11) State Key Laboratory of Crop Stress Biology in Arid Areas, College of Horticulture, China; (2) Institut de Biologie de l'Eco

14:30 C9-6. Understanding and engineering immune receptor complexes in plants.
Z. DUXBURY (1), S. Huh (2), P. Ding (2), Y. Ma (2). (1) The Sainsbury Laboratory, United Kingdom; (2) The Sainsbury Laboratory, United Kingdom; (3) University of Exeter, United Kingdom

CONCURRENT SESSION 10: MICROBIOME & PHYTOBIOME I

15:20 – 17:00; Room B113–116

Cochair: Sarah Lebeis, University of Tennessee, Knoxville, Tennessee, U.S.A.
Cochair: Davide Bulgarelli, University of Dundee, Dundee, Scotland, United Kingdom

15:20 C10-1. Mighty duckweeds: growth promoting microbes associated with an aquatic plant
S. LEBEIS (1), E. Lam (2), K. McGuire (1), S. Gilb. (1) University of Tennessee, U.S.A.; (2) Rutgers University, U.S.A.

15:40 C10-2. Tracing the domestication route of the barley rhizosphere microbiota
D. BULGARELLI (1), R. Alegria Terrazas (2), S. Rob. (1) Plant Sciences, School of Life Sciences, Univeristy of Dundee, United Kingdom; (2) Plant Sciences, School of Life Sciences, University of Dundee, United Kingdom

16:00 C10-3. Adaptation of transmissible bacterial communities to multiple hosts: how the sap-feeding insect Scaphoideus titanus ships bacterial symbionts across grapevine plants
S. LOPEZ-FERNANDEZ

16:20 C10-4. Changes in phyllosphere microbiome - The dynamics of leaf city
S. KROLL (1), M. Agler (2), E. Kemen (2). (1) Max-Planck-Institute for Plant Breeding Research, Germany; (2) Max-Planck Institute for Plant Breeding Research, Germany; (3) Max-Planck Institute for Plant Breeding Research, Germany

16:40 C10-5. Sorghum microbiome discovery and characterization in nitrogen-limited soil for improved biomass production
D. CHINIQUY (1), D. Schachtman (2), J. Dangl (3), . (1) Joint Genome Institute, Lawrence Berkeley National Labs, U.S.A.; (2) University of Nebraska-Lincoln, U.S.A.; (3) University of North Carolina at Chapel Hill, U.S.A.

CONCURRENT SESSION 11: CELL BIOLOGY OF MICROBE-HOST INTERACTIONS

15:20 – 17:00; Room C123–124

Cochair: Antje Hesse, University of Missouri, Columbia, Missouri, U.S.A.
Cochair: Chris Staiger, Purdue University, West Lafayette, Indiana, U.S.A.

15:20 C11-1. Navigating the cellular seas - Roles of vesicular trafficking in plant immunity against bacterial infection
A. HEESE (1), A. Clarke (2), C. Collins (2), E. LaMontagne (2), G. Ekenayake (2), M. Leslie (2), J. Smith (2), S. Rogers (2) (1) University of Missouri-Columbia, Div. of Biochemistry-IPG, U.S.A.; (2) University of Missouri-Columbia, Div. of Biochemistry-IPG, U.S.A.

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DAILY PROGRAM SCHEDULE AND SESSIONS

Key: S = Special Session, C = Concurrent Session, PL = Plenary Session

15:40 C11-2. Actin dynamics contribute to the innate immune response of Arabidopsis
C. STAIGER (1), J. Li (2), J. Henty-Ridilla (2), L. Cao (2), J. Chang (3), B. Day (4) (1) Purdue University, U.S.A.; (2) Purdue University, U.S.A.; (3) Oregon State University, U.S.A.; (4) Michigan State University, U.S.A.

16:00 C11-3. A *Pseudomonas syringae* type III effector uses calmodulin as co-factor to target the microtubule network
M. GUO (1), P. Kim (2), G. Li (1), C. Elowsky (3),. (1) Center for Plant Science Innovation, University of Nebraska-Lincoln, U.S.A.; (2) School of Biological Sciences, University of Nebraska-Lincoln, U.S.A.; (3) Center for Biotechnology, University of Nebraska-Lincoln, U.S.A.

16:20 C11-4. RIP proteins of barley interact with the susceptibility factor RACB and distinctively localize in epidermal cells
C. MCCOLLUM (1), C. Höfle (1), R. Hueckelhoven (2). (1) Technische Universität München, Germany; (2) Technische Universität München, Germany

16:40 C11-5. The IRE1/bZIP60 pathway are activated by potexvirus and potyvirus small membrane binding proteins and suppress virus infection
J. VERCHOT (1), D. Halterman (2), O. Arias (1), L.. (1) Oklahoma State University, U.S.A.; (2) USDA/ARS Vegetable Crops Research Unit, U.S.A.; (3) Universidad de las Fuerzas Armadas – ESPE, Quito Ecuador, Ecuador

CONCURRENT SESSION 12: PLANT HORMONES & REGULATORS IN SYMBIOSIS AND DEFENSE

15:20 – 17:00; Room A105–106
Cochair: Mary Wildermuth, University of California, Berkeley, California, U.S.A.
Cochair: (see addendum)

15:20 C12-1. Salicylic acid at the forefront: Synthesis, manipulation, and hormone interplay to balance growth vs. defense
M. WILDERMUTH (1), R. Mackelprang (1), M. Steinwand (1), R. Ramos (1), D. Chandran (1) (1) UC Berkeley, U.S.A.

15:40 C12-2. Molecular basis of jasmonate-regulated plant defense
D. XIE (1). (1) Tsinghua University, China

16:00 C12-3. Ascorbate oxidation level determines the hormone balance during the interaction between parasitic root-knot nematodes and rice
T. KYNDT (1), A. Mekonene (2), R. Verbeek (2), R. Singh (2), A. Haeck (2), K. Demeestere (2), R. Tenhaken (3), S. Siddique (4), M. Frei (4) (1) Ghent University, Belgium; (2) Ghent University, Belgium; (3) University of Salzburg, Austria; (4) Rheinische Friedrich-Wilhelms-University of Bonn, Germany

16:20 C12-4. Colorful Signaling: Resolving cellular salicylic acid and jasmonate/ethylene responses during *Hyaloperonospora arabidopsidis-Arabidopsis thaliana* interactions
S. LAUKAMM (1), V. Lipka (2), O. Tetyuk (2), A. vo. (1) Georg-August-University Göttingen, Germany; (2) Georg-August-Universität Göttingen, Germany; (3) University of Nottingham, England; (4) University of Wageningen, Netherlands

16:40 C12-5. Regulon-guided Discovery of Defensive Secondary Metabolism in *Arabidopsis*
B. BARCO (1), N. Clay (1). (1) Yale University, U.S.A.

WEDNESDAY, JULY 20

7:30 – 11:30	Speaker Ready Room Open	Room A109
8:00 – 13:00	Registration Open	Prefunction Area A
8:30 – 10:10	**Plenary Session 6**	Oregon Ballroom 201–203
10:10 – 10:40	Coffee Break	
10:10 – 21:00	Posters available for viewing	Exhibit Hall A–A1
10:10 – 21:00	Exhibits Open	Exhibit Hall A–A1
10:40 – 12:20	**Concurrent Session 13:** Symbiosis & Mutualism II	Room B113–116
	Concurrent Session 14: RNA-Mediated Interactions	Room C123–124
	Concurrent Session 15: Signal Transduction for Systemic Defense, *sponsored by Rijk Zwaan*	Room A105–106
12:20 – 13:20	Student Travel Awardees and Speaker Lunch *invitation only*	Exhibit Hall A–A1
12:20 – 13:20	Boxed Lunches, *prepurchased only*	Exhibit Hall A–A1
12:20	Lunch Break (*concessions & food trucks*)	
	Free Afternoon	
	Tours (*for those who preregistered via America's Hub World Tours, check ticket information for departure times*)	
14:00 – 15:00	*MPMI* Focus Meeting, *by invitation*	Room 103–104

SESSIONS – Wednesday Morning

Key: S = Special Session, C = Concurrent Session, PL = Plenary Session

PLENARY SESSION 6

8:30 – 10:10; Oregon Ballroom 201–203, Level 2
Moderator: Jan Leach, Colorado State University, Fort Collins, Colorado, U.S.A.

8:30 PL6-1. Unraveling the molecular mechanism of rice immunity against the fungal pathogen *Magnaporthe oryzae*
G. WANG (1). (1) Ohio State University, U.S.

8:55 PL6-2. Diffuse symbioses: pathogen suppression in the soil microbiome
L. KINKEL (1) (1) University of Minnesota, U.S.A.

9:20 PL6-3. Improving plant resistance to fungal pathogens through cell wall modification: the callose effect
C. VOIGT (1), T. Hanak (2), B. Sode (1), H. El Kilani (3), M. Naumann (1), D. Eggert (4), C. Betzel (3), R. Reimer (4) (1) University of Hamburg, Phytopathology and Biochemistry, Biocenter Klein Flottbek, Germany; (2) Universiy of Hamburg, Phytopathology and Biochemistry, Biocenter Klein Flottbek, Germany; (3) University of Hamburg, Laboratory for Structural Biology of Infection and Inflammation, Germany; (4) Heinrich Pette Institute - Leibniz Institute for Experimental Virology, Germany; (5) University of Hamburg, Laboratory for Structural Biology of Infection and Inflammation, Germany

9:45 PL6-4. Pathogen glycoside hydrolase: a new player in the apoplastic battlefield
Y. WANG (1). (1) Department of Plant Pathology, Nanjing Agricultural University, China

CONCURRENT SESSION 13: SYMBIOSIS & MUTUALISM II

10:40 – 12:20; Room B113–116
Cochair: Joel Griffitts, Brigham Young University, Provo, Utah, U.S.A.
Cochair: Alga Zuccaro, Max Planck Institute, Marburg, Germany

10:40 C13-1. How rhizobial accessory plasmids impact symbiotic negotiations
J. GRIFFITTS (1), P. Price (1), C. Harrison (1). (1) Brigham Young University, U.S.A.

11:00 C13-2. Innate sensing of glucans in plant roots and its importance in shaping host associations with fungi
A. ZUCCARO (1), S. Wawra (1), P. Fesel (1) (1) CEPLAS, University of Cologne, Germany

11:20 C13-3. Insights into Symbiotic Plant-Fungal Communication using Innovative Imaging Approaches
R. ROTH (1), S. Hillmer (2), K. Schumacher (3), J.. (1) University of Cambridge, United Kingdom; (2) EMCF@COS, Germany; (3) COS, Germany; (4) CAIC, England; (5) University of Cambridge, England

continued

DAILY PROGRAM SCHEDULE AND SESSIONS

Key: S = Special Session, C = Concurrent Session, PL = Plenary Session

11:40 C13-4. *In situ* metabolic profiling of symbiotic soybean-rhizobia interactions by laser ablation -electrospray ionization mass spectrometry (LAESI-MS)
B. AGTUCA (1), S. Stopka (2), C. Anderton (3), D. . (1) Divisions of Plant Sciences and Biochemistry, C. S. Bond Life Sciences Center, University of Missouri, U.S.A.; (2) Department of Chemistry, W. M. Keck Institute for Proteomics Technology and Applications, The George Washington University, U.S.A.; (3)

12:00 C13-5. Regulation of arbuscule degeneration during arbuscular mycorrhizal symbiosis
M. HARRISON (1), D. Floss (2), K. Bhattarai (2), S. (1) Boyce Thompson Institute, Cornell University, U.S.A.; (2) Boyce Thompson Institute, U.S.A.

CONCURRENT SESSION 14: RNA-MEDIATED INTERACTIONS

10:40 – 12:20; Room C123–124
Cochair: Richard Michelmore, University of California, Davis, California, U.S.A.
Cochair: Elizabeth Fontes, University Federal de Viçosa, Viçosa, Brazil

10:40 C14-1. Inverse modulation of the NIK-mediated antiviral signaling and antibacterial immunity in plants by RNA effectors
E. FONTES (1) (1) Universidade Federal de Vicosa, Brazil

11:00 C14-2. Cotton plants export small RNAs to induce target gene silencing in a wilt disease pathogen Verticillium dahlia (See addendum for presenter name) (1), T. Zhang (2) (1) Institute of Microbiology, Chinese Academy of Sciences, China; (2) Institute of Microbiology, Chinese Academy of Sciences, China

11:20 C14-3. Functional analysis of barley powdery mildew effector candidates and identification of their barley targets
A. AHMED (1), C. Pedersen (2), T. Schultz-Larsen (. (1) University of California, Davis Genome center, U.S.A.; (2) University of Copenhagen, Denmark; (3) Aachen University, Germany

11:40 C14-4. Bidirectional sRNA-trafficking and RNA-based plant protection against Botrytis cinerea and other pathogens that utilize small RNA effectors
M. WANG (1), A. Weiberg (2), F. Lin (3), B. Thomma. (1) UC Riverside, U.S.A.; (2) University of Munich Martinsried, Germany; (3) National Chiao Tung University, Taiwan; (4) Wageningen University, Netherlands; (5) UC Riverside, U.S.A.

12:00 C14-5. Triticum mosaic virus contains a unique translation element within its 5' untranslated region
R. ROBERTS (1), J. Zhang (1), L. Mayberry (2), K. . (1) University of Wisconsin-Madison, U.S.A.; (2) University of Texas-Austin, U.S.A.

CONCURRENT SESSION 15: SIGNAL TRANSDUCTION FOR SYSTEMIC DEFENSE

Sponsored by Rijk Zwaan
10:40 – 12:20; Room A105–106
Cochair: Brigitte Mauch-Mani, University of Neuchâtel, Neuchâtel, Switzerland
Cochair: Corina Vlot, HemholtzZentrum, Munich, Germany

10:40 C15-1. Putative sugar-binding proteins additively promote systemic acquired resistance in parallel with salicylic acid
C. VLOT (1), E. Pabst (1), H. Breitenbach (1), M. Wenig (1), C. Knappe (1) (1) Helmholtz Zentrum Muenchen, Institute of Biochemical Plant Pathology, Germany

11:00 C15-2. Stress induces the accumulation of beta-aminobutyric acid (BABA) in plants
I. BACCELLI (1), D. Thevenet (1), A. Balmer (1), V. (1) University of Neuchâtel, Switzerland

11:20 C15-3. Regulatory DNA elements in the primed systemic immunity of *Arabidopsis thaliana*
E. REIMER-MICHALSKI (1), S. Baum (1), A. Bolger (2. (1) Department of Plant Physiology, RWTH Aachen University, Germany; (2) Department of Botany and Molecular Genetics, RWTH Aachen University, Germany; (3) Genomics Core Facility, EMBO Laboratories, Germany

11:40 C15-4. Underground AZA priming against pathogens
S. ROYCHOUDHRY (1), N. Cecchini (2), J. Greenberg . (1) University of Chicago, U.S.A.; (2) University of Chicago, U.S.A.

12:00 C15-5. Processive ubiquitination controls NPR1 coactivator activity in plant immunity
S. SPOEL (1), J. Furniss (1), M. Skelly (1), H. Gr. (1) University of Edinburgh, United Kingdom

THURSDAY, JULY 21

7:30 – 14:00	Speaker Ready Room Open	Room A109
8:00 – 15:00	Registration Open	Prefunction Area A
8:30 – 10:10	**Concurrent Session 16:** Tritrophic Interactions and Biocontrol	Room C123–124
	Concurrent Session 17: Microbial Manipulation of the Host II	Room B113–116
	Concurrent Session 18: Cell Wall-Mediated Resistance	Room A105–106
10:10 – 10:40	Coffee Break	
10:10 – 14:50	Posters available for viewing	Exhibit Hall A–A1
10:40 – 12:20	**Concurrent Session 19:** Microbiome & Phytobiome II	Room B113–116
	Concurrent Session 20: Apoplastic Interactions	Room C123–124
	Concurrent Session 21: Emerging Systems	Room A105–106
12:20 – 12:50	Lunch Break (*concessions & food trucks*)	
12:20 – 13:10	Student Travel Awardees and Speaker Lunch, *invitation only*	Exhibit Hall A–A1
12:20 – 12:50	Box Lunches, *prepurchased only*	Exhibit Hall A–A1
12:20 – 14:50	Exhibits Open	Exhibit Hall A–A1
12:50 – 14:50	**Poster Viewing with Authors Present** 12:50 – 13:50 *Posters 1–722: Even-numbered poster authors* 13:50 – 14:50 *Posters 1–722: Odd-numbered poster authors*	
14:50 – 15:30	Poster Take-Down	Exhibit Hall A–A1
14:50 – 16:00	Exhibit Take-Down	Exhibit Hall A–A1
14:50 – 16:30	**Concurrent Session 22:** Inter-Kingdom Signaling	Room C123–124
	Concurrent Session 23: Population Genomics	Room A105–106
	Concurrent Session 24: Recognition in Plant Immunity II	Room B113–116
16:30 – 17:00	Coffee Break	
17:00 – 18:40	**Plenary Session 7**	Oregon Ballroom 201–203
18:40 – 19:30	**Closing Ceremony**	Oregon Ballroom 201–203
19:30 – 23:30	**Closing Event – Taste of Portland**	Portland Ballroom 251–258

SESSIONS – Thursday Morning

Key: S = Special Session, C = Concurrent Session, PL = Plenary Session

CONCURRENT SESSION 16: TRITROPHIC INTERACTIONS AND BIOCONTROL

8:30 – 10:10; Room C123–124

Cochair: Clare Casteel, University of California, Davis, California, U.S.A.
Cochair: Christoph Keel, University Lausanne, Lausanne, Switzerland

8:30 C16-1. A viral protease relocalizes in the presence of the vector to promote vector performance
C. CASTEEL (1), A. Bak (1), C. Yang (2), S. Whitham (2) (1) University of California, U.S.A.; (2) Iowa State University, U.S.A.

8:50 C16-2. Cucumber mosaic virus has plant species-specific effects on host-vector interactions
T. TUNGADI (1), A. Murphy (1), A. Pate (1), J. Iqb. (1) Department of Plant Sciences. University of Cambridge, United Kingdom

9:10 C16-3. Leaf transcriptomics reveals differing responses of Arabidopsis to colonization by ubiquitous phyllosphere colonizers with potential implications for plant health upon pathogen encounter
C. VOGEL (1), N. Bodenhausen (2), W. Gruissem (3),. (1) Institute of Microbiology, ETH Zurich, Switzerland; (2) Institute of Microbiology, ETH Zurich, Switzerland; (3) Institute of Agricultural Sciences, ETH Zurich, Switzerland

9:30 C16-4. Exposure to subinhibitory concentrations of phenazine-1-carboxylic acid controls common scab of potato through transcriptomic changes in *Streptomyces scabies*
M. FILION (1), R. Roquigny (1), T. Arseneault (2),. (1) Université de Moncton, Canada; (2) University of Reading, United Kingdom; (3) Agriculture and Agri-Food Canada, Canada

continued

Key: S = Special Session, C = Concurrent Session, PL = Plenary Session

9:50 C16-5. Cell envelope-associated components contribute to pathogenicity towards pest insects and competitiveness of root-colonizing pseudomonads with biocontrol activities
C. KEEL (1), P. Kupferschmied (1), M. Péchy-Tarr (. (1) University of Lausanne, Switzerland; (2) University of Lausanne, Switzerland; (3) Swiss Federal Institute of Technology (ETH), Switzerland; (4) Zürich University of Applied Sciences, Switzerland

CONCURRENT SESSION 17: MICROBIAL MANIPULATION OF THE HOST II

8:30 – 10:10; Room B113–116
Cochair: Yi Li, Peking University, Peking, China
Cochair: Wenbo Ma, University of California, Riverside, California, U.S.A.

8:30 C17-1. Small RNAs mediated host antiviral defense in rice
Y. LI (1). (1) Peking University, China

8:50 C17-2. Phytophthora effectors promote infection by suppressing small RNA silencing in plants
W. MA (1), Y. Zhai (1), D. Choi (1), Y. Hou (1), T. Kuan (1), J. He (2), J. Ma (2) (1) University of California, U.S.A.; (2) Fudan University, China

9:10 C17-3. Role of *Rhg1*-encoded a-SNAPs in *Rhg1*-Mediated Resistance to Soybean Cyst Nematode
A. BAYLESS (1), J. Smith (1), J. Song (1), P. McMi. (1) UW-Madison, U.S.A.

9:30 C17-4. Mechanisms of Bacterial Suppression of AGO1-RISC Activity and of Host Counter-counter Defense
L. NAVARRO (1), O. Thiébeauld (2), M. Charvin (2),. (1) IBENS-CNRS, France; (2) IBENS-CNRS, France; (3) University of Nebraska, U.S.A.; (4) LGDP, France; (5) LGDP, France

9:50 C17-5. RXLR effector PexRD54 couples host cellular transport components to autophagic compartments to stimulate autophagosome biogenesis and haustorial transport
T. BOZKURT (1), P. Pandey (1), Y. Dagdas (2), B. D. (1) Imperial College london, Department of Life Sciences, London, UK., United Kingdom; (2) The Sainsbury Laboratory, Norwich Research Park, Norwich, NR4 7UH, UK., United Kingdom; (3) Imperial College london, Department of Life Sciences, London, UK., United Kingdom; (4) INGEBI-CONICET, Obligado 2490, C.A.B.A., C1428ADN, Argentina, Argentina

CONCURRENT SESSION 18: CELL WALL-MEDIATED RESISTANCE

8:30 – 10:10; Room A105–106
Cochair: Giulia De Lorenzo, University of Rome, Rome, Italy
Cochair: Georg Jander, Boyce Thompson Institute of Plant Research, Ithaca, New York, U.S.A.

8:30 C18-1. Dampening a DAMP: a specific oxidase regulates homeostasis of oligogalacturonides and growth in Arabidopsis
G. DE LORENZO (1), M. Benedetti (1), I. Verrascina. (1) Università di Roma Sapienza, Italy; (2) Università di Roma Sapienza, Italy

8:50 C18-2. Proteins and small molecules in aphid saliva influence interactions with host plants
G. JANDER (1) (1) Boyce Thompson Institute, U.S.A.

9:10 C18-3. Cell-wall-based regulation of stomatal defense in Arabidopsis
L. ZHANG (1), W. Zeng (2), J. Chen (3), S. He (4). (1) Department of Plant Biology, DOE Plant Research Laboratory, Michigan State University, U.S.A.; (2) DOE Plant Research Laboratory, Michigan State University, U.S.A.; (3) Department of Computer Science and Engineering, DOE Plant Research Laboratory, Mic

9:30 C18-4. The wheat *Stb6* gene controlling a gene-for-gene resistance to *Zymoseptoria tritici* encodes a wall-associated kinase like protein
C. SAINTENAC (1), W. Lee (2), F. Cambon (1), J. Ru. (1) INRA, and Université Blaise Pascal, France; (2) Rothamsted Research, United Kingdom; (3) John Innes Centre, United Kingdom

9:50 C18-5. UDP-D-Glucuronate 4-Epimerases 1 (GAE1) and GAE6 are Critical for Pectin Abundance and Immunity in *Arabidopsis thaliana*
G. BETHKE (1), A. Thao (1), G. Xiong (2), B. Li (3. (1) University of Minnesota, U.S.A.; (2) Energy Biosciences Institute, University of California, U.S.A.; (3) University of California, U.S.A.; (4) University of California, U.S.A.; (5) University of California, U.S.A.

CONCURRENT SESSION 19: MICROBIOME & PHYTOBIOME II

10:40 – 12:20; Room B113-116
Cochair: Angela Sessitsch, Austrian Instituteof Technology, Vienna, Austria
Cochair: Carolyn Young, Noble Foundation, Oklahoma, U.S.A.

10:40 C19-1. Tissue specificity of plant microbiomes and the role of seed-associated microbiota
A. SESSITSCH (1), B. Mitter (1), C. Escobar-Rodríguez (1), N. Pfaffenbichler (1), S. Compant (1), L. Antonielli (2) (1) AIT Austrian Institute of Technology, Austria; (2) AIT Austrian Institute of Technology, Austria

11:00 C19-2. Understanding the spatial-temporal dynamics of a root rot disease: a bird's-eye view to molecular techniques
C. YOUNG (1). (1) The Samuel Roberts Noble Foundation, U.S.A.

11:20 C19-3. Succession of endophytic bacteria in the mountain sorrel (*Oxyria digyna)*
C. GIVEN (1), E. Häikiö (2), M. Kumar (1), R. Niss. (1) University of Jyväskylä, Finland; (2) University of Eastern Finland, Finland

11:40 C19-4. The Powdery Mildew Survey – a citizen science scheme for increasing the efficiency of identification of a harmful, fungal plant disease
O. ELLINGHAM (1), J. David (2). (1) University of Reading, United Kingdom; (2) Royal Horticultural Scoiety, United Kingdom

12:00 C19-5. Drought and Host Selection in the Grass Root Microbiome
D. COLEMAN-DERR (1), D. Naylor (2), S. Deng (2). (1) USDA-ARS, U.S.A.; (2) University of California at Berkeley, U.S.A.

CONCURRENT SESSION 20: APOPLASTIC INTERACTIONS

10:40 – 12:20; C123-124
Cochair: Vivianne Vleeshouwers, Wageningen University, Netherlands
Cochair: Thorsten Nuernberger, University Tubingen, Germany

10:40 C20-1. Effector-driven breeding for apoplastic immunity to *Phytophthora infestans* in potato
V. VLEESHOUWERS (1). (1) Wageningen University, Netherlands

11:00 C20-2. Identification and characterization of two novel plant immune receptors, RLP23 and RLP32 and engineering immunity in crops
T. NÜRNBERGER (1), H. Böhm (1), I. Albert (1), L. . (1) University Tübingen, Germany

11:20 C20-3. Finally: A Biochemical Function for the pathogenesis–related protein 1
J. GAMIR (1), P. van't Hof (2), R. Darwiche (2), R. (1) Department of Biology/University of Fribourg, Switzerland; (2) Department of Biology/University of Fribourg, Switzerland

11:40 C20-4. Apoplastic Venom Allergen-like Proteins of Plant Parasitic Nematodes Modulate the Activation of Plant Innate Immunity by Cell Surface Receptors
J. LOZANO-TORRES (1), R. Wilbers (1), S. Warmerdam. (1) Wageningen University/Laboratory of Nematology, Netherlands

12:00 C20-5. The repetitive *Ustilago maydis* effector Rsp3 shields hyphae and blocks the anti-fungal activity of a secreted maize protein
L. MA (1), C. Trippel (1), L. Wang (2), A. Mendoza-Mendoza (3), S. Ullmann (4), M. Moretti (1), S. Wawra (1), S. Reissmann (1), K. Münch (1), B. Zechmann (5), R. Kahmann (1) (1) Max Planck Institute for Terrestrial Microbiology, Germany; (2) Max Planck Institute for Heart and Lung Research, Germany; (3) Bio-Protection Research Centre, New Zealand; (4) Heinrich-Heine-Universität Düsseldorf, Germany; (5) Center for Microscopy and Imaging (CMI), Baylor University, U.S.A.

CONCURRENT SESSION 21: EMERGING SYSTEMS

10:40 – 12:20; Room A105-106
Cochair: James Westwood, Virginia Tech, U.S.A
Cochair: Godelieve Gheysen, Ghent University, Belgium

10:40 C21-1. Nematode infection of rice: interactions with the plant host and with other pathogens
G. GHEYSEN (1). (1) Ghent University, Belgium

11:00 C21-2. Using the lens of molecular plant-microbe interactions to uncover the pathways of plant parasitization by the parasitic weed *Phelipanche aegyptiaca* (broomrape).
C. CLARKE (1), J. Westwood (1). (1) Virginia Tech, U.S.A.

continued

Key: S = Special Session, C = Concurrent Session, PL = Plenary Session

11:20 C21-3. Defending plants against the World's most pesticide-resistant insect, *Myzus persicae*: A role for calcium
T. VINCENT (1), M. Avramova (1), J. Canham (1), P.. (1) John Innes Centre, United Kingdom; (2) University of Wisconsin - Madison, U.S.A.

11:40 C21-4. Identification of NB-LRR mediated nonhost resistance to wheat stripe rust in *Brachypodium distachyon*
J. BETTGENHAEUSER (1), M. Gardiner (1), M. Opanowi. (1) The Sainsbury Laboratory, United Kingdom; (2) John Innes Centre, United Kingdom; (3) CSIRO Plant Industry, Australia; (4) IBERS, Aberystwyth University, United Kingdom

12:00 C21-5. A new model for virulence in the emerging Gram-positive phytopathogen, *Rhodococcus fascians*
E. SAVORY (1), A. Creason (1), S. Fuller (1), D. S. (1) Oregon State University, U.S.A.

SESSIONS – Thursday Afternoon

CONCURRENT SESSION 22: INTER-KINGDOM SIGNALING

14:50 – 16:30; Room C123–124
Cochair: Vittorio Venturi, ICGEB, Trieste, Italy
Cochair: Barbara Valent, Kansas State University, Manhattan, Kansas, U.S.A.

14:50 C22-1. Studies on inter-species and inter-kingdom signaling in plant-associated bacteria
V. VENTURI (1) (1) ICGEB, Italy

15:10 C22-2. Symplastic effector protein trafficking during biotrophic invasion of rice cells by the blast fungus
B. VALENT (1), E. Oliveira-Garcia (1), H. Zheng (1), M. Yi (2), P. Migeon (1), M. Dalby (1), K. Park (1), S. Park (1), M. Farman (3), Z. Wang (4), J. Zhou (4) (1) Kansas State University, U.S.A.; (2) The Noble Foundation, U.S.A.; (3) University of Kentucky, U.S.A.; (4) Fujian Agriculture and Forestry University, China

15:30 C22-3. Co-option of bacterial quorum sensing for interkingdom signaling
B. GONCALVES COUTINHO (1), A. Schaefer (2), Y. Oda. (1) University of Washington, U.S.A.; (2) University of Washington, U.S.A.; (3) Oak Ridge National Laboratory, U.S.A.; (4) ICGEB, Italy

15:50 C22-4. A *gacA*- mutant of *Pseudomonas syringae* hyper-responds to type III secretion-inducing plant signals yet is less virulent
M. O'MALLEY (1), S. Peck (2), J. Anderson (1). (1) Department of Botany & Plant Pathology, Oregon State University, U.S.A.; (2) Division of Biochemistry, University of Missouri, U.S.A.

16:10 C22-5. Interkingdom chemical crosstalk across the plant-microbe interface during Rice Blast
N. NAQVI (1), R. Patkar (1), Z. Qu (1), F. Yang (1. (1) Temasek Life Sciences Laboratory, Singapore

CONCURRENT SESSION 23: POPULATION GENOMICS

14:50 – 16:30; Room A105–106
Cochair: Boris Vinatzer, Virginia Tech, Blacksburg, Virginia, U.S.A.
Cochair: Erica Goss, University of Florida, Gainesville, Florida, U.S.A.

14:50 C23-1. Population genomics insights into *Pseudomonas syringae* disease emergence and pathogen dissemination
B. VINATZER (1). (1) Virginia Tech, U.S.A.

15:10 C23-2. Interspecific homologous recombination generates genomic and phenotypic diversity in Florida populations of *Xanthomonas perforans*
E. GOSS (1), J. Jones (2), G. Vallad (2), S. Timil. (1) University of Florida, U.S.A.; (2) University of Florida, U.S.A.

15:30 C23-3. Using population genomics to understand NLR diversity in wild tomato
R. STAM (1), A. Tellier (1), D. Scheikl (1). (1) Technische Universität München, Germany

15:50 C23-4. Elucidating mechanisms of *Phytophthora* pathogen emergence in the genomics era
N. GRUNWALD (1), B. Knaus (2), J. Tabima (3). (1) USDA ARS, U.S.A.; (2) USDA ARS, U.S.A.; (3) Oregon State University, U.S.A.

16:10 C23-5. Pathogenomic analysis of South African stripe rust populations
H. VAN SCHALKWYK (1), R. Prins (2), Z. Pretorius (1), L. Boyd (3), C. Uauy (4), D. Saunders (5) (1) University of the Free State, South Africa; (2) CenGen (Pty) Ltd and University of the Free State, South Africa; (3) National Institute of Agricultural Botany, United Kingdom; (4) John Innes Centre, United Kingdom; (5) The Genome Analysis Centre and The John Innes Centre, United Kingdom

CONCURRENT SESSION 24: RECOGNITION IN PLANT IMMUNITY II

14:50 – 16:30; Room B113–116

Cochair: Aska Goverse, University of Wageningen, Wageningen, Netherlands

Cochair: Dingzhong Tang, CAS, Beijing, China

14:50 C24-1. Molecular and cellular dynamics involved in effector recognition by the nematode immune receptor GPA2
A. GOVERSE (1), E. Slootweg (1), H. Overmars (1), J. Roosien (1), O. Caldararu (2), A. Petrescu (2), J. Bakker (1), G. Smant (1) (1) Wageningen University, Netherlands; (2) IBAR, Romania

15:10 C24-2. The role of a glycosylphosphatidylinositol-anchored protein in plant immunity
D. TANG (1), H. Pan (1), Q. Shen (1) (1) Institute of Genetics and Development Biology, Chinese Academy of Sciences, China

15:30 C24-3. Structural studies of signalling domains from plant NLRs.
S. WILLIAMS (7), A. Bentham (1), X. Zhang (2), L. Casey (3), P. Lavrencic (2), S. Cesari (4), D. Ericsson (5), P. Anderson (1), M. Mobli (6), M. Bernoux (4), P. Dodds (4), B. Kobe (2), (1) School of Biological Sciences, Flinders University, Australia; (2) School of Chemistry and Molecular Biosciences, University of Queensland, Australia; (3) School of Chemistry and Molecular Biosciences, University of Queensland, Australia; (4) CSIRO Agriculture Flagship, Australia; (5) MX Beamlines, Australian Synchrotron, Australia; (6) Centre for Advanced Imaging, University of Queensland, Australia; (7) Research School of Biology, Australian National University, Australia

15:50 C24-4. The NOI/RIN4 integrated domain of the rice NLR Pii-2 binds to OsExo70-F3, an accessory protein required for *Pii*-dependent resistance
K. FUJISAKI (1), Y. Abe (1), H. Saitoh (1), H. Kan. (1) Iwate Biotechnology Research Center, Japan; (2) The Sainsbury Laboratory, United Kingdom

16:10 C24-5. Mystery solved: How the atypical pair Mi-1.2 and SERK1 regulate aphid resistance?
I. KALOSHIAN (1), H. Peng (1), S. Mantelin (2), G.. (1) University of California Riverside, U.S.A.; (2) University of California Riverside, U.S.A.; (3) University of Amsterdam, Netherlands

PLENARY SESSION 7

17:00 – 18:40; Oregon Ballroom 201–203, Level 2

Moderator: Andrew Bent, University of Wisconsin, Madison, Wisconsin, U.S.A.

17:00 PL7-1. Molecular elucidation of plant-plant Interactions
K. SHIRASU (1). (1) RIKEN Center for Sustainable Resource Science, Japan

17:25 PL7-2. Kinase mediated regulation of plant innate immune responses
G. COAKER (1), Y. Chiang (1), M. Zhang (1), T. Toruno (1) (1) University of California, Davis, U.S.A.

17:50 PL7-3. Thousands ways to kill: transcriptional variation and distinct infection programs among individuals of the wheat pathogen Zymoseptoria tritici
E. STUKENBROCK (1), J. Haueisen (1), J. Grandaubert (1) (1) Max Planck Institute for Evolutionary Biology, Germany

18:15 PL7-4. The RPS4/RRS1 NLR pair: sensing of pathogen interference and regulation of post-activation signaling
L. DESLANDES (1), J. Parker (2), C. Le Roux (3), M. Escouboué (4), A. Delga (5), G. Huet (4), A. Jauneau (6), Y. Couté (7), A. Kraut (7), K. Niefind (8), R. Berthomé (5), D. Tremousaygue (4), S. Carrere (5) (1) CNRS, France; (2) Max-Planck Institut, Germany; (3) Max-Planck Institut, Germany; (4) CNRS, France; (5) INRA, France; (6) FR3450, France; (7) CEA, France; (8) University of Cologne, Germany

POSTER TITLES BY CATEGORY

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See Poster Presenter information on page 6 for poster author times and poster viewing.

Poster Presentation Categories

Primary: Symbiosis and Mutualism
Secondary
P1: Commonalities Between Mutualists and Pathogens ..... Posters 1–12
P2: Symbiosis & Mutualism (Mechanisms and Evolution) ..... Posters 13–63

Primary: Phytobiome
Secondary
P3: Molecular Ecology of Host-Microbe Interactions ..... Posters 64–87
P4: Plant Microbiome ..... Posters 88–122
P5: Tritrophic Interactions and Biocontrol ..... Posters 123–136

Primary: Microbes
Secondary
P6: Apoplastic Interactions ..... Posters 137–151
P7: Cell Biology of Microbe-Host Interactions ..... Posters 152–226
P8: Inter-Kingdom Signaling ..... Posters 227–232
P9: Microbial Manipulation of the Host ..... Posters 233–335
P10: RNA-Mediated Interactions ..... Posters 336–343

Primary: Genomics and Systems Biology
Secondary
P11: Genomes, Genomics and Epigenomics ..... Posters 344–393
P12: Host-Microbe Co-Evolution ..... Posters 394–407
P13: Population Genomics ..... Posters 408–416
P14: Systems Biology and Modeling ..... Posters 417–425

Primary: Host Resistance
Secondary
P15: Cell Wall-Mediated Resistance ..... Posters 426–437
P16: Plant Hormones and Regulators ..... Posters 438–484
P17: Recognition in Plant Immunity ..... Posters 485–656
P18: Signal Transduction for Systemic Defense ..... Posters 657–701

Primary: Translational and Emerging Systems
Secondary
P19: Emerging Systems ..... Posters 702–712
P20: Translational Research; Developing World Needs ..... Posters 713–722

POSTER TITLES AND AUTHORS

Please note: Poster titles and author information appears as submitted and has not been edited.

SYMBIOSIS AND MUTUALISM

Commonalities Between Mutualists and Pathogens

P1-1 Relocation of nutrients during stripe rust infection of wheat. V. ROMAN-REYNA (1), J. Rathjen (2), F. Busch (2) (1) Research School of Biology, The Australian National University, Australia; (2) Research School of Biology, The Australian National University, Australia

P1-2 Time series RNA-seq reveals early root responses to ISR-inducing *Pseudomonas simiae* WCS417 and the microbial elicitors flg22, flg22417, and chitin.. I. STRINGLIS (1), S. Proietti (2), M. van Verk (2), R. Hickman (2), C. Zamioudis (2), C. Pieterse (2) (1) Utrecht University, Netherlands; (2) Utrecht University, Netherlands

P1-3 A mechanistic link between legume-rhizobium symbiosis and plant immunity. K. TOTH (1), G. Stacey (1) (1) University of Missouri, U.S.A.

P1-4 Receptors complex associated with defense and symbiotic signaling in legumes. F. FENG (1), J. Sun (2), S. Radutoiu (3), J. Stougaard (4), G. Oldroyd (2) (1) John Innes Centre, United Kingdom; (2) John Innes Centre, United Kingdom; (3) Department of Molecular Biology and Genetics, Centre for Carbohydrate Recognition and Signalling,Aarhus University, Denmark; (4) Department of Molecular Biology and Genetics, Centre for Carbohydrate Recognition and Signalling,Aarhus University, United Kingdom

P1-5 Common Accommodation Mechanisms for Mutualistic and Pathogenic Fungi in Rice. C. IBE (1) (1) University of Cambridge, United Kingdom

P1-6 The development of hyphal symbionts and pathogens relies on fatty acid biosynthesis by the plant host. A. KEYMER (1) (1) University of Munich (LMU), Germany

P1-7 Fungal endophytes from grapevine have host-dependent levels of virulence and produce antibiotic compounds in dual cultures. S. LÒPEZ-FERNÀNDEZ (1), A. Campisano (2), B. Schulz (1) (1) Technische Universität Braunschweig, Germany; (2) Fondazione Edmund Mach, Italy

P1-8 Symbiosis or defense: the molecular mechanism involving LysM receptors of the model legume *Lotus japonicus* . S. RADUTOIU (1), J. Cheng (1), M. Blaise (2), J. Stougaard (1), Z. Bozsoki (1) (1) Aarhus University/CARB, Denmark; (2) CNRS, Centre d'études d'agents Pathogènes et Biotechnologies pour la Santé, Université de Montpellier, France

P1-9 Metabolic consequences of the introduction of a *Populus trichocarpa* lectin receptor-like kinase into *Arabidopsis thaliana*, a non-ectomycorrhizal host species . T. TSCHAPLINSKI (1), Z. Zhang (2), J. Labbe (2), W. Muchero (2), Y. Yang (2), P. Ranjan (3), S. Jawdy (2), G. Tuskan (2), J. Chen (2) (1) Oak Ridge National Laboratory, U.S.A.; (2) Oak Ridge National Laboratory, U.S.A.; (3) University of Tennessee, U.S.A.

P1-10 The plant microbiome at the intersection of metabolism and defense. C. HANEY (1), L. Shapiro (2), J. Bush (3), N. Pierce (2), F. Ausubel (3) (1) The University of British Columbia, Canada; (2) Harvard University, U.S.A.; (3) Massachusetts General Hospital, U.S.A.

P1-11 Aboveground activation of defense leads to recruitment of bacteria into the rhizosphere of *Arabidopsis thaliana*. R. BERENDSEN (1), K. Yu (1), C. Pieterse (1), P. Bakker (1) (1) Utrecht University, Netherlands

P1-12 Plant and microbial proteins contributing to beneficial and detrimental root colonisation by filamentous microbes. S. SCHORNACK (1), C. Quan (1), T. Rey (1), M. Bonhomme (2), C. Jacquet (2), A. Chatterjee (1), J. Toulotte (1) (1) University of Cambridge, Sainsbury Laboratory, United Kingdom; (2) LRSV, University Paul Sabatier, France

Symbiosis & Mutualism (Mechanisms and Evolution)

P2-13 Role of Type V Protein Secretion System in endophytic rice root colonization by Azoarcus sp. BH72 . M. MARSZALKOWSKA (1), A. Sarkar (1), M. Schäfer (2), B. Reinhold-Hurek (1) (1) Department of Microbe - Plant Interactions, University of Bremen, Germany; (2) John Innes Centre, United Kingdom

P2-14 The role of ROP GTPases in Nod factor signalling. A. AKAMATSU (1), G. Oldroyd (2) (1) John Innes Centre, United Kingdom; (2) John Innes Centre, United Kingdom

P2-15 A band of misfits: role of unexpected proteins in the plant symbiotic signaling pathway. J. ANE (1), M. Venkateshwaran (2), A. Wiley-Kalil (3), D. Jayaraman (1), M. Banba (4), A. Binder (5), S. Bernard (1), M. Chabaud (6), J. Maeda (1), A. Genre (7), M. Otegui (1), D. Barker (6), H. Imaizumi-Anraku (4), M. Parniske (5) (1) University of Wisconsin - Madison, U.S.A.; (2) University of Wisconsin - Platteville, U.S.A.; (3) University of Wisconsin - Madison, U.S.A.; (4) National Institute of Agrobiological Sciences (NIAS), Japan; (5) Ludwig-Maximilians-Universität München, Germany; (6) Laboratory of Plant-Microbe Interactions, France; (7) University of Torino, Italy

P2-16 Autoregulation of infection in the *Sinorhizobium meliloti-Medicago* symbiosis. J. BATUT (1), A. GARNERONE (1), F. SORROCHE (1), M. WALCH (1), A. GASTEBOIS (1), C. MASSON-BOIVIN (1) (1) INRA-CNRS, France

P2-17 Exploring Endophytic Colonization Mechanisms of the Nitrogen-fixing Diazotroph *Azoarcus* sp. BH72 in Rice. X. CHEN (1) (1) University of Bremen, Germany

P2-18 Genome-wide Identification of Bacterial Plant Colonization Genes. B. COLE (1), M. Feltcher (2), R. Waters (1), K. Wetmore (3), M. Price (3), E. Ryan (1), G. Wang (1), S. Ul-Hasan (4), Y. Yoshikuni (1), R. Malmstrom (1), A. Deutschbauer (3), J. Dangl (2), A. Visel (1) (1) DOE-Joint Genome Institute, U.S.A.; (2) University of North Carolina, Chapel Hill, U.S.A.; (3) Lawrence Berkeley National Laboratory, U.S.A.; (4) University of California, Merced, U.S.A.

P2-19 Poplar as a model for dissecting early mycorrhizal signaling in woody perennials. K. COPE (1), M. Venkateshwaran (2), J. Maeda (3), C. Ma (4), S. Strauss (4), J. Ané (3) (1) University of Wisconsin–Madison, U.S.A.; (2) University of Wisconsin-Platteville, U.S.A.; (3) University of Wisconsin-Madison, U.S.A.; (4) Oregon State University, U.S.A.

P2-20 *Nod* genes are required for the colonization of different hosts by *Rhizobium* sp. IRBG74. M. CROOK (1), A. Wiley-Kalil (2), V. Poinsot (3), S. Erdn (4), K. Garcia (1), M. Babcock (1), J. Maeda (1), A. Desbiez-Piat (2), F. Maillet (4), A. Mukherjee (5), J. Dénarié (4), J. Ané (1) (1) Department of Bacteriology, University of Wisconsin–Madison, U.S.A.; (2) Department of Agronomy, University of Wisconsin–Madison, U.S.A.; (3) Laboratoire des IMRCP, Université Paul Sabatier, France; (4) Laboratoire des Interactions Plantes–Microorganismes, INRA-CNRS, France; (5) Department of Biology, University of Central Arkansas, U.S.A.

P2-21 Biological nitrogen fixation in poplar trees. S. DOTY (1), A. Sher (2), Z. Khan (1), M. Khorasani (1), N. Fleck (1), R. Bumgarner (1), S. Kim (1), T. DeLuca (1) (1) University of Washington, U.S.A.; (2) University of California, San Diego, U.S.A.

P2-22 Drought tolerance and growth enhancement of hybrid poplar by inoculation with an endophyte consortium. S. DOTY (1), Z. Khan (1), H. Rho (1), A. Firrincieli (2), S. Hung (1), V. Luna (3), O. Masciarelli (3), S. Kim (1) (1) University of Washington, U.S.A.; (2) University of Tuscia, Italy; (3) Universidad Nacional de Río Cuarto, Argentina

P2-23 A multitude of signals converge on SUNN to regulate nodule number. J. FRUGOLI (1), A. Crook (1), S. Nowak (1), E. Schnabel (1) (1) Clemson University, U.S.A.

P2-24 Molecular Interplay between whiteflies, begomoviruses and bacterial symbionts. M. GHANIM (1), P. Britto Cathrin (2), S. Kontsedalov (2), G. Lebedev (2), S. Kanakala (2), A. Kliot (2) (1) Volcani Center, Israel; (2) Volcani Center, Israel

P2-25 A *Brachypodium distachyon* LysM-RLK recognizes arbuscular mycorrhizal symbiotic signals. A. GIRARDIN (1), M. Cumener (1), L. Buendia (1), G. Virginie (1), R. Sibout (2), M. Dalmais (3), A. Bendahmane (3), B. Lefebvre (1) (1) Laboratory of Interaction Plant Microorganisms (LIPM) - INRA/CNRS, France; (2) INRA-Agro Paris Tech, France; (3) Univ. Paris 11-Univ. Evry-Univ. Paris7-CNRS-INRA, France

P2-26 Genome exchange and biogeography of chickpea's nitrogen-fixing bacterial symbionts.. A. GREENSPAN (1), P. Chang (2), E. Von Wettberg (3), D. Cook (4) (1) University of California, Davis, U.S.A.; (2) University of Southern California, U.S.A.; (3) Florida International University, U.S.A.; (4) University of California, Davis, U.S.A.

P2-27 Effect of arbuscular mycorrhizal (*Glomus intraradices*) inoculation on seed Germination and seedling growth of bambara groundnut (*Vigna subterranea (L)*). O. HAMZAT (1) (1) Federal University, Dutsin-Ma, Nigeria

P2-28 Diazotrophic Endophytes: Symbionts for environmentally sustainable agriculture. L. HANNON (1), D. Melville (2), S. Doty (2) (1) University of Washington, U.S.A.; (2) University of Washington, U.S.A.

P2-29 Sub-cellular distribution of polyphosphoinositide suggests a role in signaling during arbuscular mycorrhiza symbiosis.. S. IVANOV (1), M. Harrison (1) (1) Boyce Thompson Institute, U.S.A.

P2-30 The high molecular weight form of the *Sinorhizobium meliloti* 1021 symbiotic exopolysaccharide succinoglycan is sufficient to mediate invasion of host plants. K. JONES (1), H. Mendis (1), T. Madzima (1), C. Queiroux (1) (1) Florida State University, U.S.A.

P2-31 Ellucidation of genes required for endophytic N-fixation and their role in plant growth promotion. P. JOUBERT (1), S. Doty (1) (1) University of Washington, U.S.A.

P2-32 Evolutionary conservation of mycorrhiza-specific phosphate transporter gene regulation by CTTC MOTIF-BINDING TRANSCRIPTION FACTOR1 (CBX1). L. KLINNAWEE (1), L. Xue (1), M. Bucher (1) (1) Botanical Institute, Cologne Biocenter, University of Cologne, Germany

P2-33 Enacting a symbiotic relationship: plant lectin receptor-like kinase, a key player in the ectomycorrhizal association. J. LABBE (1), W. Muchero (2), Y. Yang (2), R. Priya (2), S. Jawdy (2), T. Tschaplinski (2), G. Tuskan (2), J. Chen (2) (1) ORNL/ UT Knoxville, U.S.A.; (2) ORNL, U.S.A.

P2-34 Mutualistic root endophytism of Sebacinales is not associated with the reduction of saprotrophic traits and requires a noncompromised plant innate immunity. G. LANGEN (1), U. Lahrmann (2), G. Jeena (1), H.

Frerigmann (1), A. Zuccaro (1) (1) University of Cologne, Germany; (2) Fraunhofer Institute for Toxicology and Experimental Medicine, ITEM, Germany

P2-35 Beta-rhizobial symbiosis: new insights from genome-wide transcriptome and proteome analysis. M. LARDI (1), Y. Liu (2), L. Eberl (2), G. Pessi (2) (1) University of Zurich, Switzerland; (2) University of Zurich, Switzerland

P2-36 Genome-wide transcriptome analysis of a plant growth-promoting phototrophic bacterium, *Rhodopseudomonas palustris* strain PS3 . C. LIU (1), K. Lo (2) (1) National Taiwan University, Taiwan; (2) Institute of Biotechnology, National Taiwan University,, Taiwan

P2-37 A characterization of candidate effector proteins in arbuscular mycorrhizal fungi. A. MACLEAN (1), H. Park (2), L. Mainzer (3), M. Hudson (4), V. Levesque-Tremblay (2) (1) Boyce Thompson Institute, U.S.A.; (2) Boyce Thompson Institute, U.S.A.; (3) University of Illinois at Urbana-Champaign, U.S.A.; (4) University of Illinois, Urbana-Champaign, U.S.A.

P2-38 Involvement of gibberellic acid and auxin in the regulation of mycorrhizal symbiosis in *Bletilla striata* (Orchidaceae). C. MIURA (1), T. Yamamoto (2), M. Yamato (3), S. Nagata (2), Y. Otani (2), H. Asao (4), M. Matsumoto (4), T. Yagame (5), S. Shigenobu (4) (1) Tottori University, Japan; (2) Tottori University, Japan; (3) Chiba University, Japan; (4) National Institute for Basic Biology, Japan; (5) Tsukuba Botanical Garden, National Museum of Nature and Science, Japan

P2-39 Plant Derived Glycoproteins and Glycolipids are Required for the Establishment of Functional Root-Microbe Symbiosis in Medicago truncatula. W. MOORE (1), E. Rennie (1), H. Wipf (2), P. Hussey (1), E. Cahoon (3), J. Mortimer (1), H. Scheller (1) (1) Joint BioEnergy Institute, U.S.A.; (2) UC Berkeley, U.S.A.; (3) University of Nebraska, Lincoln, U.S.A.

P2-40 Signaling events during Arbuscular Mycorrhiza symbiosis. L. MUELLER (1), L. Mainzer (2), M. Hudson (2), M. Harrison (3) (1) Boyce Thompson Institute, U.S.A.; (2) Department of Crop Science, University of Illinois, U.S.A.; (3) Boyce Thompson Institute, U.S.A.

P2-41 Gibberellin biosynthesis by symbiotic rhizobia and its effect on host legumes. R. NETT (1), X. Lu (1), R. Nagel (1), R. Peters (1) (1) Iowa State University, U.S.A.

P2-42 A host signal to microbe-plant interface for the establishment of symbiosis. O. OZTAS (1), T. He (2), H. Pan (1), E. Limpens (3), E. Federova (3), T. Bisseling (3), M. Roberts (2), D. Wang (4) (1) University of Massachusetts Amherst, U.S.A.; (2) Boston College, U.S.A.; (3) Wageningen University, Netherlands; (4) University of Massachusetts Amherst, U.S.A.

P2-43 Comparative genome analysis of lichen-forming fungi and partner algae. S. PARK (1), H. Song (2), J. Kim (1), J. Choi (2), J. Jeon (3), Y. Lee (2), J. Hur (1) (1) Korean Lichen Research Institute, Sunchon National University, Korea; (2) Fungal Bioinformatics Laboratory and Center for Fungal Genetic Resources, Seoul National University, Korea; (3) School of Biotechnology, Yeungnam University, Korea

P2-44 Competition between beta-rhizobia for legume infection. G. PESSI (1), M. Lardi (2), G. Purtschert (2), A. Gandolfi (2), S. Bolzan de Campos (2), L. Eberl (2) (1) University of Zurich/ Deparment of Plant and Microbial Biology, Switzerland; (2) University of Zürich, Switzerland

P2-45 A CCaMK-CYCLOPS-DELLA complex activates transcription of *RAM1,* a central regulator of arbuscule branching . P. PIMPRIKAR (1), S. Carbonnel (1), M. Paries (2), K. Katzer (2), V. Klingl (2), L. Karl (2), D. Floss (3), M. Harrison (3), M. Parniske (2), C. Gutjahr (2) (1) University of Munich (LMU), Germany; (2) University of Munich (LMU), Germany; (3) Boyce Thompson Institute for Plant Research, USA, U.S.A.

P2-46 A pan-genomic perspective on microbial symbiont invasions. S. PORTER (1), J. Faber-Hammond (1), M. Friesen (2) (1) Washington State University, Vancouver, U.S.A.; (2) Michigan State University, U.S.A.

P2-47 A secreted protein from *Rhizophagus irregularis* enhances the mycorrhization in *Nicotiana benthamiana*.. C. QUAN (1), E. Evangelisti (2), S. Schornack (2) (1) The Sainsbury Laboratory, University of Cambridge, United Kingdom; (2) The Sainsbury Laboratory, University of Cambridge, United Kingdom

P2-48 Effectors in symbiotic AMF-plant interaction. A. HOFFRICHTER (1), K. Sedzielewska Toro (1), A. Brachmann (1) (1) Ludwig Maximilian University of Munich, Germany

P2-49 Discovery and transfer of novel pathways for phosphate solubilization. C. SHULSE (1), M. Blow (1), M. Chovatia (2), Y. Lei (3), A. Deutschbauer (4) (1) DOE Joint Genome Institute, U.S.A.; (2) DOE Joint Genome Institute, U.S.A.; (3) UC Berkeley, U.S.A.; (4) Lawrence Berkeley National Lab, U.S.A.

P2-50 Comparative genomic analysis of five lichen-forming fungi. H. SONG (1), K. Kim (2), J. Jeon (1), S. Park (3), J. Hur (3), Y. Lee (2) (1) Interdiscplinary Program in Agricultural Genomics, Seoul National University, Seoul 151-921, Korea, Korea; (2) Department of Agricultural Biotechnology, Seoul National University, Seoul 151-921, Korea, Korea; (3) Korean Lichen Research Institute, Sunchon National University, Suncheon, South Korea, Korea

P2-51 Gibberellin guidance is required for the spatial regulation of symbiosis gene expression and infection of arbuscular mycorrhizal fungi in *Lotus japonicus*. N. TAKEDA (1), M. Nagae (2), M. Kojima (3), H. Sakakibara

(3), M. Kawaguchi (4) (1) Natl Inst of Basic Biology/SOKENDAI, Japan; (2) Natl Inst of Basic Biology, Japan; (3) RIKEN CSRS, Japan; (4) Natl Inst of Basic Biology/SOKENDAI, Japan

P2-52 Novel nuclear protein, NsiA, and its interacting transcription factor Ste12 and MAP kinase Mak2 mediate balanced symbiotic infection of endophytic fungus *Epichloë festucae* in perennial ryegrass.. S. KAMIYA (1), Y. Ozaki (1), A. Okamura (1), S. Kameoka (1), Y. Kayano (1), S. Sanjay (2), B. Scott (3), J. Maruyama (4), A. Tanaka (1), D. Takemoto (1) (1) Nagoya University, Japan; (2) Massey University, New Zealand; (3) Nagoya University, New Zealand; (4) The University of Tokyo, Japan

P2-53 Endophyte-assisted phytoremediation of arsenic contaminated soils. R. TOURNAY (1), S. Doty (1), D. Sivitilli (1), T. DeLuca (1) (1) University of Washington, U.S.A.

P2-54 Genetic diversity of Rhizobia that nodulate Onobrychis Esparseta from the arid eastern area of Central Asia. B. UMAROV (1), Z. Shakirov (2), M. Sagdieva. (2) (1) Institute of Microbiology AS RUz, 7b A.Kadyri str. Tashkent 100128, Uzbekistan,, Uzbekistan; (2) Institute of Microbiology AS RUz,, Uzbekistan

P2-55 Discovery of *Populus trichocarpa* small proteins and non-coding RNAs involved in mycorrhizal symbiosis. X. YANG (1), R. Mewalal (2), S. Jawdy (2), P. Vion (3), F. Le Tacon (3), J. Labbé (2), G. Tuskan (2) (1) Oak Ridge National Laboratory, U.S.A.; (2) Oak Ridge National Laboratory, U.S.A.; (3) INRA/Université de Lorraine, Centre INRA de Nancy, France

P2-56 Karrikin signaling in arbuscular mycorrhiza development. C. GUTJAHR (1), S. Carbonnel (1), V. Basso (1), M. Kolodzijei (1), T. Wang (2) (1) LMU Munich, Faculty of Biology Genetics, Germany; (2) John Innes Center, Metabolic Biology, United Kingdom

P2-57 Identification of genes involved in the *Burkholderia tuberum* nodulating symbiosis. M. LUM (1), A. Arnell (2), B. Kwak (2), N. Behnken (2), J. Blankenship (2) (1) Loyola Marymount University, U.S.A.; (2) Loyola Marymount University, U.S.A.

P2-58 A novel interactor of symbiotic RLKs is involved in nodulation in *Lotus japonicus*. A. YAMAZAKI (1), Y. Shimoda (2), M. Hayashi (1) (1) Center for Sustainable Resource Science, Riken, Japan; (2) NIAS, Japan

P2-59 *Medicago truncatula* MtLAX2, an orthologue of the AtAUX1 auxin influx transporter, mediates auxin control of nodulation. S. ROY (1), J. Murray (2), A. Downie (2), J. Lilley (2), G. Oldroyd (2), D. Cousins (2), C. Bone (3), S. Walker (4), J. Sun (2) (1) The Samuel Roberts Noble Foundation, U.S.A.; (2) John Innes Centre, United Kingdom; (3) University of Sheffeild, United Kingdom; (4) Babraham Institute, United Kingdom

P2-60 Use of Crispr/Cas genome editing demonstrates a critical role for uricase and xanthine dehydrogenase in soybean nitrogen fixation and nodule development.. C. NGUYEN (1), M. Stacey (2) (1) Divisions of Plant Sciences and Biochemistry, National Center for Soybean Biotechnology University of Missouri, U.S.A.; (2) Divisions of Plant Sciences and Biochemistry, National Center for Soybean Biotechnology University of Missouri, U.S.A.

P2-61 Insights into Symbiotic Plant-Fungal Communication using Innovative Imaging Approaches. R. ROTH (1), S. Hillmer (2), K. Schumacher (3), J. Skepper (4), U. Paszkowski (5) (1) University of Cambridge, United Kingdom; (2) EMCF@COS, Germany; (3) COS, Germany; (4) CAIC, England; (5) University of Cambridge, England

P2-62 Regulation of arbuscule degeneration during arbuscular mycorrhizal symbiosis. M. HARRISON (1), D. Floss (2), K. Bhattarai (2), S. Gomez (2), H. Park (2), A. MacLean (2), V. Levesque-Tremblay (2) (1) Boyce Thompson Institute, Cornell University, U.S.A.; (2) Boyce Thompson Institute, U.S.A.

P2-63 Genome sequencing reveals origins of a unique bacterial endosymbiosis in the earliest lineages of terrestrial Fungi. J. UEHLING (1), F. Dietrich (1), K. Barry (2), I. Grigoriev (2), A. Kuo (2), R. Ohm (2), A. Lipzen (2), M. Nolan (2), K. LaButti (2), J. Labbé (3), G. Bonito (4), F. Martin (5), R. Vilgalys (1) (1) Duke University, U.S.A.; (2) US Department of Energy Joint Genome Institute, U.S.A.; (3) Oak Ridge National Laboratory, U.S.A.; (4) Michigan State University, U.S.A.; (5) Institut National de la Recherche Agronomique, France

PHYTOBIOME

Molecular Ecology of Host-Microbe Interactions

P3-64 Improving the detection and control of *Fusarium oxysporum* f.sp. *elaeidis*. K. ADUSEI-FOSU (1) (1) Nottingham University, United Kingdom

P3-65 Effect of plant extracts on *Pseudomonas syringae pv. actinidiae* behavior. G. BURIANI (1), L. Fiorentini (2), A. Cellini (2), F. Spinelli (2) (1) University of Bologna, Italy; (2) University of Bologna, Italy

P3-66 Biological characterization, distribution and synergistic interactions of a Torradovirus with a Polerovirus infecting cassava in the Americas. M. CARVAJAL-YEPES (1), J. Jimenez (1), A. Quintero (1), W. Cuellar (1) (1) International center for tropical agriculture, Colombia

P3-67 Soil Microbiome Profiling and Differential Taxonomic Analysis between High Yield and Low Yield Soybean Fields. H. CHANG (1), J. Haudenshield (2), C. Bowen (2), G. Hartman (3) (1) University of Illinois at

Urbana-Champaign Department of Crop Sciences, U.S.A.; (2) USDA-ARS, U.S.A.; (3) University of Illinois at Urbana-Champaign Department of Crop Sciences; USDA-ARS, U.S.A.

P3-68 A novel group of asymptomatic potexviruses lacking a TGB3 gene and associated to mixed infections in Cassava (*Manihot esculenta* Crantz). W. CUELLAR (1), I. Lozano (2), M. Cuervo (2), A. Leiva (2), M. Carvajal-Yepes (2) (1) International center for tropical agriculture, Colombia; (2) International center for tropical agriculture, Colombia

P3-69 Effects of cotton root exudates on the rhizosphere colonization and biofilm formation of *Bacillus subtilis* strain NCD-2. Q. GUO (1), L. Dong (1), P. Wang (1), S. Li (1), X. Zhang (1), X. Lu (1) (1) Institute of Plant Protection, Hebei Academy of Agricultural and Forestry Sciences, China

P3-70 Contribution of various multidrug resistance efflux transporters to the fitness and virulence of *Pseudomonas syringae*. T. HELMANN (1), S. Lindow (1) (1) University of California, Berkeley, U.S.A.

P3-71 Syringafactin production by *Pseudomonas syringae*, is contact-dependent and affects its local environment via its hygroscopicity. M. HERNANDEZ (1), S. Lindow (1) (1) University of California, Berkeley, U.S.A.

P3-72 Differential oilseed crop lipid accumulation through inoculation with *Pseudomonas fluorescens* LBUM677: rhizosphere competency, genetic determinants and species-specific variations . J. JIMÉNEZ BECERRA (1), M. Filion (2), A. Novinscak (2) (1) Université de Moncton, Canada; (2) Université de Moncton, Canada

P3-73 Investigating the role of bacterial effector phosphorylation and 14-3-3 binding. L. LEI (1) (1) University of California Davis, U.S.A.

P3-74 Microbial eukaryotes: the dark matter in the phyllosphere universe. A. MARI (1), M. Agler (1), S. Hacquard (1), F. Roux (2), C. Alonso-Blanco (3), J. Ågren (4), M. Bonkowski (5), E. Kemen (1) (1) Max Planck Institute for Plant breeding research, Carl von Linné weg 10, 50829 Köln, Germany, Germany; (2) INRA, Laboratoire des Interactions Plantes-Microorganismes (LIPM), UMR441, F-31326 Castanet-Tolosan, France;, France; (3) Centro Nacional de Biotecnología (CNB), Consejo Superior de Investigaciones Científicas (CSIC), Madrid-28049, Spain., Spain; (4) Department of Plant Ecology and Evolution, Uppsala University, Norbyvägen 18 D, 752 36 Uppsala, Sweden, Sweden; (5) Universität zu Köln, Department of Terrestrial Ecology, Zülpicher Straße 47b, Köln, Germany, Germany

P3-75 The molecular basis of efficient interspecies competition during host plant colonization. J. RUHE (1), M. Müller (1), M. Agler (1), I. Finkemeier (2), S. Ryazanov (3), C. Griesinger (3), E. Kemen (1) (1) Max Planck Institute for Plant Breeding Research, Germany; (2) Institute for Plant Biology and Biotechnology, University of Muenster, Germany; (3) Max Planck Institute for Biophysical Chemistry, Germany

P3-76 Are bacterial volatile compounds poisonous odors to *Botrytis cinerea*, alarm signals to *Arabidopsis* to elicit induced resistance, or both? . R. SHARIFI (1), C. Ryu (2) (1) Razi University, Iran; (2) Korea Research Institute of Bioscience and Biotechnology, South Korea

P3-77 Attenuating virulence of *Pectobacterium carotovorum* by beneficial bacterial volatiles . S. LEE (1), G. Song (2), C. Ryu (2) (1) Korea Research Insititute of Bioscience and Biotechnology, South Korea; (2) Korea Research Institute of Bioscience and Biotechnology, South Korea

P3-78 Bacterial RNAs activate innate immunity in *Arabidopsis*. B. LEE (1), Y. Park (2), S. Lee (2), G. Song (2), C. Ryu (2) (1) Korea Research Insititute of Bioscience and Biotechnology, South Korea; (2) Korea Research Institute of Bioscience and Biotechnology, South Korea

P3-79 Fabricating toluene phytosensor through a signal translator rhizosphere bacterium. H. LEE (1), C. Ryu (2) (1) Korea Research Insititute of Bioscience and Biotechnology, South Korea; (2) Korea Research Institute of Bioscience and Biotechnology, South Korea

P3-80 Light modulates the switch to the pathogenic stage in *Pseudomonas syringae* pv. tomato DC3000. S. SANTAMARÍA HERNANDO (1), I. Del Río Álvarez (2), J. Rodríguez Hervá (2), E. López Solanilla (2) (1) Centre for plant biotechnology and genomics-Universidad Politécnica de Madrid, Spain; (2) Centre for Plant Biotechnology anf Genomics-Universidad Politécnica de Madrid, Spain

P3-81 Rhizobacterial community structure and function in dryland wheat. L. THOMASHOW (1), D. Mavrodi (2), O. Mavrodi (3), J. Parejko (4), M. Le Tourneau (5), R. Bonsall (3), D. Weller (1) (1) USDA-ARS, U.S.A.; (2) Department of Biological Sciences, The University of Southern Mississippi, U.S.A.; (3) Department of Plant Pathology, Washington State University, U.S.A.; (4) Department of Microbiology, University of Wisconsin-LaCrosse, U.S.A.; (5) Department of Soils, Washington State University, U.S.A.

P3-82 Codon usage is involved in regulation antibiotic production in *Pseudomonas protegens* Pf-5. Q. YAN (1), B. Philmus (2), C. Hesse (3), J. Chang (2), J. Loper (4) (1) Oregon State University, U.S.A.; (2) Oregon State University, U.S.A.; (3) USDA-ARS Horticultural Crops Research Unit, U.S.A.; (4) USDA-ARS Horticultural Crops Research Laboratory, U.S.A.

P3-83 Adaptation of transmissible bacterial communities to multiple hosts: how the sap-feeding insect *Scaphoideus titanus* ships bacterial symbionts across grapevine plants. S. LÒPEZ-FERNÀNDEZ (1), V. Mazzoni (1), I. Pertot

(1), A. Campisano (1) (1) Fondazione Edmund Mach, Italy; (2) Fondazione Edmund Mach, Italy

P3-84 The Powdery Mildew Survey – a citizen science scheme for increasing the efficiency of identification of a harmful, fungal plant disease. O. ELLINGHAM (1), J. David (2) (1) University of Reading, United Kingdom; (2) Royal Horticultural Scoiety, United Kingdom

P3-85 Indole Antibiotic Biosynthesis in Edible Plants: *From Genomes to Bioactive Molecules*. A. KLEIN (1), E. Sattely (2) (1) Stanford University, U.S.A.; (2) Stanford University, U.S.A.

P3-86 Mutations conferring bacteriocin resistance in *Pseudomonas syringae* reduce virulence toward host plants.. K. HOCKETT (1), E. Carlson (2), D. Baltrus (3) (1) University of Arizona, School of Plant Sciences, U.S.A.; (2) University of Arizona, Dept. of Ecology and Evolutionary Biology, U.S.A.; (3) University of Arizona, School of Plant Sciences, U.S.A.

P3-87 A combination of comparative genomics and LAESI-MS facilitates the discovery of amino acid analogs produced by plant-associated bacteria. R. OKRENT (1), K. Trippe (1), V. Manning (1), E. Davis (2), C. Walsh (3) (1) USDA-ARS, U.S.A.; (2) Oregon State University, U.S.A.; (3) Protea Biosciences, Inc., U.S.A.

Plant Microbiome

P4-88 Unraveling *Pseudomonas syringae* pv. *actinidiae* intra and inter-species signalling. G. BURIANI (1), L. Fiorentini (2), V. Venturi (3), F. Spinelli (2) (1) University of Bologna, Italy; (2) University of Bologna, Italy; (3) ICGEB, Italy

P4-89 Phyllosphere bacterial communities structures on healthy and diseased kiwifruits. G. BURIANI (1), L. Orrù (2), A. Lamontanara (2), V. Michelotti (2), I. Donati (3), G. Tacconi (2), F. Spinelli (3) (1) University of Bologna, Italy; (2) Agricultural Research Council (CREA) Genomic Research Centre, Italy; (3) University of Bologna, Italy

P4-90 The effect of climate change and site on the above- and belowground bacterial endophytic communities of subalpine conifer seedlings. D. CARPER (1), A. Carrell (2), L. Kueppers (3), C. Frank (1) (1) University of California, Merced, U.S.A.; (2) Department of Biology, Duke University, U.S.A.; (3) Climate and Ecosystem Sciences Division, Lawrence Berkeley NaHonal Laboratory, U.S.A.

P4-91 Interplay between plant selenium hyperaccumulation and the bacterial rhizobiome. A. COCHRAN (1), J. Bauer (2), P. Lovecka (3), M. Sura de Jong (3), E. Pilon-Smits (1) (1) Department of Biology, Colorado State University, U.S.A.; (2) Department of Biology, Colorado State University, U.S.A.; (3) Department of Biochemistry and Microbiology, Institute of Chemical Technology, Czech Republic

P4-92 Effects of inoculation with beneficial *Serratia proteamaculans* S4 and *Verticillium longisporum* on structure and allocation of plant-derived C in root and rhizosphere communities of oilseed rape. K. GKARMIRI (1), S. Mahmood (2), B. Andersson (2), S. Alström (2), N. Högberg (2), R. Finlay (2), K. Gkarmiri (1) (1) Swedish University f Agricultural Sciences, Sweden; (2) Swedish University of Agricultural Sciences, Sweden

P4-93 Microbial Community Interactions Affect Induced Systemic Resistance in *Arabidopsis thaliana*. S. HARRIS (1), J. Corwin (1), M. Feltcher (1), E. Shank (1), J. Dangl (1) (1) University of North Carolina at Chapel Hill, U.S.A.

P4-94 Synthetic communities dissect bacterial contributions to plant phenotypes. S. HERRERA PAREDES (1), G. Castrillo Molina (2), J. Macalino Esteban (2), P. Pereira Lima Teixeira (2), M. Feltcher (2), E. Getzen (2), C. Jones (2), J. Dangl (2) (1) The University of North Carolina at Chapel Hill, U.S.A.; (2) The University of North Carolina at Chapel Hill, U.S.A.

P4-95 Deciphering the microbial mechanisms of biochar involved in suppression of fusarium crown and root rot in tomato. A. JAISWAL (1), Y. Elad (2), E. Graber (2), E. Cytryn (2), O. Frenkel (2) (1) Faculty of Agriculture, Hebrew University, Israel; (2) Agriculture Research Organization (ARO), The Volcani Center, Israel

P4-96 WITHDRAWN

P4-97 A plant-pathogen-microbiome disease triangle concept. J. KREMER (1), B. Paasch (2), S. He (3), J. Tiedje (4), B. Kvitko (5), J. Jerome (2) (1) Michigan State University, U.S.A.; (2) DOE Plant Research Laboratory, Michigan State University, U.S.A.; (3) Howard Hughes Medical Institute, Michigan State University DOE Plant Research Laboratory, U.S.A.; (4) Michigan State University Center for Microbial Ecology, U.S.A.; (5) University of Georgia Department of Plant Pathology, U.S.A.

P4-98 Functional analysis of Stp1, a secreted effector of *Ustilago maydis* essential for host colonization. L. LIANG (1), K. Schipper (2), L. Lo Presti (1), N. Ludwig (1), B. Zechmann (3), T. Glatter (1), R. Kahmann (1) (1) Max Planck Institute for Terrestrial Microbiology, Germany; (2) Heinrich Heine University Düsseldorf, Dept. Microbiology, Germany; (3) Baylor University, Center for Microscopy and Imaging, U.S.A.

P4-99 Impact of sugarcane rhizospheric selection on the Pseudomonas spp. community structure and genome evolution. L. LOPES (1), M. Pereira (2), E. Davis (3), A. Weisberg (3), C. Varize (2), J. Loper (3), J. Chang (3), F. Andreote (2) (1) University of Sao Paulo, Brazil; (2) University of Sao Paulo, Brazil; (3) Oregon State University, U.S.A.

P4-100 – P4-107 WITHDRAWN

P4-108 Investigating the role of rain as source of the tomato leaf microbiome.. M. MECHAN LLONTOP (1), L. Tian (1), V. Bernal Galeano (1), B. Vinatzer (1) (1) Virginia Tech, U.S.A.

P4-109 Microbial transformation of *Populus* higher-order salicylates by microbiome isolates. J. MORRELL-FALVEY (1), D. Pelletier (2), G. Hurst (2), A. Bible (2), K. Chourey (2), M. Denney (3), K. Kertesz (3), A. Zinkle (2), C. Doktycz (2), C. Timm (2), S. Lu (2), N. Engle (2), T. Tschaplinski (2), M. Doktycz (2) (1) Oak Ridge National Laboratory, U.S.A.; (2) Oak Ridge National Laboratory, U.S.A.; (3) University of Tennessee, U.S.A.

P4-110 Influence of plant host species on the root associated microbial community and functional redundancy of the root microbiome under phosphate starvation. T. MUCYN (1), S. Yourstone (1), S. Paredes (1), H. Cameron (2), G. Castrillo (1), N. Breakfield (3), J. Dangl (1) (1) University of North Carolina, U.S.A.; (2) BASF corporation, U.S.A.; (3) NewLeaf Symbiotics, U.S.A.

P4-111 Biogeographical diversity and host plant specificity of bacterial endophyte communities in arcto-alpine plants. R. NISSINEN (1), M. Kumar (2), J. van Elsas (3), A. Sessitsch (4) (1) University of Jyväskylä, Finland; (2) University of Jyväskylä, Finland; (3) University of Groningen, Netherlands; (4) Austrian Institute of Technology, Austria

P4-112 Role of the microbiome on the maturation of plant innate immunity. B. PAASCH (1), J. Kremer (1), B. Kvitko (2), J. Jerome (1), J. Tiedje (3), S. He (4) (1) Michigan State University DOE Plant Research Laboratory, U.S.A.; (2) University of Georgia Department of Plant Pathology, U.S.A.; (3) Michigan State University Center for Microbial Ecology, U.S.A.; (4) Howard Hughes Medical Institute, Michigan State University DOE Plant Research Laboratory, U.S.A.

P4-113 Constructed Communities of *Populus* and Bacterial Isolates to Study Microbiome Function. D. PELLETIER (1), C. Timm (2), A. Carrell (3), S. Jawdy (3), L. Gunter (3), Z. Yang (3), J. Aufrecht (3), T. Lu (3), N. Engle (3), T. Tschaplinski (4), G. Tuskan (3), M. Doktycz (3), D. Weston (3) (1) Biosceince Division, Oak Ridge National Laboratory, U.S.A.; (2) Bioscience Division, Oak Ridge National Laboratory, U.S.A.; (3) Biosceince Division, Oak Ridge National Laboratory, U.S.A.; (4) Biosceince Division, Oak Ridge National Laboratory, U.S.A.

P4-114 Soil tillage as a driver of the Oilseed rape microbiome. R. RATHORE (1), K. GERMAINE (1), D. BULGARELLI (2), D. FORRISTAL (3), J. SPINK (3), P. COTTER (4), D. DOWLING (1) (1) EnviroCore, Dept. of Science & Health, School of Science, Institute of Technology Carlow, Carlow, Ireland., Ireland; (2) University of Dundee at James Hutton Institute, Errol Road, Invergowrie, Dundee, DD2 5DA, Scotland, UK., Scotland; (3) Department of Crop Science, Teagasc Crops Research Centre, Oak Park, Carlow, Ireland., Ireland; (4) Teagasc Food Research Centre, Moorepark, Fermoy, Cork, Ireland., Ireland

P4-115 Prone to fix: Resilience of the active nitrogen-fixing rice root microbiome. B. REINHOLD-HUREK (1), M. Sabale (2), A. Sarkar (2), T. Hurek (1) (1) University of Bremen, Germany; (2) University of Bremen, Germany

P4-116 The Influence of the endosphere microbiome on Pierce's disease development in grapevine.. M. ROPER (1), J. Yang (2), J. Borneman (1), P. Ruegger (1), P. Rolshausen (1) (1) University of California, Riverside, U.S.A.; (2) National Taiwan University, Taiwan

P4-117 Soil type shapes the diversity of protists living in intimate association with *Arabidopsis thaliana*. M. SAPP (1), S. Ploch (2), M. Bonkowski (3), L. Rose (1) (1) Heinrich-Heine University, Germany; (2) Senckenberg Biodiversity and Climate Research Centre, Germany; (3) University of Cologne, Germany

P4-118 The *Populus* Microbiome Atlas Project - Dissecting the microbiome landscape of an important economic and ecological model.. C. SCHADT (1), M. Cregger (2), M. Crouch (2), A. Veach (2), Z. Yang (2), T. Lu (2), N. Cude (3), P. Busby (4), K. Hameed (4), R. Vilgalys (4), T. Rials (5), C. Pan (6), S. Jun (6), I. Nookaew (6), D. Ussery (2), M. Podar (2), S. Tringe (8), G. Tuskan (2), D. Pelletier (2) (1) Oak Ridge National Laboratory, U.S.A.; (2) Oak Ridge National Laboratory, U.S.A.; (3) Novozymes Corporation, U.S.A.; (4) Duke University, U.S.A.; (5) University of Tennessee, U.S.A.; (6) Oak Ridge National Laboratory, U.S.A.; (7) Oak Ridge National Laboratory, U.S.A.; (8) DOE Joint Genome Institute, U.S.A.

P4-119 Changes in phyllosphere microbiome - The dynamics of leaf city. S. KROLL (1), M. Agler (2), E. Kemen (2) (1) Max-Planck-Institute for Plant Breeding Research, Germany; (2) Max-Planck Institute for Plant Breeding Research, Germany; (3) Max-Planck Institute for Plant Breeding Research, Germany

P4-120 Sorghum microbiome discovery and characterization in nitrogen-limited soil for improved biomass production. D. CHINIQUY (1), D. Schachtman (2), J. Dangl (3), S. Tringe (1) (1) Joint Genome Institute, Lawrence Berkeley National Labs, U.S.A.; (2) University of Nebraska-Lincoln, U.S.A.; (3) University of North Carolina at Chapel Hill, U.S.A.

P4-121 Succession of endophytic bacteria in the mountain sorrel (*Oxyria digyna)*. C. GIVEN (1), E. Häikiö (2), M. Kumar (1), R. Nissinen (1) (1) University of Jyväskylä, Finland; (2) University of Eastern Finland, Finland

P4-122 Drought and Host Selection in the Grass Root Microbiome. D. COLEMAN-DERR (1), D. Naylor (2), S. Deng (2) (1) USDA-ARS, U.S.A.; (2) University of California at Berkeley, U.S.A.

POSTERS

Tritrophic Interactions and Biocontrol

P5-123 Deciphering the genomic and phenotypic diversity of plant-associated phenazine-producing *Pseudomonas* spp.. A. BIESSY (1), M. Filion (1) (1) Université de Moncton, Canada

P5-124 The topoisomerase IV ParE is a target of multiple Fic proteins. C. LU (1), E. Nakayasu (2), A. McCloskey (3), L. Zhang (4), Z. Luo (3) (1) Chian Agurictural University; Purdue University, U.S.A.; (2) Biological Sciences Division, Pacific Northwest National Laboratory, U.S.A.; (3) Purdue Institute for Inflammation, Immunology and Infectious Disease and Department of Biological Sciences, Purdue University, U.S.A.; (4) Department of Plant Pathology, China Agricultural University, China

P5-125 Phenazine-1-carboxylic acid production by *Pseudomonas fluorescens* LBUM636 alters *Phytophthora infestans*' growth and late blight development . A. NOVINSCAK (1), M. Filion (1), C. Morrison (1) (1) Université de Moncton, Canada

P5-126 Phenazine-1-carboxylic acid-producing *Pseudomonas fluorescens* LBUM223 represses the growth and alters the transcriptome of *Phytophthora infestans*. R. ROQUIGNY (1), D. Joly (1), M. Filion (1) (1) Université de Moncton, Canada

P5-127 From seed to whole plant: Seed defense priming by rhizobacteria and their metabolites. C. RYU (1), G. Song (1), H. Choi (1), Y. Kim (2) (1) KRIBB, South Korea; (2) KRICT, South Korea

P5-128 Foliar application of the leaf-colonizing yeast *Pseudozyma churashimaensis* elicits systemic defense of pepper against bacterial and viral pathogens . C. RYU (1), G. Lee (2), S. Lee (2), K. Kim (2) (1) KRIBB, Youseong, South Korea; (2) KRIBB, South Korea

P5-129 Analysis of suppression mechanism of grapevine crown gall disease by nonpathogenic *Rhizobium vitis* strain ARK-1. K. SAITO (1), M. Watanabe (1), H. Matsui (1), M. Yamamoto (1), Y. Ichinose (1), K. Toyoda (1), A. Kawaguchi (2), Y. Noutoshi (1) (1) Okayama University, Japan; (2) Okayama Prefecture, Japan

P5-130 Aboveground insect infestation attenuates belowground *Agrobacterium*-mediated genetic transformation. G. SONG (1), S. Lee (1), J. Hong (1), H. Choi (1), G. Hong (1), D. Bae (2), K. Mysore (3), Y. Park (1) (1) KRIBB, South Korea; (2) Gyeongsang National University, South Korea; (3) The Samuel Roberts Noble Foundation, South Korea

P5-131 The Sphagnum – microbiome: insights from field manipulations and synthetic communities. D. WESTON (1), A. Carrell (2) (1) Oak Ridge National Lab, U.S.A.; (2) Duke University, U.S.A.

P5-132 Bacterial secondary metabolites mediate cooperative and competitive interactions between rhizosphere microorganisms. Q. YAN (1), B. Philmus (2), J. Chang (3), J. Loper (4) (1) Oregon State University, U.S.A.; (2) Oregon State University, U.S.A.; (3) Oregon State University, U.S.A.; (4) USDA-ARS Horticultural Crops Research Laboratory, U.S.A.

P5-133 Molculuar mechanism of perceptive insect behaviour induced by Geminivirus. J. YE (1) (1) Institute Of Microbiology Chinese Academy of Sciences, China

P5-134 Cucumber mosaic virus has plant species-specific effects on host-vector interactions. T. TUNGADI (1), A. Murphy (1), A. Pate (1), J. Iqbal (1), J. Carr (1) (1) Department of Plant Sciences. University of Cambridge, United Kingdom

P5-135 Leaf transcriptomics reveals differing responses of Arabidopsis to colonization by ubiquitous phyllosphere colonizers with potential implications for plant health upon pathogen encounter. C. VOGEL (1), N. Bodenhausen (2), W. Gruissem (3), J. Vorholt (2) (1) Institute of Microbiology, ETH Zurich, Switzerland; (2) Institute of Microbiology, ETH Zurich, Switzerland; (3) Institute of Agricultural Sciences, ETH Zurich, Switzerland

P5-136 Exposure to subinhibitory concentrations of phenazine-1-carboxylic acid controls common scab of potato through transcriptomic changes in *Streptomyces scabies*. M. FILION (1), R. Roquigny (1), T. Arseneault (2), C. Goyer (3), A. Novinscak (1) (1) Université de Moncton, Canada; (2) University of Reading, United Kingdom; (3) Agriculture and Agri-Food Canada, Canada

MICROBES

Apoplastic Interactions

P6-137 Biochemical, structural, and functional characterization of the Avr4 core effector family in fungi.. L. CHEN (1), A. Kohler (2), A. Salvucci (3), N. Hurlburt (4), B. Schwessinger (3), A. Fisher (5), I. Stergiopoulos (3) (1) Department of Plant Pathology, UC Davis, U.S.A.; (2) Joint BioEnergy Institute (DOE), U.S.A.; (3) Department of Plant Pathology, UC Davis, U.S.A.; (4) Department of Chemistry, UC Davis, U.S.A.; (5) Department of Molecular and Cellular Biology, UC Davis, U.S.A.

P6-138 Sfa2 transcriptional regulator: a convergence node for fine tuning the expression of type III and VI secretion systems in *Pseudomonas syringae* pv. *tomato* DC3000. C. CHIEN (1), Y. Lu (2), N. Lin (1) (1) Department of Agricultural Chemistry, National Taiwan University, Taiwan; (2) Department of Agricultural Chemistry, National Taiwan University, Malaysia

P6-139 Specific protease activities induced in the apoplast of a resistant tomato cultivar in response to *Ralstonia solanacearum* infection. N. COLL (1), M. Planas-Marquès (1), J. Paulus (2), F. Kaschani (3), R. van der Hoorn (2), M. Valls (1) (1) Centre for Research in Agricultural Genomics, Spain; (2) Plant Chemetics Laboratory, Department of Plant Sciences, University of Oxford, United Kingdom; (3) Chemical Proteomics, Fakultät für Biologie, Zentrum für Medizinische Biotechnologie, Universität Duisburg-Essen, Germany

P6-140 Analysis by RNA-Seq of *Xylella fastidiosa* evidences transcriptional regulation exerted by calcium that is correlated with prolonged biofilm formation over time. L. DE LA FUENTE (1), J. Parker (1), H. Chen (1) (1) AUBURN UNIVERSITY, U.S.A.

P6-141 Dissecting the regulon of the two-component system CvsSR: Identifying new virulence genes in *Pseudomonas syringae* pv. *tomato* DC3000 . M. FISHMAN (1), P. Stodghill (2), M. Filiatrault (2) (1) Cornell University, U.S.A.; (2) USDA-ARS, U.S.A.

P6-142 Transcriptome analysis revealed a potential role of RXLR effectors during mating in *Phytophthora infestans*. T. GEORGIOS (1), R. Vetukuri (1), A. Åsman (1), J. Fogelqvist (1), C. Dixelius (1) (1) Swedish University of Agricultural Sciences, Sweden

P6-143 SOBIR1 plays a central role in signaling by receptor-like proteins. M. JOOSTEN (1), A. van der Burgh (1), J. Wu (1) (1) Wageningen University, Netherlands

P6-144 A cytotoxic effector from the wheat pathogen *Zymoseptoria tritici*. G. KETTLES (1), K. Kanyuka (1), J. Rudd (1) (1) Rothamsted Research, United Kingdom

P6-145 New approaches to access the *P. syringae* transcriptome *in planta*.. B. KVITKO (1), A. Lovelace (1), A. Smith (1) (1) University of Georgia, U.S.A.

P6-146 Novel effectors identified in the apoplast of *Cladosporium fulvum*-infected tomato. C. MESARICH (1), B. Okmen (2), H. Rovenich (2), M. Karimi Jashni (2), C. Wang (2), S. Griffiths (2), J. Collemare (2), C. Deng (3), P. de Wit (2) (1) Laboratory of Molecular Plant Pathology, Institute of Agriculture and Environment, Massey University, New Zealand; (2) Laboratory of Phytopathology, Wageningen University, Netherlands; (3) Breeding and Genomics, The New Zealand Institute for Plant and Food Research, New Zealand

P6-147 Duel function of Fly1 in *Ustilago maydis*-maize pathosystem. B. ÖKMEN (1), B. Kemerich (2), D. Hilbig (2), J. Aschenbroich (3), K. Schipper (3), G. Doehlemann (2) (1) University of Cologne, Germany; (2) University of Cologne, Germany; (3) Heinrich-Heine University, Germany

P6-148 It's a sticky business – the role of *Pseudomonas* exopolysaccharides and motility during plant infection. S. PFEILMEIER (1), C. Zipfel (2), J. Malone (3) (1) The Sainsbury Laboratory / John Innes Centre, United Kingdom; (2) The Sainsbury Laboratory, United Kingdom; (3) John Innes Centre, United Kingdom

P6-149 Finally: A Biochemical Function for the pathogenesis–related protein 1. J. GAMIR (1), P. van't Hof (2), R. Darwiche (2), R. Schneiter (2), F. Mauch (2) (1) Department of Biology/University of Fribourg, Switzerland; (2) Department of Biology/University of Fribourg, Switzerland

P6-150 Apoplastic Venom Allergen-like Proteins of Plant Parasitic Nematodes Modulate the Activation of Plant Innate Immunity by Cell Surface Receptors. J. LOZANO-TORRES (1), R. Wilbers (1), S. Warmerdam (1), A. Finkers-Tomczak (1), A. Diaz-Granados (1), C. van Schaik (1), J. Helder (1), J. Bakker (1), A. Goverse (1), A. Schots (1), G. Smant (1), J. Lozano-Torres (1) (1) Wageningen University/Laboratory of Nematology, Netherlands

P6-151 The repetitive *Ustilago maydis* effector Rsp3 shields hyphae and blocks the anti-fungal activity of a secreted maize protein. L. MA (1), C. Trippel (1), L. Wang (2), A. Mendoza-Mendoza (3), S. Ullmann (4), M. Moretti (1), S. Wawra (1), S. Reissmann (1), K. Münch (1), B. Zechmann (5), R. Kahmann (1) (1) Max Planck Institute for Terrestrial Microbiology, Germany; (2) Max Planck Institute for Heart and Lung Research, Germany; (3) Bio-Protection Research Centre, New Zealand; (4) Heinrich-Heine-Universität Düsseldorf, Germany; (5) Center for Microscopy and Imaging (CMI), Baylor University, U.S.A.

Cell Biology of Microbe-Host Interactions

P7-152 A histological and biochemical comparison of resistant and susceptible *Populus* genotypes inoculated with *Sphaerulina musiva*. N. ABRAHAM (1), P. Borowicz (2), J. Leboldus (3) (1) North Dakota State university, Plant pathology Dept #7660, U.S.A.; (2) North Dakota state university, U.S.A.; (3) Oregon state university, U.S.A.

P7-153 WITHDRAWN

P7-154 A bacterial effector targets host plasmodesmata to promote pathogen virulence in plants. K. AUNG (1), S. He (1) (1) Michigan State University, U.S.A.

P7-155 Host-specific gene induction in the plant parasitic nematode *Pratylenchus coffeae*. C. BELL (1), C. Lilley (1), H. Atkinson (1), J. McCarthy (1), P. Urwin (1) (1) University of Leeds, United Kingdom

P7-156 High-throughput FACS-based mutant screen identifies a gain?of?function allele of the *Fusarium graminearum* adenylyl cyclase causing deoxynivalenol over-production. A. BLUM (1), A. Benfield (2), J. Stiller (2), J. Batley (3), K. Kazan (4), D. Gardiner (2) (1) University of Queensland, CSIRO Agriculture, Australia; (2) CSIRO Agriculture, Australia; (3) University of Queensland, University of Western Australia, Australia; (4) CSIRO Agriculture, University of Queensland, Australia

P7-157 Giant cell wall molecular structure and role of plant cell wall related genes on development of *Meloidogyne incognita* . R. BOZBUGA (1), C. Lilley (1), J. Knox (1) (1) Centre for Plant Sciences, Faculty of Biological Sciences, University of Leeds, Leeds, West Yorkshire, United Kingdom

P7-158 The DinJ/RelE toxin-antitoxin system suppresses virulence in *Xylella fastidiosa*. L. BURBANK (1), D. Stenger (1) (1) USDA Agricultural Research Service, U.S.A.

P7-159 The bacterial pathogen *Pseudomonas syringae* suppresses MAMP-tiggered Ca2+ influx in a partly effector-independent manner. M. CAVDAR (1), R. Panstruga (1) (1) RWTH Aachen, Germany

P7-160 Virulence of *Pseudomonas syringae* pv. *tomato* DC3000 is modulated through the Catabolite Repression Control protein Crc. S. CHAKRAVARTHY (1), B. Butcher (1), K. D'Amico (2), Y. Liu (1), M. Filiatrault (2) (1) Cornell University, U.S.A.; (2) USDA/ARS, and Cornell University, U.S.A.

P7-161 Dissecting the role of NbRab small GTPase in different plant viruses. C. CHENG (1), P. Hou (1), P. Chen (1) (1) Tzu Chi University, Taiwan

P7-162 Promotion of *Bamboo mosaic virus* accumulation in *Nicotiana benthamiana* by 5'?3' exonuclease NbXRN4. L. CHENG-CHENG (1), M. Menghsiao (1) (1) National Chung Hsing University, Taiwan

P7-163 The sugarcane pathogen *Leifsonia xyli* subsp. *xyli* reduces plant growth by interfering in the development of the shoot apex . M. CICARELLI CIA (1), J. Rodrigues Marques (1), R. Cunha Antunes de Faria (1), L. Aranha Camargo (1) (1) University of São Paulo, Brazil

P7-164 Rerouting of selective autophagy towards the haustorial interface by Phytophthora infestans. Y. DAGDAS (1), K. Belhaj (1), A. Maqbool (2), A. Chaparro-Garcia (1), P. Pandey (3), N. Cruz-Mireles (1), B. Petre (1), N. Tabasum (3), R. Hughes (2), J. Sklenar (1), J. Win (1), F. Menke (1), K. Findlay (4), M. Banfield (2), T. Bozkurt (3), S. Kamoun (1) (1) The Sainsbury Laboratory, United Kingdom; (2) John Innes Centre, Department of Biological Chemistry, United Kingdom; (3) Imperial College, London, United Kingdom; (4) John Innes Centre, Department of Cell and Developmental Biology, United Kingdom

P7-165 Diversity of disease-supportive respiratory metabolism among phylotypes of *Ralstonia solanacearum*. B. DALSING (1), B. McDonald (1), D. Khokhani (1), J. Klassen (2), F. Ailloud (3), E. Gonzalez-Orta (4), A. MacIntyre (1), P. Prior (5), C. Allen (6) (1) University of Wisconsin-Madison, U.S.A.; (2) University of Connecticut, U.S.A.; (3) Cirad, France; (4) Sacramento State, U.S.A.; (5) INRA, France; (6) University of Wisconsin-Madison, U.S.A.

P7-166 Characterization of potential defense compound transporters in barley. M. EHLERT (1), H. Nour-Eldin (1), B. Møller (1), M. Lyngkjær (1) (1) Department of Plant and Environmental Sciences, Denmark

P7-167 *Candidatus* Liberibacter asiaticus carries a chromosomal CI phage repressor homolog that binds a bacteriophage promoter and may be required for prophage maintenance. L. FLEITES (1), M. Jain (1), S. Zhang (1) (1) University of Florida, U.S.A.

P7-168 Searching functional traits marker genes in biocontrol and hostile bacteria strains isolated from rhizosphere of wild plants and probed in *Capsicum annuum*. S. FRAIRE (1), I. Martínez-Raudales (1), K. Castro-Correa (2), Y. De la Cruz-Rodríguez (2), J. Vega-Arreguin (3), J. Larsen (4) (1) Universidad Autónoma de Zacatecas, Mexico; (2) Universidad Autónoma de Zacatecas, Mexico; (3) Escuela Nacional de Estudios Superiores, Universidad Nacional Autónoma de México, Campus León., Mexico; (4) Centro de Investigación en Ecosistemas, Universidad Nacional Autónoma de México, Campus Morelia., Mexico

P7-169 Cellobiose transport: the key to trigger virulence in the plant pathogenic bacterium *Streptomyces scabies*. J. SALAZAR (1), S. Jourdan (2), M. Kim (3), S. Rigali (2), R. Loria (3), I. Francis (1,3) (1) California State University Bakersfield, U.S.A.; (2) University of Liege, Belgium; (3) University of Florida, U.S.A.; (4) California State University Bakersfield, U.S.A.

P7-170 Solanaceous species recognise a novel PAMP from *Rhynchosporium commune*. B. FRANCO (1), A. Berepiki (1), P. Birch (2), K. Kanyuka (3), A. Avrova (1) (1) James Hutton Institute, United Kingdom; (2) University of Dundee, United Kingdom; (3) Rothamsted Research, United Kingdom

P7-171 Characterization of the infection cycle of *Phytophthora betacearum* on tree tomato (*Solanum betacearum)*. N. GUAYAZAN PALACIOS (1), M. Mideros Bastidas (1), G. Danies Turano (1), S. Restrepo Restrepo (2) (1) Universidad de Los Andes, Colombia; (2) Universidad de Los Andes, Colombia

P7-172 Autophagy is involved in assisting the replication of *Bamboo mosaic virus* in *Nicotiana benthamiana*. Y. HUANG (1), Y. Hsiao (1), . Li (1), Y. Hsu (1), C. Tsai (1) (1) Graduate Institute of Biotechnology, National Chung Hsing University, Taiwan; (2) Graduate Institute of Biotechnology, National Chung Hsing University, Taiwan

P7-173 Chloroplast Hsp70 isoform is required for efficient replication of *Bamboo mosaic virus* in old leaves of *Nicotiana benthamiana*. Y. HUANG (1), C. Hu (1), N. Lin (2), Y. Hsu (1) (1) Graduate Institute of Biotechnology, National Chung Hsing University, Taiwan; (2) Institute of Plant and Microbial Biology, Academia Sinica, Taiwan

P7-174 A retroelement-encoded effector of *Blumeria graminis* targets barley RACB for exploitation of a host cell developmental pathway. R. HÜCKELHOVEN (1), T. Reiner (2), B. Scheler (2), V. Schnepf (2), B. Zechmann (3), M. Nottensteiner (2) (1) Technische Universität München, Germany; (2) TU München, Germany; (3) Center for Microscopy and Imaging at Baylor University in Waco, Texas, U.S.A.

P7-175 The Type II secretion system mediates virulence for the xylem-limited pathogen, *Xylella fastidiosa*. B. INGEL (1), P. Wang (2) (1) University of California Riverside, U.S.A.; (2) University of California Riverside, U.S.A.

P7-176 Identification and functional characterization of a Bcl-2 associated athanogene in *Aspergillus nidulans*. . S. JAIN (1), N. Keller (1), M. Kabbage (1) (1) University of Wisconsin-Madison, U.S.A.

P7-177 Nutritional strategies of haustorial and nonhaustorial oomycete plant pathogens on Solanaceous hosts revealed by RNA-seq, metabolomics, fluorescent protein tagging, and gene silencing. H. JUDELSON (1), M. Kagda (1), M. Abrahamian (1), A. Ah Fong (1) (1) University of California, U.S.A.

P7-178 *Brachypodium distachyon* - A new model host for *Claviceps purpurea*. S. KIND (1), S. Schurack (1), J. Hinsch (2), P. Tudzynski (1) (1) University of Muenster, Germany; (2) University of Duesseldorf, Germany

P7-179 *Colletotrichum orbiculare* MOR is crucial for regulation of appressorium development and pathogenesis by communicating with plant-derived signals. S. KODAMA (1), J. ishizuka (1), I. Miyashita (1), T. Ishii (1), T. Nishiuchi (2), H. Miyoshi (3), Y. Kubo (1) (1) Graduate School of Life & Env Sciences, Kyoto Prefectural University, Japan; (2) Advanced Science Research Center, Kanazawa University, Japan; (3) Graduate School of Agriculture, Kyoto University, Japan

P7-180 ER stress sensor IRE1 is involved in pathogen induced cell death. C. KOERNER (1), K. Mukhtar (1), X. Liu (1) (1) University of Alabama at Birmingham, U.S.A.

P7-181 Phytopathological and molecular characterization of the partially *mlo*-virulent barley powdery mildew isolate HL-3. S. KUSCH (1) (1) RWTH Aachen University, Germany

P7-182 Arabidopsis SYNAPTOTAGMIN A plays a key role in membrane contact sites formation, virus movement and plasmodesmata regulation.. A. LEVY (1), S. Lazarowitz (2) (1) University of Florida, U.S.A.; (2) Cornell University, U.S.A.

P7-183 Discovery and functional profiling of *Phytophthora capsici* RXLR effectors in pepper plants. G. LIM (1), S. Oh (1) (1) Department of Applied Biology/Chungnam National University, South Korea

P7-184 Identification of a C2H2-type zinc-finger transcription factor that binds to the promoter of *Parastagonospora nodorum* Tox3 and is similar to Con7. S. LIN (1), Y. Chooi (2), P. Solomon (1) (1) Plant Sciences Division, Research School of Biology, The Australian National University, Australia; (2) School of Chemistry and Biochemistry, University of Western Australia, Australia

P7-185 *Arabidopsis thaliana* AtGCN2 kinase coordinates translational regulation and plant immune responses. X. LIU (1), K. Pajerowska-Mukhtar (1) (1) University of Alabama at Birmingham, U.S.A.

P7-186 PXO_03177 encoding a hypothetical protein from Xanthomonas oryzae pv. oryzae is involved in polysaccharide production, stress tolerance, biofilm formation and virulence. F. LIU (1), G. Qian (2), G. Wu (1), Y. Zhao (1) (1) Institute of Plant Protection, Jiangsu Academy of Agricultural Sciences, China; (2) College of Plant Protection, Nanjing Agricultural University, China

P7-187 Antimicrobial mechanism of peptides derived from *Trichoderma*. S. LIU (1), H. Lin (2), M. Hsieh (1), K. Peng (2) (1) Department of Molecular Biotechnology, Da-Yeh University, Taiwan; (2) Department of Life Science, National Dong Hwa University, Taiwan

P7-188 Investigating the mechanisms of fungal effector uptake by plant cells. L. LO PRESTI (1), S. Uszkoreit (1), T. Heimerl (2), R. Kahmann (1) (1) Max Planck Institute For Terrestrial Microbiology, Germany; (2) Philipps University Marburg, Germany

P7-189 Subversion of FLS2 subcellular transport by the bacterial effector HopM1.. J. LOISEAU (1), M. Schattat (2) (1) The Sainsbury Laboratory, United Kingdom; (2) Martin Luther University Halle-Wittenberg, Germany

P7-190 Hydroxynitrile glucosides in barley and their involvement in disease resistance. M. LYNGKJAER (1), E. Eva Knoch (1), P. Roelsgaard (1), C. Olsen (1) (1) Department of Plant and Environmental Science, University of Copenhagen, Denmark

P7-191 Effects of movement protein mutants on *Ourmiavirus* infection, and their co-localization with plant cytoskeleton and organelles . P. MARGARIA (1), C. Anderson (1), M. Turina (2), C. Rosa (1) (1) Pennsylvania State University, U.S.A.; (2) Institute for Sustainable Plant Protection, Italy

P7-192 *De novo* asparagine biosynthesis by *Magnaporthe oryzae* is required for fungal proliferation in rice cells . M. MARROQUIN-GUZMAN (1), R. Wilson (1) (1) University of Nebraska-Lincoln, U.S.A.

P7-193 A quorum sensing-defective mutant of *Pectobacterium carotovorum* subsp. *brasiliense* 1692 is attenuated in virulence and unable to occlude xylem tissue of susceptible potato plant stems. L. MOLELEKI (1), R. Pretorius (1), C. Tanui (1), G. Mosina (1) (1) University of Pretoria, South Africa

P7-194 Multiple quorum-sensing systems in phenazine-producing *Pseudomonas chlororaphis* subsp. *aurantiaca* StFRB508. T. MOROHOSHI (1), T. Yamaguchi (1), N. Someya (2), T. Ikeda (1) (1) Utsunomiya University, Japan; (2) National Agriculture and Food Research Organization (NARO), Japan

P7-195 Air humidity is a circadian Zeitgeber influencing plant-microbe interactions. M. MWIMBA (1) (1) Duke University, U.S.A.

P7-196 Analyses of the functions of *Magnaporthe oryzae ATR* gene with an efficient vector set for AtMT transgenesis of filamentous fungus.. M. NARUKAWA-NARA (1), Y. Hirato (2), K. Baba (2), T. Yasuda (2), T. Kamakura (2) (1) Tokyo University of Science, Japan; (2) Tokyo University of Science, Japan

P7-197 Diverse host targets of a conserved *Pseudomonas syringae* effector form an ARF-GEF-based complex in Arabidopsis. K. NOMURA (1) (1) MSU, U.S.A.

P7-198 Spatiotemporal imaging analysis of syncytium formation process induced by *Heterodera glycines* using two-photon excitation microscopy. M. OHTSU (1), T. Suzaki (2), Y. Sato (3), D. Kurihara (4), M. Kawaguchi (5), D. Maruyama (3), T. Higashiyama (3) (1) Graduate School of Science, Nagoya University, Japan; (2) Gene Research Center, Tsukuba University, Japan; (3) WPI-ITbM, Nagoya University, Japan; (4) JST ERATO, Nagoya University, Japan; (5) National Institute for Basic Biology, Japan

P7-199 A two genes – for – one gene interaction between *Leptosphaeria maculans* and *Brassica napus*. Y. PETIT (1), A. Degrave (2), M. Meyer (2), F. Blaise (2), B. Ollivier (2), T. Rouxel (2), I. Fudal (2), M. Balesdent (2) (1) French National Institute for Agronomical Research, France; (2) INRA/AgroParisTech UMR1290 BIOGER, France

P7-200 Fumonisin B1 produced *in planta* by *Fusarium verticillioides* is associated with inhibition of maize ß-1,3-glucanase activity . J. PLASENCIA (1), E. Galeana-Sanchez (2), D. Sanchez-Rangel (3), M. de la Torre-Hernandez (2) (1) Departamento de Bioquimica, Facultad de Quimica, UNAM, Mexico; (2) Departamento de Bioquimica, Facultad de Quimica, UNAM, Mexico; (3) Instituto de Ecologia, A.C., Mexico

P7-201 Multiple *Xanthomonas euvesicatoria* type III effectors inhibit flg22-triggered immunity. G. POPOV (1), M. Fraiture (2), F. Brunner (2), G. Sessa (3) (1) Department of Molecular Biology and Ecology of Plants, Tel-Aviv University, Israel; (2) Department of Biochemistry, Centre for Plant Molecular Biology, Eberhard Karls University, Germany; (3) Department of Molecular Biology and Ecology of Plants, Tel-Aviv University, Israel

P7-202 Contribution of cell surface carbohydrates to the *Xylella fastidiosa*-grapevine interaction. J. RAPICAVOLI (1), B. Blanco-Ulate (2), R. Figueroa-Balderas (2), A. Morales-Cruz (2), D. Cantu (2), M. Roper (1) (1) University of California, U.S.A.; (2) University of California, U.S.A.

P7-203 Characterizing roles for lactate metabolism in rice blast disease: new insights into post-penetrative host infection strategies by *Magnaporthe oryzae*. R. ROCHA (1) (1) University of Nebraska-Lincoln, U.S.A.

P7-204 An aphid effector interacts with a host protein involved in trafficking in a species-specific manner. P. RODRIGUEZ (1), C. Escudero (2), J. Bos (3) (1) James Hutton Institute, United Kingdom; (2) James Hutton Institute / University of Dundee, United Kingdom; (3) James Hutton Institute / University of Dundee, United Kingdom

P7-205 The Regulation of Invasive Cell-to-Cell Movement during Tissue Colonisation by the Rice Blast Fungus. W. SAKULKOO (1), G. Littlejohn (1), M. Oses-Ruiz (1), N. Talbot (1) (1) Biosciences, University of Exeter, United Kingdom

P7-206 Identification of quorum sensing-regulated virulence genes in plant pathogen *Pantoea ananatis*.. R. SATO (1), T. Ikeda (1), T. Morohoshi (1) (1) Utsunomiya University, Japan

P7-207 Molecular understanding of parasitic plants' ability to avoid auto-parasitism and invade others. S. SAUCET (1), K. Shirasu (2) (1) RIKEN CSRS, Japan; (2) RIKEN CSRS, Japan

P7-208 Development of an expression assay probing the ability of the P6 effector of *Cauliflower mosaic virus* expressed *in trans* to support virion accumulation.. J. SCHOELZ (1), Y. Zhang (1), A. Mustafa (1), R. Nelson (2), C. Angel (3) (1) University of Missouri, U.S.A.; (2) The Samuel Roberts Noble Foundation, U.S.A.; (3) Cenicana, Colombia

P7-209 Investigating redundant roles by Myosin XI-K, Myosin XI-2 and CHUP1 during *Cauliflower mosaic virus* infection of *Arabidopsis thaliana*. J. SCHOELZ (1), C. Angel (2), A. Rodriguez (1), Y. Zhang (1), P. Harries (3), R. Nelson (4) (1) University of Missouri, U.S.A.; (2) Cenicafe, Colombia; (3) Pittsburgh State University, U.S.A.; (4) The Samuel Roberts Noble Foundation, U.S.A.

P7-210 The *Magnaporthe oryzae RSR1* gene regulates fungal antioxidation and is essential for host ROS neutralization during rice cell invasion . L. SEGAL (1), R. Wilson (1) (1) University of Nebraska-Lincoln, U.S.A.

P7-211 Histopathological study of compatible and incompatible interactions between barley and the spot blotch fungus *Bipolaris sorokiniana*. S. SHRESTHA (1), R. Sharma Poudel (1), P. Borowicz (1), S. Zhong (1) (1) North Dakota State University, U.S.A.

P7-212 Genome elements in *Rhodococcus fascians* D188 and PBTS *Rhodococcus* spp. . R. STAMLER (1), D. Vereecke (2), I. Francis (3), J. Randall (4) (1) New Mexico State University, U.S.A.; (2) Ghent University, Belgium; (3) California State University Bakersfield, U.S.A.; (4) New Mexico State University, U.S.A.

P7-213 Glucose-TOR signaling regulates cell cycle progression and autophagy during appressorium development by the rice blast fungus *Magnaporthe oryzae*. G. SUN (1), M. Marroquin-Guzman (1), R. Wilson (1) (1) Department of Plant Pathology, U.S.A.

P7-214 A protein deubiquitinating enzyme important for basal defence. H. THORDAL-CHRISENSEN (1), T. Schultz-Larsen (1), A. Lenk (1) (1) Department of Plant and Environmental Sciences, University of Copenhagen, Denmark

P7-215 The defense gene NbEILP from *Nicotiana benthamiana* plays a role in assisting the cell-to-cell movement of *Bamboo mosaic virus*. C. TSAI (1), I. Chen (2) (1) National Chung Hsing University, Taiwan; (2) National Chung Hsing University, Taiwan

P7-216 Assessing the alleged immobility of the phytopathogenic actinomycete *Rhodococcus fascians*. D. VEREECKE (1), P. Lambert (2), R. Stamler (2), I. Francis (3), J. Randall (2) (1) Ghent University, Belgium; (2) New Mexico State University, U.S.A.; (3) California State University Bakersfield, U.S.A.

P7-217 The difficult search for the target of *Xanthomonas oryzae* pv. oryzicola virulence factor Tal11b. L. WANG (1), A. Bogdanove (2), L. Wang (3) (1) Cornell University, U.S.A.; (2) Plant Pathology and Plant-Microbe Biology Section, School of Integrative Plant Science, 334 Plant Sc, U.S.A.; (3) Plant Pathology and Plant-Microbe Biology Section, School of Integrative Plant Science, Cornell university, U.S.A.

P7-218 Lysine biosynthesis and secondary metabolite production in *F. graminearum* . G. WIESENBERGER (1), C. Schüller (1), M. Peruci (2), A. Parich (3), A. Malachová (3), F. Berthiller (3), R. Schuhmacher (3), G. Adam (1) (1) University of Natural Resources and Life Sciences, Vienna (BOKU), Department of Applied Genetics and Cell Biology, Austria; (2) University of Natural Resources and Life Sciences, Vienna (BOKU), Department of Applied Genetics and Cell Biology, Austria; (3) University of Natural Resources and Life Sciences, Vienna (BOKU), IFA Tulln, Center for Analytical Chemistry, Austria

P7-219 Idenfication and characterization of *SSD6* in *Arabidopsis*. W. XIE (1) (1) University of Copenhagen, Denmark

P7-220 EFR-induced plant immunity can be effective against *Pseudomonas syringae* infection and Agrobacterium transformation.. F. YANG (1), M. Guo (1), G. Felix (3), J. Alfano (4) (1) Center for Plant Science Innovation and the Department of Plant Pathology, University of Nebraska, U.S.A.; (2) Center for Plant Science Innovation and the Department of Plant Pathology, University of Nebraska, U.S.A.; (3) Center of Plant Molecular Biology, University Tübingen, Germany; (4) Center for Plant Science Innovation and the Department of Plant Pathology, University of Nebraska, U.S.A.

P7-221 Novel methodology for improving cell biology of yeast for the investigation of interactions between Blumeria graminis and hosts. S. YU (1), A. Henderson (1), A. Dawson (1), R. Woodruff (1), E. Lockyer (1), E. Read (1), G. Sritharan (1), M. Ryan (1), M. Sgroi (1), P. Ngou (1), Y. Liu (1), Y. Xiang (1), R. Zhang (1) (1) Imperial College London, United Kingdom

P7-222 The dual-specificity protein phosphatase MoYvh1 functions upstream of MoPdeH to regulate the development and pathogenicity in *Magnaporthe oryzae*. H. ZHANG (1), X. Liu (1), B. Qian (1), C. Gao (1), X. Zheng (1), Z. Zhang (1) (1) Nanjing Agricultural University, China

P7-223 Actin dynamics contribute to the innate immune response of Arabidopsis. C. STAIGER (1), J. Li (2), J. Henty-Ridilla (2), L. Cao (2), J. Chang (3), B. Day (4) (1) Purdue University, U.S.A.; (2) Purdue University, U.S.A.; (3) Oregon State University, U.S.A.; (4) Michigan State University, U.S.A.

P7-224 A *Pseudomonas syringae* type III effector uses calmodulin as co-factor to target the microtubule network. M. GUO (1), P. Kim (2), G. Li (1), C. Elowsky (3), J. Alfano (1) (1) Center for Plant Science Innovation, University of Nebraska-Lincoln, U.S.A.; (2) School of Biological Sciences, University of Nebraska-Lincoln, U.S.A.; (3) Center for Biotechnology, University of Nebraska-Lincoln, U.S.A.

P7-225 The IRE1/bZIP60 pathway are activated by potexvirus and potyvirus small membrane binding proteins and suppress virus infection. J. VERCHOT (1), D. Halterman (2), O. Arias (1), L. Pena (1), A. VelaArias (3) (1) Oklahoma State University, U.S.A.; (2) USDA/ARS Vegetable Crops Research Unit, U.S.A.; (3) Universidad de las Fuerzas Armadas – ESPE, Quito Ecuador, Ecuador

P7-226 Role of *Rhg1*-encoded a-SNAPs in *Rhg1*-Mediated Resistance to Soybean Cyst Nematode. A. BAYLESS (1), J. Smith (1), J. Song (1), P. McMinn (1), A. Bent (1) UW-Madison, U.S.A.

POSTERS

Inter-Kingdom Signaling

P8-227 Volatile signals from non-host plants deter growth and aflatoxin production by the fungus *Aspergillus*. M. BRODHAGEN (1), R. Kelsey (2), J. Young (3), A. Batson (4), J. Levy (3), J. McCollum (5), B. Kinash (6) (1) Western Washington University, U.S.A.; (2) US Forest Service, U.S.A.; (3) Western Washington University, U.S.A.; (4) Adaptive Symbiotic Technologies, U.S.A.; (5) Infectious Disease Research Institute, U.S.A.; (6) Twiss Labs, U.S.A.

P8-228 *Pseudomonas syringae* pv. *tomato* oxidative stress-regulated transcription factors play an important role for virulence in tomato and *Arabidopsis*. Y. ISHIGA (1), Y. Ichinose (2) (1) University of Tsukuba, Japan; (2) Okayama University, Japan

P8-229 Phytostimulation of drought stressed Arabidopsis by *B. phytofirmans* PsJN results from an interplay among contact-dependent induction of stress tolerance and volatile-mediated plant growth promotion. T. LEDGER (1), J. Tamayo (1), S. Rojas (1), J. Poupin (2) (1) Universidad Adolfo Ibáñez, Chile; (2) Universidad Adolfo Ibáñez, Chile

P8-230 Co-option of bacterial quorum sensing for interkingdom signaling. B. GONCALVES COUTINHO (1), A. Schaefer (2), Y. Oda (2), D. Pelletier (3), V. Venturi (4), C. Harwood (2) (1) University of Washington, U.S.A.; (2) University of Washington, U.S.A.; (3) Oak Ridge National Laboratory, U.S.A.; (4) ICGEB, Italy

P8-231 A *gacA*- mutant of *Pseudomonas syringae* hyper-responds to type III secretion-inducing plant signals yet is less virulent. M. O'MALLEY (1), S. Peck (2), J. Anderson (1) (1) Department of Botany & Plant Pathology, Oregon State University, U.S.A.; (2) Division of Biochemistry, University of Missouri, U.S.A.

P8-232 Interkingdom chemical crosstalk across the plant-microbe interface during Rice Blast. N. NAQVI (1), R. Patkar (1), Z. Qu (1), F. Yang (1) (1) Temasek Life Sciences Laboratory, Singapore

Microbial Manipulation of the Host

P9-233 How does "RALPH" effector BEC1054 work? Investigating the mode of action of an RNAse-Like effector Protein associated with Haustoria in barley powdery mildew. P. SPANU (1), M. Przydacz (1), H. Pennington (1), R. Jones (1) (1) Imperial College London, United Kingdom

P9-234 The impact of heavy metal contamination on particular ectomycorrhizal fungi and associated plant hosts. J. VELEZ (1), J. Velez (1) (1) University of Tennessee Knoxville, U.S.A.

P9-235 A remorin protein from tobacco is targeted by the Pseudomonas type III effector protein HopZ1a: evidence for a novel virulence mechanism?. P. ALBERS (1), S. Üstün (1), C. Schroeder (2), K. Witzel (1), F. Börnke (1) (1) Leibniz-Institute of Vegetable and Ornamental Crops (IGZ), Germany; (2) Institute for Biochemistry and Biology, University of Potsdam, Germany

P9-236 The *in planta* regulon of the major *Ralstonia solanacearum* virulence regulator PhcA. C. Allen (1), D. Khokani (1), T. Tran Minh (1) (1) UW-Madison, U.S.A.

P9-237 Cell death inducing activity of the *Phytophthora capsici* effector CRN83_152 can be uncoupled from its virulence function(s). T. AMARO (1), G. Thilliez (1), R. McLeod (1), E. Huitema (2) (1) Division of Plant Sciences, University of Dundee, United Kingdom; (2) Division of Plant Sciences, University of Dundee, United Kingdom

P9-238 Proteomics identifies infection-specific proteins of *Rhizoctonia solani*, insight into adaptation to different plant hosts and a thaumatin that enhances host susceptibility.. J. ANDERSON (1), J. Hane (2), T. Stoll (3), N. Pain (1), M. Hastie (3), P. Kaur (1), C. Hoogland (4), J. Gorman (3), K. Singh (1) (1) CSIRO Agriculture, Australia; (2) Curtin University, Australia; (3) QIMR Berghofer Medical Research Institute, Australia; (4) QIMR Berghofer Medical Research Institute, Australia

P9-239 Translocation of RXLR effector Pi04314 from *Phytophthora infestans* into plant cells to form holoenzymes with host protein phosphatase PP1c. P. BIRCH (1), P. Boevink (2), S. Wang (1), X. Wang (3), H. McLellan (3), S. Naqvi (3), Q. He (3), M. armstrong (4), Z. Tian (5), I. hein (4), E. Gilroy (4), S. whisson (4) (1) University of Dundee, United Kingdom; (2) James Hutton Institute, United Kingdom; (3) University of Dundee, United Kingdom; (4) James Hutton Institute, United Kingdom; (5) Huazhong Agricultural University, China

P9-240 Unconventional effects of TAL effectors. N. BOOHER (1), S. Carpenter (2), Z. Dubrow (1), N. Falahi-Charkhabi (2), Y. He (1), L. Kladsuwan (1), A. Read (2), P. Singh (2), L. Wang (2), K. Wilkins (2), L. Maron (2), T. Tuan (4), B. Szurek (4), A. Bogdanove (1) (1) Cornell University, U.S.A.; (2) Cornell University, U.S.A.; (3) Cornell University, U.S.A.; (4) IRD, Montpelier, France

P9-241 The *Xanthomonas* type-III effector XopS interferes with proteasomal turnover of a WRKY transcription factor to dampen the induction of plant defense responses. F. BÖRNKE (1), S. Üstün (1), D. van Thiel (1) (1) Leibniz-Institute for Vegetable and Ornamental Crops, Germany

P9-242 Impact of Type VI Secretion System (T6SS) effectors on *Arabidopsis thaliana* transformation in *A. tumefaciens*. J. BRAVO (1), A. Kenefick (2), B. Nguyen (2), J. Kim (2), R. Froom (2), A. Resnick (2), L. Banta (2) (1) Williams College, U.S.A.; (2) Williams College, U.S.A.

P9-243 Investigation of pathogenicity determinants in a hemibiotrophic ascomycete *Leptosphaeria maculans*. L. BURKETOVA (1), M. Novakova (1), D. Stehlik (2) (1) Institute of Experimental Botany, Academy of Sciences of the Czech Republic, Czech Republic; (2) University of Chemistry and Technology Prague, Faculty of Food and Biochemical Technology, Czech Republic

P9-244 Identification and characterisation of a new flax rust effector. A. CATANZARITI (1), S. Williams (1), C. Anderson (1), J. Ellis (2), P. Dodds (2), A. Hardham (1), D. Jones (1) (1) Research School of Biology, Australian National University, Australia; (2) CSIRO Agriculture, Australia

P9-245 The role of the phytotoxin coronatine in symptom development and growth in *Nicotiana benthamiana*. S. CHAKRAVARTHY (1), J. Worley (1), P. Parrish (2), A. Collmer (1) (1) Cornell University, U.S.A.; (2) Davidson College, U.S.A.

P9-246 Structural and functional analyses of *Phytophthora sojae* RxLR effector PSR2 reveal functional domains for host RNA silencing suppression activity. D. CHOI (1), J. He (2), S. Duan (1), J. Ma (2), W. Ma (1) (1) University of California, Riverside, U.S.A.; (2) Fudan University, China

P9-247 An endophytic bacterium, *Bacillus velezensis* YC7010 induces systemic resistance against brown planthopper in rice. Y. CHUNG (1), H. Rhasid (1), A. Khan (1), M. Hossain (2), J. Hwang (1) (1) Gyeongsang National University, South Korea; (2) Regional Agricultural Research Station, Bangladesh

P9-248 The smut fungus *Thecaphora thlaspeos* colonizes the model plant *Arabidopsis thaliana* . K. COURVILLE (1), L. Frantzeskakis (1), K. Bösch (1), R. Kellner (2), M. Feldbrügge (1), V. Göhre (1) (1) University of Düsseldorf, Germany; (2) Max Planck Institute for Plant Breeding, Germany

P9-249 BARLEY POWDERY MILDEW METALLO-PROTEASE-LIKE EFFECTOR: A UNIVERSAL VIRULENCE FACTOR IN FUNGI?. S. DAS GUPTA (1), M. Urban (2), G. Scalliet (3), K. Hammond-Kosack (2), L. Bindschedler (1) (1) Royal Holloway, University of London, United Kingdom; (2) Rothamstead Research, United Kingdom; (3) Syngenta, Switzerland; (4) Royal Holloway, University of London, United Kingdom

P9-250 Harnessing power of fungal endophytes that enhance plants to tolerate abiotic stress. K. DASTOGEER (1), H. Li (1), K. Sivasithamparam (1), M. Jones (1), S. Wylie (1) (1) Murdoch University, Australia

P9-251 Uncovering root microbiome functions by advanced metagenomics. R. DE JONGE (1), Y. Van de Peer (2), C. Pieterse (1) (1) Utrecht University, Netherlands; (2) University of Ghent - VIB, Belgium

P9-252 A TAL effector from *Xanthomonas oryzae* pv. oryzicola may contribute to virulence by targeting a transcription factor. Z. DUBROW (1), L. Wang (1), A. Bogdanove (1) (1) Cornell University, U.S.A.

P9-253 Every Jack has his Jill: Unveiling nuclear host targets of *Phytophthora capsici* RxLR effectors. S. ENGELHARDT (1), A. Howden (1), S. ten Have (2), E. Huitema (1) (1) Division of Plant Sciences, University of Dundee; Dundee Effector Consortium, Dundee, UK, United Kingdom; (2) Wellcome Trust Centre for Gene Regulation and Expression, University of Dundee, United Kingdom

P9-254 Characterization of VP2145, a Putative Histone Deacetylase T3SS Effector from *Vibrio parahaemolyticus*. J. FERNANDEZ (1), P. Li (1), K. Orth (1) (1) UT Southwestern Medical Center, U.S.A.

P9-255 Investigating the role of secreted citrus proteases during HLB progression. J. FRANCO (1), G. Coaker (1) (1) University of California, Davis, U.S.A.

P9-256 A secreted root-knot nematode effector that disrupts the plant actin cytoskeleton. C. GLEASON (1), N. Leelarasamee (1) (1) Georg August University, Germany

P9-257 Determination of Virulence Contributions from *Phytophthora infestans* Effectors IPI-O1 and IPI-O4. Y. CHEN (1), D. Halterman (2) (1) Department of Horticulture, University of Wisconsin-Madison, U.S.A.; (2) U.S. Department of Agriculture-Agricultural Research Service, U.S.A.

P9-258 A simple test system for customized endonucleases and homology-directed genome editing. G. HENSEL (1), N. Budhagatapalli (2), S. Schedel (2), S. Hiekel (2), T. Rutten (2), J. Kumlehn (2) (1) Leibniz Institute of Plant Genetics and Crop Plant Research (IPK) Plant Reproductive Biology Correns, Germany; (2) Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Germany

P9-259 Suppression of basal defenses in the syncytium of the cyst nematode *Heterodera schachtii* by Arabidopsis miR827. T. HEWEZI (1), S. Piya (2), M. Qi (3), B. Muthukumar (2), J. Rice (2) (1) University of Tennessee, U.S.A.; (2) University of Tennessee, U.S.A.; (3) Iowa State University, U.S.A.

P9-260 Host-induced gene silencing of *Phakopsora pachyrhizi* genes in soybean mediated by the *bean pod mottle virus*. D. HU (1), Z. Chen (1) (1) Department of Plant Pathology and Crop Physiology, Louisiana State University Agricultural Center, U.S.A.

P9-261 An oomycete avirulence effector stabilizes a plant RNA binding protein to subvert host immunity. J. HUANG (1), J. Huang (2) (1) Nanjing Agricultural University, China; (2) Nanjing Agricultural University, Nanjing, China, China

P9-262 Transcriptional profiling and effector identification of the *Exserohilum turcicum-Zea mays* interaction. M. HUMAN (1), O. Bezuidt (1), D. Berger (1), B. Crampton (1) (1) University of Pretoria, South Africa

P9-263 *Xanthomonas oryzae*-triggered production of rice small RNAs during infection. J. JACOBS (1), G. Reshetnyak (1), F. Auguy (1), A. Perez-Quintero (1), C. Medina (2), R. Koebnik (1), B. Szurek (1), S. Lacombe (3), S. Cunnac (1) (1) IRD-Montpellier, France; (2) INRA, France; (3) IRD-Montpellier, France

P9-264 Absence of a functional glyoxalase system in *Candidatus* Liberibacter asiaticus confirms that the bacterium scavenges host cells for its energy requirements. M. JAIN (1), L. Fleites (2), S. Zhang (2), D. Gabriel (2) (1) Department of Plant Pathology, University of Florida, U.S.A.; (2) Department of Plant Pathology, University of Florida, U.S.A.

P9-265 Genetic variation of *Magnaporthe oryzae* avirulence genes, *AVR-PiK* and morphological characterization of rice blast isolates in Thailand. C. JANTASURIYARAT (1), A. Longya (1), T. Sirisathaworn (1), C. Chaipanya (1) (1) Department of Genetics, Faculty of Science, Kasetsart University, Chatuchak, Bangkok 10900, Thailand, Thailand

P9-266 Interaction of the human pathogen *Shigella* with *Arabidopsis* plants. S. JO (1), M. Lee (2), J. Lee (2), D. Lee (2), C. Ryu (2), M. Kim (2), J. Park (2) (1) UST/KRIBB, South Korea; (2) KRIBB, South Korea

P9-267 Investigating a potential role for SQUAMOSA promoter-binding protein (SBP) transcription factors as positive regulators of programmed cell death in tomato. R. KESSENS (1) (1) University of Wisconsin - Madison, U.S.A.

P9-268 Cytokinins synthesized by the biotrophic fungus *Claviceps purpurea* are essential for a compatible rye-fungus interaction. J. HINSCH (1), S. Kind (2), P. Galuszka (3), P. Tudzynski (2) (1) University of Duesseldorf, Germany; (2) University of Muenster, Germany; (3) Centre of Molecular Biology and Genetics of the Palacký University, Czech Republic

P9-269 A *Phytophthora* RxLR effector modulate host immunity by regulating histone acetylation. L. KONG (1), X. Qiu (2), J. Kang (2), Y. Wang (2), M. Qiu (2), Y. Lin (2), G. Kong (2), J. Huang (2), W. Ye (2), Y. Wang (2), S. Dong (2), Y. Wang (2) (1) Plant Pathology Department, Nanjing Agricultural University,Nanjing, China, China; (2) Plant Pathology Department, Nanjing Agricultural University,Nanjing, China, China

P9-270 Perturbation of maize metabolism influences susceptibility to *Ustilago maydis*. M. KRETSCHMER (1), D. Croll (1), J. Kronstad (1) (1) Michael Smith Laboratories, The University of British Columbia, Canada

P9-271 A new hypovirulence associated mycovirus from *Fusarium* spp. isolated from apple orchards. S. KULSHRESTHA (1), M. Sharma (1) (1) Shoolini University of Biotechnology and Management Sciences, India

P9-272 N-Acetylglucosamine metabolism is crucial during infectious hyphal growth and virulence of the rice blast fungus *Magnaporthe oryzae*. A. KUMAR (1), S. Ghosh (2), D. Bhatt (3), A. Narurla (4), A. Datta (3) (1) National Institute of Plant Genome Research (NIPGR), India; (2) Central Institute of Medicinal and Aromatic Plants, India; (3) National Institute of Plant Genome Research, India; (4) Hamdard University, India

P9-273 *Pseudomonas syringae* DC3000-derived auxin contributes to Virulence on Arabidopsis. B. KUNKEL (1), S. McClerklin (1), S. Lee (1), R. Nwumeh (1) (1) Washington University in St. Louis, U.S.A.

P9-274 Tackling organ-specificity in the potato – late blight interaction. A. LACAZE (1), F. Sormany (1) (1) Université de Moncton, Canada

P9-275 Global expression profiling of the corn smut fungus reveals unprecedented insights into how its metabolism and effectors are used in the plant environment.. D. LANVER (1), A. Müller (1), G. Schweizer (1), N. Ludwig (1), F. Haas (2), J. Altmüller (3), S. Rensing (2) (1) Max-Planck-Institute for Terrestrial Microbiology, Germany; (2) Philipps University Marburg, Germany; (3) Cologne Center for Genomics, Germany

P9-276 A bacterial effector that suppresses activation of specific members of MAMP-activated MAPKs.. J. LEE (1), L. Eschen-Lippold (1), D. Scheel (1) (1) Leibniz Institute of Plant Biochemistry, Germany

P9-277 Cleavage of BAK1 by a *Pseudomonas syringae* effector to subvert plant innate immunity.. L. LEI (1), K. Panya (2), Y. Liping (1), C. Gaihong (3), C. She (3), A. James (4), Z. Jian-Min (1) (1) State Key Laboratory of Plant Genomics, Institute of Genetics and Developmental Biology, CAS, China; (2) Center for Plant Science Innovation and School of Biological Sciences, University of Nebraska, Lincoln, NE, USA, U.S.A.; (3) National Institute of Biological Sciences, Beijing, China; (4) Center for Plant Science Innovation and Department of Plant Pathology, University of Nebraska, Lincoln, NE, USA, U.S.A.

P9-278 The *Pseudomonas syringae* type III effector HopK1 targets phototropins to suppress blue-light–mediated immunity. G. LI (1), N. Suetsugu (2), M. Wada (2), J. Alfano (1) (1) Center for Plant Science Innovation and the Department of Plant Pathology The University of Nebraska, U.S.A.; (2) Graduate School of Biostudies Kyoto University, Japan

P9-279 The rice blast fungus, magnaporthe oryzae causes specific disruption of the f-actin cytoskeleton and compromises chloroplast function during rice infection. G. LITTLEJOHN (1), X. Yan (2), M. Martin-Urdiroz (2), H. Saitoh (3), D. Sones (2), R. Terauchi (3), N. Talbot (2) (1) University of Exeter, United Kingdom; (2) University of Exeter, United Kingdom; (3) Iwate Biotechnology Research Centre, Japan

P9-280 Heterologous Expression Screens of In planta-Expressed Blast Secreted Proteins Identify a Candidate Effector that Associates with Aquaporin-1 in Rice. W. LIU (1), X. Xie (2), G. Wang (3) (1) State Key Laboratory for Biology of Plant Diseases and Insect Pests, Institute of Plant Protection, China; (2) State Key Laboratory for Biology of Plant Diseases and Insect Pests, Institute of Plant Protection, China; (3) Department of Plant Pathology, Ohio State University, U.S.A.

P9-281 CLCuMuB betaC1 Subverts Ubiquitination By Interacting With NbSKP1s To Enhance Geminivirus Infection In Nicotiana Benthamiana. Y. LIU (1), Q. Jia (1), N. Liu (1), K. Xie (1) (1) Tsinghua University, China

P9-282 HpaP modulates the secretion of type 3 substrates and plays an essential role in *Ralstonia solanacearum* virulence. F. LONJON (1), D. Rengel (2), C. Henry (3), D. Lohou (2), M. Turner (5), O. Catrice (2), N. Peeters (2), S. Genin (2), F. Vailleau (2) (1) Laboratoire des Interactions Plantes Micro-organismes (LIPM), France; (2) Laboratoire des Interactions Plantes Micro-organismes (LIPM), France; (3) PAPPSO, Micalis Institute, INRA, AgroParisTech, Université Paris-Saclay,, France; (4) Laboratoire des Interactions Plantes Micro-organismes (LIPM), France; (5) Laboratoire des Interactions Plantes Micro-organismes (LIPM),, France

P9-283 Bacterial wilt disease changes the xylem sap metabolome. T. LOWE (1), A. Jancewicz (1), R. Mitra (2), B. Dalsing (1), P. Masson (1), C. Allen (1) (1) University of Wisconsin-Madison, U.S.A.; (2) Carleton College, U.S.A.

P9-284 Structure of *Pseudomonas syringae* HopZ1a reveals a conserved enzymatic mechanism for YopJ family of Type III effectors . K. MA (1), Z. Zhang (1), W. Ma (1), J. Song (1) (1) University of California Riverside, U.S.A.

P9-285 A *Ralstonia solanacearum* type-III effector targets redox regulators to suppress immune responses. A. MACHO (1), Y. Sang (1), Y. Wang (1), H. Ni (1), A. Cazale (2), Y. She (1), N. Peeters (2) (1) Shanghai Center for Plant Stress Biology, China; (2) Laboratoire des Interactions Plantes-Microorganismes, France

P9-286 Polyhydroxybutyrate and trehalose: A close look at metabolites present in tomato xylem sap during *Ralstonia solanacearum* infection. A. MACINTYRE (1) (1) University of Wisconsin-Madison, U.S.A.

P9-287 Co-evolution of virulence and recognition in rice blast disease. J. MAIDMENT (1), A. Maqbool (1), H. Saitoh (2), H. Kanzaki (2), M. Franceschetti (1), C. Stevenson (1), S. Kamoun (3), R. Terauchi (2), M. Banfield (1) (1) John Innes Centre, United Kingdom; (2) Iwate Biotechnology Research Center, Japan; (3) The Sainsbury Laboratory, United Kingdom

P9-288 Structural basis of host ATG8 binding by the Irish potato famine pathogen effector protein PexRD54. A. MAQBOOL (1), R. Hughes (1), Y. Dagdas (2), E. Zess (1), N. Tregidgo (1), K. Belhaj (2), A. Round (3), T. Bozkurt (4), S. Kamoun (2), M. Banfield (1) (1) John Innes Centre, United Kingdom; (2) The Sainsbury Laboratory, United Kingdom; (3) EMBL, France; (4) Imperial College London, United Kingdom

P9-289 A *Foxtail mosaic virus*-based vector for virus-induced gene silencing in maize. Y. MEI (1), C. Zhang (2), J. Hill (1), S. Whitham (1) (1) Iowa State University, U.S.A.; (2) Alcorn State University, U.S.A.

P9-290 Tomato 14-3-3 proteins are signaling components of immunity and common targets of *Xanthomonas* effectors. Z. DUBROW (1), S. Sukumaran (2), J. Kim (1), D. Teper (2), E. Bosis (2), G. Sessa (2), M. Mudgett (1) (1) Stanford University, U.S.A.; (2) Tel Aviv University, Israel

P9-291 The barley powdery mildew effector protein ROPIP1 is encoded on an active retroelement. M. NOTTENSTEINER (1), R. Hückelhoven (1) (1) Chair of Phytopathology, Center of Life and Food Sciences Weihenstephan, TU München, Germany

P9-292 Insights into the virulence role of *Blumeria graminis* f.sp *hordei* RNAse-like effector CSEP0264 (BEC1011). K. ORMAN (1), L. Bindschedler (1), C. Turnbull (2) (1) Royal Holloway University of London, United Kingdom; (2) Imperial College London, United Kingdom

P9-293 Regulation of bacterial virulence by two component signal transduction systems. A. PANDEY (1) (1) CSIR-Central Institute of Medicinal and Aromatic Plants, India

P9-294 GENETIC BASIS OF TRANSLOCATION OF *MAGNAPORTHE ORYZAE* AVR-Pik INTO RICE CELLS. H. PENNINGTON (1), A. Bialas (1), K. Yoshida (2), M. Banfield (1), R. Terauchi (3), S. Kamoun (1) (1) The Sainsbury Laboratory, Norwich Research Park, United Kingdom; (2) Laboratory of Plant Genetics, Graduate School of Agricultural Science, Kobe University, Japan; (3) Iwate Biotechnology Research Center, Japan

P9-295 *Burkholderia phytofirmans* PsJN regulates Arabidopsis growth through a signaling mechanism dependent of auxin and ethylene . M. POUPIN (1), M. Greve (1), V. Carmona (2), I. Pinedo (2), T. Ledger (2) (1) Facultad de Ingenieria y Ciencias, Universidad Adolfo Ibanez, Chile; CAPES, Chile., Chile; (2) Facultad de Ingenieria y Ciencias, Universidad Adolfo Ibanez, Chile; CAPES, Chile., Chile

P9-296 Characterization of effector candidates from the soybean rust fungus that suppress plant immunity. M. QI (1), T. Link (2), R. Voegele (3), T. Baum (1), S. Whitham (1) (1) Iowa State University, U.S.A.; (2) Institut für Phytomedizin, Universität Hohenheim, Germany; (3) Institut für Phytomedizin, Universität Hohenheim, Germany

P9-297 The role of sulfate transporters in virulence of *Xanthomonas oryzae pv. oryzicola*. A. READ (1), A. Bogdanove (2) (1) Plant Pathology and Plant Microbe Biology - School of Integrative Plant Science - Cornell University, U.S.A.; (2) Plant Pathology and Plant-Microbe Biology - School of Integrative Plant Science - Cornell University, U.S.A.

P9-298 Is the *Verticillium* effector Ave1 a dual function protein?. H. ROVENICH (1), J. Boshoven (1), C. Grandellis (2), M. Seidl (1), J. Ottado (2), B. Thomma (1) (1) Wageningen University, Netherlands; (2) IBR-CONICET, Argentina

P9-299 Characterization of *Golovinomyces cichoracearum* Effectors. K. SCHEIBEL (1), S. Somerville (1) (1) UC Berkeley, U.S.A.

P9-300 Symptom development in soybeans infected with Soybean dwarf luteovirus is tied to differential activation of the salicylic or jasmonic acid defense signaling pathways.. W. SCHNEIDER (1), C. Dardick (2), O. Smith (3), M. Graham (4), D. Luster (1) (1) USDA-ARS FDWSRU, U.S.A.; (2) USDA-ARS AFRC, U.S.A.; (3) Hood College, U.S.A.; (4) USDA-ARS CICGR, U.S.A.

P9-301 Characterization of secreted modifying enzymes from the late blight pathogen *Phytophthora infestans*. C. SCHOINA (1), K. Bouwmeester (2), M. Seidl (2), S. Rodenburg (2), H. Meijer (2), F. Govers (2) (1) Wageningen Univercity, Netherlands; (2) Wageningen University, Netherlands

P9-302 The water soaking caused by the TAL effector AvrHah1 involves cell wall modification and may elucidate a role for lesion development during bacterial spot of tomato. A. SCHWARTZ (1), R. Morbitzer (2), T. Lahaye (2), B. Staskawicz (1) (1) University of California, Berkeley, U.S.A.; (2) University of Tübingen, Germany

P9-303 RXLR effector PexRD54 links a plastid-localized protein to autophagy. M. SEGRETIN (1), Y. Dagdas (2), N. Sanguankiattichai (3), S. Kamoun (2) (1) INGEBI-CONICET, Argentina; (2) The Sainsbury Laboratory, United Kingdom; (3) Imperial College London, Department of Life Sciences, United Kingdom

P9-304 *Xanthomonas* XopAU is an active protein kinase that manipulates host MAP kinase signaling to promote disease. G. SESSA (1), D. Teper (2), E. Bosis (2), G. Popov (2), G. Popov (2) (1) Tel Aviv University, Israel; (2) Tel Aviv University, Israel

P9-305 Functional characterization of putative effector genes of basil downy mildew pathogen *Peronospora belbahrii*. D. SHAO (1), M. Tian (1) (1) University of Hawaii at Manoa, U.S.A.

P9-306 *Puccinia graminis f. sp. tritici Avr-r45*; identification of an effector that manipulates an integrated domain R-protein complex. R. SHARMA POUDEL (1), J. Richards (1), S. Solanki (1), R. Brueggeman (1) (1) North Dakota State University, U.S.A.

P9-307 Characterization of the functional duality of a bacterial type III secreted protein AvrRxo1 and its chaperone Arc1 as a toxin-antitoxin system. T. SHIDORE (1), J. Long (2), J. Leach (2), L. Triplett (1) (1) The Connecticut Agricultural Experiment Station, U.S.A.; (2) Colorado State University, U.S.A.

P9-308 Functional and physiological characterization of *OsSULTR3;6*, a new class of susceptibility gene. P. SINGH (1), L. Wang (1), A. Read (1) (1) Cornell University, Plant Pathology and Plant-Microbe Biology Section, U.S.A.

P9-309 WITHDRAWN

P9-310 The Tin2 effector determines the pathogenic lifestyle in smut fungi. S. TANAKA (1), R. Kahmann (1) (1) Max Planck Institute for Terrestrial Microbiology, Germany

P9-311 Investigating the functional convergence of pathogen effectors that target TCP transcription factors in *Arabidopsis thaliana*. P. TEIXEIRA (1), L. Yang (2), P. Epple (3), S. Biswas (4), Y. He (5), O. Finkel (2), M. English (6), P. Mieczkowski (2), P. Braun (7), J. Dangl (2) (1) University of North Carolina at Chapel Hill, U.S.A.; (2) University of North Carolina at Chapel Hill, U.S.A.; (3) BASF Plant Science, U.S.A.; (4) Harvard Medical School, U.S.A.; (5) North Carolina State University, U.S.A.; (6) University of Tennessee, U.S.A.; (7) Technische Universität München, Germany

P9-312 Establishment of a simple and efficient *agrobacterium*-mediated transformation system for *Phytophthora palmivora*. D. WU (1), N. Navet (1), M. Tian (1) (1) University of Hawaii at Manoa, U.S.A.

P9-313 *Burkholderia phytofirmans* PsJN protects *Arabidopsis thaliana* against a virulent strain of *Pseudomonas syringae* DC3000 through additive mechanisms of biocontrol. T. TIMMERMANN (1), G. Armijo (2), R. Donoso (1), A. Seguel (2), L. Holuigue (2), B. Gonzalez (1) (1) Universidad Adolfo Ibanez, Chile; (2) Pontificia Universidad Catolica de Chile, Chile

P9-314 Functional analysis of evolutionary conserved *Phytophthora* RxLR24 effector. I. TOMCZYNSKA (1), M. Stumpe (1), F. Mauch (1) (1) Department of Plant Biology, University of Fribourg, Chemin du Musee 10, CH-1700 Fribourg, Switzerland

P9-315 Heterozygosity plays a key role in pathogenicity of *Hyaloperonospora arabidopsidis*. M. TOR (1), V. Cevik (2), O. Telli (1), E. Holub (3), D. Studholme (4), A. Woods-Tor (1) (1) Institute of Science and the Environment, University of Worcester, United Kingdom; (2) Tha Sainsbury Laboratory, Norwich, United Kingdom; (3) Life Sciences, University of Warwick, United Kingdom; (4) Biosciences, University of Exeter, United Kingdom

P9-316 Probing the interaction between the *Phytophthora infestans* effector PexRD24 and the host enzyme Protein Phosphatase 1.. F. VARDEN (1), P. Birch (2), M. Banfield (1) (1) John Innes Centre, United Kingdom; (2) The James Hutton Institute, United Kingdom

P9-317 Cell type-specific gene expression changes in *Arabidopsis thaliana* roots in response to beneficial *Pseudomonas simiae* WCS417 rhizobacteria . E. VERBON (1), L. Liberman (2), P. Benfey (2), C. Pieterse (3) (1) Utrecht Unversity, Netherlands; (2) Duke University, U.S.A.; (3) Utrecht University, Netherlands

P9-318 A Cyst Nematode Effector Regulates Plant Gene Expressions Through Epigenetic Modifications. P. VIJAYAPALANI (1), T. Hewezi (2), M. Mitchum (3), T. Baum (1) (1) Iowa State University, U.S.A.; (2) University of Tennessee, U.S.A.; (3) University of Missouri, U.S.A.

P9-319 Proteomic identification of fungal induced protein hyperacetylation. J. WALLEY (1), G. Song (1), M. McReynolds (1) (1) Iowa State University, U.S.A.

P9-320 HrpH, a multipurpose lytic transglycosylase associated with the type III secretion system of *Pseudomonas syringae* pv. *tomato* DC3000 . H. WEI (1), A. Collmer (1) (1) School of Integrative Plant Science, Section of Plant Pathology and Plant-Microbe Biology, Cornell University, U.S.A.

P9-321 *In planta* interactor screen of RXLR effectors reveals plant processes manipulated by *Phytophthora infestans*. J. WIN (1), B. Petre (1), Y. Dagdas (1), T. Bozkurt (3), J. Sklenar (1), M. Schattat (4), A. Abd-El-Haliem (5), L. Cano (6), R. Lozano-Duran (7), A. Jones (8), J. Vossen (9), S. Robatzek (1), S. Schornack (10), S. Kamoun (1) (1) The Sainsbury Laboratory, United Kingdom; (10) Sainsbury Laboratory University of Cambridge, United Kingdom; (2) The Sainsbury Laboratory, United Kingdom; (3) Imperial College London, United Kingdom; (4) Martin Luther University Halle-Wittenberg, Germany; (5) University of Amsterdam, Netherlands; (6) University of Florida, U.S.A.; (7) The Shanghai Center for Plant Stress Biology, China; (8) University of Warwick, United Kingdom; (9) Wageningen UR Plant Breeding, Netherlands

P9-322 Oomycete effector HaRxL106 interacts with Arabidopsis RADICAL INDUCED CELL DEATH1 and suppresses NPR1-dependent immunity. L. WIRTHMUELLER (1), S. Asai (2), G. Rallapalli (3), D. Kim (3), G. Fabro (4), M. Wrzaczek (5), J. Kangasjarvi (6), J. Sklenar (3), F. Menke (3), M. Banfield (7), J. Jones (3) (1) Freie Universität Berlin, Germany; (2) RIKEN Center for Sustainable Resource Science, Japan; (3) The Sainsbury Laboratory, United Kingdom; (4) Research Centre in Biological Chemistry of Córdoba, Argentina; (5) University of Helsinki, Finland; (6) University of Helsinki, Finland; (7) John Innes Centre, United Kingdom

P9-323 Identification of *Pyrenophora teres* f. *teres* candidate effector genes in the *VR1* and *VR2* genomic regions.. N. WYATT (1), R. Brueggeman (2), J. Faris (3), T. Friesen (3) (1) North Dakota State University, U.S.A.; (2) North Dakota State Univeristy, U.S.A.; (3) Cereal Crops Research Unit, USDA-ARS, U.S.A.

P9-324 Reconstitution of a model plant disease. X. XIN (1), K. Nomura (1), K. Aung (1), A. Velásquez (1), J. Yao (1), F. Boutrot (2), C. Zipfel (2), J. Chang (3), S. He (1) (1) Michigan State University, U.S.A.; (2) The Sainsbury Laboratory, United Kingdom; (3) Oregon State University, U.S.A.

P9-325 Functional characterization of the novel SPRYSEC effector family members from the potato cyst nematode *Globodera rostochiensis*. X. WANG (1), R. Cui (2), H. Yang (2), S. Chen (2) (1) USDA-ARS, U.S.A.; (2) Cornell University, U.S.A.; (3) Cornell University, U.S.A.

P9-326 A coin with double sides? *Phytophthora* essential effector Avh238 has dual functions in cell death activation and plant immunity suppression. B. YANG (1), Q. Wang (2), M. Jing (3), B. Guo (3), H. Wang (3), W. Ye (3), Y. Wang (3), S. Dong (3), Y. Wang (3) (1) Nanjing Agricultural University, China; (2) Department of Botany and Plant Pathology, Oregon State University, U.S.A.; (3) Nanjing Agricultural University, China

P9-327 Exploring the mechanisms of immunosuppression by the plant-beneficial rhizobacterium *Pseudomonas capeferrum* WCS358. K. YU (1), R. Berendsen (1), C. Pieterse (1), P. Bakker (1) (1) Plant-Microbe Interactions, Faculty of Science, Utrecht University, Netherlands

P9-328 Genetic diversity: an ally in TALE-targeted gene predictions in the Cassava-*Xanthomonas* pathosystem. C. ZARATE CHAVES (1), D. Osorio Rodriguez (2), M. Buitrago Acosta (2), L. Jaimes Niño (2), A. Perez Quintero (3), S. Restrepo Restrepo (2), C. Lopez Carrascal (4), B. Szurek (3), A. Bernal Giraldo (2) (1) Universidad de los Andes. Laboratorio de micología y fitopatología LAMFU, Colombia; (2) Universidad de los Andes. Laboratorio de micología y fitopatología LAMFU, Colombia; (3) Institut de Recherche pour le Développement. Interactions Plantes-Microorganismes-Environnement (IPME), France; (4) Universidad Nacional de Colombia. Manihot Biotech., Colombia; (5) Institut de Recherche pour le Développement. Interactions Plantes-Microorganismes-Environnement (IPME), France

P9-329 Identification of *Phytophthora* Crinklers (CRNs) with RNA silencing suppression activity. Y. ZHAI (1), W. Ma (2), E. Huitema (3) (1) University of California, Riverside, U.S.A.; (2) Department of Plant Pathology and Microbiology and Center for Plant Cell Biology, University of California, Riverside, U.S.A.; (3) Division of Plant Sciences and College of Life Sciences, University of Dundee, United Kingdom

P9-330 Identification of A *Phytophthora parasitica* RXLR effector that associates with *Arabidopsis thaliana* NPR1 to promote infection. M. ZHANG (1), Q. Li (1), Q. Zhang (2), W. Li (1), Y. Chen (1), D. Dou (3) (1) Nanjing Agricultural University, China; (2) Nanjing Agricultural University, China; (3) Nanjing Agricultural University, China

P9-331 Mechanisms of Bacterial Suppression of AGO1-RISC Activity and of Host Counter-counter Defense. L. NAVARRO (1), O. Thiébeauld (2), M. Charvin (2), F. Yang (3), D. Pontier (4), E. Lastrucci (2), L. Bapaume (2), G. Li (3), T. Lagrange (5), J. Alfano (3) (1) IBENS-CNRS, France; (2) IBENS-CNRS, France; (3) University of Nebraska, U.S.A.; (4) LGDP, France; (5) LGDP, France

P9-332 RXLR effector PexRD54 couples host cellular transport components to autophagic compartments to stimulate autophagosome biogenesis and haustorial transport. T. BOZKURT (1), P. Pandey (1), Y. Dagdas (2), B. Dagvadorj (3), A. Toufexi (3), C. Duggan (3), M. Segretiin (4), S. Kamoun (2) (1) Imperial College london, Department of Life Sciences, London, UK., United Kingdom; (2) The Sainsbury Laboratory, Norwich Research Park, Norwich, NR4 7UH, UK., United Kingdom; (3) Imperial College london, Department of Life Sciences, London, UK., United Kingdom; (4) INGEBI-CONICET, Obligado 2490, C.A.B.A., C1428ADN, Argentina, United Kingdom

P9-333 Delivery of *Phytophthora sojae* effector Avr1b *in planta* requires PI3P-binding, but does not require N-terminal cleavage. B. TYLER (1), Q. Wang (1), F. Arredondo (1), Y. Fang (1), E. Perez (1) (1) Center for Genome Research and Biocomputing, Oregon State University, U.S.A.

P9-334 Mimicry of The Plant Hormone PSY1 by A Sulfated Bacterial Peptide, RaxX. A. JOE (1), R. Pruitt (1) (1) Department of Plant pathology the Genome Center, University of California Davis, USA, U.S.A.

P9-335 WITHDRAWN

RNA-Mediated Interactions

P10-336 Small RNA-Based Antiviral Defense in the Phytopathogenic Fungus *Colletotrichum higginsianum* . K. GILBERT (1), S. Campo (2), J. Carrington (1) (1) Donald Danforth Plant Science Center, U.S.A.; (2) Centre for Research in Agricultural Genomics, Spain

P10-337 Host-induced gene silencing targeting the *Aspergillus flavus omtA* gene to reduce aflatoxin contamination in maize. Y. RARUANG (1), O. Omolehin (2), Q. Wei (3), R. Brown (4), D. Bhatnagar (3), Z. Chen (2) (1) Louisiana State Univeristy AgCenter, U.S.A.; (2) Louisiana State University AgCenter, U.S.A.; (3) United States Department of Agriculture Agricultural Research Service, U.S.A.; (4) United States Department of Agriculture Agricultural Research Service, Canada

P10-338 Functional analysis of *Ustilago hordei* effector UhAVR1 during compatible and incompatible interactions with its barley host. A. MONTENEGRO ALONSO (1), G. Bakkeren (2) (1) The University of British Columbia, Canada; (2) Agriculture and Agri-Food Canada, Canada

P10-339 Cotton plants export small RNAs to induce target gene silencing in a wilt disease pathogen Verticillium dahliae. H. GUO (1), T. Zhang (2) (1) Institute of Microbiology, Chinese Academy of Sciences, China; (2) Institute of Microbiology, Chinese Academy of Sciences, China

P10-340 Functional analysis of barley powdery mildew effector candidates and identification of their barley targets. A. AHMED (1), C. Pedersen (2), T. Schultz-Larsen (2), M. Kwaaitaal (3), H. Jørgensen (2), H. Thordal-Christensen (2) (1) University of California, Davis Genome center, U.S.A.; (2) University of Copenhagen, Denmark; (3) Aachen University, Germany

P10-341 Bidirectional sRNA-trafficking and RNA-based plant protection against Botrytis cinerea and other pathogens that utilize small RNA effectors. M. WANG (1), A. Weiberg (2), F. Lin (3), B. Thomma (4), H. Huang (3), H. Jin (5) (1) UC Riverside, U.S.A.; (2) University of Munich Martinsried, Germany; (3) National Chiao Tung University, Taiwan; (4) Wageningen University, Netherlands; (5) UC Riverside, U.S.A.

P10-342 Triticum mosaic virus contains a unique translation element within its 5' untranslated region. R. ROBERTS (1), J. Zhang (1), L. Mayberry (2), K. Browning (2), A. Rakotondrafara (1) (1) University of Wisconsin-Madison, U.S.A.; (2) University of Texas-Austin, U.S.A.

P10-343 A Land Plant-specific Transcription Factor Directly Enhances DNA-dependent RNA Polymerase II Transcribing A Pathogenic Noncoding RNA Template. Y. WANG (1), J. Qu (2), S. Ji (3), A. Wallace (2), J. Wu (2), Y. Li (3), V. Gopalan (2), B. Ding (2) (1) The Ohio State University, U.S.A.; (2) The Ohio State University, U.S.A.; (3) Peking University, China

GENOMICS AND SYSTEMS BIOLOGY

Genomes, Genomics and Epigenomics

P11-344 A novel approach to detect fungal and wheat genes involved in leaf rust disease by expression associations during various race-specific interactions. G. BAKKEREN (1), H. Khalil (1), X. Wang (2), R. Linning (1), D. Joly (3), D. Cram (4), N. Thiessen (5), G. Taylor (5), B. McCallum (2), B. Saville (6) (1) Agriculture & Agri-Food Canada, Summerland Research & Development Centre, Canada; (2) Agriculture & Agri-Food Canada, Morden Research & Development Centre, Canada; (3) Department of Biology, Université de Moncton, Canada; (4) National Research Council Canada, Canada; (5) Genome Sciences Centre, Canada; (6) Trent University, Canada

P11-345 *B. napus-Leptosphaeria maculans* interaction: Perception and downstream signalling. H. BORHAN (1), P. Haddadi (2), L. Ma (2) (1) AAFC, Canada; (2) Agriculture and Agri-Food Canada, Saskatoon Research and Development Centre, Canada

P11-346 Sequence identification of a novel begomovirus affecting bean crops in southwestern Colombia. M. CARVAJAL-YEPES (1), L. Zambrano (1), J. Bueno (1), C. Olaya (2), W. Cuellar (3) (1) International center for tropical agriculture, Colombia; (2) Washington State University, U.S.A.; (3) International center for tropical agriculture, Colombia

P11-347 Direct repeat-mediated DNA deletion of the MAT1-2 genes results in unidirectional mating type switching in *Sclerotinia trifoliorum*. W. CHEN (1), L. Xu (2) (1) USDA ARS, U.S.A.; (2) Washington State University, U.S.A.

P11-348 Behind enemy lines: investigating the molecular arsenal of the banana pathogen *Fusarium oxysporum* f.sp. *cubense*. E. CZISLOWSKI (1), S. Fraser-Smith (1), M. Zander (1), W. O'Neill (2), L. Tran-Nguyen (3), J. Batley (4), E. Aitken (1) (1) The University of Queensland, Australia; (2) Biosecurity Queensland, Department of Agriculture and Fisheries, Australia; (3) Norther Territory Department of Primary Industries and Fisheries, Australia; (4) The University of Western Australia, Australia

P11-349 Fine mapping of a novel resistance gene to clubroot disease in *Brassica oleracea* through bulked segregant RNA sequencing . A. DAKOURI (1), X. Zhang (2), G. Peng (3), B. Gossen (3), K. Falk (3), F. Yu (3) (1) Agriculture and Afri-Food Canada, Canada; (2) Agricluture and Agri-Food Canada, Canada; (3) Agriculture and Agri-Food Canada, Canada

P11-350 Evolution of the chromosomes in crown gall-causing Agrobacteria. E. DAVIS (1), A. Weisberg (1), J. Tabima (1), M. Putnam (1), M. Miller (1), M. Kohen (1), J. Loper (2), N. Grünwald (2), W. Ream (3), J. Chang (1) (1) Oregon State University, U.S.A.; (2) USDA-ARS Horticultural Crops Research Laboratory, U.S.A.; (3) Oregon State University, U.S.A.

P11-351 Alteration of plant defense pathways by effectors of the protist plant pathogen, *Plasmodiophora brassicae* . M. DJAVAHERI (1), H. Borhan (2), P. Haddadi (2), L. Ma (2), S. Rolfe (3), S. Strelkov (4), M. Links (2), W. Clarke (5), S. Robinson (2), I. Parkin (2) (1) AAFC, Canada; (2) Agriculture and Agri-Food Canada, Saskatoon Research and Development Centre, Canada; (3) University of Sheffield, United Kingdom; (4) University of Alberta, Canada; (5) New York Genome Centre, U.S.A.

P11-352 Is less actually more? Does the absence of group-specific DNA fragments in *Acidovorax citrulli* contribute to broaden its host range?. N. ECKSHTAIN-LEVI (1), D. Shkedy (2), M. Gershovits (2), G. Mateus Da Silva (3), R. Walcott (3), T. Pupko (2), S. Burdman (4) (1) Department of Plant Pathology, Physiology and Weed Science, Virginia Polytechnic Institute and State University, U.S.A.; (2) Department of Cell Research and Immunology, George S. Wise Faculty of Life Sciences, Tel Aviv University, Israel; (3) Department of Plant Pathology, College of Agricultural and Environmental Sciences, University of Georgia, U.S.A.; (4) Department of Plant Pathology and Microbiology, Robert H. Smith Faculty of Agriculture, The Hebrew University of Jerusalem, Israel

P11-353 Uncovering temporal gene expression profiles of the yellow rust pathogen during infection of wheat. M. ELMORE (1), C. Conley (2), B. Perroud (1), L. Froenicke (1), J. Peng (2), X. Wang (3), J. Dubcovsky (3), R. Michelmore (3) (1) Genome Center, University of California at Davis, U.S.A.; (2) Department of Statistics, University of California at Davis, U.S.A.; (3) Department of Plant Science, , University of California at Davis, U.S.A.

P11-354 Comparative Genomics of Temperate and Tropical Downy Mildews. K. FLETCHER (1), L. Derevnina (2), S. Reyes-Chin-Wo (3), L. Bertier (3), A. Kozik (3), R. Michelmore (3) (1) Genome Center, UC Davis, U.S.A.; (2) The Sainsbury Laboratory, United Kingdom; (3) Genome Center, UC Davis, U.S.A.

P11-355 Disease progression and molecular response of flax (*Linum usitatissimum* L.) to the pathogenic fungus *Fusarium oxysporum* f.sp. *lini*.. L. GALINDO-GONZALEZ (1), M. Deyholos (2) (1) Department of Biological Sciences, University of Alberta, Canada; (2) Department of Biology, University of British Columbia, Canada

P11-356 Validation of genome wide association studies (GWAS) for the identification of candidate genes associated with virulence in *Parastagonospora nodorum*. Y. GAO (1), Z. Liu (1), J. Faris (2), J. Richards (1), R. Brueggeman (1), R. Oliver (3), B. McDonald (4), T. Friesen (2) (1) Plant Pathology Department, North Dakota State University, U.S.A.; (2) NCSL, USDA-ARS, U.S.A.; (3) School of Science, Curtin University, Australia; (4) Institute of Integrative Biology, Plant Pathology Group, Swiss Federal Institute of Technology, Switzerland

P11-357 Virus detection in naturally infected plants using high-throughput sequencing. F. GAWEHNS (1), E. Meekes (1), I. Stulemeijer (2), M. de Kock (2), M. Ebskamp (1) (1) Naktuinbouw, Netherlands; (2) BKD, Netherlands

P11-358 The transcriptome atlas of Leptosphaeria-Brassica interaction: Blackleg eQTL variations by RNA-seq. P. HADDADI (1), N. Larkan (1), M. Borhan (1) (1) Agriculture and Agri-Food Canada, Canada

P11-359 Transcriptional control of plant immune-response genes by active DNA demethylation. T. HALTER (1), J. Wang (2), E. Lastrucci (2), D. Amesefe (2), R. Birkenbihl (3), I. Somssich (3), L. Navarro (2) (1) Institut de Biologie de l'Ecole Normale Supérieure (IBENS), France; (2) IBENS, France; (3) MPI Köln, Germany

P11-360 WITHDRAWN

P11-361 *Phytophthora* effector target enrichment and sequencing to aid the re-annotation of genomes and to elucidate effector diversity. I. HEIN (1), G. Thilliez (2), K. Baker (2), D. Cooke (2), E. Huitema (3), P. Birch (4) (1) The James Hutton Institute, United Kingdom; (2) The James Hutton Institute, United Kingdom; (3) University of Dundee, United Kingdom; (4) The University of Dundee, United Kingdom

P11-362 Comparative Genomics of *Fusarium oxysporum* f sp. *fragariae*. P. HENRY (1), T. Gordon (2) (1) UC Davis Dept. Plant Pathology, U.S.A.; (2) UC Davis Department of Plant Pathology, U.S.A.

P11-363 Global genome-wide DNA methylation patterns induced by the beet cyst nematode *Heterodera schachtii* in Arabidopsis roots. T. HEWEZI (1), T. Lane (1), S. Piya (1), A. Rambani (1), J. Rice (1) (1) University of Tennessee, U.S.A.

P11-364 Identification of the phosphorylation targets of symbiotic receptor-like kinases using a high-throughput multiplexed assay for kinase specificity.. D. JAYARAMAN (1), A. Richards (1), M. Westphall (1), J. Coon (1), J. Ané (1) (1) University of Wisconsin-Madison, U.S.A.

P11-365 A proteomic, phosphoproteomic, and acetylomic atlas of the model legume *Medicago truncatula*. D. JAYARAMAN (1), C. Minogue (1), H. Marx (1), A. Richards (2), J. Maeda (1), S. Rajasekar (1), A. Del Valle-Echevarria (1), M. Westphall (2), M. Sussman (1), J. Ané (2), J. Coon (2) (1) University of Wisconsin-Madison, U.S.A.; (2) University of Wisconsin-Madison, U.S.A.

P11-366 WITHDRAWN

P11-367 Genome analysis of receptor-like protein encoding genes in pepper reveals dynamics of global gene expression in plant growth and diverse responses to biotic stresses. W. KANG (1), D. Choi (2), S. Yeom (3), Y. Kim (4) (1) Institute of Agriculture & Life Science, Gyeongsang National University, South Korea; (2) Department of Plant Science, Seoul National University, South Korea; (3) Department of Agricultural Plant Science, Gyeongsang National University, South Korea; (4) Korea Bioinformation Center, Korea Research Institute of Bioscience and Biotechnology, South Korea

P11-368 Whole genome sequencing of the oomycete pathogen *Sclerospora graminicola* and prediction of effector candidates. M. KOBAYASHI (1), Y. Hiraka (2), A. Abe (2), H. Yaegashi (2), S. Natsume (2), H. Kikuchi (2), H. Takagi (2), H. Saitoh (2), J. Win (3), S. Kamoun (3), R. Terauchi (2) (1) Iwate Biotechnology Research Center, Japan; (2) Iwate Biotechnology Research Center, Japan; (3) The Sainsbury Laboratory, United Kingdom

P11-369 Genetic determinants of bacterial adaptation to plants. A. LEVY (1), S. Clingenpeel (1), B. Alvarez (1), K. Stillman (1), S. Yourstone (2), S. Paredes (2), T. Glavina del Rio (1), S. Lebeis (3), D. Lundberg (4), D. Pelletier (5), S. Doty (6), T. Woyke (1), S. Tringe (1), J. Dangl (2) (1) DOE Joint Genome Institute, U.S.A.; (2) University of North Carolina, Chapel Hill, U.S.A.; (3) University of University of Tennessee, Knoxville, U.S.A.; (4) Max Planck Institute for Developmental Biology, Germany; (5) Oak Ridge National Lab, U.S.A.; (6) University of Washington, U.S.A.

P11-370 Functional analyses of candidate effector genes from *Hemileia vastatrix* based on the type three secretion system of *Pseudomonas syringae* pv. *garcae*. T. MAIA (1), G. Marin-Ramirez (1), S. Brommonschenkel (1) (1) Universidade Federal de Viçosa/Departamento de Fitopatologia, Brazil

P11-371 Whole genome analysis and prediction of the quantitative disease resistance against Verticillium wilt. M. MAZURIER (1), A. Sbeiti (1), S. Benameur (1), M. Tardin (2), M. Gras (2), T. Tatarinova (3), S. Nuzhdin (3), P. Marjoram (3), M. Rickauer (1), C. Ben (1), L. Gentzbittel (1) (1) Université Fédérale de Toulouse, France; (2) Société R2n - Groupe RAGT, France; (3) University of Southern California, U.S.A.

P11-372 Genome wide Identification and characterization of potato long intergenic noncoding RNAs responsive to *Pectobacterium carotovorum* subspecies *brasiliense 1692* infection. L. MOLELEKI (1), S. Kwenda (1) (1) University of Pretoria, South Africa

P11-373 Cotton Bacterial Blight: The case of a (re)emergent disease. A. PHILLIPS (1), M. Wilson (2), A. Vijayaraghavan (2), J. Burke (2), I. Bunn (3), K. Veley (2), R. Bart (2) (1) Donald Danforth Plant Science Center and Washington University in Saint Louis, U.S.A.; (2) Donald Danforth Plant Science Center, U.S.A.; (3) Harvard University, U.S.A.

P11-374 Conservation and diversity of the *Agrobacterium* type VI secretion systems involved in interbacterial competition. M. Santos (1), S. Cho (1), H. Chang (1), C. Kuo (1), E. Lai (1) (1) Institute of Plant and Microbial Biology, Academia Sinica, Taipei, Taiwan, Taiwan

P11-375 *Ustilago maydis* effectors in the post-genomic era. M. SCHUSTER (1), G. Schweizer (1), R. Kahmann (1), A. Lupas (2) (1) Max Planck Institute for Terrestrial Microbiology, Germany; (2) Max Planck Institute for Developmental Biology, Germany

P11-376 New tools for wheat stripe rust research. B. SCHWESSINGER (1), H. Yiheng (2), W. Cuddy (3), R. Park (3), J. Rathjen (2) (1) Australian National University, Australia; (2) Australian National University, Australia; (3) University of Sydney, Australia

P11-377 '*Candidatus* Phytoplasma solani' strain SA-1 has a highly repetitive genome. M. SERUGA MUSIC (1), S. Hogenhout (2), C. Kuo (3) (1) Department of Biology, Faculty of Science, University of Zagreb, Croatia; (2) Department of Cell and Developmental Biology, John Innes Centre, United Kingdom; (3) Institute of Plant and Microbial Biology, Academia Sinica, Taiwan

P11-378 Towards understanding the Panicum virgatum microbiome - switchgrass geno-/ecotype and treatment practices influence the microbial community. E. SINGER (1), T. Juenger (2), T. Woke (1) (1) Joint Genome Institute, U.S.A.; (2) University of Texas Austin, U.S.A.

P11-379 Utilizing gene tree variation to identify candidate effector genes in *Zymoseptoria tritici* . P. SOLOMON (1), A. Milgate (2), M. McDonald (1) (1) The Australian National University, Australia; (2) NSW DPI, Australia

P11-380 A systems approach to breeding for disease resistance to necrotrophic fungal pathogens in lettuce. A. TALBOT (1), E. Ransom (1), J. Brough (2), J. Graham (3), J. Clarkson (2), P. Hand (3), K. Denby (2), D. Pink (3), C. Wagstaff (4) (1) University of Warwick, United Kingdom; (2) University of Warwick, United Kingdom; (3) Harper-Adams University, United Kingdom; (4) University of Reading, United Kingdom

P11-381 Whole Genome Analyses of *Clavibacter michiganensis* subsp. *michiganensis* Strains Reveals Core Secreted Proteins that Promote Virulence on Tomato. S. THAPA (1), R. Gilbertson (1), G. Coaker (1) (1) University of California, U.S.A.

P11-382 Ti plasmids cluster genetically and cluster by *Agrobacterium* taxa and plant host type . A. WEISBERG (1), E. Davis (1), J. Tabima (1), M. Putnam (1), M. Miller (1), M. Kohen (1), J. Loper (2), N. Grünwald (2), W. Ream (1), J. Chang (1) (1) Oregon State University, U.S.A.; (2) USDA ARS, U.S.A.

P11-383 Identification of root-knot nematode genetic loci that modulate distinct patterns of host gene expression using a genetic/genomic approach. V. WILLIAMSON (1), D. Nielsen (2), D. Bird (2) (1) Univ. of California Davis, U.S.A.; (2) North Carolina State University, U.S.A.

P11-384 Inter-chromosomal transfer of immune response during barley-powdery mildew interactions. R. WISE (1), P. Surana (2), D. Mistry (2), R. Xu (3), A. Chapman (2), G. Fuerst (1), J. Dickerson (2), D. Nettleton (2) (1) USDA-ARS / Iowa State University, U.S.A.; (2) Iowa State University, U.S.A.; (3) Google Inc., U.S.A.

P11-385 Prediction and characterization of WY-domain effectors in downy mildews. K. WOOD (1), L. Derevnina (2), S. Reyes Chin Wo (3), J. Gil (3), J. Wong (4), R. Michelmore (3) (1) UC Davis, U.S.A.; (2) The Sainsbury Lab, United Kingdom; (3) UC Davis, U.S.A.; (4) Bayer, Belgium

P11-386 Molecular characterization of two apple mosaic virus isolates and construction of an ApMV infectious cDNA clone. Y. XIANG (1), Z. Li (2), B. Bhagwat (1), J. Holmes (1), M. Bernardy (1), Y. Wu (2) (1) Agriculture and Agri-Food Canada, Summerland Research and Development Centre, Canada; (2) College of Plant Protection, Northwest A&F University, China

P11-387 *Pseudomonas syringae* Effector AvrPtoB Exploits A Plant Defense-Essential Subset Of Ubiquitin-Conjugating Enzymes To Suppress Host Immunity. L. ZENG (1), B. Zhou (1), R. Mural (2), X. Chen (3), M. Oates (4), R. Connor (5), G. Martin (6), J. Gough (4) (1) University of Nebraska-Lincoln, U.S.A.; (2) University of Nebraska-Lincoln, U.S.A.; (3) Fujian Agriculture and Forestry University, China; (4) University of Bristol, United Kingdom; (5) University of Arkansas at Little Rock, U.S.A.; (6) The Boyce Thompson Institute for Plant Research, U.S.A.

P11-388 Regulating fungal pathogenesis through chromatin modifications. D. COOK (1), M. Seidl (2), M. Kramer (2), B. Thomma (2) (1) Wageningen University, Netherlands; (2) Wageningen University, Netherlands

P11-389 Epigenetic regulation during infection for rust pathogens. B. XU (1) (1) Commonwealth Scientific and Industrial Research Organisation, Australia

P11-390 Comparative & Evolutionary Genomics of the Pseudomonas syringae Species Complex. D. GUTTMAN (1), S. Thakur (1), B. Weir (2) (1) University of Toronto, Canada; (2) Landcare Research, New Zealand

P11-391 Different waves of effector genes with contrasted genomic location are expressed by *Leptosphaeria maculans* during cotyledon and stem colonisation of oilseed rape. J. GERVAIS (1), T. Rouxel (1), M. Balesdent (1), I. Fudal (1), C. Plissonneau (1) (1) INRA BIOGER, France

P11-392 Variation in genome size and ploidy levels in plant pathogenic oomycetes, particularly the downy mildews. L. BERTIER (1), J. Gil (1), S. Reyes-Chin-Wo (1), K. Fletcher (1), R. Michelmore (1) (1) UC Davis Genome Center, U.S.A.

P11-393 Pathogenomic analysis of South African stripe rust populations. H. VAN SCHALKWYK (1), R. Prins (2), Z. Pretorius (1), L. Boyd (3), C. Uauy (4), D. Saunders (5) (1) University of the Free State, South Africa; (2) CenGen (Pty) Ltd and University of the Free State, South Africa; (3) National Institute of Agricultural Botany, United Kingdom; (4) John Innes Centre, United Kingdom; (5) The Genome Analysis Centre and The John Innes Centre, United Kingdom

Host-Microbe Co-evolution

P12-394 A downy mildew effector evades recognition by polymorphism of expression and subcellular localization. S. ASAI (1), V. Cevik (2), O. Furzer (2), N. Ishaque (2), K. Shirasu (1), J. Jones (2) (1) Center for Sustainable Resource Science, RIKEN, Japan; (2) The Sainsbury Laboratory, United Kingdom

P12-395 Wheat side story: Characterizing host responses to yellow rust. P. CORREDOR MORENO (1), D. Saunders (2) (1) The Genome Analysis Centre, United Kingdom; (2) The Genome Analysis Centre / The John Innes Centre, United Kingdom

P12-396 *Comparative genome analysis* of pathogenic *Clavibacter michiganensis* strain PF008 causing bacterial canker in pepper with its closely related pathogenic strains of the same species. C. OH (1), I. Hwang (1) (1) Department of Horticultural Biotechnology, Kyung Hee University, Korea; (2) Department of Horticultural Biotechnology, Kyung Hee University, Korea

P12-397 Insights into molecular basis of disease susceptibility and resistance against Phymatotrichum root rot using multi-omics approach. P. KANKANALA (1), P. Jones (2), D. Weighill (2), D. Jacobson (2), K. Mysore (1) (1) The Samuel Roberts Noble Foundation, U.S.A.; (2) Oak Ridge National Laboratory, Oak Ridge, TN; The University of Tennessee, Knoxville, TN, U.S.A.

P12-398 Comparative mapping of five-needle pine major genes for resistance to white pine blister rust. J. LIU (1), R. Sniezko (2) (1) 506 West Burnside Road, Canada; (2) USDA Forest Service, Dorena Genetic Resource Center, U.S.A.

P12-399 An ancient event of Horizontal Gene Transfer (HGT) from *Agrobacterium* into sweetpotato and its wild relatives.. D. QUISPE-HUAMANQUISPE (1), J. Kreuze (2), G. Gheysen (3), T. Kyndt (3), R. Jarret (4), M. Ghislain (2) (1) Ghent University, Belgium; (2) International Potato Center (CIP), Peru; (3) Ghent University, Belgium; (4) USDA, U.S.A.

P12-400 LIGHT as important environmental cue for pathogens and their hosts – from the perspective of the gray mold fungus *Botrytis cinerea*. J. SCHUMACHER (1) (1) IBBP, WWU Münster, Germany

P12-401 Comparative genomics of the Sigatoka disease complex on banana indicates a direct link between pathogen emergence and nutritional virulence.. I. STERGIOPOULOS (1), T. Chang (1), A. Salvucci (1), P. Crous (2) (1) University of California Davis, U.S.A.; (2) CBS-KNAW Fungal Biodiversity Centre, Netherlands

P12-402 Deciphering genetic mechanisms in *Plasmodiophora brassicae*. S. STJELJA (1), J. Fogelqvist (2), C. Dixelius (2) (1) Swedish University of Agricultural Sciences,Department of Plant Biology,P.O. Box 7080, Sweden; (2) Swedish University of Agricultural Sciences, Department of Plant Biology, P.O. Box 7080, Sweden

P12-403 Effect of *Pythium arrhenomanes* elicitor NLP on the interaction with *Meloidogyne graminicola* in rice. R. VERBEEK (1), E. Rom Mas (2), M. Sikder (2), M. Höfte (2) (1) Ghent University, Belgium; (2) Ghent University, Belgium

P12-404 Sequence reversion in the distal element of *Potato leafroll virus* coat protein gene stop codon indicates a strong bias toward the stem loop structure to allow efficient read-through . Y. XU (1), S. Gray (2) (1) Cornell University, U.S.A.; (2) Cornell University; USDA-ARS, Robert W. Holley Center for Agriculture and Health, U.S.A.

P12-405 Code-cracking TAL effector function and evolution in the rice-*Xanthomonas oryzae* system. A. PEREZ-QUINTERO (1), M. Hutin (2), T. Tran (3), A. Derepeer (4), S. Cunnac (1), L. Gagnevin (4), B. Szurek (4) (1) UMR IPME, IRD-CIRAD-Université Montpellier 2, France; (2) Department of Plant Pathology and Plant-Microbe Biology, Cornell University, U.S.A.; (3) Agricultural Genetics Institute, Vietnam; (4) UMR IPME, IRD-CIRAD-Université Montpellier 2, France

P12-406 Sequential expression of *Sclerotinia sclerotiorum* pathogenicity factors during infection of *Brassica napus* as revealed by RNA-Seq analysis . S. Seifbarghi (1), M. Borhan (2), Y. Wei (3), D. Hegedus (2) (1) Agriculture and Agri-Food Canada, Saskatoon SK, S7N 0X2, Canada, Canada; (2) Agriculture and Agri-Food Canada, Saskatoon SK, S7N 0X2, Canada, Canada; (3) Department of Biology, University of Saskatchewan, Saskatoon, Canada, Canada

P12-407 Natural variation in the Arabidopsis *AGO2* gene alters antiviral activity. P. MOFFETT (1), A. Adurogbangba (1), C. Roussin-Léveillé (1), C. Brosseau (1) (1) Université de Sherbrooke, Canada

Population Genomics

P13-408 High genetic diversity of the grey leaf spot pathogen, *Cercospora zeina,* observed in commercial maize in South Africa. D. BERGER (1), M. Muller (2), N. Kunene (1), B. Crampton (2), B. Bluhm (3), S. Phillips (1), I. Barnes (4) (1) Plant Science Department, Forestry and Agricultural Biotechnology Institute, University of Pretoria, South Africa; (2) Plant Science Department, Forestry and Agricultural Biotechnology Institute, University of Pretoria, South Africa; (3) Department of Plant Pathology, University of Arkansas, U.S.A.; (4) Genetics Department, Forestry and Agricultural Biotechnology Institute, University of Pretoria, South Africa

P13-409 Population structure of an aerial *Phytophthora* species in forest systems. S. BRAR (1), R. Bradshaw (1), R. McDougal (2), N. Williams (3) (1) Massey University, New Zealand; (2) Scion New Zealand Forest Research Institute Ltd, New Zealand; (3) Scion New Zealand Forest Research Institute Ltd, New Zealand

P13-410 Genetic Dynamics and Mating Type Inheritance in an Experimental, Overwintering Biparental Population of *Phytophthora capsici*. M. CARLSON (1), E. Gazave (2), M. Gore (2), C. Smart (1) (1) Cornell University, Plant Pathology and Plant-Microbe Biology Section, School of Integrative Plant Science, U.S.A.; (2) Cornell University, Plant Breeding and Genetics Section, School of Integrative Plant Science, U.S.A.

P13-411 Dissection of the genetic architecture of rice resistance to the blast fungus *Magnaporthe oryzae*. H. KANG (1), Y. Wang (2), S. Peng (2), Y. Zhang (3), Y. Xiao (2), D. Wang (2), S. Qu (4), Z. Li (1), S. Yan (5), Z. Wang (2), W. Liu (1), Y. Ning (1), P. Korniliev (6), H. Leung (7), J. Mezey (6), S. McCouch (6), G. Wang (8) (1) Institute of Plant Protection, Chinese Academy of Agricultural Sciences, China; (2) Hunan Agricultural University, China; (3) nstitute of Plant Protection, Chinese Academy of Agricultural Sciences, China; (4) Institute of Virology and Biotechnology, Zhejiang Academy of Agricultural Sciences, China; (5) Tianjin Crop Research Institute, Tianjin Academy of Agriculture Sciences, China; (6) Department of Plant Breeding & Genetics, Cornell University, U.S.A.; (7) International Rice Research Institute, China; (8) Department of Plant Pathology, Ohio State University, Columbus, U.S.A.

P13-412 Replication competence served as a driving force for experimental evolution of a satellite RNA associated with *Bamboo mosaic virus*. S. LEE (1), I. Wang (2), M. Liu (3), Y. Hsu (3), N. Lin (4) (1) Institute of Plant and Microbial Biology, Academia Sinica, Taiwan; (2) Department of Biological Sciences, University at Albany, U.S.A.; (3) Graduate Institute of Biotechnology, National Chung Hsing University, Taiwan; (4) Institute of Plant and Microbial Biology, Academia Sinica, Taiwan

P13-413 Molecular and bioinformatics characterization of host and temperature dependent accumulation of dimeric viral RNA molecules derived from the S segment of Polygonun ringspot tospovirus. P. MARGARIA (1), A. Bertran (2), M. Ciuffo (3), C. Rosa (1), R. Oliveira Resende (2), M. Turina (3) (1) Pennsylvania State University, U.S.A.; (2) University of Brasília, Brazil; (3) Institute for Sustainable Plant Protection, Italy

P13-414 Population genomics reveals intricate variation in a major pathogen of rice. S. MIDHA (1), K. Bansal (1), R. Sonti (2), P. Patil (1) (1) CSIR-Institute of Microbial Technology, India; (2) CSIR-Centre for Cellular and Molecular Biology, India

P13-415 Using population genomics to understand NLR diversity in wild tomato. R. STAM (1), A. Tellier (1), D. Scheikl (1) (1) Technische Universität München, Germany

P13-416 Elucidating mechanisms of *Phytophthora* pathogen emergence in the genomics era. N. GRUNWALD (1), B. Knaus (2), J. Tabima (3) (1) USDA ARS, U.S.A.; (2) USDA ARS, U.S.A.; (3) Oregon State University, U.S.A.

Systems Biology and Modeling

P14-417 Wheat susceptibility to *Fusarium* head blight involves specific molecular responses shaped by both grain development process and *Fusarium graminearum* growth. L. BONHOMME (1), C. CHETOUHI (1), F. CAMBON (1), P. LASSERRE-ZUBER (1), P. LECOMTE (1), O. SOUDIERE (1), T. LANGIN (1) (1) UMR GDEC, France

P14-418 Metabolomic profiling of sugarcane infected with *Leifsonia xyli* subsp. *xyli*, the causal agent of ratoon stunting disease. F. CASTRO-MORETTI (1), J. Cocuron (2), A. Alonso (2), L. Camargo (3) (1) Center for Applied Plant Sciences/The Ohio State University, U.S.A.; (2) Department of Molecular Genetics/The Ohio State University, U.S.A.; (3) Plant Pathology and Nematology Department/Universidade de Sao Paulo, Escola Superior de Agricultura "Luiz de Queiroz", Brazil

P14-419 Characterization of lectin receptor-like kinases in *Populus*-microbe interactions. J. CHEN (1), W. Muchero (1), Y. Yang (1), J. Labbé (1), X. Yang (1), S. Jawdy (1), M. Kennedy (2), J. Johnson (2), A. Sreedasyam (3), J. Schmutz (3), G. Tuskan (1) (1) Oak Ridge National Laboratory, U.S.A.; (2) Department of Energy Joint Genome Institute, U.S.A.; (3) HudsonAlpha Institute for Biotechnology, U.S.A.

P14-420 Direct regulation of *ARGONAUTE7* by miRNA-regulated transcription factors. J. HOYER (1), J. Pruneda-Paz (2), G. Breton (3), M. Hassert (4), S. Kay (5), J. Carrington (4) (1) Donald Danforth Plant Science Center and Washington University in St. Louis, U.S.A.; (2) University of California San Diego, U.S.A.; (3) University of Texas Health Science Center at Houston, U.S.A.; (4) Donald Danforth Plant Science Center, U.S.A.; (5) Scripps Research Institute, U.S.A.

P14-421 The Use of Integrated SNP Correlation, Co-expression and Genome-Wide Association Networks for *Populus trichocarpa* to Discover Pleiotropic & Epistatic Plant Functions Involved in Microbial Interactions. D. JACOBSON (1), D. Weighill (2), C. Bleker (2), W. Muchero (1), T. Tschaplinski (1), G. Tuskan (1) (1) Oak Ridge National Laboratory, U.S.A.; (2) Oak Ridge National Laboratory/University of Tennessee, U.S.A.

P14-422 Getting to the edge: network science identifies biological modules in Arabidopsis regulatory and interactions networks. S. MUKHTAR (1) (1) University of Alabama at Birmingham, U.S.A.

P14-423 Cell surface receptors networks control plant development and defenses. E. SMAKOWSKA (1), A. Mot (2), D. Desveaux (3), D. Guttman (3), Y. Belkhadir (1) (1) Gregor Mendel Institute of Molecular Plant Biology (GMI), Austria; (2) Department of Cell & Systems Biology, University of Toronto, Canada; (3) Department of Cell & Systems Biology, Centre for the Analysis of Genome Evolution & Function, University of Toronto, Canada

P14-424 Integration of resistance QTL, expression QTL and co-expression modules reveals molecular responses of maize to the fungal pathogen *Cercospora zeina*. D. BERGER (1), N. Christie (2), A. Myburg (2) (1) Plant Science Department, Forestry and Agricultural Biotechnology Institute, University of Pretoria, South Africa; (2) Genetics Department, Forestry and Agricultural Biotechnology Institute, University of Pretoria, South Africa

P14-425 Integrating host-pathogen signaling networks during barley-powdery mildew interactions. J. ELMORE (1), P. Surana (2), W. Xu (2), M. Hunt (2), G. Fuerst (1), A. Chapman (2), M. Liu (2), D. Nettleton (2), J. Walley (2), R. Wise (1) (1) USDA-ARS/Iowa State University, U.S.A.; (2) Iowa State University, U.S.A.

HOST RESISTANCE

Cell wall-mediated resistance

P15-426 Understanding DAMP induced innate immunity in tomato and role of cell wall integrity. M. DASGUPTA (1), M. Sahoo (2), N. Prakash (2), S. Ngachan (3) (1) ICAR Research Complex for NEH Region, Manipur Centre, Lamphelpat, Imphal-795 004, India, India; (2) ICAR Research Complex for NEH Region, Manipur Centre, Lamphelpat, Imphal-795 004, India, India; (3) ICAR Research Complex for NEH Region, Umiam, Meghalaya, Pin 793103, India, India

P15-427 3-Aminobenzamide inhibits callose deposition and alters PMR4 callose synthase abundance independently of poly(ADP-ribosyl)ation. B. KEPPLER (1), J. Song (1), A. Bent (1) (1) University of Wisconsin, U.S.A.

P15-428 The role of reactive oxygen species in non-host resistance to *Rhizoctonia solani*.. B. KIDD (1), R. Foley (1), K. Singh (2), J. Anderson (1) (1) CSIRO, Australia; (2) CSIRO, Australia

P15-429 Simultaneous Integration of Plant Steroid Signaling and Immunity by a Pair of Cell Surface Receptors. J. KONG (1), Y. Belkhadir (2), E. Smakowska (2) (1) Gregor Mendel institute, Austria; (2) Gregor Mendel Institute, Austria

P15-430 Not "Ten Years After" but "Twenty Years After": Cloning of the barley Ror1 gene. R. PANSTRUGA (1), J. Acevedo (1), N. Ahmadinejad (2), K. Drwiega (1), M. Kwaaitaal (1), M. Mascher (3), K. Baumgarten (1), X. Dong (4), G. James (4), K. Schneeberger (4), N. Stein (3), P. Schulze-Lefert (4) (1) RWTH Aachen University, Germany; (2) University of Bonn, Germany; (3) IPK Gatersleben, Germany; (4) MPIPZ Köln, Germany

P15-431 Function of a glutathione-S-transferase in Arabidopsis pre-invasive defence. M. PASTORCZYK (1), M. Pislewska-Bednarek (1), R. Nakano (2), K. Hiruma (2), A. Molina (3), Y. Takano (4), P. Schulze-Lefert (2), P. Bednarek (1) (1) Institute of Bioorganic Chemistry, Poland; (2) Max Planck Institute for Plant Breeding Research, Germany; (3) Centre for Plant Biotechnology and Genomics, Spain; (4) Graduate School of Life and Environmental Sciences, Jordan

P15-432 MATE transporter-dependent export of hydroxycinnamic acid amides. S. ROSAHL (1), M. Dobritzsch (1), K. Gorzolka (1), A. Matern (1), L. Eschen-Lippold (1) (1) Leibniz Institute of Plant Biochemistry, Germany; (2) Leibniz Institute of Plant Biochemistry, Germany

P15-433 Cell-wall-based regulation of stomatal defense in Arabidopsis. L. ZHANG (1), W. Zeng (2), J. Chen (3), S. He (4) (1) Department of Plant Biology, DOE Plant Research Laboratory, Michigan State University, U.S.A.; (2) DOE Plant Research Laboratory, Michigan State University, U.S.A.; (3) Department of Computer Science and Engineering, DOE Plant Research Laboratory, Michigan State University, U.S.A.; (4) Department of Plant Biology, DOE Plant Research Laboratory, Howard Hughes Medical Institute, Michigan State University, U.S.A.

P15-434 The wheat *Stb6* gene controlling a gene-for-gene resistance to *Zymoseptoria tritici* encodes a wall-associated kinase like protein. C. SAINTENAC (1), W. Lee (2), F. Cambon (1), J. Rudd (2), R. King (2), A. Phillips (2),

C. Uauy (3), K. Hammond-Kosack (2), T. Langin (1), K. Kanyuka (2) (1) INRA, and Université Blaise Pascal, France; (2) Rothamsted Research, United Kingdom; (3) John Innes Centre, United Kingdom

P15-435 UDP-D-Glucuronate 4-Epimerases 1 (GAE1) and GAE6 are Critical for Pectin Abundance and Immunity in *Arabidopsis thaliana*. G. BETHKE (1), A. Thao (1), G. Xiong (2), B. Li (3), N. Soltis (3), N. Hatsugai (1), R. Hillmer (1), F. Katagiri (1), D. Kliebenstein (4), M. Pauly (4), J. Glazebrook (1) (1) University of Minnesota, U.S.A.; (2) Energy Biosciences Institute, University of California, U.S.A.; (3) University of California, U.S.A.; (4) University of California, U.S.A.; (5) University of California, U.S.A.

P15-436 Colorful Signaling: Resolving cellular salicylic acid and jasmonate/ethylene responses during *Hyaloperonospora arabidopsidis-Arabidopsis thaliana* interactions. S. LAUKAMM (1), V. Lipka (2), O. Tetyuk (2), A. von Hoyningen-Huene (2), M. Pound (3), K. Hanika (4), H. Ghareeb (2) (1) Georg-August-University Göttingen, Germany; (2) Georg-August-Universität Göttingen, Germany; (3) University of Nottingham, England; (4) University of Wageningen, Netherlands

P15-437 Regulon-guided Discovery of Defensive Secondary Metabolism in *Arabidopsis*. B. BARCO (1), N. Clay (1) (1) Yale University, U.S.A.

Plant Hormones and Regulators

P16-438 Induction of ethylene inhibits development of soybean sudden death syndrome by inducing defense-related genes and reducing *Fusarium virguliforme* growth. N. ABDELSAMAD (1), G. MacIntosh (2) (1) Iowa State Univ, U.S.A.; (2) Iowa State University, U.S.A.

P16-439 *Fusarium graminearum* is able to detoxify cereal defense compounds (tryptamine-derived hydroxycinnamic acid amides) and to convert the released tryptamine into auxin. G. ADAM (1), P. Spörhase (2), P. Fruhmann (3), E. Beltran Iturat (4), A. Bartholomäus (1), A. Stadler (1), C. Schmeitzl (1), G. Wiesenberger (1), B. Kluger (5), M. Doppler (6), C. Büschl (6), R. Krska (4), R. Schuhmacher (6), F. Berthiller (4) (1) Univ. of Natural Resources and Life Sciences, Vienna (BOKU), Dpt. of Applied Genetics and Cell Biol., Austria; (2) Univ. of Natural Resources and Life Sciences, Vienna (BOKU), Dpt. of Applied Genetics and Cell Biol., Austria; (3) TU Vienna, Inst. of Applied Synthetic Chemistry, Austria; (4) Univ. Nat. Res. and Life Sci. (BOKU), Dpt. IFA Tulln, Center for Analytical Chemistry, Austria; (5) bernhard.kluger@boku.ac.at, Austria; (6) Univ. Nat. Res. and Life Sci. (BOKU), Dpt. IFA Tulln, Center for Analytical Chemistry, Austria

P16-440 Regulon-guided discovery of defensive secondary metabolism in *Arabidopsis*. B. BARCO (1), N. Clay (1) (1) Department of MCDB, Yale University, U.S.A.

P16-441 *PBS3* coordinates the leaf specific outcome of abiotic and biotic stress crosstalk through salicylic acid mediated immune signaling. M. BERENS (1), K. Tsuda (1) (1) Max Planck Institute for Plant Breeding Research, Germany

P16-442 Jasmonate-induced oxygenases are novel players in immune suppression acting as jasmonic acid hydroxylases. L. CAARLS (1), J. Elberse (1), M. Awwanah (1), N. Ludwig (1), T. Zeilmaker (1), M. de Vries (2), R. Schuurink (2), G. Van den Ackerveken (1) (1) Utrecht University, Netherlands; (2) University of Amsterdam, Netherlands

P16-443 Identification of transcription factors affecting *CrPR1a* induction in periwinkle and their potential roles in plant defense against phytoplasma. J. CHEN (1), H. Lo (2), C. Lai (2), C. Lin (2) (1) Institute of Biotechnology/National Taiwan University, Taiwan; (2) Department of Plant Pathology & Microbiology/National Taiwan University, Taiwan

P16-444 Dehydroabietinal, an abietane diterpenoid, activates the autonomous pathway to impact flowering time and defense in *Arabidopsis thaliana*. Z. CHOWDHURY (1), M. Giri (1), R. Chaturvedi (1), B. Venables (1), J. Shah (1) (1) University of North Texas, U.S.A.

P16-445 Dehydroabietinal, an abietane diterpenoid, activates the autonomous pathway to impact flowering time and defense in *Arabidopsis thaliana*. Z. CHOWDHURY (1) (1) University of North Texas, U.S.A.

P16-446 Refactored SA-signaling for tunable defense. O. DE LANGE (1), A. Khakhar (2), J. Nemhauser (2), E. Klavins (2) (1) The University of Washington, U.S.A.; (2) The University of Washington, U.S.A.

P16-447 Transcriptome analysis of cell-specific JAZ4 regulation of plant responses in *Arabidopsis*. L. DEMOTT (1), P. Oblessuc (1), M. Melotto (1) (1) University of California - Davis, U.S.A.

P16-448 Identification of candidate genes that contribute to resistance towards *F. graminearum* in soybean PI 567301B. C. GEDLING (1), S. Verhoff (1), S. Lee (2), R. Mian (3), L. McHale (1), A. Dorrance (1) (1) The Ohio State University, U.S.A.; (2) North Carolina State University, U.S.A.; (3) USDA ARS, U.S.A.

P16-449 Quantitative monitoring of pathogen-induced plant hormone dynamics with temporal and single cell resolution. H. GHAREEB (1), S. Laukamm (1), M. Pound (2), O. Tetyuk (3), K. Hanika (4), V. Lipka (3) (1) Department of Plant Cell Biology, Georg August University of Goettingen, Germany; (2) Centre for Plant Integrative Biology, University of Nottingham, United Kingdom; (3) Department of Plant Cell Biology, Georg August University of Goettingen, Germany; (4) University of Wageningen, Netherlands

P16-450 *Phytophthora infestans* effector PiAvr2 targets StBSLs to activate The Brassinosteroid pathway. E. GILROY (1), D. Turnbull (2), S. Naqvi (3), S. Breen (4), H. Wang (5), M. Malec (6), H. Mclellan (7), L. Welsh (8), P. Hedley (8), J. Stephens (8), F. Brunner (9), L. Yang (10), Z. Tian (5), J. Zhan (12), P. Birch (7) (1) The James Hutton Institute, Dundee, Scotland, United Kingdom; (10) Fujian Key Laboratory of Plant Virology, Fujian Agricultural and Forestry University, Fuzhou, China., China; (11) College of Horticulture and Forestry, Huazhong Agricultural University, Wuhan, China, China; (12) Fujian Key Laboratory of Plant Virology, Fujian Agricultural and Forestry University, Fuzhou, China., China; (2) The University of Dundee, Dundee, Scotland, United Kingdom; (3) James Hutton Ltd, United Kingdom; (4) The Australian National University, Australia; (5) College of Horticulture and Forestry, Huazhong Agricultural University, Wuhan, China, China; (6) Centre for Plant Molecular Biology, University of Tuebingen,, Germany; (7) The University of Dundee, United Kingdom; (8) The James Hutton Institute, United Kingdom; (9) Centre for Plant Molecular Biology, University of Tuebingen, Tuebingen, Germany, Germany

P16-451 Influence of fatty acid metabolism in plants on defense responses to aphid herbivory. F. GOGGIN (1) (1) University of Arkansas, U.S.A.

P16-452 Dynamics and regulation of jasmonic acid and salicylic acid transcriptional networks in Arabidopsis.. R. HICKMAN (1), M. Van Verk (1), A. Van Dijken (1), K. Denby (2), C. Pieterse (1), S. Van Wees (1) (1) Utrecht University, Netherlands; (2) Warwick University, United Kingdom

P16-453 Temperature regulation of salicylic acid-mediated defense in *Arabidopsis thaliana*. B. HUOT (1), A. Velásquez (2), E. Hubbard (2), J. Pulman (3), J. Yao (4), K. Childs (3), K. Tsuda (6), B. Montgomery (7), S. He (8) (1) DOE-Plant Research Laboratory, Cell and Molecular Biology Program, Michigan State University, U.S.A.; (2) DOE-Plant Research Laboratory, Michigan State University, U.S.A.; (3) Plant Biology Department, Center for Genomics Enabled Plant Science, Michigan State University, U.S.A.; (4) Department of Biological Sciences, Western Michigan University, U.S.A.; (5) Plant Biology Department, Center for Genomics Enabled Plant Science, Michigan State University, U.S.A.; (6) Department of Plant-Microbe Interactions, Max Planck Institute for Plant Breeding Research, Germany; (7) DOE-Plant Research Laboratory, Department of Biochemistry and Molecular Biology, Michigan State University, U.S.A.; (8) DOE-Plant Research Laboratory, Howard Hughes Medical Institute-Gordon and Betty Moore Foundation, Michigan State University, U.S.A.

P16-454 Diazotrophic bacteria in *Guzmania monostachia* (Bromeliaceae): hormonal signaling molecules and leaf tissue colonization. C. KLEINGESINDS (1), P. Mioto (1), R. Zuccarelli (2), M. Rodrigues (2), D. Demarco (2), M. Aidar (3), H. Mercier (2) (1) University of São Paulo, Brazil; (2) University of São Paulo, Brazil; (3) Instituto de Botânica de São Paulo, Brazil

P16-455 Ascorbate oxidation level determines the hormone balance during the interaction between parasitic root-knot nematodes and rice. T. KYNDT (1), A. Mekonene (2), R. Verbeek (2), R. Singh (2), A. Haeck (2), K. Demeestere (2), R. Tenhaken (3), S. Siddique (4), M. Frei (4) (1) Ghent University, Belgium; (2) Ghent University, Belgium; (3) University of Salzburg, Austria; (4) Rheinische Friedrich-Wilhelms-University of Bonn, Germany

P16-456 Characterization of the interaction between the *Beet Necrotic Yellow Vein Virus* pathogenicity factor P25 and an Auxin/indole-3-acetic acid protein from sugar beet. S. LIEBE (1), H. Thiel (2), D. Gilmer (3), M. Varrelmann (2) (1) Institute of Sugar Beet Research, Germany; (2) Institute of Sugar Beet Research, Germany; (3) Institut de Biologie Moléculaire des Plantes, France

P16-457 The plant growth-promoting rhizobacterium *Streptomyces coelicolor* M145 induces systemic resistance in *Arabidopsis thaliana* against *Pst* DC3000 by activating the salicylate signaling pathway. N. LIN (1), C. Chen (1) (1) Department of Agricultural Chemistry/National Taiwan University, Taiwan

P16-458 Characterization of Arabidopsis *CALMODULIN-LIKE* genes involved in fine-tuning plant immune signaling . Y. LU (1), W. Truman (2), G. Bethke (1), J. Glazebrook (1) (1) University of Minnesota, Twin Cities, U.S.A.; (2) Institute of Plant Genetics of the Polish Academy of Sciences, Poland

P16-459 The Arabidopsis oxygenases DOWNY MILDEW RESISTANT 6 and DMR6-LIKE OXYGENASE 1 negatively regulate immunity by hydroxylation of salicylic acid. N. LUDWIG (1), J. Elberse (1), T. Zeilmaker (1), C. Böttcher (2), A. Melquiond (1), G. Van den Ackerveken (1) (1) Utrecht University, Netherlands; (2) Julius-Kühn Institut, Germany

P16-460 Genetic suppressor screen and transcriptional profiling elucidate the PBS3 node of plant immunity in *Arabidopsis thaliana*. R. MACKELPRANG (1), R. Ramos (1), M. Wildermuth (1), R. Okrent (2) (1) University of California, Berkeley, U.S.A.; (2) USDA-ARS Forage Seed and Cereal Research Unit, U.S.A.

P16-461 A transcriptional regulator mediates the salicylic acid and Jasmonic acid/ethylene antagonism by modulating phosphoenolpyruvate shunt in *Arabidopsis*. W. MUCHERO (1) (1) Oak Ridge National Laboratory, U.S.A.

P16-462 The role of strigolactone signaling in rice-endophytic bacterium interaction. H. NAKASHITA (1), M. Kusajima (1), T. Asami (2), H. Yamakawa (3) (1) Fukui Prefectural University, Japan; (2) The University of Tokyo, Japan; (3) NARO Agricultural Research Center, Japan

P16-463 An uncharacterized GCN5-related N-acetyltransferase negatively regulates biotic and abiotic stress responses through the EDR1 signaling pathway. M. NEUBAUER (1), R. Innes (1) (1) Indiana University, U.S.A.

P16-464 Expression profiling of marker genes for salicylic acid, jasmonic acid and ethylene in *Brachypodium distachyon* highlights its similar defense mechanism to rice. Y. NOUTOSHI (1), Y. Kouzai (1), M. Kimura (1), Y. Yamanaka (1), M. Watanabe (1), H. Matsui (1), M. Yamamoto (1), Y. Ichinose (1), K. Toyoda (1), Y. Onda (2), K. Mochida (2) (1) Okayama University, Japan; (2) RIKEN CSRS, Japan

P16-465 Exploring the realm of unknown induced proteins by salicylic acid and their role in resistance against biotrophic pathogens. M. PEREIRA MENDES (1), R. Hickman (1), C. Pieterse (1), S. van Wees (1), M. van Verk (2) (1) Plant-Microbe Interactions, Dept. of Biology, Utrecht University, The Netherlands, Netherlands; (2) Plant-Microbe Interactions/Bioinformatics, Dept. of Biology, Utrecht University, The Netherlands, Netherlands

P16-466 How members of the NPR receptor family sense the SAR signal salicylic acid – the alternate model. U. PFITZNER (1), D. Neeley (1), F. Maier (1), E. Konopka (1) (1) Universitaet Hohenheim, Germany

P16-467 Genome-wide association study reveals novel regulators of defense hormonal crosstalk in *Arabidopsis thaliana*. S. PROIETTI (1), S. Coolen (1), L. Caarls (1), S. Van Wees (1), C. Pieterse (1) (1) Utrecht University, Netherlands

P16-468 Plant immunity in *Arabidopsis thaliana* ecotypes with natural variations in defense related genes. N. SCHOLTEN (1), J. Zeier (1) (1) Heinrich-Heine-Universität Düsseldorf, Germany

P16-469 PHB3 interacts with ICS1 and is involved in the SA-mediated defense response of *Arabidopsis thaliana*. A. SEGUEL (1), J. Jelenska (2), A. Herrera (1), J. Greenberg (2), L. Holuigue (1) (1) Pontificia Universidad Católica de Chile, Chile; (2) The University of Chicago, U.S.A.

P16-470 Alternative Splicing of a Host Defense Regulatory Gene in Soybean (*Glycine max*) . P. SELIG (1), V. Nalam (1) (1) Indiana University-Purdue University, U.S.A.

P16-471 The N-end rule pathway : a novel regulator of plant immunity. M. SOREL (1), R. De Marchi (1), B. Mooney (2), I. Fudal (3), K. Goslin (1), K. Kwasniewska (4), P. Ryan (4), M. Pfalz (5), J. Kroymann (5), S. Pollmann (6), A. Feechan (7), F. Wellmer (4), S. Rivas (8), E. Graciet (1) (1) Maynooth University, Biology department, Ireland; (2) Maynooth university, Biology department, Ireland; (3) INRA, UMR BIOGER, France; (4) Trinity College Dublin, Smurfit Institute of Genetics, Ireland; (5) CNRS, Laboratoire Ecologie Systematique Evolution, France; (6) Centro de Biotecnologia y Genomica de Plantas, U.P.M, Spain; (7) UCD Earth Institute and School of Biology and Environmental Science, Ireland; (8) INRA, CNRS, Laboratoire des Interactions Plantes-Microorganismes, France

P16-472 The regulatory function of TCP8 in plant innate immunity. B. SPEARS (1), F. Gao (2), J. Nam (2), W. Gassmann (1) (1) University of Missouri, Columbia, U.S.A.; (2) University of Missouri, Columbia, U.S.A.

P16-473 The role of auxin in susceptibility of soybean to *Phytophthora sojae*. A. STASKO (1), J. Lin (2), J. Blakeslee (2), A. Dorrance (1) (1) Department of Plant Pathology The Ohio State University-Ohio Agricultural Research and Development Center, U.S.A.; (2) Department of Horticulture and Crop Science The Ohio State University-Ohio Agricultural Research Development Center, U.S.A.

P16-474 Completing the pathway: Salicylic acid biosynthesis and its role in disease resistance in *Arabidopsis thaliana*. M. STEINWAND (1), M. Strawn (2), M. Wildermuth (1) (1) University of California Berkeley, U.S.A.; (2) Boehringer Ingelheim, U.S.A.

P16-475 Identification of cytoplasmic receptor-like kinases and transcription factors regulating the expression of *SARD1* and *CBP60g* . T. SUN (1), Q. Kong (1) (1) Department of Botany, University of British Columbia, Canada

P16-476 Role of SNC1 and Nitrate reductase activity on autoimmunity in the SUMO E3 ligase mutant *siz1*. H. VAN DEN BURG (1), V. Hammoudi (1), G. Vlachakis (1), S. Chatterjee (1), B. Beerens (1) (1) University of Amsterdam, Netherlands

P16-477 Elevated [CO2] compromises both Type I and Type II wheat resistance to Fusarium head blight. M. VAUGHAN (1) (1) USDA ARS, U.S.A.

P16-478 Comparative Analysis of Signaling Pathways Triggered by Different Pattern-recognition Receptor-types. W. WAN (1), M. Zaidem (2), J. Kilian (1), D. Weigel (2), A. Gust (1), T. Nuernberger (1) (1) Center for Plant Molecular Biology and Plant Biochemistry, University of Tuebingen, Germany; (2) Department of Molecular Biology, Max Planck Institute for Developmental Biology, Germany

P16-479 Posttranslational Modifications of NPR1: Dynamic Regulation of Immune Responses through the Interplay of Sumoylation and Phosphorylation. J. WITHERS (1) (1) Duke University, U.S.A.

P16-480 Activation of ethylene signaling pathways enhances disease resistance by regulating ROS and phytoalexin production in rice. C. YANG (1) (1) State Key Laboratory of Plant Genomics, Institute of Microbiology, Chinese Academy of Sciences, China

P16-481 Divergent pathogen effectors promote virulence by manipulating a transcriptional node of growth-defense crosstalk. L. YANG (1), P. José Pereira Lima Teixeira (1), S. Biswas (2), Y. He (3), O. Finkel (4), M. English (5), P. Epple (6), P. Mieczkowski (4), J. Dangl (7) (1) University of North Carolina Chapel Hill, U.S.A.; (2) Harvard Medical School, U.S.A.; (3) NC State University, U.S.A.; (4) University of North Carolina Chapel Hill, U.S.A.; (5)

University of Tennessee, U.S.A.; (6) BASF Plant Science LP, U.S.A.; (7) University of North Carolina Chapel Hill; HHMI, U.S.A.

P16-482 Analysis of the host hormonal signaling involved in *Brassica napus - Leptosphaeria maculans* pathosystem. C. YANG (1), D. Fernando (1) (1) Department of Plant Science, University of Manitoba, Canada

P16-483 Comparative transcriptome profiling of qualitative- and quantitative-specific defense responses underlying the *Brassica napus - Leptosphaeria maculans* pathosystem. X. ZHANG (1), M. Becker (2), M. Belmonte (2), W. Fernando (1) (1) Department of Plant Science, University of Manitoba, Canada; (2) Department of Biological Sciences, University of Manitoba, Canada; (3) Department of Plant Science, University of Manitoba, Canada

P16-484 WRKY70 Negatively Regulates *SARD1*, a Positive Regulator of SA Synthesis . M. ZHOU (1), Y. Lu (1), J. Glazebrook (1) (1) Department of Plant Biology, Microbial and Plant Genomics Institute, University of Minnesota, U.S.A.

Recognition in Plant Immunity

P17-485 Differential recognition of AVR2 variants of *Phytophthora infestans* by diverse *R* genes from wild *Solanum* species. C. AGUILERA GALVEZ (1), N. Champouret (1), E. Eggers (1), H. Rietman (1), R. Visser (2), V. Vleeshouwers (1) (1) Wageningen University, Netherlands; (2) Wageningen University, Netherlands

P17-486 Death be not proud – *rcs5* is a wall associated kinase gene that functions as a dominant susceptibility factor in the Barley- *Cochliobolus sativus* interaction to produce necroptosis. G. AMEEN (1), T. Drader (2), L. Sager (1), B. Steffenson (3), A. Kleinhofs (2), R. Brueggeman (1) (1) Department of Plant Pathology, North Dakota State University, U.S.A.; (2) Department of Crop and Soil Science, Washington State University, U.S.A.; (3) Department of Plant Pathology, University of Minnesota, U.S.A.

P17-487 A unique TIR-only receptor is required for recognition of a bacterial type-III effector. R. ANDERSON (1), M. Nishimura (1), K. Cherkis (1), M. Machius (1), Q. Lui (4), T. Law (1), J. Dangl (1) (1) University of North Carolina at Chapel Hill, U.S.A.

P17-488 Identification of gene pairs involved in the incompatibility between an *Eleusine* isolate of *Pyricularia oryzae* and common wheat. S. ASUKE (1), I. Chuma (1), Y. Tosa (1) (1) Kobe University, Japan

P17-489 Identification of signaling components leading to induction of plant defense responses mediated by the MAMP EIX. A. AVNI (1) (1) Tel Aviv University, Israel

P17-490 Bacterial outer membrane vesicles induce plant immunity and enhance bacterial disease resistance. O. BAHAR (1) (1) Dept. of Plant Pathology and Weed Science, ARO - Volcani Centre, Israel

P17-491 Requirement for translationally regulated candidate genes during plant NB-LRR- mediated defense responses. T. BARFF (1), L. Meteigner (2), M. Cohen (2), M. El Oirdi (2), K. Yoshioka (3), P. Moffett (2) (1) Université de sherbrooke, Canada; (2) Université de Sherbrooke, Canada; (3) University of Toronto, Canada

P17-492 Biochemical screen to identify components of the ZAR1 immune complex. M. BAUDIN (1), N. Dina (2), G. Walker (3), V. William (4), N. Mori (2), J. Hassan (2) (1) Plant and Microbial Biology Department of UC Berkeley, U.S.A.; (2) Plant and Microbial Biology Department of UC Berkeley, U.S.A.; (3) Plant and Microbial Biology Department of UC Berkeley , U.S.A.; (4) ARS, U.S.A.

P17-493 Does soybean use a fungal polyamine oxidase to induce immunity?. J. BAUMBACH (1), M. Bhattacharyya (1) (1) Iowa State University, U.S.A.

P17-494 The rocky road to NLR diversity in *Arabidopsis thaliana*. F. BEMM (1), A. Keller (1), D. Weigel (1) (1) MPI for Developmental Biology, Tübingen, Germany, Germany

P17-495 A receptor-like protein provides broad-spectrum resistance in soybean. M. BHATTACHARYYA (1), M. Ngaki (1), D. Sahoo (2), B. Wang (2), S. Swaminathan (2) (1) Iowa State University, U.S.A.; (2) Iowa State University, U.S.A.; (3) Iowa State University, U.S.A.

P17-496 Folate is required for nonhost immunity of Arabidopsis against soybean pathogens.. M. BHATTACHARYYA (1), S. Kambakam (1), B. Sahu (1), R. Sumit (1), P. Singh (1), M. Ngaki (1) (1) Iowa State University, U.S.A.

P17-497 Investigations into the localization and function of Sr35, a wheat CC-NBS-LRR protein that confers resistance to race TTKSK (Ug99) of *Puccinia graminis* f. sp. *tritici*. S. BOLUS (1), G. Coaker (1), J. Dubcovsky (1) (1) University of California, Davis, U.S.A.

P17-498 Identification of a rice locus conferring broad spectrum disease resistance to bacterial pathogens. A. BOSSA-CASTRO (1), C. Raghavan (2), C. Tekete (3), E. Delorean (1), A. Dereeper (4), K. Dagno (5), O. Koita (3), G. Mosquera (6), H. Leung (2), V. Verdier (4), J. Leach (1) (1) Colorado State University, U.S.A.; (2) International Rice Research Institute (IRRI), Philippines; (3) Université des Sciences Techniques et Technologiques, Faculté des Sciences et Techniques, LBMA, Mali; (4) IRD, Cirad, Univ. Montpellier, Interactions Plantes Microorganismes Environnement, France; (5) Institute of Rural Economy, Plant Protection, Mali; (6) International Center for Tropical Agriculture (CIAT), Colombia

P17-499 Dissecting multiple resistance specificities at the *Mla* locus in barley. H. BRABHAM (1), I. Hernández-Pinzón (1), P. Green (1), M. Moscou (1), P. Hayes (2) (1) The Sainsbury Laboratory, United Kingdom; (2) Oregon State University, U.S.A.

P17-500 PAMP perception during *Fusarium graminearum* pathogenesis . E. BRAUER (1) (1) Agriculture and Agri-Food Canada, Canada

P17-501 Extreme resistance to *Cowpea mosaic virus*: molecular forms of the virus-encoded elicitors. G. BRUENING (1), J. Gao (1), Q. Fan (2) (1) Plant Pathology, University of California at Davis, U.S.A.; (2) Huazhong Agricultural University, China

P17-502 An improved purification system for flax resistance proteins M, L6 and L7. H. BURDETT (1), P. Anderson (1), S. Williams (2), P. Sornaraj (3), M. Rahman (1), B. Kobe (4) (1) Flinders University, Australia; (2) Australian National University, Australia; (3) Department of Industry Innovation and Science, Australia; (4) University of Queensland, Australia

P17-503 Epistatic influence in tomato Ve1-mediated resistance. C. CASTROVERDE (1), R. Nazar (1), J. Robb (1) (1) Molecular and Cellular Biology, University of Guelph, Canada

P17-504 Understanding the molecular basis for tomato resistance to the Fusarium wilt fungus *Fusarium oxysporum* f. sp. *lycopersici*. A. CATANZARITI (1), Y. Gonzalez-Cendales (1), H. Do (1), P. Bru (1), D. Jones (1) (1) Research School of Biology, Australian National University, Australia

P17-505 Distinct resistance genes arrest development of the oomycete rust *Albugo candida* in *Arabidopsis thaliana* at different infection stages. V. CEVIK (1), S. Huh (1), A. Cooper (2), O. Furzer (1), S. Fairhead (3), J. Taylor (2), J. Carlier (4), P. Sarris (5), J. Jones (1), E. Holub (2) (1) The Sainsbury Laboratory, United Kingdom; (2) University of Warwick, School of Life Sciences, Warwick Crop Centre, United Kingdom; (3) University of Warwick, School of Life Sciences, Warwick Crop Centre, United Kingdom; (4) University of Algarve, Laboratory of Genomics and Genetic Improvement, Portugal; (5) Division of Plant and Microbial Sciences, School of Biosciences, University of Exeter, United Kingdom

P17-506 Mining and Identification of Functional Novel Alleles of *Pi2/9* locus From Rice 3K Germplasm Against Rice Blast, *Magnaporthe oryzae* via Genome Wide Association Study (GWAS) Pipeline. C. CHAIPANYA (1), J. Divina (1), F. Borja (1), J. Yanoria (1), R. Mauleon (1), R. Opulencia (1), C. Jantasuriyarat (2), B. Zhou (1) (1) International Rice Research Institute, Philippines; (2) Department of Genetics, Faculty of Science, Kasetsart University, Bangkok, Thailand

P17-507 The SERK family as co-receptors for FLS2. P. CHATELAIN (1), M. Albert (1), U. Fürst (1), G. Felix (1) (1) ZMBP - Center for Plant Molecular Biology, Tuebingen University, Germany

P17-508 Endoplasmic reticulum stress responses function in the HRT-mediated hypersensitive response in *Nicotiana benthamiana*. H. CHOI (1), J. Moon (1), J. Park (2) (1) Korea Research Institute Bioscience and Biotechnology(KRIBB)/UST, South Korea; (2) Korea Research Institute Bioscience and Biotechnology(KRIBB), South Korea

P17-509 RECEPTOR–LIKE CYTOPLASMIC KINASE FACILITATES PLANT IMMUNITY VIA INTERACTION AND PHOSPHORYLATION WITH EFFECTOR-TARGETED PROTEIN RIN4 IN ARABIDOPSIS. E. CHUNG (1), R. Anderson (2), J. Dangl (3) (1) Howard Hughes Medical Institute (HHMI) / UNC-Chapel Hill, U.S.A.; (2) Department of Biology, UNC-Chapel Hill, U.S.A.; (3) Howard Hughes Medical Institute (HHMI), UNC-Chapel Hill, U.S.A.

P17-510 A resistance mechanism from the American heirloom rice variety Carolina Gold Select is dependent on TAL effector central repeat region composition, but not the repeat variable diresidues. S. COHEN (1), L. Triplett (2), J. Leach (1) (1) Colorado State University, U.S.A.; (2) The Connecticut Agricultural Experiment Station, U.S.A.

P17-511 Dissecting the role of lysin motif receptor-like kinases (LYKs) in chitin-triggered immunity in grapevine. L. DAVIES (1), C. Villano (2), D. Brulé (3), M. Héloir (3), F. Boutrot (4), C. Zipfel (4), B. Poinssot (3), I. Dry (1) (1) Commonwealth Scientific and Industrial Research Organisation, Australia; (2) University of Naples Federico II, Italy; (3) INRA, Université de Bourgogne, France; (4) The Sainsbury Laboratory, England

P17-512 An E3 ubiquitin ligase, PUB4, regulates immune signaling through the interaction with Arabidopsis CERK1. Y. DESAKI (1), S. Takahashi (1), H. Koizumi (1), T. Miura (1), K. Yashima (1), Y. Ishibashi (1), K. Kito (1), M. Narusaka (2), Y. Narusaka (2), H. Kaku (1), N. Shibuya (1) (1) Department of Life Sciences, School of Agriculture, Meiji University, Japan; (2) Research Institute for Biological Sciences Okayama, Japan

P17-513 Genomic Screens to Identify Next-Generation MAMPs and their Cognate Pattern Recognition Receptors. D. DESVEAUX (1), A. Mott (2), S. Thakur (2), E. Smakowska (3), P. Wang (1), Y. Belkhadir (3), D. Guttman (1) (1) University of Toronto / Centre for the Analysis of Genome Evolution and Function, Canada; (2) University of Toronto, Canada; (3) Gregor Mendel Institute (GMI), Austria

P17-514 Heavy metal-associated isoprenylated plant protein is a putative host target of AvrPto5 effector of kiwifruit pathogen *Pseudomonas syringae* pv. *actinidiae*. K. DHARMARAJ (1), W. CUI (2), M. YOON (2), E. RIKKERINK

(2), M. TEMPLETON (1) (1) The University of Auckland & The New Zealand Institute for Plant & Food Research Limited, New Zealand; (2) The New Zealand Institute for Plant & Food Research Limited, New Zealand

P17-515 A dominant mutation in *BDA4* suppresses the autoimmune phenotypes in *snc2-1D*. Y. DING (1) (1) University of British Columbia, Canada

P17-516 Characterization of increased *Pantoea stewartii* resistance in maize *pan1* mutants. P. DOBLAS IBANEZ (1), L. Smith (1) (1) University of California San Diego, U.S.A.

P17-517 ELR INTERACTS WITH SOBIR1 TO MOUNT DEFENSE RESPONSES AGAINST *PHYTOPHTHORA INFESTANS* IN POTATO. E. DOMAZAKIS (1), M. Joosten (2), D. Wouters (2), S. Kamoun (3), R. Visser (2), V. Vleeshouwers (2) (1) Wageningen University, Netherlands; (2) Wageningen University, Netherlands; (3) The Sainsbury Laboratory, United Kingdom

P17-518 Special Ks – doping RPM1 activity. F. EL KASMI (1), R. Anderson (1), E. Chung (1), J. Dangl (1) (1) University of North Carolina, U.S.A.

P17-519 Characterization of barley host and non-host interactions with aphids. C. ESCUDERO-MARTINEZ (1), J. Morris (2), P. Hedley (3) (1) James Hutton Institute and Dundee University, United Kingdom; (2) James Hutton Institute Cell and Molecular Sciences, United Kingdom; (3) James Hutton Institute, Cell and Molecular Sciences, United Kingdom

P17-520 Recognitional specificity of the flax rust AvrP and AvrP123 effectors is determined by polymorphisms at their N-and C-termini. N. FARAH (1), A. Catanzariti (1), P. Dodds (2), A. Hardham (3), D. Jones (3) (1) Research School of Biology, ANU, Australia; (2) CSIRO, Australia; (3) Research School of Biology, ANU, Australia

P17-521 Identification and characterization of a novel *Sclerotinia*-MAMP and its receptor in *Arabidopsis*. C. FEILER (1), W. Zhang (2), A. Gust (3), T. Nuernberger (3), D. Kolb (3) (1) University of Tuebingen, Center for plant molecular biology, Germany; (2) ETH Zurich, Switzerland; (3) University of Tuebingen, Germany

P17-522 Development of genomic and breeding resources to uncover virulence mechanisms in oat crown rust. M. FIGUEROA (1), S. Rottschaefer (2), M. Miller (2), V. Omidvar (2), H. Karaoglu (3), F. Li (2), D. Singh (3), N. Upadhyaya (4), R. Dill-Macky (2), P. Dodds (4), R. Park (3), S. Kianian (5) (1) University of Minnesota, U.S.A.; (2) University of Minnesota, U.S.A.; (3) Plant Breeding Institute, University of Sydney, Australia; (4) CSIRO Agriculture, Australia; (5) USDA-ARS Cereal Disease Laboratory, U.S.A.

P17-523 Molecular and functional characterization of the plant immune receptor RLP32. K. FROEHLICH (1), E. Melzer (2), L. Fan (3), T. Nuernberger (3) (1) Center for Plant Molecular Biology, Department of Plant Biochemistry, Germany; (2) Center for Plant Molecular Biology, Department of Plant Biochemistry, Germany; (3) Center for Plant Molecular Biology, Department of Plant Biochemistry, Germany

P17-524 Potato Late Blight (Phytophthora Infestans (Mont.) de Bary) Disease Development and Tuber Yield with Response to Planting Dates and Fungicides Application In Nepal. S. GAIRE (1) (1) Agriculture and Forestry University, Nepal

P17-525 Characterization of Putative NPR1-dependent Aphid Resistance Factors in Tomato. A. GALLA (1), C. Avila (2), F. Goggin (1) (1) University of Arkansas, U.S.A.; (2) Department of Horticultural Science , Texas A& M University, U.S.A.

P17-526 The role of chloroplast-resident RNA helicase ISE2 in defense response against pathogens. E. GANUSOVA (1), T. Burch-Smith (1) (1) University of Tennessee, U.S.A.

P17-527 Interactions of Arabidopsis SRFR1, a negative regulator of effector-triggered immunity, with transcription factors and transcriptional co-repressors. C. GARNER (1), C. Rogan (2), S. Kim (1), S. Bhattacharjee (3) (1) University of Missouri, U.S.A.; (2) University of Missouri, U.S.A.; (3) Regional Centre for Biotechnology, India

P17-528 The bacterial Type III-secreted protein AvrRps4 is a bipartite effector. W. GASSMANN (1), M. Halane (2), S. Kim (2), C. Garner (2), S. Bhattacharjee (2) (1) University of Missouri, U.S.A.; (2) University of Missouri, U.S.A.

P17-529 Characterization of the role in plant defense of a cassava protein that potentially interacts with the HpaF effector from *Xanthomonas axonopodis* pv. *manihotis* . D. GÓMEZ DE LA CRUZ (1), C. Trujillo (1), V. Hurtado (1), C. Alvarado (1), S. Restrepo (1), A. Bernal (1) (1) Laboratorio de Micología y Fitopatología, Universidad de los Andes, Colombia

P17-530 Tomato atypical receptor kinase 1 protein abundance is differentially regulated during pathogen infection. A. GUZMAN (1), D. Lanver (2), K. Taylor (1), J. Kim (1), H. Liu (3), M. Mudgett (1) (1) Stanford University, U.S.A.; (2) Max-Planck-Institut für terrestrische Mikrobiologie, Germany; (3) Department of Plant Pathology, Nanjing Agricultural University, China

P17-531 Interaction dynamics between the potato late blight resistance protein RB and pathogen effectors. Y. LIN (1), D. Halterman (2) (1) University of Wisconsin-Madison, U.S.A.; (2) USDA, U.S.A.

P17-532 Proteome-wide identification of protein poly(ADP-ribosyl)ation targets reveals an important role of FHA domain protein DAWDLE in *Arabidopsis* immunity.. P. HE (1), B. Feng (1), S. Ma (2), S. Chen (3), S. Zhang (4),

B. Yu (4), S. Dinesh-Kumar (2), L. Shan (1) (1) Texas A&M University, U.S.A.; (2) University of California, Davis, U.S.A.; (3) University of Florida, U.S.A.; (4) University of Nebraska, U.S.A.

P17-533 The Tomato LRR-RLP CuRe1 detects molecular patterns of the parasitic plant *Cuscuta reflexa*. V. HEGENAUER (1), U. Fürst (1), B. Kaiser (1), M. Stahl (1), M. Albert (1), M. Smoker (2), C. Zipfel (2), G. Felix (1) (1) Eberhard Karls University of Tuebingen, Germany; (2) Sainsbury Laboratory, Norwich Research Park, United Kingdom

P17-534 Tomato receptor FLS3 binds flgII-28 and activates the plant immune system. S. HIND (1), S. Strickler (1), P. Boyle (1), D. Dunham (1), Z. Bao (1), I. O'Doherty (2), J. Baccile (2), J. Hoki (2), C. Clarke (3), B. Vinatzer (3), F. Schroeder (2), G. Martin (2) (1) Boyce Thompson Institute, U.S.A.; (2) Boyce Thompson Institute; Cornell University, U.S.A.; (3) Virginia Tech, U.S.A.

P17-535 Towards the identification of novel soybean cyst nematode resistance genes. K. HORGAN (1), C. Fliege (2), N. Yu (2), B. Diers (2), M. Hudson (3), A. Bent (4) (1) University of Wisconsin-Madison, U.S.A.; (2) University of Illinois at Urbana-Champaign, U.S.A.; (3) University of Illinois at Urbana-Champaign , U.S.A.; (4) University of Wisconsin-Madison, U.S.A.

P17-536 RDR6 knock down line potentiates the BaMV infection in newly emerging leaves of *Nicotiana benthamiana*. Y. HSU (1), M. Luo (1), Y. Huang (1), N. Lin (3) (1) Graduate Institute of Biotechnology, National Chung Hsing University, Taiwan; (2) Graduate Institute of Biotechnology, National Chung Hsing University, Taiwan; (3) Institute of Plant and Microbial Biology, Academia Sinica, Taiwan

P17-537 The rice NLR heteropair RGA4/RGA5 confers resistance to bacterial blight and bacterial leaf streak diseases. M. HUTIN (1), S. Cesari (2), V. Chalvon (3), C. Michel (3), T. Tran (4), R. Koebnik (4), S. Boris (4), T. Kroj (3) (1) Cornell University, PPPMB, U.S.A.; (2) CSIRO, Australia; (3) INRA, France; (4) IRD, France; (5) IRD, France

P17-538 Flagellin peptide flg22 is transported to distal tissues in Arabidopsis.. J. JELENSKA (1), S. Davern (2), R. Standaert (2), S. Mirzadeh (2), J. Greenberg (1) (1) University of Chicago, U.S.A.; (2) Oak Ridge National Laboratory, U.S.A.

P17-539 Investigate the regulation of Mitogen-activated protein Kinase Phosphatase 1 (MKP1) in PAMP signaling and resistance to bacteria. L. JIANG (1), Y. Wan (1), J. Anderson (2), R. Ulm (3), S. Peck (2) (1) University of Missouri-Columbia, U.S.A.; (2) University of Missouri-Columbia, U.S.A.; (3) University of Geneva, Switzerland

P17-540 Transcripts of disease resistance gene are under surveillance by of nonsense-mediated mRNA decay. H. JUNG (1), G. Jung (2), Y. Lee (2), K. Shin (3), S. Kim (3) (1) Dong-A University, Korea; (2) Dong-A University, Korea; (3) Myongji University, Korea

P17-541 Identification of novel regulators of the NADPH oxidase RBOHD during plant immunity. Y. KADOTA (1), Y. Goto (2), H. Matsui (3), J. Sklenar (4), P. Derbyshire (4), F. Menke (4), H. Nakagami (3), C. Zipfel (4), K. Shirasu (2) (1) RIKEN CSRS, Plant Immunity Research Group,, Japan; (2) RIKEN CSRS, Plant Immunity Research Group,, Japan; (3) RIKEN CSRS, Plant Proteomics Research Unit, Japan; (4) The Sainsbury Laboratory, United Kingdom; (5) RIKEN CSRS, Plant Proteomics Research Unit, Japan

P17-542 Pathogen infection and MORC1 affect chromatin accessibility of transposable elements and expression of their proximal genes in Arabidopsis. H. KANG (1), Y. Bordiya (1), Y. Zheng (2), J. Nam (1), H. Choi (2), B. Lee (3), J. Kim (3), D. Klessig (2), Z. Fei (2) (1) Texas State University, U.S.A.; (2) Boyce Thompson Institute, U.S.A.; (3) University of Texas, Austin, U.S.A.

P17-543 Heavy metal-associated domain (HMA) proteins of rice confer susceptibility to *Magnaporthe oryzae* and are targeted by M. oryzae effector AVR-Pik. H. KANZAKI (1), H. Saitoh (1), S. Cesari (2), K. Fujisaki (1), E. Kanzaki (1), K. Yoshida (3), T. Takeda (1), K. Ito (1), C. Mitsuoka (1), A. Hirabuchi (1), M. Banfield (4), T. Kroj (5), S. Kamoun (6), R. Terauchi (1) (1) Iwate Biotechnology Research Center, Japan; (2) CSIRO Plant Industry, Australia; (3) Kobe Univ. Laboratory of plant Genetics, Japan; (4) John Innes Centre, Japan; (5) INRA, UMR BGPI, France; (6) The Sainsbury Laboratory, United Kingdom

P17-544 Small GTPase OsRac1-indued S-nitrosylation of GAPDH is invovled in disease resistance to rice blast fungus. Y. KAWANO (1), K. Kosami (1), J. Su (2), K. Shimamoto (2) (1) Shanghai Center for Plant Stress Biology, China; (2) Nara Institute of Science and Technology, Japan

P17-545 Genome-based cloning of *Pvr4* conferring multiple potyvirus resistance from *Capsicum annuum* 'CM334'. S. KIM (1), J. Lee (2), D. Choi (2) (1) Seoul National University, South Korea; (2) Seoul National University, South Korea

P17-546 GRP7 is involved in Salicylic acid-mediated defense by its binding to SA-related transcripts. P. KIM (1), A. Joe (2), J. Alfano (1) (1) University of Nebraska, U.S.A.; (2) University of California, U.S.A.

P17-547 *Xanthomonas* AvrBsT interacts with calmodulin (CaM) and its CaM-binding domain is required for activation of effector-triggered immunity. . M. CHENONG (1), J. Kim (2), N. Ozabaki-Yagan (2), Y. Wang (3), M. Mudgett (2) (1) Department of Biology, Stanford University, U.S.A.; (2) Stanford University, U.S.A.; (3) China Agricultural University, China

P17-548 Studying the link between DNA-damage and NLR-mediated immune responses. M. KNIP (1), M. Cann (2), F. Takken (3) (1) University of Amsterdam, Netherlands; (2) Durham University, United Kingdom; (3) University of Amsterdam, Netherlands

P17-549 Genomic and functional studies reveal important roles of integrated domains in NLR-immune receptors. T. KROJ (1), D. Ortiz (2), S. Cesari (3) (1) INRA, France; (2) INRA, France; (3) CSIRO, Australia

P17-550 Mechanistic basis by which the Prf resistance protein manipulates the defense-related NAC1 transcription factor. J. KUD (1), X. Niu (2), W. Wang (1), Y. Liu (2), F. Xiao (1) (1) University of Idaho, U.S.A.; (2) Hefei University of Technology, China

P17-551 Segregation of unknown signaling components in potato complicates marker-assisted selection for *Ve*-mediated Verticillium resistance. A. KUMAR (1), D. Halterman (2), D. Rouse (3), S. Jansky (1) (1) Department of Horticulture, University of Wisconsin-Madison, U.S.A.; (2) U.S. Department of Agriculture-Agricultural Research Service, Vegetable Crops Research Unit, Madison, Wisconsin, U.S.A.; (3) Department of Plant Pathology, University of Wisconsin-Madison, U.S.A.

P17-552 The effects of calmodulin on plant immunity to *Pseudomonas syringae*. K. LAGERSTROM (1), P. Kim (1), J. Alfano (1) (1) University of Nebraska, U.S.A.

P17-553 Towards unravelling the *exserohilum turcicum*-sorghum pathosystem through inoculation trials and transcriptome data. B. LANGENHOVEN (1), M. Craven (2), S. Murray (3), A. Nieuwoudt (4), M. Human (4) (1) University of Pretoria, South Africa; (2) Agricultural Research Centre-Grain Crops Institute, South Africa; (3) University of Cape Town, South Africa; (4) University of Pretoria, South Africa

P17-554 Innate immunity in a forest tree: RLP-RLK complex mediates resistance to Septoria stem canker in *Populus trichocarpa*. J. LEBOLDUS (1), W. Muchero (2), J. Chen (2), J. Chang (3), A. Weisberg (3), K. Dunnell (3), G. Tuskan (2), R. Brueggeman (4) (1) Oregon State University, U.S.A.; (2) Oak Ridge National Laboratory, U.S.A.; (3) Oregon State University, U.S.A.; (4) North Dakota State University, U.S.A.

P17-555 Elucidating the pathogenic effects of *Ramularia collo-cygni* in barley. M. Lyngkjær (1), R. Lemcke (1) (1) University of Copenhagen, Denmark

P17-556 Quantitative high-throughput yeast two-hybrid screen identifies proteins that contribute to immunity against *Pseudomonas syringae*. J. LEWIS (1), J. Hassan (2), R. Rubalcava (2), D. Ouyang (2), K. Schreiber (2) (1) USDA, UC Berkeley, U.S.A.; (2) UC Berkeley, U.S.A.

P17-557 Non-host resistance genes in *Brachypodium distachyon* against the rust pathogen *Puccinia graminis* . F. LI (1), V. Omidvar (1), R. Milne (2), S. Kianian (3), J. Vogel (4), M. Ayliffe (5), M. Moscou (6), P. Dodds (2), E. Lagudah (2), M. Figueroa (1) (1) University of Minnesota, U.S.A.; (2) CSIRO Agriculture, Australia; (3) USDA-ARS Cereal Disease Laboratory, U.S.A.; (4) Joint Genome Institute, U.S.A.; (5) CSIRO Agriculture, U.S.A.; (6) The Sainsbury Laboratory, United Kingdom

P17-558 Arabidopsis heterotrimeric G proteins directly regulate FLS2-mediated immunity. X. LIANG (1), J. Zhou (2), J. Wang (2), M. Ma (2) (1) nstitute of Genetics and Developmental Biology,CAS, China; (2) Institute of Genetics and Developmental Biology,CAS, China

P17-559 Phosphoproteomic profiling reveals early regulatory mechanisms of membrane-associated proteins during ETI. T. LIEBRAND (1), D. Matuszak (1), G. Coaker (1) (1) UC Davis, Dept. of Plant Pathology, U.S.A.

P17-560 Identifying the receptor of *Phytophthora infestans* apoplastic effector SCR74 from wild potato . X. LIN (1) (1) Wageningen UR, China

P17-561 Bioactivities of *Trichoderma* chrysophanol. S. LIU (1), C. Liao (2), M. Hsieh (1), C. Lo (3), H. Yang (4), K. Lin (2), K. Peng (2) (1) Department of Molecular Biotechnology, Da-Yeh University, Taiwan; (2) Department of Life Science, National Dong Hwa University, Taiwan; (3) Department of Biotechnology, National Formosa University, Taiwan; (4) Department of Research, Buddhist Tzu Chi General Hospital, Taiwan

P17-562 A Putative Lipase-like Protein Regulates Arabidopsis Immune Gene Expression and Defense Responses. C. LIU (1), F. Cui (1), P. He (2), L. Shan (1) (1) Department of Plant Pathology and Microbiology, Institute for Plant Genomics & Biotechnology, Texas A&M University, U.S.A.; (2) Department of Biochemistry and Biophysics, Institute for Plant Genomics & Biotechnology, Texas A&M University, U.S.A.

P17-563 Arabidopsis Receptor-like kinase BIR1 negatively regulates cell death mediated by BAK1. Y. LIU (1), Y. Zhang (1) (1) University of British Columbia, Canada

P17-564 Identification and characterization of rice mutants that suppress XA21-mediated immunity by combining forward genetics and genomics approaches. F. LIU (1), M. Chern (1), W. Zhang (1), R. Jain (1), P. Ronald (1) (1) UC Davis, U.S.A.

P17-565 Autoimmunity in *camta3* is triggered by NLR immune receptors . S. LOLLE (1), C. Greeff (1), M. Roux (1), K. Sømark (1), J. Mundy (1), M. Petersen (1) (1) Department of Biology, University of Copenhagen, Denmark

P17-566 How does pathogen perception via the WRKY domain activate the RRS1/RPS4 immune complex?. Y. MA (1), P. Martinez (1),. Duxbury (2), P. Sarris (3), H. Brown (1), L. Wirthmueller (4), J. Jones (1) (1) The Sainsbury

Laboratory, United Kingdom; (2) The Sainsbury Laboratory, United Kingdom; (3) University of Exeter, United Kingdom; (4) University of Berlin, Germany

P17-567 XEGL1, a bidirectional decoy of *Phytophthora sojae*, safeguards the virulence function of XEG1 from interference in soybean. Z. MA (1), L. Zhu (1), T. Song (2), Y. Wang (1), Q. Zhang (1), Y. Xia (1), M. Qiu (1), Y. Lin (1), H. Li (1), W. Ye (1), Y. Wang (1), S. Dong (1), Y. Wang (1) (1) Nanjing agricultural university, China; (2) Jiangsu Academy of agricultural sciences, China

P17-568 The interactome of BIR2 reveals a novel adapter protein potentially linking BAK1 to NB-LRR-type resistance genes. R. MANSTRETTA (1), T. Halter (2), N. Schmidt (3), S. Schulze (3), B. Kemmerling (3) (1) Department of Plant Biochemistry (ZMBP), Eberhard-Karls-University, 72076 Tübingen, Germany, Germany; (2) Institut de Biologie de l'Ecole Normale Supérieure (IBENS), 75005 Paris, France, France; (3) Department of Plant Biochemistry (ZMBP), Eberhard-Karls-University, 72076 Tübingen, Germany, Germany

P17-569 An undergraduate team-research project: the comprehensive analysis of Arabidopsis loci associated with the functions of *Pseudomonas syringae* effectors.. K. MASE (1), E. Boak-Nyberg (2), R. Meyer (2), T. Pan (2), T. Reese (2), . Siegle (2), . Bair (2), P. Carlson (2), V. Carveth (2), C. Davis (2), S. Dumler (2), L. Gonsalves (2), H. Hanson (2), A. Heyder (2), P. Johnson (2), D. Kragh (2), R. Kurandina (2), K. Lim (2), A. Lord (2), A. Lord (2), S. Lothert (2), N. Luong Van (2), S. Miller (2), A. Ramnarayan (2), J. Resch (2), M. Rivi (2), N. Rudin (2), B. Spokely (2), N. Strom (2), B. Swanson (2), J. Walker (2), J. Wemmer (2), . Xie (2), S. Chakravarthy (3), H. Wei (3), A. Collmer (3), F. Katagiri (2) (1) University of Minnesota, U.S.A.; (2) University of Minnesota, U.S.A.; (3) Cornell University, U.S.A.

P17-570 Unravelling the defence arsenal of the wild *Solanum dulcamara* to *Pythophthora infestans*: resistance and tolerance.. L. MASINI (1), K. Abreha (1), E. Alexandersson (1), L. Råberg (2), R. Vetukuri (1), L. Grenville-Briggs Didymus (1), E. Andreasson (1), I. Rieu (3), Å. Lankinen (1) (1) Swedish University of Agricultural Sciences (SLU), Sweden; (2) Lund University, Sweden; (3) Radboud University, Netherlands

P17-571 The evolution and global diversity of *AvrPm3a2/f2* and *SvrPm3a1/f1*, two effector genes controlling race-specific resistance in wheat powdery mildew. K. MCNALLY (1), S. Bourras (2), F. Menardo (2), C. Praz (2), B. Keller (2) (1) University of Zurich Institute for Plant and Microbial Biology, Switzerland; (2) University of Zurich Institute of Plant and Microbial Biology, Switzerland

P17-572 Identification and molecular characterization of novel MAMP activities from the gram-negative bacteria *Ralstonia solanacearum* and *Escherichia coli* perceived by RLP32 in *Arabidopsis thaliana*. E. MELZER (1), L. Fan (1), K. Fröhlich (1), T. Nürnberger (1) (1) Uni Tuebingen, Germany

P17-573 Dual specificity at the *Mla* locus confers resistance to barley powdery mildew and wheat stripe rust. M. MOSCOU (1), I. Hernandez-Pinzon (1) (1) The Sainsbury Laboratory, United Kingdom

P17-574 Role of Stomata in Nonhost Disease Resistance. K. MYSORE (1), S. Lee (2), A. Kaundal (2), R. Vemanna (2), M. Senthil-kumar (2), M. Kang (3), C. Rojas (2), S. Oh (2), S. Roy Choudhury (4), H. Lee (2), Y. Ishiga (2), R. Allen (3) (1) The Samuel Roberts Noble Foundation, U.S.A.; (2) The Samuel Roberts Noble Foundation, U.S.A.; (3) Oklahoma State University, U.S.A.; (4) Donald Danforth Center, U.S.A.

P17-575 PAMP-responsive phosphoprotein MARK1 limits program cell death induction. H. NAKAGAMI (1), H. Matsui (2), Y. Nomura (3), M. Egusa (4), G. Hyon (3), H. Kaminaka (4), M. Trujillo (5), K. Shirasu (3) (1) RIKEN CSRS / Max Planck Institute for Plant Breeding Research, Japan; (2) RIKEN CSRS / Okayama University, Japan; (3) RIKEN CSRS, Japan; (4) Tottori University, Japan; (5) Leibniz Institute of Plant Biochemistry, Germany

P17-576 Improving disease resistance in strawberry. C. NELLIST (1), R. Vickerstaff (1), A. Armitage (1), R. Harrison (1) (1) NIAB-East Malling Research, United Kingdom

P17-577 The role of plant Cyanogenic Glucosides (CGs) in immunity and symbiosis. M. NEWMAN (1), L. Andersen Gersby (1), G. Erbs (2) (1) University of Copenhagen, Denmark; (2) University of Copenhagen, Denmark

P17-578 A wheat defence related miRNA targets a WRKY-domain containing NLR. V. NICOLIS (1), E. Venter (1) (1) University of Johannesburg, South Africa

P17-579 Characterization of PAMP-activated RLK genes in *Solanum tuberosum* . L. NIETZSCHMANN (1), S. Rosahl (1) (1) Leibniz Institute for Plant Biochemistry, Germany

P17-580 Elucidating the structural basis of effector induced susceptibility in the *Parastagonospora nodorum* - wheat interaction . M. OUTRAM (1), X. Zhao (1), S. Breen (2), P. Solomon (2), B. Kobe (1), S. Williams (2) (1) University of Queensland, Australia; (2) The Australian National University, Australia

P17-581 The arms-race of plant-pathogen perception: from structural understanding to disease resistance. J. PAULUS (1), S. Brouwer (1), R. van der Hoorn (1), S. Kumari (2) (1) Department of Plant Sciences, University of Oxford, United Kingdom; (2) Max Planck Institute for Plant Breeding Research, Germany

P17-582 *Rpp1* encodes a ULP-NBS-LRR protein that controls immunity to *Phakopsora pachyrhizi* in soybean. K. PEDLEY (1), A. Pandey (2), A. Ruck (1), S. Whitham (3), M. Graham (4) (1) Foreign Disease-Weed Science Research Unit, United States Department of Agriculture-Agricultural Research Service, U.S.A.; (2) National Agri-Food

Biotechnology Institute, India; (3) Department of Plant Pathology and Microbiology, Iowa State University, U.S.A.; (4) Corn Insects and Crop Genetics Research Unit, United States Department of Agriculture-Agricultural Research Service, U.S.A.

P17-583 *Trichoderma koningii* Epl1 induces crops resistance to pathogens. S. LIU (1), C. Cheng (2), M. Hsieh (1), K. Peng (3), C. Lo (2) (1) Department of Molecular Biotechnology, Da-Yeh University, Taiwan; (2) Department of Biotechnology, National Formosa University, Taiwan; (3) Department of Life Science, National Dong Hwa University, Taiwan

P17-584 Gene expression of *AtPEPR* receptors and *AtPep* peptides in response to *Xylella fastidiosa*. M. PEREIRA (1), J. Tomaz (2) (1) Instituto Agronômico do Paraná - IAPAR, Brazil; (2) Agronomic Institute of Paraná State - IAPAR, Brazil

P17-585 Identification of septoria nodorum blotch responsive QTLs in wheat through the removal of defined necrotrophic effector-host sensitivity gene interactions. H. PHAN (1), K. Rybak (1), E. Furuki (1), R. Oliver (1) (1) Curtin University, Australia

P17-586 Diversity of resistance and virulence mechanisms in the rice/*Rice yellow mottle virus* pathosystem. H. PIDON (1), A. Pinel (2), E. Hébrard (2), S. Chéron (1), A. Ghesquière (1), L. Albar (1) (1) IRD, UMR DIADE, France; (2) IRD, UMR IPME, France

P17-587 WITHDRAWN

P17-588 Novel sources of disease resistance in pepper against bacterial spot pathogen, *Xanthomonas gardneri*. N. POTNIS (1), P. Wechter (1) (1) USDA-ARS, U.S.A.

P17-589 Fine mapping of QTLs responsible for Ascochyta blight in chickpea. S. PURAYANNUR (1), K. Kumar (2), C. Vemula (3) (1) National Institute of Plant Genome Research, India; (2) National Institute of Plant Genome Reseach, India; (3) School of Life Sciences, Central University of Gujarat, India

P17-590 Genetic dissection of NLP-triggered immunity in Arabidopsis. T. RAAYMAKERS (1), R. Hijne (1), T. Van Butselaar (1), G. Van den Ackerveken (1) (1) Utrecht University, Netherlands

P17-591 A Conserved Amino Acid Sequence in Harpin Family Proteins Required for the Binding of Fibrillin 4 and Activation of the Hypersensitive Response in Plants. W. RAHFELDT (1), C. Li (1) (1) Plant Health Care, Inc, U.S.A.

P17-592 Suppressors of plant defense responses from wheat rust fungi. S. RAMACHANDRAN (1), C. Yin (2), J. Kud (3), K. Tanaka (2), S. Hulbert (2) (1) Washington State University, U.S.A.; (2) Washington State University, U.S.A.; (3) University of Idaho, U.S.A.

P17-593 Inheritance of primed genes enhance common bean (*Phaseolus vulgaris* L.) resistance to halo blight (*Pseudomonas syringae* pv phaseolicola). G. RAMIREZ (1), R. Alvarez (2) (1) CINVESTAV, Mexico; (2) CINVESTAV, Mexico

P17-594 Specificity of LORE-dependent lipopolysaccharide immune sensing in Arabidopsis. S. RANF (1) (1) Technische Universitaet Muenchen, Chair of Phytopathology, Germany

P17-595 Role of plant-microbe interactions in host resistance and emergence of virulent races. M. RASHID (1), S. Liban (2), X. Zhang (1), P. Park (1), M. Borhan (3), W. Fernando (1) (1) University of Manitoba, Canada; (2) DL seeds, Canada; (3) Agriculture and Agri-Food Canada, Canada

P17-596 Deciphering the role of NLR immune receptors DNA binding/damage in plant immunity. M. RICHARD (1), M. Knip (1), T. Aalders (1), M. Cann (2), F. Takken (1) (1) Molecular Plant Pathology, SILS, University of Amsterdam, Netherlands; (2) School of Biological and Biomedical Sciences, Biophysical Sciences Institute, Durham University, United Kingdom

P17-597 High-Resolution Mapping and Candidate Gene Identification of Unique *Pyrenophora teres* f. *teres* Necrotrophic Effector Host Sensitivities on Barley Chromosome 6H. J. RICHARDS (1), T. Friesen (2), R. Brueggeman (1) (1) North Dakota State University, U.S.A.; (2) USDA-ARS, Cereal Crops Research Unit, Red River Valley Agricultural Research Center, U.S.A.

P17-598 The natural alkamide affinin actives the priming of common bean (Phaseolus vulgaris L.) plants, and induces the JA and SA pathways. M. RICO (1), R. ALVAREZ (1) (1) CINVESTAV, Mexico

P17-599 Systematic Mutagenesis Analysis of the Turnip yellows virus Suppressor of RNA Silencing P0. M. SACCO (1), T. Nguyen (1), M. Dughbaj (1), K. Valdez (1), S. Oza (1), T. Choi (1), K. Wang (1) (1) California State University, Fullerton, U.S.A.

P17-600 Dissection of molecular interactions between *Magnaporthe oryzae* effector AVR-PikD and rice NLR Pikp-1/Pikp-2 i*n planta*. H. SAITOH (1), A. Maqbool (2), M. Franceschetti (2), A. Uemura (1), H. Kanzaki (1), S. Kamoun (3), M. Banfield (2), R. Terauchi (1) (1) Iwate Biotechnology Research Center, Japan; (2) John Innes Centre, United Kingdom; (3) The Sainsbury Laboratory, United Kingdom

P17-601 Independent evolution of powdery mildew avirulence effectors (AVRA) and their surveillance by the allelic barley Mildew Locus A (MLA) immune receptors.. I. SAUR (1), X. Lu (1), B. Kracher (1), S. Bauer (1), T.

Maekawa (1), P. Schulze-Lefert (1) (1) Department of Plant-Microbe Interactions, Max Planck Institute for Plant Breeding Research, Germany

P17-602 Receptor complex formation of the receptor-like kinase LORE in innate immunity. M. SCHÄFFER (1), S. Eibel (1), T. Illig (1), L. Raasch (1), R. Hückelhoven (1), S. Ranf (1) (1) TU München, Germany

P17-603 PLDgamma1 is a negative regulator of MAMP signalling in *Arabidopsis thaliana*. M. SCHLOEFFEL (1), M. Šemanjski (2), W. Wan (3), B. Macek (2), A. Gust (3) (1) Plant Biochemistry, Center for Plant Molecular Biology, Germany; (2) Proteome Center Tuebingen Interdepartmental Institute for Cell Biology, Germany; (3) Plant Biochemistry, Center for Plant Molecular Biology, Germany

P17-604 The uncharacterized protein ZED2 contributes to immune activation in Arabidopsis following recognition of the *Pseudomonas syringae* effector HopZ1a . K. SCHREIBER (1), J. Hassan (2), M. Baudin (2), D. Nazarchuk (2), G. Walker (2), T. Helmann (2), J. Lewis (2) (1) University of California - Berkeley, U.S.A.; (2) University of California - Berkeley, U.S.A.

P17-605 Genome-wide comparative analyses and evolutionary history of nucleotide-binding leucine-rich repeat (NLR) gene family among Solanaceae plants. E. SEO (1), S. Yeom (2), H. Lee (3), D. Choi (3) (1) Seoul National University, South Korea; (2) Gyeongsang National University, South Korea; (3) Seoul National University, South Korea

P17-606 Putative plant membrane receptor shedding: Case study on RLK902. J. SERNESTRAND (1), M. Berens (2), R. van der Hoorn (3), T. Colby (2), P. Huesgen (1) (1) Juelich Forschungszentrum, Germany; (2) Max planck institute for plant breeding research, Germany; (3) Department of Plant Sciences, University of Oxford, United Kingdom

P17-607 HopF-triggered immunity in *Arabidopsis* requires a ZAR1/ZRK module. D. SETO (1), N. Koulena (2), T. Lo (2), D. Desveaux (2), D. Guttman (2) (1) University of Toronto, Canada; (2) University of Toronto, Canada

P17-608 Microbe-associated molecular pattern-induced monoubiquitination of PRR complex-associated kinase BIK1 in *Arabidopsis* immunity.. L. SHAN (1), X. Ma (1), P. He (1) (1) Texas A&M University, U.S.A.

P17-609 Involvement of a putative SlSOBIR1-interacting receptor-like protein in plant response to elicitins. R. LIOU (1), W. Shih (1), C. Huang (1), C. Wang (2), K. Peng (1) (1) Dept. Plant Pathol. & Microbiol., National Taiwan University, Taiwan; (2) Institute of Plant & Microbial Biology, Academia Sinica, Taiwan

P17-610 Plant defense responses to herbivores involve recognition of independent herbivore-associated molecular patterns in rice. T. SHINYA (1), Y. Hojo (2), Y. Desaki (3), J. Christeller (4), K. Okada (5), N. Shibuya (3), I. Galis (2) (1) Institute of Plant Science and Resources, Okayama University, Japan; (2) Institute of Plant Science and Resources, Okayama University, Japan; (3) Department of Life Sciences, Meiji University, Japan; (4) The New Zealand Institute for Plant & Food Research, New Zealand; (5) Biotechnology Research Center, The University of Tokyo, Japan

P17-611 The Arabidopsis leucine-rich repeat receptor–like kinase NILR1 is required for induction of innate immunity to parasitic nematodes. S. SIDDIQUE (1), B. Mendy (2), M. Wangombe (2), Z. Radakovic (2), J. Holbein (2), F. Grundler (2), C. Zipfel (3) (1) INRES, Department of Molecular Phytomedicine, University of Bonn, Germany; (2) INRES, Department of Molecular Phytomedicine, University of Bonn, Germany; (3) The Sainsbury Laboratory, Norwich Research Park, Norwich, United Kingdom

P17-612 Role of plant antiviral defense during VIGS in plant. D. SINGH (1) (1) Samuel Roberts Noble Foundation, India

P17-613 Inter- and intramolecular interactions regulating the activity of the CNL immune receptors Rx1 and Gpa2 in complex with RanGAP2. E. SLOOTWEG (1), R. Pomp (1), O. Sukarta (2), I. Dols (2), J. Alkemade (2), J. Borst (3), A. Goverse (2) (1) Laboratory of Nematology, Wageningen University, Netherlands; (2) Laboratory of Nematology, Wageningen University, Netherlands; (3) Laboratory of Biochemistry, Wageningen University, Netherlands

P17-614 Characterizing the dynamic changes in the subcellular localization of *Rhg1* gene products during SCN infection. J. SMITH (1), A. Bayless (1), J. Song (1), A. Teillet (1), A. Bent (1) (1) University of Wisconsin-Madison, U.S.A.

P17-615 Comparative analysis of NLR-mediated recognition of a bacterial effector AvrRpt2 in Malus and Arabidopsis. K. SOHN (1), M. Prokchorchik (2) (1) Postech, Korea; (2) Massey University, New Zealand

P17-616 A Dual NLR with an integrated sensory domain, complexes with a transcription factor to mediate *Ug99* resistance in barley. S. SOLANKI (1), G. Ameen (1), R. Brueggeman (1) (1) North Dakota State University, U.S.A.

P17-617 Antagonistic perception of endogenous peptides by FERONIA regulates plant immunity. M. STEGMANN (1), J. Monaghan (2), E. Smakowska (3), H. Roevenich (4), N. Holton (1), Y. Belkhadir (3), C. Zipfel (1) (1) The Sainsbury laboratory, United Kingdom; (2) Queens University, Canada; (3) Gregor Mendel Institute, Austria; (4) Wageningen University, Netherlands

P17-618 Inhibition of plant apoplastic immune subtilases: of pathogen or plant origin?. D. SUELDO (1), T. Hong (1), S. Ninck (2) (1) University of Oxford, United Kingdom; (2) Universität Duisburg-Essen, Germany

P17-619 Exploring the Resistosome of the Potato CC-NB-LRR Immune Receptor Rx1. O. SUKARTA (1) (1) wageningen university, Netherlands

P17-620 Identification and functional analysis of autophosphorylation sites in Arabidopsis CERK1. M. SUZUKI (1), S. Kenkichi (2), M. Shibuya (2), H. Shimada (2), N. Motoyama (2), S. Takahashi (2), I. Yoshida (2), M. Ohnishi (2), Y. Ishibashi (2), Z. Fujimoto (3), Y. Desaki (2), H. Kaku (2), K. Kito (2), N. Shibuya (2) (1) Meiji university, Japan; (2) Meiji university, Japan; (3) National Institute of Agrobiological Sciences, Japan

P17-621 Responsiveness to microbe-associated molecular patterns in *Brachypodium distachyon*. A. TAKAHASHI (1), Y. Kouzai (1), M. Kimura (1), M. Watanabe (1), H. Matsui (1), M. Yamamoto (1), Y. Ichinose (1), K. Toyoda (1), Y. Noutoshi (1) (1) Okayama University, Japan

P17-622 The *Fusarium oxysporum* effector Six8 manipulates plant immunity through association with the transcriptional co-repressors TPL and TPR1. F. TAKKEN (1), F. Gawehns (2), M. de Sain (2), P. Houterman (2), H. Dekker (3), D. Valkenburg (2), H. van den Burg (2), M. Rep (2), G. van den Ackervecken (4), H. Richter (2) (1) University of Amsterdam - Mol. Plant Pathology, Netherlands; (2) University of Amsterdam - Mol. Plant Pathology, Netherlands; (3) University of Amsterdam - mass spectrometry, Netherlands; (4) Utrecht University - Plant-Microbe Interactions,, Netherlands

P17-623 A multilayered regulatory mechanism for the autoinhibition and activation of a plant CC-NB-LRR resistance protein with an extra N-terminal domain. X. TAO (1), X. Chen (2), M. Zhu (2), L. Jiang (2), W. Zhao (2), J. Li (2), J. Wu (2), C. Li (2), B. Bai (2), G. Lu (2), H. Chen (2) (1) Nanjing Agricultural University, China; (2) Nanjing Agricultural University, China

P17-624 The difference of resistance level to *Septoria gentian* in *Gentian*.. C. TATEDA (1), R. Tomita (2), K. Sekine (3) (1) Iwate Biotechnology Research Center, Japan; (2) Iwate Biotechnology Research Center, Japan; (3) Univercity of Ryukyus, Japan

P17-625 Basal defense against root-knot nematodes in *Arabidopsis thaliana*. M. TEIXEIRA (1), I. Kaloshian (2) (1) UCR, U.S.A.; (2) Professor/UCR, U.S.A.

P17-626 Arms race coevolution in rice blast disease: the link between an effector host target and plant immunity through an integrated NLR domain. R. TERAUCHI (1), H. Kanzaki (2), H. Saitoh (2), A. Maqbool (3), K. Yoshida (4), S. Cesari (5), T. Kroj (6), M. Banfield (3), S. Kamoun (7) (1) Iwate Biotechnology Research Center, Japan; (2) Iwate Biotechnology Research Center, Japan; (3) John Innes Centre, United Kingdom; (4) Kobe University, Japan; (5) CSIRO, Australia; (6) INRA, France; (7) The Sainsbury Laboratory, United Kingdom

P17-627 The XA21::EFR Chimeric Receptor Recognizes RaxX and Confers Resistance to *Xanthomonas* Infection. N. THOMAS (1), N. Oksenberg (1), B. Schwessinger (1), Y. Ngyuen (1), P. Ronald (1) (1) UC Davis, U.S.A.

P17-628 Gene expression of *At*PEPR receptors and *At*Pep peptides in response to *Xylella fastidiosa*. J. TOMAZ (1), M. Pereira (1) (1) Agronomic Institute of Paraná State - IAPAR, Brazil

P17-629 Phosphorylated RIN4 interacts with a unique set of client proteins in the absence of NLR perception. T. TORUNO (1), D. Lee (1), . Shen (2), D. Mackey (2), G. Coaker (1) (1) University of California, Davis, U.S.A.; (2) The Ohio State University, U.S.A.

P17-630 Arabidopsis miRNA boosts host immunity against *Verticillium dahliae* via repression of plant target gene transcript. M. VAN DAMME (1), G. van den Berg (1), L. Faino (1), B. Thomma (1) (1) Wageningen University, Phytopathology, Netherlands

P17-631 Screening *Arabidopsis thaliana* populations for disease resistance against *Xanthomonas campestris* pv *campestris*.. M. VAN HULTEN (1), S. Chatterjee (1), H. van den Burg (1) (1) Molecular Plant Pathology, Swammerdam Institute for Life Sciences, University of Amsterdam, Netherlands

P17-632 Natural variation in *Arabidopsis thaliana* resistance mechanisms to *Pseudomonas syringae*. A. VELÁSQUEZ (1), M. Oney (1), B. Huot (1), S. He (1) (1) Michigan State University, U.S.A.

P17-633 Unravelling the wheat-*Diuraphis noxia* miRNome. E. VENTER (1), P. Sibisi (2) (1) Department of Botany and Plant Biotechnology, University of Johannesburg, South Africa; (2) Department of Botany and Plant Biotechnology, University of Johannesburg, South Africa

P17-634 Structural basis of the *Pseudomonas syringae* effector HopBB1 targeting two *Arabidopsis* jasmonate repressors to activate the jasmonate-signaling pathway. L. WAN (1), L. Yang (1), P. Teixeira (1), F. Monteiro (1), J. Dangl (1) (1) University of North Carolina at Chapel Hill, U.S.A.

P17-635 The Arabidopsis major leaf ferredoxin Fd2 regulates immune responses and mediates Harpin-induced hypersensitive reaction. M. WANG (1), K. Zhang (2), L. Rui (3), M. Bellizzi (2), D. Tang (3), Z. Wei (4), G. Wang (1) (1) Ohio State University, U.S.A.; (2) Ohio State University, U.S.A.; (3) Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, China; (4) Plant Health Care, Inc., U.S.A.

P17-636 Identification of two novel receptor kinases from tomato that act as the receptor sites for bacterial cold shock protein and the wound factor systemin. L. WANG (1), M. Albert (1), G. Felix (1) (1) Center for Plant Molecular Biology, University of Tuebingen, Germany

P17-637 PDBP1 is a novel regulator of plant elicitor peptide (PEP)-induced plant immunity. P. WECKWERTH (1), Z. Shen (2), S. Briggs (2), K. Dressano (2), A. Huffaker (1) (1) UCSD, U.S.A.; (2) UCSD, U.S.A.

P17-638 Resistance to early blight in potato. J. WOLTERS (1), G. Bijsterbosch (2), R. Visser (2), G. van der Linden (2), V. Vleeshouwers (2) (1) Wageningen UR, Netherlands; (2) Wageningen UR, Netherlands

P17-639 Leucine-rich repeats determine NLR helper-sensor specificity in a redundant immune signaling network. C. WU (1), A. Abd-El-Haliem (2), T. Bozkurt (3), K. Belhaj (4), J. Vossen (2), S. Kamoun (4) (1) The Sainsbury Laboratory, Norwich Research Park, United Kingdom; (2) Plant Breeding, Wageningen University, Netherlands; (3) Department of Life Sciences, Imperial College London, United Kingdom; (4) The Sainsbury Laboratory, Norwich Research Park, United Kingdom

P17-640 Arabidopsis cysteine-rich receptor like kinases and their roles in amplifying plant immune responses. K. YADETA (1), A. Creer (1), J. Franco (1), J. Rufian (2), G. Coaker (1) (1) Department of Plant Pathology, University of California Davis, U.S.A.; (2) Instituto de Hortofruticultura Subtropical y Mediterránea "La Mayora" – Universidad de Málaga, Spain

P17-641 Regulation of sugar transporter activity for antibacterial defense in *Arabidopsis*. K. YAMADA (1), Y. Saijo (2), Y. Takano (1) (1) Kyoto University, Japan; (2) NAIST, Japan

P17-642 PBL27 directly connects between the chitin receptor, CERK1 and MAPK cascade in chitin-triggered immunity. K. YAMAGUCHI (1), K. Yamada (2), T. Shirakawa (2), A. Mine (3), M. Narusaka (4), Y. Narusaka (4), K. Ichimura (5), K. Tsuda (3), F. Tamo (2), N. Shibuya (6), T. Kawasaki (2) (1) Dept. Adv. Biosci. Kindai Univ., Japan; (2) Dept. Adv. Biosci. Kindai Univ., Japan; (3) MPIPZ, Germany; (4) RIBS Okayama, Japan; (5) Faculty of Agriculture, Kagawa Univ, Japan; (6) Dept. Life Sci., Meiji Univ, Japan

P17-643 Characterization of the *Xa10* paralog genes in rice cultivar Nipponbare for disease resistance to *Xantomonas oryzae* pv *oryzae*. Z. YIN (1), J. Wang (2), X. Zeng (2), D. Tian (2), K. Gu (2), X. Yang (2), L. Wang (2), K. Ong (2) (1) Temasek Life Sciences Laboratory, Singapore; (2) Temasek Life Sciences Laboratory, Singapore

P17-644 Phosphorylation of rice RBOH by CERK1-associated RLCK regulates chitin-triggered ROS burst. M. YOSHIOKA (1), K. Yamaguchi (2), M. Fujiwara (3), S. Yoshimura (2), T. Kawasaki (2), H. Yoshioka (1) (1) Nagoya University, Japan; (2) Kindai University, Japan; (3) Keio University, Japan

P17-645 Epigenetic regulation of *Rhg1*, a Soybean Cyst Nematode resistance locus. R. ZAPOTOCNY (1) (1) University of Wisconsin-Madison, U.S.A.

P17-646 Structural and functional investigation of plant TIR domain interaction. X. ZHANG (1), M. Bernoux (1), S. Williams (2), K. Sohn (3), T. Newman (4), T. Ve (2), P. Dodds (1), B. Kobe (2) (1) Commonwealth Scientific and Industrial Research Organisation Agriculture, Australia; (2) School of Chemistry and Molecular Biosciences and Australian Infectious Diseases Research Centre, University of Queensland, Australia; (3) Dept. of Life Sciences, School of Interdisciplinary Bioscience and Bioengineering, Pohang University of Science and Technology, Korea; (4) Bio-protection Research Centre, Institute of Agriculture and Environment, Massey University, New Zealand; (5) School of Chemistry and Molecular Biosciences and Australian Infectious Diseases Research Centre, University of Queensland, Australia

P17-647 A barley protein kinase positively regulates disease resistance through mediating phosphorylation-coupled turnover of a defense repressor WRKY3. L. ZHANG (1), X. Han (1), P. Xue (1), Q. Shen (1) (1) Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, China

P17-648 *Acidovorax citrulli* Type III Effector Aave_2166 Interacts with a Tobacco WRKY transcription Factor to Triggers Plant Defense. B. ZHAO (1), J. Miao (2), S. Traore (2), D. Kong (2) (1) Virginia Tech, U.S.A.; (2) Virginia Tech, U.S.A.

P17-649 Identification of a new subclade of *Leptosphaeria biglobosa* on *Brassica rapa* in Oregon, USA. Z. ZOU (1), X. Zhang (1), T. Paulitz (2), C. Ocamb (3), L. duToit (4), F. Dilantha (1) (1) University of Manitoba, Canada; (2) Washington State University, Pullman, U.S.A.; (3) Oregon State University, U.S.A.; (4) Washington State University, Mount Vernon NWREC, U.S.A.

P17-650 Structural studies of signalling domains from plant NLRs.. A. Bentham (1), X. Zhang (2), L. Casey (3), P. Lavrencic (2), S. Cesari (4), D. Ericsson (5), P. Anderson (1), M. Mobli (6), M. Bernoux (4), P. Dodds (4), B. Kobe (2), S. Williams (7) (1) School of Biological Sciences, Flinders University, Australia; (2) School of Chemistry and Molecular Biosciences, University of Queensland, Australia; (3) School of Chemistry and Molecular Biosciences, University of Queensland, Australia; (4) CSIRO Agriculture Flagship, Australia; (5) MX Beamlines, Australian Synchrotron, Australia; (6) Centre for Advanced Imaging, University of Queensland, Australia; (7) Research School of Biology, Australian National University, Australia

P17-651 The NOI/RIN4 integrated domain of the rice NLR Pii-2 binds to OsExo70-F3, an accessory protein required for *Pii*-dependent resistance. K. FUJISAKI (1), Y. Abe (1), H. Saitoh (1), H. Kanzaki (1), H. Takagi (1), E. Kanzaki (1), A. Uemura (1), S. Kamoun (2), R. Terauchi (1) (1) Iwate Biotechnology Research Center, Japan; (2) The Sainsbury Laboratory, United Kingdom

P17-652 Mystery solved: How the atypical pair Mi-1.2 and SERK1 regulate aphid resistance?. I. KALOSHIAN (1), H. Peng (1), S. Mantelin (2), G. Hicks (2), F. Takken (3) (1) University of California Riverside, U.S.A.; (2) University of California Riverside, U.S.A.; (3) University of Amsterdam, Netherlands

P17-653 RECEPTOR-LIKE PROTEIN REQUIRED FOR CSP22 RESPONSIVENESS (NbCSPR) underlies age-dependent immune responses to bacterial cold shock protein in *Nicotiana benthamiana*.. I. SAUR (1), Y. Kadota (2), N. Holton (3), J. Sklenar (3), E. Smakowska (4), Y. Belkhadir (4), C. Zipfel (3), J. Rathjen (5) (1) Department of Plant-Microbe Interactions, Max Planck Institute for Plant Breeding Research, Germany; (2) Plant Immunity Research Group, RIKEN Center for Sustainable Resource Science, Japan; (3) The Sainsbury Laboratory, United Kingdom; (4) Gregor Mendel Institute of Molecular Plant Biology GmbH, Austrian Academy of Sciences, Austria; (5) Research School of Biology, The Australian National University, Australia

P17-654 Two redundant plant TRAF proteins participate in NLR immune receptor turnover. S. HUANG (1), X. Chen (2), X. Zhong (2), M. Li (2), K. Ao (2), J. Huang (2), X. Li (1) (1) University of British Columbia, Canada; (2) University of British Columbia, Canada

P17-655 The Arabidopsis leucine-rich repeat receptor kinase BIR3 has a dual function in the negative regulation of BAK1 receptor complex formation and stabilization of BAK1. S. SCHULZE (1), T. Halter (2), J. Imkampe (3), S. Huang (4), S. Manzotta (5), N. Schmidt (3), R. Manstretta (3), S. Postel (6), F. Tax (7), S. de Vries (8), S. Clouse (9), C. Zipfel (10), X. Wang (11), B. Kemmerling (3) (1) ZMBP-Centre for Plant Molecular Biology, Germany; (10) The Sainsbury Laboratory, Norwich Research Park, Norwich, England; (11) State Key Laboratory of Crop Stress Biology in Arid Areas, College of Horticulture, China; (2) Institut de Biologie de l'Ecole Normale Supérieure (IBENS), France; (3) ZMBP-Centre for Plant Molecular Biology, Germany; (4) State Key Laboratory of Crop Stress Biology in Arid Areas, College of Horticulture, Northwest A&FUniversity, China; (5) Plant Science Company GmbH, Germany; (6) Institute of Human Virology, University of Maryland School of Medicine, U.S.A.; (7) Department of Molecular and Cellular Biology, University of Arizona, U.S.A.; (8) Laboratory of Biochemistry, Wageningen University, Netherlands; (9) Department of Horticultural Science, North Carolina State University, U.S.A.

P17-656 Understanding and engineering immune receptor complexes in plants.. Z. DUXBURY (1), S. Huh (2), P. Ding (2), Y. Ma (2), J. Sklenar (2), F. Menke (2), P. Sarris (3), J. Jones (2) (1) The Sainsbury Laboratory, United Kingdom; (2) The Sainsbury Laboratory, United Kingdom; (3) University of Exeter, United Kingdom

Signal Transduction for Systemic Defense

P18-657 *Nicotiana benthamina* MAPK-WRKY pathway regulates effector-triggered ROS burst to confer resistance against *Phytophthora infestans*. H. ADACHI (1), T. Nakano (2), N. Miyagawa (3), N. Ishihama (4), M. Yoshioka (2), Y. Katou (2), T. Yaeno (5), K. Shirasu (4), H. Yoshioka (2) (1) Graduate School of Bioagricultural Sciences, Nagoya University, Japan; (2) Graduate School of Bioagricultural Sciences, Nagoya University, Japan; (3) ZEN-NOH, Japan; (4) RIKEN CSRS, Japan; (5) Faculty of Agriculture, Ehime University, Japan

P18-658 Impact of light and nitrogen supply on biosynthesis and action of metabolic regulators of systemic acquired resistance in Arabidopsis. Z. AJAMI-RASHIDI (1), J. Zeier (1), K. Gruner (1) (1) Heinrich Heine Universität, Germany

P18-659 The solution structure of Sr33 coiled-coil domain challenges paradigms for coiled-coil dimerization in plant NLR immune receptors.. A. BENTHAM (1), L. Casey (2), P. Lavrencic (2), P. Anderson (1), B. Kobe (2), S. Williams (2) (1) Flinders University, Australia; (2) University of Queensland, Australia

P18-660 A novel virus defense gene determines fitness in the cereal pathogen *Fusarium graminearum*. J. BORMANN (1), C. Heinze (1), M. Mentges (1), A. Brockmann (1), A. Alder (1), C. Blum (1), M. Freitag (2), W. Schäfer (1) (1) Molecular Phytopathology, University Hamburg, Germany; (2) Biochemistry and Biophysics, Oregon State University, U.S.A.

P18-661 Investigating long-distance signal movement during Systemic Acquired Resistance in Arabidopsis. P. CARELLA (1), J. Merl-Pham (2), D. Wilson (1), S. Dey (3), S. Hauck (2), A. Vlot (3), R. Cameron (1) (1) Department of Biology, McMaster University, Canada; (2) Helmholtz Zentrum Muenchen, Research Unit Protein Science, Germany; (3) Helmholtz Zentrum Muenchen, Institute of Biochemical Plant Pathology, Germany

P18-662 A new chloroplast targeting mechanism revealed by systemic defense-associated lipid transfer proteins. N. CECCHINI (1), C. Hu (2), E. Agbo (2), K. Zodrow (2), D. Speed (2), S. Roychoudhry (2), J. Greenberg (2) (1) Molecular Genetics and Cell Biology - The University of Chicago, U.S.A.; (2) Molecular Genetics and Cell Biology, The University of Chicago, U.S.A.

P18-663 Identify a novel MAP kinase that targets receptor-like cytoplasmic kinases to regulate plant innate immunity. Y. CHIANG (1), M. Zhang (1), T. Toruño (1), K. Yadeta (1), J. Banderas (1), G. Coaker (1) (1) University of California, Davis, U.S.A.

P18-664 An RNA binding protein phosphorylated in response to Plant Elicitor Peptides is a negative regulator of plant innate immunity.. K. DRESSANO (1), P. Weckwerth (1), S. Briggs (1), A. Huffaker (1) (1) UCSD, U.S.A.

P18-665 Overlapping metabolomes indicate common biomarkers to M/PTI responses induced by lipopolysaccharides, chitosan and flagellin-22 in *Nicotiana tabacum* cells.. I. DUBERY (1), M. Mhlongo (1), L. Piater (1), N. Madala (1), P. Steenkamp (2) (1) University of Johannesburg, South Africa; (2) CSIR, South Africa

P18-666 Alterations of flg22-signaling and innate immunity in loss of functional mutants of dynamin related protein network.. G. EKANAYAKE (1) (1) Universiity of Missouri, U.S.A.

P18-667 The Receptor-like Kinase SDS2 Complexes with the E3 Ligase SPL11 and Two Receptor-Like Cytoplasmic Kinases to Regulate Cell Death and Immunity in Rice. J. FAN (1), G. Wang (1) (1) Department of Plant Pathology, The Ohio State University, U.S.A.

P18-668 Reactive Oxygen Species Play a Role in the Infection of the Necrotrophic Fungi, *Rhizoctonia solani* in Wheat. R. FOLEY (1), B. Kidd (1), J. Anderson (1), J. Hane (1), K. Singh (2) (1) CSIRO, Australia; (2) CSIRO/UWA, Australia

P18-669 Functional characterization of the *CYSTEINE DESULPHURASE (CD)* gene involved in nonhost disease resistance. J. FONSECA (1), S. Lee (2), S. Muthappa (3), K. Mysore (4) (1) Noble Foundation, U.S.A.; (2) University of Florida, U.S.A.; (3) NIPGR, India; (4) Noble Foundation, U.S.A.

P18-670 Effects of endophytic colonization with *Azospirillum* strain on disease resistance in tomato plants. M. FUJITA (1), Y. Okumura (1), M. Kusajima (1), H. Nakashita (1) (1) Fukui Prefectural University, Japan

P18-671 Investigating induction of SAR in during gene- for-gene interactions between *Arabidopsis thaliana* and *Pseudomonas syringae*. T. GAIKWAD (1), M. Grant (2), M. de Torres-Zabala (1), P. Winlove (3), S. Green (3), D. Horsell (3) (1) Biosciences, College of Life and Environmental Sciences, University of Exeter, UK, United Kingdom; (2) Biosciences,College of Life and Environmental Sciences, University of Exeter,UK., United Kingdom; (3) Physics, College of Engineering, Mathematics and Physics, University of Exeter.UK., United Kingdom

P18-672 Investigation of host response in the pathosystem *Solanum tuberosum* L. / *Rhizoctonia solani* Kühn AG-3. F. GENZEL (1), P. Franken (2), R. Grosch (1) (1) Leibniz Institute of Vegetable and Ornamental Crops Großbeeren/Erfurt e.V., Germany; (2) Humboldt University of Berlin, Germany

P18-673 A P450 monooxygenase homologue of *Pinus taeda* in Arabidopsis involves in the regulation of defense and development in plants. . M. GIRI (1), R. Chaturvedi (1), Z. Chowdhury (1), R. Petros (1), B. Venables (1), J. Shah (1) (1) University of North Texas, U.S.A.

P18-674 An E3-BAG protein module controls cell death and autoimmunity in rice. Z. HE (1), Q. You (1) (1) Institute of Plant Physiology & Ecology, Shanghai Institutes for Biological Sciences, CAS, China

P18-675 Identify specific small RNA biomarkers and master regulators of citrus natural defense responses against HLB. C. HUANG (1), D. Niu (2) (1) UCR Plant Pathology and Microbiology Department, U.S.A.; (2) UCR Plant Pathology and Microbiology Department, U.S.A.

P18-676 Identification and characterization of small-molecules that inhibit plant immune responses. N. ISHIHAMA (1), Y. Noutoshi (2), S. Choi (3), I. Saska (3), S. Asai (3), B. Huot (4), S. He (4), K. Shirasu (3) (1) RIKEN Center for Sustainable Resource Science, Japan; (2) Graduate School of Environmental and Life Science, Okayama University, Japan; (3) RIKEN Center for Sustainable Resource Science, Japan; (4) Department of Energy Plant Research Laboratory, Michigan State University, U.S.A.

P18-677 Proteomic characterization of plant immune complexes using proximity-based BioID. M. KHAN (1), D. Desveaux (1), R. Subramaniam (2) (1) University of Toronto, Canada; (2) Agriculture and Agri-Food Canada, Canada

P18-678 Crosstalk between SA-mediated and ABA-mediated signaling pathways in tomato plants.. M. KUSAJIMA (1), Y. Okumura (1), H. Nakashita (1) (1) Fukui Prefectural University, Japan

P18-679 The role of Clathrin-coated vesicle networks in plant innate immunity against bacterial infection. E. LAMONTAGNE (1), C. Collins (2), A. Clarke (1), A. Heese (1) (1) University of Missouri, U.S.A.; (2) University of Wisconsin-Madison, U.S.A.; (3) University of Missouri, U.S.A.

P18-680 Wheat homologues of BAK1 contribute to basal resistance against *Zymoseptoria tritici* and *Fusarium graminearum*. W. LEE (1), J. Rudd (1), K. Hammond-Kosack (1), K. Kanyuka (1) (1) Rothamsted Research, United Kingdom

P18-681 A Role of the *FZL* gene in regulating cell death and defense in Arabidopsis. H. LU (1), A. Tremblay (1), S. Seabolt (1), H. Zeng (2), S. Boeckler (3), D. Tate (1), T. Dong (1), N. Yao (2), B. Westermann (3) (1) University of Maryland Baltimore County, U.S.A.; (2) School of Life Sciences, Sun Yat-sen University, China; (3) Institut für Zellbiologie, Universität Bayreuth, Germany

P18-682 Differential Roles of Two Homologous Cyclin-Dependent Kinase Inhibitor Genes in Regulating Cell Cycle and Innate Immunity in Arabidopsis. H. LU (1), S. Hamdoun (2), C. Zhang (1), M. Gill (1), N. Kumar (3), M. Churchman (3), J. Larkin (3), A. Kwon (1) (1) University of Maryland Baltimore County, U.S.A.; (2) University of Maryland Baltimore County, U.S.A.; (3) Louisiana State University, U.S.A.

P18-683 The circadian clock component LUX ARRHYTHMO regulates Arabidopsis defense through salicylic acid. H. LU (1), C. Zhang (1), N. Seitz (2), W. Angel (1), D. Lin (1), A. Hallworth (1) (1) University of Maryland Baltimore County, U.S.A.; (2) University of Maryland Baltimore County, Canada

P18-684 Dual and opposing roles of xanthine dehydrogenase in defense-associated reactive oxygen species metabolism in Arabidopsis. X. MA (1), W. Wang (2), F. Bittner (3) (1) University of Maryland, U.S.A.; (2) Sichuan Agricultural University, China; (3) Braunschweig University of Technology, Germany

P18-685 Detection of *Ramularia collo-cygni* from winter barley (*Hordeum vulgare*) using a quantitative real-time PCR. A. MÄE (1), P. Sooväli (2) (1) Estonian Crop Research Institute, Estonia; (2) Estonian Crop Research Institute, Estonia

P18-686 Functional analysis of PAMP-responsive phosphoprotein MARK2. H. MATSUI (1), I. Yotsui (2), K. Maeda (3), G. Hyon (2), Y. Nomura (2), Y. Ichinose (4), H. Nakagami (5) (1) RIKEN CSRS / Okayama University, Japan; (2) RIKEN CSRS, Japan; (3) Faculty of Agriculture, Okayama University, Japan; (4) Graduate school of Environmental and Life Science, Okayama University, Japan; (5) RIKEN CSRS / MPIPZ, Japan

P18-687 The Molecular Basis Behind the "Silver Bullet": *mlo*-based Powdery Mildew Resistance. J. MILLER (1), N. Clay (1) (1) Yale University, U.S.A.

P18-688 AQUAPORIN INTERACTING PROTEIN (AQI), a new regulator of cell death in plants. A. PFITZNER (1), E. Glink (1), K. Fischer (1), B. Neuhäuser (1), U. Ludwig (1) (1) Universitaet Hohenheim, Germany

P18-689 Global transcriptome and metabolome analyses reveal a key role for jasmonate and lignin biosynthetic pathways in soybean resistance to *Sclerotinia sclerotiorum*. A. RANJAN (1), D. Smith (1), M. Kabbage (2) (1) University of Wisconsin Madison, U.S.A.; (2) University of Wisconsin, U.S.A.

P18-690 Extracellular vesicles isolated from the apoplast of Arabidopsis leaves carry stress-response proteins. B. RUTTER (1), R. Innes (1) (1) Indiana University, U.S.A.

P18-691 Mitogen-activated protein kinases (MAPK) activation post effector recognition in tomato.. A. SHEIKH (1) (1) School of Life Sciences, University of Warwick, United Kingdom

P18-692 Comparative & functional genomics of plant innate immunity using the moss *Physcomitrella patens* as a model. S. STANIMIROVIC (1), M. Petersen (1), J. Mundy (1) (1) University of Copenhagen, Department of Biology, Denmark

P18-693 MAPK-targeted VQ-proteins: Novel modulators of plant immune responses. M. WEYHE (1), P. Pecher (2), L. Eschen-Lippold (1), D. Scheel (3), J. Lee (1) (1) Leibniz Institute of Plant Biochemistry, Germany; (2) John Innes Centre, United Kingdom; (3) Leibniz Institute of Plant Biochemistry, Germany

P18-694 The role of Mono-and Digalactosyldiacylglycerol Lipids in Regulating Systemic Acquired Resistance in Plants. Y. XIA (1), Q. Gao (2), K. Yu (3), B. Shan (3), C. Wang (4), D. Navarre (5), A. Kachroo (6), P. Kachroo (6) (1) University of Kentucky (Ohio State University Current), U.S.A.; (2) University of Kentucky (USDA-ARS NCSL Current), U.S.A.; (3) University of Kentucky, U.S.A.; (4) Qingdao Agricultural University, China; (5) USDA-ARS & Washington State University, U.S.A.; (6) University of Kentucky (Corresponding author), U.S.A.

P18-695 Molecular Characterization of the Broad-Spectrum Resistance to Powdery Mildew Conferred by the *Stpk-V* Gene from the Wild Species *Haynaldia villosa*. L. XING (1), C. qian (2), A. cao (1), J. xiao (1), X. wang (1), P. chen (1) (1) National Key Laboratory of Crop Genetics and Germplasm Enhancement , Nanjing Agricultural University/JCIC-MCP, China; (2) Laboratory of Forage Breeding, Institute of Animal Science, Jiangsu Academy of Agricultural Sciences, China

P18-696 Conservation of chitin-induced MAPK activation mechanisms between rice and Arabidopsis. K. YAMADA (1), K. Yamaguchi (1), A. Terauchi (1), K. Ishikawa (1), T. Kawasaki (1) (1) Dept. Adv. Biosci. Kindai Univ, Japan

P18-697 Identification of infection-specific proteins produced in Japanese birch plantlet No.8 infected with *Inonotus obliquus* strain IO-U1. S. YOKOTA (1), S. Iizuka (2), J. Ohshima (2), F. Ishiguri (2) (1) Utsunomiya University, Japan; (2) Utsunomiya University, Japan

P18-698 Stress induces the accumulation of beta-aminobutyric acid (BABA) in plants. I. BACCELLI (1), D. Thevenet (1), A. Balmer (1), V. Pastor (1), A. Vallat (1), R. Neier (1), G. Glauser (1), B. Mauch-Mani (1) (1) University of Neuchâtel, Switzerland

P18-699 Regulatory DNA elements in the primed systemic immunity of *Arabidopsis thaliana*. E. REIMER-MICHALSKI (1), S. Baum (1), A. Bolger (2), B. Usadel (2), V. Benes (3), U. Conrath (1) (1) Department of Plant Physiology, RWTH Aachen University, Germany; (2) Department of Botany and Molecular Genetics, RWTH Aachen University, Germany; (3) Genomics Core Facility, EMBO Laboratories, Germany

P18-700 Underground AZA priming against pathogens. S. ROYCHOUDHRY (1), N. Cecchini (2), J. Greenberg (1) (1) University of Chicago, U.S.A.; (2) University of Chicago, U.S.A.

P18-701 Processive ubiquitination controls NPR1 coactivator activity in plant immunity. S. SPOEL (1), J. Furniss (1), M. Skelly (1), H. Grey (1) (1) University of Edinburgh, United Kingdom

TRANSLATIONAL AND EMERGING SYSTEMS

Emerging Systems

P19-702 New Plant Varieities: Food Safety - Regulation - Consultation. P. COURNOYER (1) (1) U.S. Food and Drug Administration, U.S.A.

P19-703 WITHDRAWN

P19-704 Uncovering microbial colonisation mechanisms of barley using *Phytophthora palmivora*. R. LE FEVRE (1), B. O'Boyle (1), M. Moscou (2), S. Schornack (1) (1) The Sainsbury Laboratory, Cambridge, United Kingdom; (2) The Sainsbury Laboratory, Norwich, United Kingdom

P19-705 Effectoromics as a tool for better management of soybean root/stem rot. J. MCDOWELL (1), K. Fedkenheuer (1), M. Fedkenheuer (1), C. Davis (1), S. Maroof (1), B. Tyler (2), A. Robertson (3) (1) Virginia Tech, U.S.A.; (2) Oregon State University, U.S.A.; (3) Iowa State University, U.S.A.

P19-706 Assessment of *imp, aceF* and *secY* as genotyping tools in MLST analysis of '*Candidatus* Phytoplasma mali' . M. SERUGA MUSIC (1), J. Plavec (2), I. Krizanac (2), Z. Budinscak (2) (1) Department of Biology, Faculty of Science, University of Zagreb, Croatia; (2) CCAFRA- Institute for Plant Protection, Croatia

P19-707 *In situ* metabolic profiling of symbiotic soybean-rhizobia interactions by laser ablation -electrospray ionization mass spectrometry (LAESI-MS). B. AGTUCA (1), S. Stopka (2), C. Anderton (3), D. Koppenaal (3), L. Pasa-Tolic (3), A. Vertes (2), G. Stacey (1) (1) Divisions of Plant Sciences and Biochemistry, C. S. Bond Life Sciences Center, University of Missouri, U.S.A.; (2) Department of Chemistry, W. M. Keck Institute for Proteomics Technology and Applications, The George Washington University, U.S.A.; (3) Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory, U.S.A.

P19-708 Using the lens of molecular plant-microbe interactions to uncover the pathways of plant parasitization by the parasitic weed *Phelipanche aegyptiaca* (broomrape). . C. CLARKE (1), J. Westwood (1) (1) Virginia Tech, U.S.A.

P19-709 Defending plants against the World's most pesticide-resistant insect, *Myzus persicae*: A role for calcium. T. VINCENT (1), M. Avramova (1), J. Canham (1), P. Higgins (1), M. Giolai (1), S. Mugford (1), M. Pitino (1), M. Toyota (2), S. Gilroy (2), T. Miller (1), S. Hogenhout (1), D. Sanders (1) (1) John Innes Centre, United Kingdom; (2) University of Wisconsin - Madison, U.S.A.

P19-710 Identification of NB-LRR mediated nonhost resistance to wheat stripe rust in *Brachypodium distachyon*. J. BETTGENHAEUSER (1), M. Gardiner (1), M. Opanowicz (2), B. Gilbert (3), N. Upadhyaya (3), J. Doonan (4), M. Ayliffe (3), M. Moscou (1) (1) The Sainsbury Laboratory, United Kingdom; (2) John Innes Centre, United Kingdom; (3) CSIRO Plant Industry, Australia; (4) IBERS, Aberystwyth University, United Kingdom

P19-711 A new model for virulence in the emerging Gram-positive phytopathogen, *Rhodococcus fascians*. E. SAVORY (1), A. Creason (1), S. Fuller (1), D. Stevens (1), J. Chang (1) (1) Oregon State University, U.S.A.

P19-712 TILLING for effective powdery mildew resistance: A non-transgenic approach aimed at the generation of hexaploid wheat mlo mutants. R. PANSTRUGA (1), J. Acevedo (1), H. Thieron (1), D. Spencer (1), A. Phillips (2), K. Hammond-Kosack (2) (1) RWTH Aachen University, Germany; (2) Rothamsted Research, United Kingdom

Translational Research; Developing World Needs

P20-713 Epigenetic coordination of broad-spectrum disease resistance and yield balance in rice. Z. HE (1), Y. Deng (2), Z. Xie (2), D. Yang (2), K. Zhai (2) (1) Institute of Plant Physiology & Ecology, Shanghai Institutes for Biological Sciences, CAS, China; (2) Institute of Plant Physiology & Ecology, Shanghai Institutes for Biological Sciences, CAS, China

P20-714 RNA interference: an emerging tool for crop pest control. S. RAHMAN (1), M. Jones (1), J. Nyarko (1) (1) Murdoch university, Australia

P20-715 Photosynthesis measurements using PhotosynQ reflects soybean root health and helps predict sudden death syndrome (SDS) symptom development. M. ROTH (1), J. Wang (1), Z. Noel (1), E. Papenfuss (1), G. Austic (1), D. TerAvest (1), Y. Yang (1), J. Chen (1), D. Kramer (1), M. Chilvers (1) (1) Michigan State University, U.S.A.

P20-716 Effect of pyraclostrobin application on viral and bacterial diseases of tomato. N. SKANDALIS (1), A. Dimopoulou (1), D. Beri (1), A. Tzima (1), I. Malandraki (1), I. Theologidis (1), S. Bitivanos (2), C. Varveri (1), T. Klitsinaris (3), N. Vassilakos (1) (1) Benaki Phytopathological Institute, Greece; (2) BASF Hellas S.A., Greece; (3) BASF Hellas S.A., Greece

P20-717 High-throughput assay for small molecules targeting the Type I efflux pump of *Xylella fastidiosa*.. D. GABRIEL (1), M. Jain (1), L. Fleites (1), S. Zhang (1) (1) University of Florida, U.S.A.

P20-718 Dissecting the disease triangle of plant pathology. R. BART (1) (1) Donald Danforth Plant Science, U.S.A.

P20-719 Return of the phytoalexins - a strategy for Asian soybean rust control. S. BEYER (1), H. Schultheiss (2), J. Gätgens (3), M. Oldiges (3), C. Langenbach (1), U. Conrath (1) (1) Plant Physiology Department, RWTH-Aachen University, Germany; (2) BASF Plant Science Company GmbH, Germany; (3) Institute of Bio- and Geosciences, IBG-1: Biotechnology, Research Center Jülich, Germany

P20-720 Expanding the recognition specificity of NB-LRR proteins to confer disease resistance to the Soybean Mosaic Virus. M. HELM (1), R. Innes (1) (1) Indiana University, U.S.A.

P20-721 Enhanced late blight resistance of potato shown by siRNA mediated control of pathogen gene expression in greenhouse and field trials. D. STAHL (1), N. Temme (1), C. Blumenhagen (1), T. Sauter (1), L. Hoppe (1), C. Davenport (1), Z. Stumo (2), K. Prenzler (1), M. Pflugmacher (1), K. Koch (1) (1) KWS SAAT SE, Germany; (2) Betaseed, U.S.A.

P20-722 Expanding the recognition specificity of NLR proteins to confer disease resistance to the Soybean Mosaic Virus. M. HELM (1), R. Innes (1) (1) Indiana University, U.S.A.

AUTHOR INDEX

S = Special Session, PL = Plenary Lecture, C = Concurrent Session, P = Poster

Aalders, Thomas, P17-596
Abd-El-Haliem, Ahmed, P17-639, P9-321
Abdelsamad, Noor, P16-438
Abe, Akira, P11-368
Abe, Yoshiko, C24-4, P17-651
Abraham, Nivi, P7-152
Abrahamian, Melania, P7-177
Abreha, Kibrom, P17-570
Acevedo, Johanna, P15-430, C3-4, P19-712
Adachi, Hiroaki, P18-657
Adam, Gerhard, P16-439, P7-218
Adusei-Fosu, Kwasi, P3-64
Agbo, Elinam, P18-662
Agler, Matthew, P3-74, P3-75, C10-4, P4-119
Ågren, Jon, P3-74
Agtuca, Beverly, C13-4, P19-707
Aguilera Galvez, Carolina, P17-485
Ah Fong, Audrey, P7-177
Ahmadinejad, Nahal, P15-430
Ahmed, Ali, C14-3, P10-340
Aidar, Marcos, P16-454
Ailloud, Florent, P7-165
Aitken, Elizabeth, P11-348
Ajami-Rashidi, Ziba, P18-658
Akamatsu, Akira, P2-14
Albar, Laurence, P17-586
Albers, Philip, P9-235
Albert, Isabell, C20-2
Albert, Markus, P17-507, P17-533, P17-636
Alder, Arne, P18-660
Alegria Terrazas, Rodrigo, C10-2
Alexandersson, Erik, P17-570
Alfano, James, P7-220, P9-278, C11-3, P7-224, P17-546, C17-4, P9-331
Alkemade, Joris, P17-613
Allen, Caitilyn, P7-165, P9-236, P9-283
Allen, Randy, P17-574
Alonso, Ana, P14-418
Alonso-Blanco, Carlos, P3-74
Altmüller, Janine, P9-275
Alvarado, Camilo, P17-529
Alvarez, Bryan, P11-369
Alvarez, Raul, P17-593, P17-598
Amaro, Tiago, P9-237
Ameen, Gazala, P17-486, P17-616
Amesefe, Delase, P11-359
Andersen Gersby, Lotte, P17-577
Anderson, Charles, P7-191
Anderson, Claire, P9-244
Anderson, Jeffrey, P17-539, C22-4, P8-231
Anderson, Jonathan, P15-428, P18-668, P9-238
Anderson, Peter, P17-502, P18-659, C24-3, P17-650
Anderson, Ryan, P17-487, P17-509, P17-518
Anderson-Furgeson, James, S5-3
Anderton, Christopher, C13-4, P19-707
Andreasson, Erik, P17-570
Andreote, Fernando, P4-99
Ane, Jean-Michel, P2-15
Ané, Jean-Michel, P11-364, P11-365, P2-20
Angel, Carlos, P7-208, P7-209
Angel, William, P18-683
Ao, Kevin, C9-4, P17-654
Aranha Camargo, Luis Eduardo, P7-163
Arias, Omar, C11-5, P7-225
Armijo, Grace, P9-313
Armitage, Andrew, P17-576
Armstrong, Miles, P9-239
Arnell, Ashley, C1-3, P2-57
Arredondo, Felipe, C5-3, P9-333
Arseneault, Tanya, C16-4, P5-136
Asai, Shuta, P12-394, P18-676, P9-322
Asami, Tadao, P16-462
Asao, Hisayo, P2-38
Aschenbroich, Jörn, P6-147
Åsman, Anna, P6-142
Asuke, Soichiro, P17-488
Atkinson, Howard, P7-155
Aubert, Marjorie, C2-1
Aufrecht, Jayde, P4-113
Auguy, Florence, P9-263
Aung, Kyaw, P7-154, P9-324
Austic, Greg, P20-715
Ausubel, Frederick, C7-5, P1-10
Avila, Carlos, P17-525
Avni, Adi, P17-489
Avramova, Marieta, C21-3, P19-709
Avrova, Anna, P7-170
Awwanah, Mo, P16-442
Ayliffe, Michael, P17-557, C21-4, P19-710, S4-2, S6-1, S6-5
Baba, Kouhei, P7-196
Babcock, Marcus, P2-20
Baccelli, Ivan, C15-2, P18-698
Bae, Dong-Won, P5-130
Bahar, Ofir, P17-490
Bai, Baohui, P17-623
Bair, Zachary, P17-569
Baker, Barbara, PL3-1
Bakker, Jaap, C20-4, P6-150
Bakker, Peter, Blank, P9-327, C7-6, P1-11
Bakkeren, Guus, P11-344
Balbirnie, Katharin, C10-2
Balesdent, Marie-Hélène, P7-199, C2-5, P11-391
Balmer, Andrea, C15-2, P18-698
Baltrus, David, C4-4, P3-86
Banba, Mari, P2-15
Banderas, Jesus, P18-663
Banfield, Mark, P17-543, P17-600, P17-626, P7-164, P9-287, P9-288, P9-294, P9-316, P9-322, C9-1
Bansal, Kanika, P13-414
Banta, Lois, P9-242
Bapaume, Laure, C17-4, P9-331
Barco, Brenden, P16-440, C12-5, P15-437
Barff, Teura, P17-491
Bariana, Harbans, S6-5
Barker, David, P2-15
Barnes, Irene, P13-408
Barnett, Melanie, S1-4
Bart, Rebecca, P11-373, C3-6, P20-718
Bartholomäus, Anika, P16-439
Basso, Veronica, C1-2, P2-56
Batley, Jacqueline, P7-156, P11-348
Batson, Alex, P8-227
Batut, Jacques, P2-16
Baudin, Mael, P17-492, P17-604
Bauer, Jemma, P4-91
Bauer, Saskia, P17-601
Baum, Stephani, C15-3, P18-699
Baum, Thomas, P9-296, P9-318, C5-1
Baumbach, Jordan, P17-493
Baumgarten, Kira, P15-430
Bayless, Adam, P17-614, C17-3, P7-226
Becker, Michael, P16-483
Beerens, Bas, P16-476
Behnken, Natalia, C1-3, P2-57
Belhaj, Khaoula, P17-639, P7-164, P9-288
Belkhadir, Youssef, P15-429, P17-513, P17-617, C6-3, P14-423, C9-3, P17-653
Bell, Christopher, P7-155
Bellizzi, Maria, P17-635
Belmonte, Mark, P16-483
Beltran Iturat, Eduardo, P16-439
Bemm, Felix, P17-494
Ben, Cécile, P11-371
Benameur, Samy, P11-371
Bendahmane, Abdel, P2-25
Benedetti, Manuel, C18-1
Benes, Vladimir, C15-3, P18-699
Benfey, Philip, P9-317
Benfield, Aurélie, P7-156
Bent, Andrew, P15-427, P17-535, P17-614, P17-645, C17-3, P7-226
Bentham, Adam, P18-659, C24-3, P17-650, S6-1
Berendsen, Roeland, Blank, P9-327, C7-6, P1-11
Berens, Matthias, P16-441, P17-606
Berepiki, Adokiye, P7-170
Berger, Dave, P13-408, P9-262, C6-4, P14-424
Beri, Despoina, P20-716
Bernal, Adriana, P17-529
Bernal Galeano, Vivian, P4-108
Bernal Giraldo, Adriana, P9-328
Bernard, Shane, P2-15
Bernardy, Mike, P11-386
Bernoux, Maud, P17-646, C24-3, P17-650, S6-1
Berthiller, Franz, P16-439, P7-218
Bertier, Lien, P11-354, C2-6, P11-392
Bertran, André, P13-413
Bethke, Gerit, P16-458, C18-5, P15-435
Bettgenhaeuser, Jan, C21-4, P19-710
Beyer, Sebastian, P20-719
Bezuidt, Oliver, P9-262
Bhagwat, Basdeo, P11-386
Bhatnagar, Deepak, P10-337
Bhatt, Dharmendra, P9-272
Bhattacharjee, Saikat, P17-527, P17-528
Bhattacharyya, Madan, P17-493, P17-495, P17-496
Bhattarai, Kishor, C13-5, P2-62
Bialas, Aleksandra, P9-294
Bible, Amber, P4-109
Biessy, Adrien, P5-123
Bijsterbosch, Gerard, P17-638
Binder, Andreas, P2-15
Bindschedler, Laurence, P9-249
Birch, Paul, P16-450, P7-170, P9-239, P9-316
Bird, David, P11-383
Birkenbihl, Rainer, P11-359
Bisseling, Ton, P2-42
Biswas, Surojit, P16-481, P9-311
Bitivanos, Stergios, P20-716
Bittner, Florian, P18-684
Blaise, Françoise, P7-199
Blakeslee, Joshua, P16-473
Blanco-Ulate, Barbara, P7-202
Blankenship, Jocelyn, C1-3, P2-57
Bleker, Carissa, P14-421
Blow, Matthew, P2-49
Bluhm, Burton, P13-408
Blum, Ailisa, P7-156
Blum, Christine, P18-660
Blumenhagen, Clarissa, P20-721
Boak-Nyberg, Emily, P17-569
Bodenhausen, Natacha, C16-3, P5-135
Boeckler, Stefan, P18-681
Boevink, Petra, P9-239
Bogdanove, Adam, P7-217, P9-240, P9-252, P9-297
Böhm, Hannah, C20-2
Bolger, Anthony, C15-3, P18-699
Bolus, Stephen, P17-497
Bolzan de Campos, Samanta, P2-44
Bonas, Ulla, PL2-1
Bone, Caitlin, C1-5, P2-59
Bonhomme, Ludovic, P14-417
Bonhomme, Maxime, C7-3, P1-12
Bonkowski, Michael, P3-74, P4-117
Bonsall, Robert, P3-81
Booher, Nicholas, P9-240
Bordiya, Yogendra, P17-542
Borhan, Mohammad Hossein, P11-345, P11-351, P11-358, P17-595, C8-5, P12-406
Borja, Frances, P17-506
Bormann, Joerg, P18-660
Borneman, James, P4-116
Börnke, Frederik, P9-235, P9-241
Borowicz, Pawel, P7-152, P7-211
Borst, Jan Willem, P17-613
Bos, Jorunn, P7-204

AUTHOR INDEX

Bösch, Kristin, P9-248
Boshoven, Jordi, P9-298
Bosis, Eran, P9-290, P9-304
Bossa-Castro, Ana, P17-498, S2-3
Böttcher, Christoph, P16-459
Bourras, Salim, P17-571
Boutrot, Freddy, P17-511, P9-324
Bouwmeester, Klaas, P9-301
Bowen, Charles, P3-67
Boyd, Lesley, C23-5, P11-393
Bozbuga, Refik, P7-157
Bozkurt, Tolga, P17-639, P7-164, P9-288, P9-321, C17-5, P9-332
Brabham, Helen, P17-499
Brachmann, Andreas, P2-48
Bradshaw, Rosie, P13-409
Brar, Simren, P13-409
Brauer, Elizabeth, P17-500
Braun, Pascal, P9-311
Bravo, Janis, P9-242
Breakfield, Natalie, P4-110
Breen, Susan, P16-450, P17-580, S6-6
Breton, Ghislain, P14-420
Briggs, Steven, P18-664, P17-637
Britto Cathrin, Pakkianathan, P2-24
Brockmann, Anke, P18-660
Brodhagen, Marion, P8-227
Broeckling, Corey, C5-2
Brough, Josie, P11-380
Brouwer, Sophie, P17-581
Brown, Hannah, P17-566
Brown, Neil, S6-2
Brown, Robert, P10-337
Browning, Karen, C14-5, P10-342
Bru, Pierrick, P17-504
Brueggeman, Robert, P17-486, P17-554, P17-597, P17-616, P9-306, P9-323, P11-356
Bruening, George, P17-501
Brulé, Daphnée, P17-511
Brunner, Frédéric, P7-201, P16-450
Bucher, Marcel, P2-32
Budhagatapalli, Nagaveni, P9-258
Budinscak, Zeljko, P19-706
Buendia, Luis, P2-25
Bueno, Juan, P11-346
Buitrago Acosta, Maria, P9-328
Bulgarelli, Davide, P4-114, C10-2
Bumgarner, Roger, P2-21
Bunn, Imani, P11-373
Burbank, Lindsey, P7-158
Burch-Smith, Tessa, P17-526
Burdett, Hayden, P17-502
Burdman, Saul, P11-352
Buriani, Giampaolo, P3-65, P4-88, P4-89
Burke, Jillian, P11-373
Burketova, Lenka, P9-243
Busby, Posy, P4-118
Busch, Florian, P1-1
Büschl, Christoph, P16-439
Bush, Jenifer, C7-5, P1-10
Butcher, Bronwyn, P7-160
Caarls, Lotte, P16-442, P16-467
Cahoon, Edgar, P2-39
Camargo, Luis Eduardo, P14-418
Cambon, Florence, P14-417, C18-4, P15-434
Cameron, Hunter, P4-110
Cameron, Robin, P18-661
Campisano, Andrea, P1-7
Canham, James, C21-3, P19-709
Cann, Martin, P17-548, P17-596
Cano, Liliana, P9-321
Cantu, Dario, P7-202
Cao, Aizhong, P18-695
Capela, Delphine, C7-2
Carbonnel, Samy, P2-45, C1-2, P2-56
Carella, Philip, P18-661
Carlier, Jorge, P17-505
Carlson, Ethan, C4-4, P3-86
Carlson, Maryn, P13-410
Carlson, Praloy, P17-569
Carmona, Vicente, P9-295
Carpenter, Sara, P9-240
Carper, Dana, P4-90
Carr, John, C16-2, P5-134
Carrell, Alyssa, P4-113, P4-90, P5-131
Carrington, James, P14-420
Carvajal-Yepes, Monica, P11-346, P3-66, P3-68
Carveth, Virginia, P17-569
Casey, Lachlan, P18-659, C24-3, P17-650, S6-1
Castrillo Molina, Gabriel, P4-110, P4-94
Castro-Correa, Karen, P7-168
Castro-Moretti, Fernanda, P14-418
Castroverde, Christian Danve, P17-503
Catanzariti, Ann-Maree, P17-504, P17-520, P9-244
Catrice, Olivier, P9-282
Cavdar, Meltem, P7-159
Cazale, Anne-Claire, P9-285
Cecchini, Nicolás, C15-4, P18-662, P18-700
Cellini, Antonio, P3-65
Cervone, Felice, C18-1
Cesari, Stella, P17-543, P17-549, P17-626, C24-3, P17-650, S6-1
Cevik, Volkan, P12-394, P17-505, P9-315
Chabaud, Mireille, P2-15
Chaipanya, Chaivarakun, P17-506 P9-265
Chakravarthy, Suma, P17-569, P7-160, P9-245
Champouret, Nicolas, P17-485
Chang, Hao-Xun, P3-67
Chang, Hsing-Hua, P11-374
Chang, Jeff, P11-350, P11-382, P17-554, P3-82, P4-99, P5-132, P9-324, C21-5, P19-711
Chang, Peter, P2-26
Chang, Ti-Cheng, P12-401
Chaparro-Garcia, Angela, P7-164
Chapman, Antony, P11-384, C6-5, P14-425
Charvin, Magali, C17-4, P9-331
Chatelain, Philippe, P17-507
Chatterjee, Abhishek, C7-3, P1-12
Chatterjee, Sayantani, P16-476, P17-631
Chaturvedi, Ratnesh, P18-673
Chen, Chyi-Chuann, P16-457
Chen, Hongyu, P17-623, P6-140
Chen, I-Hsuan, P7-215
Chen, Jay, P14-419
Chen, Jen-Chih, P16-443
Chen, Jiapeng, S6-1
Chen, Jin, P20-715, C18-3, P15-433
Chen, Jin-Gui, P17-554, P2-33, C7-4, P1-9
Chen, Li-Hung, P6-137
Chen, Peidu, P18-695
Chen, Po-Lun, P7-161
Chen, Shiyan, P9-325
Chen, Sixue, P17-532
Chen, Weidong, P11-347
Chen, Xi, P2-17
Chen, Xiaojiao, P17-623
Chen, Xuanyang, P11-387
Chen, Xuejin, C9-4, P17-654
Chen, Yanyu, P9-330
Chen, Yu, P9-257
Chen, Zhiyuan, P9-260
Chen, Zhi-Yuan, P10-337
Cheng, Chi-Hua, P17-583
Cheng, Chi-Ping, P7-161
Cheng, Jeryl, P5-1
Cheng-Cheng, Lee, P7-162
Chenong, Mi Sun, P17-547
Cherkis, Karen, P17-487
Chern, Mawsheng, P17-564
Chéron, Sophie, P17-586
Chetouhi, Cherif, P14-417
Chiang, Yi-Hsuan, P18-663
Chien, Ching-Fang, P6-138
Childs, Kevin, P16-453
Chilvers, Martin, P20-715
Chiniquy, Dawn, C10-5, P4-120
Cho, Shu-Ting, P11-374
Choi, Doil, P11-367, P17-545, P17-605
Choi, Du Seok, P9-246
Choi, Hye Kyung, P5-127, P5-130
Choi, Hyo Ju, P17-508
Choi, Hyong Woo, P17-542
Choi, Jaeyoung, P2-43
Choi, Seung-won, P18-676
Choi, Timothy, P17-599
Chooi, Yit-Heng, P7-184
Chourey, Karuna, P4-109
Chovatia, Mansi, P2-49
Chowdhury, Zulkarnain, P16-445, P18-673
Christeller, John, P17-610
Christie, Nanette, C6-4, P14-424
Chuma, Izumi, P17-488
Chung, Eui-Hwan, P17-509, P17-518
Chung, Young, P9-247
Churchman, Michelle, P18-682
Cicarelli Cia, Mariana, P7-163
Cilia, Michelle, S1-6
Citovsky, Vitaly, S5-6
Ciuffo, Marina, P13-413
Clarke, Alex, P18-679
Clarke, Christopher, C21-2, P19-708
Clarke, Wayne, P11-351
Clarkson, John, P11-380
Clay, Nicole, P16-440, P18-687, C12-5, P15-437
Clerissi, Camille, C7-2
Clingenpeel, Scott, P11-369
Clouse, Steven, C9-5, P17-655
Coaker, Gitta, P11-381, P17-497, P17-559, P17-629, P17-640, P18-663, P9-255, PL7-2
Cochran, Alyssa, P4-91
Cocuron, Jean-Christophe, P14-418
Cohen, Mathias, P17-491
Cohen, Stephen, P17-510
Colby, Tom, P17-606
Cole, Benjamin, P2-18
Coleman-Derr, Devin, C19-5, P4-122
Coll, Núria, P6-139
Collemare, Jérôme, P6-146
Collins, Carina, P18-679
Collmer, Alan, P17-569, P9-245, P9-320
Conley, Christopher, P11-353
Connor, Richard, P11-387
Conrath, Uwe, P20-719, C15-3, P18-699
Cook, David, C2-2, P11-388
Cook, Douglas, P2-26
Coolen, Silvia, P16-467
Coon, Joshua, P11-364, P11-365
Cooper, Abigail Cooper, P17-505
Corredor Moreno, Pilar, P12-395
Corwin, Jason, P4-93
Cotter, Paul, P4-114
Cournoyer, Patrick, P19-702
Courville, Kaitlyn, P9-248
Cousins, Donna, C1-5, P2-59
Cram, Dustin, P11-344
Crampton, Bridget, P13-408, P9-262
Craven, Maryke, P17-553
Creason, Allison, C21-5, P19-711
Creer, Athena, P17-640
Cregger, Melissa, P4-118
Croll, Daniel, P9-270
Crook, Ashley, P2-23
Crook, Matthew, P2-20
Crouch, Miranda, P4-118
Crous, Pedro, P12-401
Cruveiller, Stéphane, C7-2
Cruz-Mireles, Neftaly, P7-164
Cuddy, William, P11-376
Cude, Nathan, P4-118
Cuellar, Wilmer, P11-346, P3-66, P3-68
Cuervo, Maritza, P3-68
Cui, Fuhao, P17-562
Cui, Ruqiang, P9-325
Cui, Wei, P17-514
Cumener, Marie, P2-25
Cunha Antunes de Faria, Raphael, P7-163
Cunnac, Sebastien, P9-263, C8-4, P12-405
Cytryn, Eddie, P4-95
Czislowski, Elizabeth, P11-348
D'Amico, Katherine, P7-160

Dagdas, Yasin, P7-164, P9-288, P9-303, P9-321, C17-5, P9-332
Dagno, Karim, P17-498, S2-3
Dagvadorj, Bayantes, C17-5, P9-332
Dakouri, Abdulsalam, P11-349
Dalmais, Marion, P2-25
Dalsing, Beth, P7-165, P9-283
Dangl, Jeffery, P11-369, P17-634, P9-311, PL1-1, , P4-120, P16-481, P17-487, P17-509, P17-518, P2-18, P4-110, P4-93, P4-94, C10-5
Danies Turano, Giovanna, P7-171
Dardick, Chris, P9-300
Darwiche, Rabih, C20-3, P6-149
Das Gupta, Shaoli, P9-249
Dasgupta, Madhumita, P15-426
Dastogeer, Khondoker Mohammad Golam, P9-250
Datta, Asis, P9-272
Davenport, Colin, P20-721
Davern, Sandra, P17-538
David, John, C19-4, P3-84
Davies, Laura, P17-511
Davis, Cole, P17-569
Davis, Colin, P19-705
Davis, Edward, P11-350, P11-382, P4-99, C4-5, P3-87
Dawson, Bill, S1-1
de Jonge, Ronnie, P9-251
de Kock, Maarten, P11-357
De la Cruz-Rodríguez, Yadira Yumiko, P7-168
De La Fuente, Leonardo, P6-140
de la Torre-Hernandez, Maria Eugenia, P7-200
de Lange, Orlando, P16-446
De Lorenzo, Giulia, C18-1
De Marchi, Remi, P16-471
de Sain, Mara, P17-622
de Torres-Zabala, Marta, P18-671
de Vries, Michel, P16-442
de Vries, Sacco, C9-5, P17-655
de Wit, Pierre, P6-146
Degrave, Alexandre, P7-199
Dekker, Henk, P17-622
Del Río Álvarez, Isabel, P3-80
Del Valle-Echevarria, Angel, P11-365
Delorean, Emily, P17-498, S2-3
DeLuca, Thomas, P2-21, P2-53
Demarco, Diego, P16-454
Demeestere, Kristof, P16-455
DeMott, Logan, P16-447
Dénarié, Jean, P2-20
Denby, Katherine, P11-380, P16-452, C6-1
Deng, Cecilia, P6-146
Deng, Siwen, C19-5, P4-122
Deng, Yiwen, P20-713
Denney, Maddie, P4-109
Derbyshire, Paul, P17-541
Dereeper, Alexis, P17-498, S2-3, C8-4, P12-405
Derevnina, Lida, P11-354, P11-385
Desaki, Yoshitake, P17-512, P17-610, P17-620
Desbiez-Piat, Arnaud, P2-20
Deslandes, Laurent, PL7-4
Desveaux, Darrell, P17-513, P17-607, P18-677, C6-3, P14-423
Deutschbauer, Adam, P2-18, P2-49
Dey, Sanjukta, P18-661
Deyholos, Michael, P11-355
Dharmaraj, Karthikeyan, P17-514
Diaz-Granados, Amalia, C20-4, P6-150
Dickerson, Julie, P11-384
Diers, Brian, P17-535
Dilantha, Fernando, P17-649
Dill-Macky, Ruth, P17-522, S4-2
Dimopoulou, Anastasia, P20-716
Dina, Nazarchuk, P17-492
Dinesh-Kumar, Savithramma, P17-532, PL4-2
Ding, Pingtao, C9-6, P17-656
Ding, Yuli, P17-515
Diskin, Sonia, P4-104
Divina, Jan, P17-506
Dixelius, Christina, P12-402, P6-142
Djavaheri, Mohammad, P11-351
Do, Huong, P17-504
Doblas Ibanez, Paula, P17-516
Dobritzsch, Melanie, P15-432
Dodds, Peter, P17-520, P17-522, P17-557, P17-646, P9-244, C24-3, P17-650, S4-2, S4-3, S6-1
Doehlemann, Gunther, P6-147
Doktycz, Charles, P4-109
Doktycz, Mitchel, P4-109, P4-113
Dols, Ivo, P17-613
Domazakis, Emmanouil, P17-517
Donati, Irene, P4-89
Dong, Lihong, P3-69
Dong, Suomeng, P17-567, P9-269, P9-326, C8-2
Dong, ThuyVy, P18-681
Dong, Xinnian, PL5-2
Dong, Xue, P15-430
Donoso, Raul, P9-313
Doonan, John, C21-4, P19-710
Doppler, Maria, P16-439
Dorrance, Anne, P16-448, P16-473
Doty, Sharon, P11-369, P2-21, P2-22, P2-28, P2-31, P2-53
Dou, Daolong, P9-330
Dowling, David, P4-114
Downie, Allan, C1-5, P2-59
Drader, Tom, P17-486
Dressano, Keini, P17-637, P18-664
Drwiega, Katarzyna, P15-430
Dry, Ian, P17-511
Duan, Shuyi, P9-246
Dubcovsky, Jorge, P11-353, P17-497
Dubery, Ian, P18-665
Dubrow, Zoë, P9-240, P9-252, P9-290
Duggan, Cian, C17-5, P9-332
Dughbaj, Mansour, P17-599
Dumler, Samantha, P17-569
Dunnell, Kelsey, P17-554
duToit, Lindsey, P17-649
Duxbury, Zane, P17-566, C9-6, P17-656
Eberl, Leo, P2-35, P2-44
Ebskamp, Michel, P11-357
Eckshtain-Levi, Noam, P11-352
Eggers, Ernst-Jan, P17-485
Egusa, Mayumi, P17-575
Ehlert, Marcus, P7-166
Eibel, Sonja, P17-602
Ekanayake, Gayani, P18-666
El Kasmi, Farid, P17-518
El Oirdi, Mohamed, P17-491
Elad, Yigal, P4-95
Elberse, Joyce, P16-442, P16-459
Elbourne, Liam, C4-1
Ellingham, Oliver, C19-4, P3-84
Ellis, Jeffery, S6-1, P9-244
Elmore, James, C6-5, P14-425
Elmore, Manjula, P11-353
Elowsky, Christian, C11-3, P7-224
Engelhardt, Stefan, P9-253
Engle, Nancy, P4-109, P4-113
English, Marie, P16-481, P9-311
Epple, Petra, P16-481, P9-311
Erbs, Gitte, P17-577
Erdn, Stephanie, P2-20
Ericsson, Daniel, C24-3, P17-650
Eschen-Lippold, Lennart, P15-432, P18-693, P9-276
Escudero-Martinez, Carmen, P7-204, P17-519
Evangelisti, Edouard, P2-47
Faber-Hammond, Joshua, P2-46
Fabro, Georgina, P9-322
Faino, Luigi, P17-630
Fairhead, Sebastian, P17-505
Falahi-Charkhabi, Nargues, P9-240
Falk, Kevin, P11-349
Fan, Jiangbo, P18-667, S2-5
Fan, Li, P17-523, P17-572, C20-2
Fan, Qiuling, P17-501
Fang, Yufeng, C5-3, P9-333
Farah, Nadya, P17-520
Faris, Justin, P11-356, P9-323
Federova, Elena, P2-42
Fedkenheuer, Kevin, P19-705
Fedkenheuer, Michael, P19-705
Feechan, Angela, P16-471
Fei, Zhangjin, P17-542
Feiler, Christina, P17-521
Feldbrügge, Michael, P9-248
Felix, Georg, P17-507, P17-533, P17-636, P7-220
Feltcher, Meghan, P2-18, P4-93, P4-94
Feng, Baomin, P17-532
Feng, Feng, P1-4
Fernandez, Jessie, P9-254
Fernando, Dilantha, P16-482
Fernando, W.G. Dilantha, P16-483, P17-595
Feygenberg, Oleg, P4-104
Figueroa, Melania, P17-522, P17-557, S4-2
Figueroa-Balderas, Rosa, P7-202
Filiatrault, Melanie, P6-141, P7-160
Filion, Martin, P3-72, P5-123, P5-125, P5-126, C16-4, P5-136
Findlay, Kim, P7-164
Finkel, Omri, P16-481, P9-311
Finkemeier, Iris, P3-75
Finkers-Tomczak, Anna, C20-4, P6-150
Fiorentini, Luca, P3-65, P4-88
Firrincieli, Andrea, P2-22
Fischer, Karla, P18-688
Fisher, Andrew, P6-137
Fishman, Maxwell, P6-141
Fleck, Neil, P2-21
Fleites, Laura, P7-167, P9-264, C3-3, P20-717
Fletcher, Kyle, P11-354, C2-6, P11-392
Fliege, Christina, P17-535
Floss, Daniela, P2-45, C13-5, P2-62
Flury, Pascale, C16-5
Fogelqvist, Johan, P12-402, P6-142
Foley, Rhonda, P15-428, P18-668
Fonseca, Jose, P18-669
Forristal, Dermot, P4-114
Fraaije, Bart, S6-3
Fraire, Saul, P7-168
Fraiture, Malou, P7-201
Franceschetti, Marina, P17-600, P9-287
Francis, Isolde, P7-169, P7-212, P7-216
Franco, Barbara, P7-170
Franco, Jessica, P17-640, P9-255
Frank, Carolin, P4-90
Franken, Philipp, P18-672
Frantzeskakis, Lamprinos, P9-248
Fraser-Smith, Sam, P11-348
Frei, Michael, P16-455
Freitag, Michael, P18-660
Frenkel, Omer, P4-95
Frerigmann, Henning, P2-34
Friesen, Maren, P2-46
Friesen, Timothy, P11-356, P17-597, P9-323
Fröhlich, Katja, P17-523, P17-572, C20-2
Froenicke, Lutz, P11-353
Froom, Ruby, P9-242
Frugoli, Julia, P2-23
Fruhmann, Philipp, P16-439
Fu, Shuai, S2-2
Fudal, Isabelle, P16-471, P7-199, C2-5, P11-391
Fuerst, Gregory, P11-384, C6-5, P14-425
Fujimoto, Zui, P17-620
Fujisaki, Koki, P17-543, C24-4, P17-651
Fujita, Moeka, P18-670
Fujiwara, Masayuki, P17-644
Fuller, Skylar, C21-5, P19-711
Furniss, James, C15-5, P18-701
Fürst, Ursula, P17-507, P17-533
Furuki, Eiko, P17-585
Furzer, Oliver, P12-394, P17-505
Gabriel, Dean, P9-264, C3-3, P20-717
Gagnevin, Lionel, C8-4, P12-405
Gaikwad, Trupti, P18-671
Gaire, Shankar, P17-524
Galeana-Sanchez, Eduardo, P7-200

AUTHOR INDEX

Galindo-Gonzalez, Leonardo, P11-355
Galis, Ivan, P17-610
Galla, Aravind, P17-525
Galuszka, Petr, P9-268
Gamir, Jordi, C20-3, P6-149
Gandolfi, Alessia, P2-44
Ganusova, Elena, P17-526
Gao, Chuyun, P7-222
Gao, Jinliang, P17-501
Gao, Qingming, P18-694
Gao, Yuanyuan, P11-356
Garcia, Kevin, P2-20
Gardiner, Donald, P7-156, S4-3
Gardiner, Matthew, C21-4, P19-710
Garner, Christopher, P17-527, P17-528
Garnerone, Anne-Marie, P2-16
Garrido Oter, Ruben, P5-1
Gassmann, Walter, P17-528
Gastebois, Amandine, P2-16
Gätgens, Jochem, P20-719
Gawehns, Fleur, P11-357, P17-622
Gazave, Elodie, P13-410
Gedling, Cassidy, P16-448
Geffroy, Valerie, C2-1
Gelvin, Stanton, S5-4
Genin, Stephane, P9-282
Genre, Andrea, P2-15
Gentzbittel, Laurent, P11-371
Genzel, Franziska, P18-672
Germaine, Kieran, P4-114
Gershovits, Michael, P11-352
Gervais, Julie, C2-5, P11-391
Getzen, Emily, P4-94
Ghanim, Murad, P2-24
Ghareeb, Hassan, P4-101, C12-4, P15-436
Gherman, Iulia, C6-1
Ghesquière, Alain, P17-586
Gheysen, Godelieve, P12-399, C21-1
Ghislain, Marc, P12-399
Ghosh, Sumit, P9-272
Gil, Juliana, P11-385, C2-6, P11-392
Gilbert, Brian, C21-4, P19-710
Gilbert, Sarah, C10-1
Gilbertson, Robert, P11-381
Gill, Manroop, P18-682
Gilmer, David, P16-456
Gilroy, Eleanor, P16-450, P9-239
Gilroy, Simon, C21-3, P19-709
Giolai, Michael, C21-3, P19-709
Girardin, Ariane, P2-25
Giri, Mrunmay, P18-673
Given, Cindy, C19-3, P4-121
Glatter, Timo, P4-98
Glauser, Gaétan, C15-2, P18-698
Glavina del Rio, Tijana, P11-369
Glazebrook, Jane, P16-458, P16-484, C18-5, P15-435
Gleason, Cynthia, P9-256
Glink, Eva, P18-688
Goggin, Fiona, P16-451, P17-525
Göhre, Vera, P9-248
Gomez, Susana, C13-5, P2-62
Gómez De La Cruz, Diana, P17-529
Goncalves Coutinho, Bruna, C22-3, P8-230
Gonsalves, Lauren, P17-569
Gonzalez, Bernardo, P9-313
Gonzalez-Cendales, Yvonne, P17-504
Gonzalez-Orta, Enid, P7-165
Gordon, Thomas, P11-362
Gore, Michael, P13-410
Gorman, Jeffrey, P9-238
Gorzolka, Karin, P15-432
Goslin, Kevin, P16-471
Goss, Erica, C23-2
Gossen, Bruce, P11-349
Goto, Yukihisa, P17-541
Gough, Julian, P11-387
Govers, Francine, P9-301
Goverse, Aska, P17-613, C20-4, P6-150
Goyer, Claudia, C16-4, P5-136
Graber, Ellen, P4-95
Graciet, Emmanuelle, P16-471
Graham, Juliane, P11-380
Graham, Michelle, P17-582, P9-300
Grandellis, Carolina, P9-298
Grangeon, Romain, S5-3
Grant, Murray, P18-671
Gras, Marie-Christine, P11-371
Gratias, Ariane, C2-1
Gray, Stewart, P12-404, C8-3
Greeff, Christiaan, P17-565
Green, Phon, P17-499
Green, Stephen, P18-671
Greenberg, Jean, P16-469, P17-538, P18-662, C15-4, P18-700
Greenspan, Alex, P2-26
Grenville-Briggs Didymus, Laura, P17-570
Greve, Macarena, P9-295
Grey, Heather, C15-5, P18-701
Griesinger, Christian, P3-75
Griffiths, Scott, P6-146
Griffitts, Joel, C13-1
Grosch, Rita, P18-672
Gruissem, Wilhelm, C16-3, P5-135
Grundler, Florian, P17-611
Gruner, Katrin, P18-658
Grünwald, Niklaus, C23-4, P13-416, P11-350, P11-382
Gu, Keyu, P17-643
Gu, Yangnan, P5-2
Guayazan Palacios, Natalia, P7-171
Gunter, Lee, P4-113
Guo, Baodian, P9-326
Guo, Ming, P7-220, C11-3, P7-224
Guo, Qinggang, P3-69
Gust, Andrea, P17-521, P17-603
Gutjahr, Caroline, P2-45, C1-2, P2-56
Guttman, David, P17-513, P17-607, C2-4, P11-390, C6-3, P14-423
Guzman, Andrew, P17-530
Gysel, Kira, P5-1
Haas, Fabian, P9-275
Hacquard, Stephane, P3-74
Haddadi, Parham, P11-345, P11-351, P11-358
Haeck, Ashley, P16-455
Häikiö, Elina, C19-3, P4-121
Halane, Morgan, P17-528
Hallworth, Amelia, P18-683
Halter, Thierry, P11-359, P17-568, C9-5, P17-655
Halterman, Dennis, P17-531, P17-551, P9-257, C11-5, P7-225
Hamdoun, Safae, P18-682
Hameed, Kahlid, P4-118
Hammond-Kosack, Kim, P18-680, P9-249, C18-4, P15-434, C3-4, P19-712, S6-2, S6-3
Hammoudi, Valentin, P16-476
Hamzat, Olabisi, P2-27
Han, Xinyun, P17-647
Hand, Paul, P11-380
Hane, James, P18-668, P9-238
Haney, Cara, C7-5, P1-10
Hanika, Katharina, P4-101, C12-4, P15-436
Hannon, Lisa, P2-28
Hanson, Heather, P17-569
Hardham, Adrienne, P17-520, P9-244
Hargreaves, John, S6-3
Harries, Phillip, P7-209
Harris, Susanna, P4-93
Harrison, Clarice, C13-1
Harrison, Maria, P2-29, P2-40, C13-5, P2-62
Harrison, Maria J, P2-45
Harrison, Richard, P17-576
Hartman, Glen, P3-67
Harwood, Caroline, C22-3, P8-230
Hassan, Jana, P17-492, P17-556, P17-604
Hassert, Mariah, P14-420
Hastie, Marcus, P9-238
Hatsugai, Noriyuki, C18-5, P15-435, P2-2
Hatta, Asyraf, S6-5
Hauck, Stephanie, P18-661
Haudenshield, James, P3-67
Hayashi, Makoto, C1-4, P2-58
Hayes, Patrick, P17-499
He, Jinqiu, P9-246
He, Ping, P17-532, P17-562, P17-608
He, Qin, P9-239
He, Sheng, P18-676
He, Sheng Yang, P16-453, P17-632, P4-112, P4-97, P7-154, P9-324, C18-3, P15-433
He, Tao, P2-42
He, Yijian, P16-481, P9-311
He, Yongqiang, P9-240
He, Zuhua, P18-674, P20-713
Hébrard, Eugénie, P17-586
Hedley, Pete, P16-450, P17-519
Heese, Antje, P18-679
Hegedus, Dwayne, C8-5, P12-406
Hegenauer, Volker, P17-533
Heimerl, Thomas, P7-188
Hein, Ingo, P9-239
Heinze, Cornelia, P18-660
Helder, Johannes, C20-4, P6-150
Helm, Matthew, P20-720, C3-5, P20-722
Helmann, Tyler, P17-604, P3-70
Héloir, Marie-Claire, P17-511
Henry, Celine, P9-282
Henry, Peter, P11-362
Hensel, Goetz, P9-258
Hernandez, Monica, P3-71
Hernández-Pinzón, Inma, P17-573, S6-5, P17-499
Herrera, Ariel, P16-469
Herrera Paredes, Sur, P4-94
Hesse, Cedar, P3-82
Hewezi, Tarek, P11-363, P9-259, P9-318
Heyder, Arefat, P17-569
Hickman, Richard, P1-2, P16-452, P16-465
Hicks, Glenn, C24-5, P17-652
Hiekel, Stefan, P9-258
Higashiyama, Tetsuya, P7-198
Higgins, Peter, C21-3, P19-709
Hijne, Ruben, P17-590
Hilbig, Daniel, P6-147
Hill, John, P9-289
Hillmer, Rachel, C18-5, P15-435, P2-2
Hillmer, Stefan, C13-3, P2-61
Hinsch, Janine, P7-178, P9-268
Hirabuchi, Akiko, P17-543
Hiraka, Yukie, P11-368
Hirato, Yuki, P7-196
Hiruma, Kei, P15-431
Hockett, Kevin, C4-4, P3-86
Hoffrichter, Anne, P2-48
Höfle, Caroline, C11-4
Höfte, Monica, P12-403
Hogenhout, Saskia, P11-377, C21-3, P19-709, PL5-3
Hojo, Yuko, P17-610
Holbein, Julia, P17-611
Holmes, Janesse, P11-386
Holton, Nicholas, P17-617, C9-3, P17-653
Holub, Eric, P17-505, P9-315
Holuigue, Loreto, P16-469, P9-313
Hong, Gun Hyong, P5-130
Hong, Jaehwa, P5-130
Hong, Tram Ngoc, P17-618
Hoogland, Chistine, P9-238
Hooper, Juliet, S6-3
Hoppe, Lydia, P20-721
Horgan, Katelyn, P17-535
Horsell, David, P18-671
Hossain, Mohammad, P9-247
Hou, Pei-Yu, P7-161
Houterman, Petra, P17-622
Howden, Andrew, P9-253
Hoyer, J, P14-420
Hsiao, Yung-Jen, P7-172
Hsieh, Ming-Yu, P17-561, P17-583, P7-187
Hsu, Yau-Heiu, P13-412, P17-536, P7-173, P7-172
Hu, Chung-Chi, P7-173
Hu, Ciara, P18-662
Hu, Dongfang, P9-260
Huang, ChienYu, P18-675
Huang, Chun-Tzu, P17-609
Huang, Hsien-Da, P4-107, C14-4, P10-341

Huang, Jianhua, C9-4, P17-654
Huang, Jie, P9-269
Huang, Shuai, C9-4, P17-654
Huang, Shuhua, C9-5, P17-655
Huang, Ying-Ping, P7-172
Huang, Ying-Wen, P17-536, P7-173
Hubbard, Emily, P16-453
Hückelhoven, Ralph, P17-602, P7-174, P9-291
Hudson, Matthew, P17-535, P2-37, P2-40
Hueckelhoven, Ralph, C11-4
Huesgen, Pitter, P17-606
Huffaker, Alisa, P17-637, P18-664, PL4-3
Hughes, Richard, P7-164, P9-288
Huh, Sung, P17-505, C9-6, P17-656
Huitema, Edgar, P9-237, P9-253, P9-329
Human, Miekie, P17-553, P9-262
Hung, Shang, P2-22
Hunt, Matthew, C6-5, P14-425
Huot, Bethany, P16-453, P17-632, P18-676
Hur, Jae-Seoun, P2-43, P2-50
Hurek, Thomas, P4-115
Hurlburt, Nicholas, P6-137
Hurst, Greg, P4-109
Hurtado, Valentina, P17-529
Hussey, Paul, P2-39
Hutin, Mathilde, C8-4, P12-405
Hwang, In Sun, P12-396
Hwang, Jung-Hyun, P9-247
Hyon, Gang-Su, P17-575, P18-686
Ibe, Carol, P1-5
Ichimura, Kazuya, P17-642
Ichinose, Yuki, P16-464, P17-621, P5-129, P8-228, P18-686
Iizuka, Saki, P18-697
Ikeda, Tsukasa, P7-194, P7-206
Illig, Tina, P17-602
Imaizumi-Anraku, Haruko, P2-15
Imkampe, Julia, C9-5, P17-655
Ingel, Brian, P7-175
Innes, Roger, P16-463, P18-690, P20-720, C3-5, P20-722
Iqbal, Javaid, C16-2, P5-134
Ishaque, Naveed, P12-394
Ishibashi, Yuko, P17-512, P17-620
Ishiga, Yasuhiro, P17-574, P8-228
Ishiguri, Futoshi, P18-697
Ishihama, Nobuaki, P18-657, P18-676
Ishii, Takaaki, P7-179
Ishikawa, Kazuya, P18-696
Ishizuka, Junya, P7-179
Ito, Kazue, P17-543
Ivanov, Sergey, P2-29
Jackson, Scott, C2-1
Jacobs, Jonathan, P9-263
Jacobson, Daniel, P12-397, P14-421
Jacquet, Christophe, C7-3, P1-12
Jaimes Niño, Luisa, P9-328
Jain, Mukesh, P7-167, P9-264, C3-3, P20-717
Jain, Rashmi, P17-564
Jain, Sachin, P7-176
Jaiswal, Amit, P4-95
James, Geo, P15-430
Jancewicz, Amy, P9-283
Jansky, Shelley, P17-551
Jantasuriyarat, Chatchawan, P17-506, P9-265
Jarret, Robert, P12-399
Jawdy, Sara, P14-419, P2-33, P2-55, P4-113, C7-4, P1-9
Jayaraman, Dhileepkumar, P11-364, P11-365, P2-15
Jedrzejczak-Rey, Nicolas, P4-105
Jeena, Ganga, P2-34
Jelenska, Joanna, P16-469, P17-538
Jeon, Jongbum, P2-50
Jeon, Junhyun, P2-43
Jerome, John, P4-112, P4-97
Jia, Qi, P9-281
Jiang, Lei, P17-623
Jiang, Lingyan, P17-539
Jimenez, Jenyfer, P3-66
Jiménez Becerra, Jesús Antonio, P3-72
Jin, Hailing, P4-107, C14-4, P10-341
Jing, Maofeng, P9-326
Jo, Sung Hee, P9-266
Joe, Anna, P17-546, C5-5, P9-334
Johnson, Jenifer, P14-419
Johnson, Philip, P17-569
Jones, Alex, P9-321
Jones, Corbin, P4-94
Jones, David, P17-504, P17-520, P9-244
Jones, Jeffrey, C23-2
Jones, Jonathan, P12-394, P17-566, P9-322, C9-6, P17-656, S6-5
Jones, Jonathan D. G., P17-505
Jones, Kathryn, P2-30
Jones, Michael, P20-714, P9-250
Jones, Piet, P12-397
Joosten, Matthieu, P17-517, P6-143
Jørgensen, Hans, C14-3, P10-340
José Pereira Lima Teixeira, Paulo, P16-481
Joubert, Pierre, P2-31
Jourdan, Sam, P7-169
Judelson, Howard, P7-177
Juenger, Thomas, P11-378
Jun, Se Ran, P4-118
Jung, Ga-Young, P17-540
Jung, Ho Won, P17-540
Kabbage, Mehdi, P18-689, P7-176
Kachroo, Aardra, P18-694
Kachroo, Pradeep, P18-694
Kadota, Yasuhiro, P17-541, C9-3, P17-653
Kagda, Meenakshi, P7-177
Kahmann, Regine, P11-375, P4-98, P7-188, P9-310, C20-5, P6-151
Kaiser, Bettina, P17-533
Kaku, Hanae, P17-512, P17-620
Kaloshian, Isgouhi, P17-625, C24-5, P17-652
Kamakura, Takashi, P7-196
Kambakam, Sekhar, P17-496
Kameoka, Shin-ichi, P2-52
Kaminaka, Hironori, P17-575
Kamiya, Shota, P2-52
Kamoun, Sophien, P11-368, P17-517, P17-543, P17-600, P17-626, P17-639, P7-164, P9-287, P9-288, P9-294, P9-303, P9-321, C17-5, P9-332, C24-4, P17-651
Kanakala, Surapathrudu, P2-24
Kang, Hong Gu, P17-542
Kang, Houxiang, P13-411
Kang, Jiangang, P9-269
Kang, Miyoung, P17-574
Kang, Won-Hee, P11-367
Kangasjarvi, Jaakko, P9-322
Kankanala, Prasanna, P12-397
Kanyuka, Kostya, P18-680, P6-144, P7-170, C18-4, P15-434
Kanzaki, Eiko, P17-543, C24-4, P17-651
Kanzaki, Hiroyuki, P17-543, P17-600, P17-626, P9-287, C24-4, P17-651
Karaoglu, Haydar, P17-522, S4-2
Karimi Jashni, Mansoor, P6-146
Karl, Leonhard, P2-45
Kaschani, Farnusch, P6-139
Katagiri, Fumiaki, P17-569, C18-5, P15-435, PL2-2
Katou, Yuri, P18-657
Katzer, Katja, P2-45
Kaundal, Amita, P17-574
Kaur, Parwinder, P9-238
Kawaguchi, Akira, P5-129
Kawaguchi, Masayoshi, P2-51, P7-198
Kawano, Yoji, P17-544
Kawasaki, Tsutomu, P17-642, P17-644, P18-696, S2-4
Kay, Steve, P14-420
Kayano, Yuka, P2-52
Kazan, Kemal, P7-156
Keel, Christoph, C16-5
Keller, Anna-Lena, P17-494
Keller, Beat, P17-571
Keller, Nancy, P7-176
Kellner, Ronny, P9-248
Kelsey, Rick, P8-227
Kemen, Eric, P3-74, P3-75, C10-4, P4-119
Kemerich, Bastian, P6-147
Kemmerling, Birgit, P17-568, C9-5, P17-655
Kenefick, Aubrey, P9-242
Kenkichi, Suto, P17-620
Kennedy, Megan, P14-419
Keppler, Brian, P15-427
Kershaw, Michael, S2-1
Kertesz, Kitty, P4-109
Kessens, Ryan, P9-267
Kettles, Graeme, P6-144
Keymer, Andreas, P1-6
Khakhar, Arjun, P16-446, P4-103
Khalil, Hala, P11-344
Khan, Ajmal, P9-247
Khan, Madiha, P18-677
Khan, Zareen, P2-21, P2-22
Khokhani, Devanshi, P9-236, P7-165
Khorasani, Mahsa, P2-21
Kianian, Shahryar, P17-522, P17-557, S4-2
Kidd, Brendan, P15-428, P18-668
Kikuchi, Hideko, P11-368
Kim, Daesung, P9-322
Kim, Emily, S5-5
Kim, Jacob, P9-242
Kim, Jonghwan, P17-542
Kim, Jung A, P2-43
Kim, Jung-Gun, P17-530, P17-547, P9-290, P9-309
Kim, Ki-Tae, P2-50
Kim, Kyung Do, C2-1
Kim, Kyung Mo, P5-128
Kim, Min, P7-169
Kim, Myung Hee, P9-266
Kim, Panya, P17-546, C11-3, P7-224
Kim, Saet-Byul, P17-545
Kim, Sang Hee, P17-527, P17-528
Kim, Sang Hyon, P17-540
Kim, Soo-Hyung, P2-21, P2-22
Kim, Yong-Min, P11-367
Kim, Young Sook, P5-127
Kimura, Mamiko, P16-464, P17-621
Kinash, Brianna, P8-227
Kind, Sabine, P7-178, P9-268
King, Robert, C18-4, P15-434, S6-2, S6-3
Kinkel, Linda, PL6-2
Kirkwood, Jay, C5-2
Kito, Keiji, P17-512, P17-620
Kladsuwan, Lawan, P9-240
Klassen, Jonathan, P7-165
Klavins, Eric, P16-446
Klein, Andrew, C4-3, P3-85
Kleingesinds, Carolina, P16-454
Kleinhofs, Andris, P17-486
Klessig, Daniel, P17-542
Kliebenstein, Daniel, C18-5, P15-435, C6-2
Klingl, Verena, P2-45
Klinnawee, Lompong, P2-32
Kliot, Adi, P2-24
Klitsinaris, Tassos, P20-716
Kluger, Bernhard, P16-439
Knaus, Brian, C23-4, P13-416
Knip, Marijn, P17-548, P17-596
Knoch, Eva, P7-190
Knox, J Paul, P7-157
Kobayashi, Michie, P11-368
Kobe, Bostjan, P17-502, P17-580, P17-646, P18-659, C24-3, P17-650, S6-1, S6-6
Koch, Kerstin, P20-721
Kodama, Sayo, P7-179
Koebnik, Ralf, P9-263
Koerner, Camilla, P7-180
Kohen, Max, P11-350, P11-382
Kohler, Amanda, P6-137
Koita, Ousmane, P17-498, S2-3
Koizumi, Haruki, P17-512
Kojima, Mikiko, P2-51
Kolb, Dagmar, P17-521
Kolodzijei, Markus, C1-2, P2-56
Kong, Danyu, P17-648

AUTHOR INDEX

Kong, Guanghui, P9-269
Kong, Jixiang, P15-429
Kong, Liang, P9-269
Kong, Qing, P16-475
Konopka, Evelyn, P16-466
Kontsedalov, Svetlana, P2-24
Koppenaal, David, C13-4, P19-707
Korniliev, Pavel, P13-411
Kosami, Ken-Ichi, P17-544
Koulena, Noushin, P17-607
Kouzai, Yusuke, P16-464, P17-621
Kozik, Alex, P11-354
Kracher, Barbara, P17-601
Kragh, Deirdre, P17-569
Kramer, David, P20-715
Kramer, Martin, C2-2, P11-388
Kremer, James, P4-112, P4-97
Kretschmer, Matthias, P9-270
Kreuze, Jan, P12-399
Krizanac, Ivana, P19-706
Kroj, Thomas, P17-543, P17-549, P17-626
Kroll, Samuel, C10-4, P4-119
Kronstad, James, P9-270
Kroymann, Juergen, P16-471
Krska, Rudolf, P16-439
Kubo, Yasuyuki, P7-179
Kud, Joanna, P17-550
Kueppers, Lara, P4-90
Kulshrestha, Saurabh, P9-271
Kumar, Anil, P9-272
Kumar, Arun, P17-551
Kumar, Dinesh, PL4-2
Kumar, Kamal, P17-589
Kumar, Manoj, P4-111, C19-3, P4-121
Kumar, Narender, P18-682
Kumari, Selva, P17-581
Kumlehn, Jochen, P9-258
Kunene, Ncobile, P13-408
Kunkel, Barbara, P9-273
Kuo, Chih-Horng, P11-374, P11-377
Kupferschmied, Peter, C16-5
Kurandina, Regina, P17-569
Kurihara, Daisuke, P7-198
Kusajima, Miyuki, P16-462, P18-670, P18-678
Kusch, Stefan, P7-181
Kvitko, Brian, P4-112, P4-97, P6-145
Kwaaitaal, Mark, P15-430, C14-3, P10-340
Kwak, Brandy, C1-3, P2-57
Kwasniewska, Kamila, P16-471
Kwenda, Stanford, P11-372
Kwon, Ashley, P18-682
Kyndt, Tina, P12-399, P16-455
Kyozuka, Junko, P19-703
Labbé, Jessy, P2-33, C7-4, P1-9, P14-419, P2-55
Lacaze, Aline, P9-274
Lacombe, Severine, P9-263
Lagrange, Thierry, C17-4, P9-331
Lagudah, Evans, P17-557, S4-2, S6-1, S6-5
Lahaye, Thomas, P9-302
Lahrmann, Urs, P2-34
Lai, Chien-Ming, P16-443
Lai, Erh-Min, P11-374
Lam, Eric, C10-1
Lambert, Paul, P7-216
LaMontagne, Erica, P18-679
Lamontanara, Antonella, P4-89
Lane, Thomas, P11-363
Langen, Gregor, P2-34
Langenbach, Caspar, P20-719
Langenhoven, Brigitte, P17-553
Langin, Thierry, P14-417, C18-4, P15-434
Lankinen, Åsa, P17-570
Lanver, Daniel, P17-530, P9-275
Lapham, Rachelle, S5-4
Lardi, Martina, P2-35, P2-44
Larkan, Nicholas, P11-358
Larkin, John, P18-682
Larsen, John, P7-168
Lasserre-Zuber, Pauline, P14-417
Lastrucci, Emmanuelle, P11-359, C17-4, P9-331
Laukamm, Sabine, P4-101, C12-4, P15-436
Lavrencic, Peter, P18-659, C24-3, P17-650, S6-1
Law, Terry, P17-487
Lazarowitz, Sondra, P7-182
Le Fevre, Ruth, P19-704
Le Tacon, François, P2-55
Le Tourneau, Melissa, P3-81
Leach, Jan, P17-498, P17-510, P9-307, C5-2, S2-3
Lebedev, Galina, P2-24
Lebeis, Sarah, P11-369, C10-1
LeBoldus, Jared, P17-554, P7-152
Lecomte, Philippe, P14-417
Ledger, Thomas, P8-229, P9-295
Lee, Boyoung, P3-78
Lee, Bum Kyu, P17-542
Lee, Dae Hee, P9-266
Lee, DongHyuk, P17-629
Lee, Gahyung, P5-128
Lee, Hae-Ran, P3-79
Lee, Hee-Kyung, P17-574
Lee, Hyun-Ah, P17-605
Lee, Jiyoung, P9-266
Lee, Joo Hyun, P17-545
Lee, Justin, P18-693, P9-276
Lee, Lan-Ying, S5-5, S5-4
Lee, Moo-Seung, P9-266
Lee, Sang-Heon, P5-128
Lee, Seonghee, P17-574, P18-669, S5-5
Lee, Shu-Chuan, P13-412
Lee, Soohyun, P3-77, P3-78, P5-130
Lee, Soon Goo, P9-273
Lee, Sungwoo, P16-448
Lee, Wing Sham, S6-2, P18-680, C18-4, P15-434
Lee, Yong-Hwan, P2-43, P2-50
Lee, Yu Jeong, P17-540
Leelarasamee, Natthanon, P9-256
Lefebvre, Benoit, P2-25
Lei, Lei, P3-73
Lei, Yan, P2-49
Leiva, Ana, P3-68
Lemcke, René, P17-555
Lenk, Andrea, P7-214
Leung, Hei, P13-411, P17-498, S2-3
Levesque-Tremblay, Veronique, P2-37, C13-5, P2-62
Levy, Amit, P7-182
Levy, Asaf, P11-369
Levy, John, P8-227
Lewis, Jennifer, P17-556, P17-604
Li, Baohua, C18-5, P15-435
Li, Chenyang, S2-2
Li, Chijun, P17-591
Li, Chun, P17-623
Li, Feng, P17-522, P17-557, S4-2
Li, Guangyong, P9-278, C11-3, P7-224, C17-4, P9-331
Li, Haiyang, P17-567
Li, Hua, P9-250
Li, Jia, P17-623
Li, Meng, C9-4, P17-654
Li, Peng, P9-254
Li, Qi, P9-330
Li, Shezeng, P3-69
Li, Shigui, S2-5
Li, Siou-Cen, P7-172
Li, Wenhao, P9-330
Li, Xin, C9-4, P17-654
Li, Yi, C17-1
Li, Zhengnan, P11-386
Li, Zhiqiang, Blank, P13-411
Liang, Liang, P4-98
Liao, Chuan-Kai, P17-561
Liban, Sakaria, P17-595
Liberman, Louisa, P9-317
Liebe, Sebastian, P16-456
Liebrand, Thomas, P17-559
Lilley, Catherine, P7-155, P7-157
Lilley, Jodi, C1-5, P2-59
Lim, GiTaek, P7-183
Lim, Klothilda, P17-569
Limpens, Erik, P2-42
Lin, Chan-Pin, P16-443
Lin, Daniela, P18-683
Lin, Feng-mao, P4-107, C14-4, P10-341
Lin, Hong-Shin, P7-187
Lin, Jinshan (Ella), P16-473
Lin, Kuo-Chih, P17-561
Lin, Nai-Chun, P16-457, P6-138
Lin, Na-Sheng, P13-412, P17-536, P7-173
Lin, Shao-Yu, P7-184
Lin, Xiao, P17-560
Lin, Yachun, P17-567, P9-269
Lin, Yuan, P17-531
Lindow, Steven, P3-70, P3-71, PL3-2
Link, Tobias, P9-296
Links, Matthew, P11-351
Linning, Rob, P11-344
Liou, Ruey-Fen, P17-609
Lipka, Volker, P4-101, C12-4, P15-436
Littlejohn, George, P7-205, P9-279
Liu, Chenglong, P17-562
Liu, Chi-Te, P2-36
Liu, Fengquan, P7-186
Liu, Furong, P17-564
Liu, Hongxia, P17-530
Liu, Jun-Jun, P12-398
Liu, Lijing, P5-2
Liu, Meiling, C6-5, P14-425
Liu, Ming-Ru, P13-412
Liu, Na, P9-281
Liu, Shu-Ying, P17-561, P17-583, P7-187
Liu, Wende, P13-411, P9-280
Liu, Xiaoyu, P7-180, P7-185
Liu, Xinyu, P7-222
Liu, Yanan, P17-563
Liu, Yilei, P2-35
Liu, Yingyu, P7-160
Liu, Yongsheng, P17-550
Liu, Yule, P9-281
Liu, Zhaohui, P11-356
Lo, Chaur-Tsuen, P17-561, P17-583
Lo, Hsiao-Fu, P16-443
Lo, Kai-Jiun, P2-36
Lo, Timothy, P17-607
Lo Presti, Libera, P4-98, P7-188
Lohou, David, P9-282
Loiseau, Jenna, P7-189
Lolle, Signe, P17-565
Long, John, P9-307
Long, Sharon, OC, S1-4
Longya, Apinya, P9-265
Lonjon, Fabien, P9-282
Loper, Joyce, P11-350, P11-382, P3-82, P4-99, P5-132
Lopes, Lucas, P4-99
Lopez Carrascal, Camilo, P9-328
López Solanilla, Emilia, P3-80
Lòpez-Fernàndez, Sebastiàn, P1-7
Lord, Adam, P17-569
Lord, Amanda, P17-569
Loria, Rosemary, P7-169
Lothert, Shayman, P17-569
Lovecka, Petra, P4-91
Lovelace, Amelia, P6-145
Lowe, Tiffany, P9-283
Lozano, Ivan, P3-68
Lozano-Duran, Rosa, P9-321
Lozano-Torres, Jose, C20-4, P6-150, C20-4, P6-150
Lu, Canhua, P5-124
Lu, Gang, P17-623
Lu, Hua, P18-681, P18-682, P18-683
Lu, Shen, P4-109
Lu, Tse, P4-118
Lu, Tse-Yuan, P4-113
Lu, Xiuyun, P3-69
Lu, Xunli, P17-601
Lu, Yew-Yee, P6-138
Lu, You, P16-458, P16-484
Ludwig, Nicole, P4-98, P9-275
Ludwig, Nora, P16-442, P16-459
Ludwig, Uwe, P18-688
Lui, Qingli L, P17-487
Lum, Michelle, C1-3, P2-57
Luna, Virginia, P2-22
Lundberg, Derek, P11-369
Luo, Meng-Jhe, P17-536
Luo, Zhao-Qing, P5-124
Luong Van, Nadia, P17-569
Lupas, Andrei, P11-375
Luster, Douglas, P9-300
Lyngkjaer, Michael, P17-555, P7-190, P7-166
Ma, Jinbiao, P9-246
Ma, Ka-Wai, P9-284

Ma, Lay-Sun, C20-5, P6-151
Ma, Li-Jun, PL2-3
Ma, Lisong, P11-345, P11-351
Ma, Shisong, P17-532
Ma, Wenbo, P9-246, P9-284, P9-329
Ma, Xianfeng, P18-684
Ma, Xiyu, P17-608
Ma, Yan, P17-566, C9-6, P17-656
Ma, Zhenchuan, P17-567
Macalino Esteban, Jose, P4-94
Macek, Boris, P17-603
Machado, Ana, S6-2
Machius, Mischa, P17-487
Macho, Alberto, P9-285
MacIntosh, Gustavo, P16-438
MacIntyre, April, P7-165, P9-286
Mackelprang, Rebecca, P16-460
Mackey, David, P17-629
MacLean, Allyson, P2-37, C13-5, P2-62
Madala, Ntakadzeni, P18-665
Madsen, Lene, P5-1
Madzima, Thelma, P2-30
Mäe, Andres, P18-685
Maeda, Junko, P11-365, P2-15, P2-20
Maeda, Kazuki, P18-686
Maekawa, Takaki, P17-601
Mago, Rohit, S6-1
Maidment, Josephine, P9-287
Maier, Felix, P16-466
Maillet, Fabienne, P2-20
Mainzer, Liudmila, P2-37, P2-40
Maki, Noriko, P19-703
Malachová, Alexandra, P7-218
Malandraki, Ioanna, P20-716
Malec, Marek, P16-450
Malmstrom, Rex, P2-18
Malone, Jacob, P6-148
Manners, John, S4-3
Manning, Viola, C4-5, P3-87
Manstretta, Raffaele, P17-568, C9-5, P17-655
Mantelin, Sophie, C24-5, P17-652
Manzotta, Sara, C9-5, P17-655
Maorer, Dalia, P4-104
Maqbool, Abbas, P17-600, P17-626, P7-164, P9-287, P9-288
Marchetti, Marta, C7-2
Margaria, Paolo, P13-413, P7-191
Mari, Alfredo, P3-74
Marjoram, Paul, P11-371
Maron, Lyza, P9-240
Maroof, Saghai, P19-705
Marroquin-Guzman, Margarita, P7-192, P7-213
Martin, Gregory, P11-387
Martinez, Paula, P17-566
Martínez-Raudales, Inés, P7-168
Martin-Urdiroz, Magdalena, P9-279, S2-1
Maruyama, Daisuke, P7-198
Maruyama, Jun-ichi, P2-52
Marx, Harald, P11-365
Mascher, Martin, P15-430
Masciarelli, Oscar, P2-22
Mase, Keisuke, P17-569, P2-2
Masini, Laura, P17-570
Masson, Patrick, P9-283
Masson-Boivin, Catherine, P2-16, C7-2
Matern, Andreas, P15-432
Mateus Da Silva, Gustavo, P11-352
Matsui, Hidenori, P16-464, P17-541, P17-575, P17-621, P18-686, P5-129
Matsumoto, Miwako, P2-38
Mattei, Benedetta, C18-1
Matuszak, Daniel, P17-559
Mauch, Felix, P9-314, C20-3, P6-149
Mauch-Mani, Brigitte, C15-2, P18-698
Mauleon, Ramil, P17-506
Maurhofer, Monika, C16-5
Mavrodi, Dmitri, P3-81, C4-1
Mavrodi, Olga, P3-81, C4-1
Mayberry, Laura, C14-5, P10-342
Mazurier, Mélanie, P11-371
McCallum, Brent, P11-344
McCarthy, James, P7-155
McClerklin, Sheri, P9-273
McCloskey, Alix, P5-124
McCollum, Christopher, C11-4
McCollum, Joseph, P8-227
McCouch, Susan, P13-411
McDonald, Bradon, P7-165
McDonald, Bruce, P11-356
McDonald, Megan, P11-379
McDougal, Rebecca, P13-409
McDowell, John, P19-705
McGuire, Kathleen, C10-1
McHale, Leah, P16-448
McLellan, Hazel, P16-450, P9-239
McLeod, Rory, P9-237
McMinn, Patrick, C17-3, P7-226
McNally, Kaitlin, P17-571
McReynolds, Maxwell, P9-319
Mechan Llontop, Marco, P4-108
Medina, Clemence, P9-263
Meekes, Ellis, P11-357
Mei, Yu, P9-289
Meijer, Harold, P9-301
Mekonene, Adelahu, P16-455
Melotto, Maeli, P16-447
Melquiond, Adrien, P16-459
Melville, Devin, P2-28
Melzer, Eric, P17-523, P17-572, C20-2
Menardo, Fabrizio, P17-571
Mendis, Hajeewaka, P2-30
Mendoza-Mendoza, Artemio, C20-5, P6-151
Mendy, Badou, P17-611
Menghsiao, Meng, P7-162
Menke, Frank, P17-541, P7-164, P9-322, C9-6, P17-656
Mentges, Michael, P18-660
Mercier, Helenice, P16-454
Merl-Pham, Juliane, P18-661
Mesarich, Carl, P6-146
Meteigner, Louis-Valentin, P17-491
Mewalal, Ritesh, P2-55
Meyer, Michel, P7-199
Meyer, Rachel, P17-569
Mezey, Jason, P13-411
Mhlongo, Msizi, P18-665
Mian, Rouf, P16-448
Miao, Jiamin, P17-648
Michelmore, Richard, P11-353, P11-354, P11-385, C2-6, P11-392
Michelotti, Vania, P4-89
Mideros Bastidas, Maria, P7-171
Midha, Samriti, P13-414
Mieczkowski, Piotr, P16-481, P9-311
Milgate, Andrew, P11-379
Miller, Jimi, P18-687
Miller, Marilyn, P11-350, P11-382
Miller, Marisa, P17-522, S4-2
Miller, Sally, PL1-3
Miller, Scott, P17-569
Miller, Tony, C21-3, P19-709
Milne, Ricky, P17-557, S4-2
Mine, Akira, P17-642
Minogue, Catherine, P11-365
Mioto, Paulo, P16-454
Mirzadeh, Saed, P17-538
Mistry, Divya, P11-384
Mitchum, Melissa, P9-318
Mitra, Raka, P9-283
Mitsuoka, Chikako, P17-543
Miura, Chihiro, P2-38
Miura, Takaki, P17-512
Miyagawa, Noriko, P18-657
Miyashita, Ito, P7-179
Miyoshi, Hideto, P7-179
Mobli, Mehdi, C24-3, P17-650
Mochida, Keiichi, P16-464
Moffett, Peter, P17-491
Moleleki, Lucy, P11-372, P7-193
Molina, Antonio, P15-431
Møller, Birger Lindberg, P7-166
Monaghan, Jacqueline, P17-617
Monteiro, Freddy, P17-634
Montgomery, Beronda, P16-453
Moon, Ju Yeon, P17-508
Mooney, Brian, P16-471
Moore, William, P2-39
Morales-Cruz, Abraham, P7-202
Morbitzer, Robert, P9-302
Moretti, Marino, C20-5, P6-151
Mori, Nolan, P17-492
Morohoshi, Tomohiro, P7-194, P7-206
Morrell-Falvey, Jennifer, P4-109
Morris, Jenny, P17-519
Morrison, Christoipher, P5-125
Mortimer, Jenny, P2-39
Moscou, Matthew, P17-499, P17-557, P17-573, P19-704, C21-4, P19-710, S4-2
Mosina, Gabo, P7-193
Mosquera, Gloria, P17-498, S2-3
Mot, Adam, C6-3, P14-423
Motoyama, Noriko, P17-620
Mott, Adam, P17-513
Muchero, Wellington, P14-419, P14-421, P16-461, P17-554, P2-33, C7-4, P1-9
Mucyn, Tatiana, P4-110
Mudgett, Mary Beth, P17-530, P17-547, P9-290, P9-309
Mueller, Lena, P2-40
Mugford, Sam, C21-3, P19-709
Mukherjee, Arijit, P2-20
Mukhtar, Karolina, P7-180
Mukhtar, Shahid, P14-422
Muller, Mischa, P13-408
Müller, Andre, P9-275
Müller, Martin, P3-75
Münch, Karin, C20-5, P6-151
Mundy, John, P17-565, P18-692
Murakami, Eiichi, P5-1
Mural, Ravi, P11-387
Murphy, Alexandra, C16-2, P5-134
Murray, Jeremy, C1-5, P2-59
Murray, Shane, P17-553
Mustafa, Adhab, P7-208
Muthappa, Senthil-Kumar, P18-669
Muthukumar, Balasubramaniam, P9-259
Mwimba, Musoki, P7-195
Myburg, Alexander, C6-4, P14-424
Mysore, Kirankumar, P12-397, P18-669, P17-574, P5-130, S5-5
Nagae, Miwa, P2-51
Nagata, Shotaro, P2-38
Nakagami, Hirofumi, P17-541, P17-575, P18-686
Nakano, Ryohei Thomas, P15-431
Nakano, Takaaki, P18-657
Nakashita, Hideo, P16-462, P18-670, P18-678
Nakayasu, Ernesto, P5-124
Nalam, Vamsi, P16-470
Nam, Ji Chul, P17-542
Naqvi, Naweed, C22-5, P8-232
Naqvi, Shaista, P16-450, P9-239
Narukawa-Nara, Megumi, P7-196
Narurla, Alka, P9-272
Narusaka, Mari, P17-512, P17-642
Narusaka, Yoshihiro, P17-512, P17-642
Natsume, Satoshi, P11-368
Navarre, DuRoy, P18-694
Navarro, Lionel, P11-359, C17-4, P9-331
Navet, Natasha, P9-312
Naylor, Dan, C19-5, P4-122
Nazar, Ross, P17-503
Nazarchuk, Dina, P17-604
Neeley, David, P16-466
Neier, Reinhard, C15-2, P18-698
Nellist, Charlotte, P17-576
Nelson, Richard, P7-208, P7-209
Nemhauser, Jennifer, P16-446, P4-103
Nettleton, Daniel, P11-384, C6-5, P14-425
Neubauer, Matthew, P16-463
Neuhäuser, Benjamin, P18-688
Newman, Mari-Anne, P17-577
Newman, Toby, P17-646
Ngachan, S, P15-426
Ngaki, Micheline, P17-495, P17-496
Nguyen, Breanna, P9-242
Nguyen, Cuong, C1-6, P2-60
Nguyen, Tan, P17-599
Ngyuen, Yen, P17-627
Ni, Hong, P9-285

AUTHOR INDEX

Nicolis, Vittorio, P17-578
Nielsen, Dahlia, P11-383
Nietzschmann, Linda, P17-579
Nieuwoudt, Alandie, P17-553
Ninck, Sabrina, P17-618
Ning, Yuese, P13-411, S2-5
Nishimura, Marc, P17-487
Nishiuchi, Takumi, P7-179
Nissinen, Riitta, P4-111, C19-3, P4-121
Niu, DongDong, P18-675
Niu, Xiangli, P17-550
Noel, Zachary, P20-715
Nomura, Kinya, P7-197, P9-324
Nomura, Yuko, P17-575, P18-686
Nookaew, Intawaat, P4-118
Nottensteiner, Mathias, P7-174, P9-291
Nour-Eldin, Hussam Hassan, P7-166
Noutoshi, Yoshiteru, P16-464, P17-621, P18-676, P5-129
Novakova, Miroslava, P9-243
Novinscak, Amy, P3-72, P5-125, C16-4, P5-136
Nowak, Stephen, P2-23
Nürnberger, Thorsten, P17-521, P17-523, P17-572, C20-2
Nuzhdin, Sergey, P11-371
Nwumeh, Ron, P9-273
Nyarko, John, P20-714
Oates, Matt, P11-387
Oblessuc, Paula, P16-447
O'Boyle, Bridget, P19-704
Ocamb, Cynthia, P17-649
Oda, Yasuhiro, C22-3, P8-230
Oh, Chang-Sik, P12-396
Oh, Sang-Keun, P7-183
Oh, Sunhee, P17-574
Ohnishi, Mihoko, P17-620
Ohshima, Jyunichi, P18-697
Ohtsu, Mina, P7-198
Okada, Kazunori, P17-610
Okamura, Ayane, P2-52
Ökmen, Bilal, P6-146, P6-147
Okrent, Rachel, P16-460, C4-5, P3-87
Oksenberg, Nir, P17-627
Okumura, Yasuko, P18-670, P18-678
Olaya, Cristian, P11-346
Oldiges, Marco, P20-719
Oldroyd, Giles, P1-4, P2-14, C1-5, P2-59, PL1-4
Oliva, Ricardo, C3-2
Oliveira Resende, Renato, P13-413
Oliver, Richard, P11-356, P17-585
Ollivier, Bénédicte, P7-199
Olsen, Carl, P7-190
O'Malley, Megan, C22-4, P8-231
Omidvar, Vahid, P17-522, P17-557, S4-2
Omolehin, Olanike, P10-337
Onda, Yoshihiko, P16-464
O'Neill, Wayne, P11-348
Oney, Matthew, P17-632
Ong, Kar Hui, P17-643
Opanowicz, Magdalena, C21-4, P19-710
Opulencia, Rina, P17-506
Orrù, Luigi, P4-89
Orth, Kim, P9-254
Ortiz, Diana, P17-549
Oses-Ruiz, Miriam, P7-205, S2-1
Osorio Rodriguez, Daniela, P9-328
Otani, Yuria, P2-38
Otegui, Marisa, P2-15
Ottado, Jorgelina, P9-298
Outram, Megan, P17-580, S6-6
Ouyang, Debra, P17-556
Ouyang, Xinhao, S2-5
Oza, Shyamal, P17-599
Ozabaki-Yagan, Nejla, P17-547
Ozaki, Yoshino, P2-52
Oztas, Onur, P2-42
Paasch, Bradley, P4-112, P4-97
Pain, Nicholas, P9-238
Pajerowska-Mukhtar, Karolina, P7-185
Pan, Chongle, P4-118
Pan, Huairong, P2-42
Pan, Tiffany, P17-569
Pandey, Ajay, P17-582
Pandey, Alok, P9-293
Pandey, Pooja, P7-164, C17-5, P9-332
Panstruga, Ralph, P15-430, P7-159, C3-4, P19-712
Papenfuss, Eric, P20-715
Paredes, Sur, P11-369, P4-110
Parejko, James, P3-81
Parich, Alexandra, P7-218
Paries, Michael, P2-45
Park, Chan Ho, S2-5
Park, Hee-Jin, P2-37, C13-5, P2-62
Park, Jeong Mee, P17-508, P9-266
Park, Paula, P17-595
Park, Robert, P11-376, P17-522, S4-2, S6-1
Park, Sook-Young, P2-43, P2-50
Park, So-Yon, S5-5
Park, Yong-Soon, P3-78, P5-130
Parker, Jennifer, P6-140
Parkin, Isobel, P11-351
Parniske, Martin, P2-15, P2-45
Parrish, Phoebe, P9-245
Pasa-Tolic, Ljiljana, C13-4, P19-707
Pastor, Victoria, C15-2, P18-698
Pastorczyk, Marta, P15-431
Paszkowski, Uta, PL1-2, C13-3, P2-61
Pate, Adrienne, C16-2, P5-134
Patil, Prabhu, P13-414
Patkar, Rajesh, C22-5, P8-232
Paulitz, Timothy, P17-649
Paulsen, Ian, C4-1
Paulus, Judith, P17-581, P6-139
Pauly, Markus, C18-5, P15-435
Pecher, Pascal, P18-693
Péchy-Tarr, Maria, C16-5
Peck, Scott, P17-539, C22-4, P8-231
Pedersen, Carsten, C14-3, P10-340
Pedley, Kerry, P17-582
Peeters, Nemo, P9-282, P9-285
Pelletier, Dale, P11-369, P4-109, P4-113, P4-118, C22-3, P8-230
Pena, Lisabeth, C11-5, P7-225
Penfold, Chris, C6-1
Peng, Gary, P11-349
Peng, Hsuan-Chieh, C24-5, P17-652
Peng, Jie, P11-353
Peng, Ke-Chun, P17-609
Peng, Kou-Cheng, P17-561, P17-583, P7-187
Peng, Shasha, P13-411
Pennington, Helen, P9-294
Pereira, Maiara, P17-584, P17-628
Pereira, Michele, P4-99
Pereira Lima Teixeira, Paulo, P4-94
Pereira Mendes, Marciel, P16-465
Perez, Eli, C5-3, P9-333
Perez-Quintero, Alvaro, P9-328, P9-263, C8-4, P12-405
Periyannan, Sambasivam, S6-1, S6-5
Perroud, Bertrand, P11-353
Peruci, Michaela, P7-218
Pessi, Gabriella, P2-35, P2-44
Petersen, Morten, P17-565, P18-692
Petit, Yohann, P7-199
Petre, Benjamin, P9-321, P7-164
Petros, Robby, P18-673
Pfalz, Marina, P16-471
Pfeilmeier, Sebastian, P6-148
Pfitzner, Artur, P18-688
Pfitzner, Ursula, P16-466
Pflugmacher, Maike, P20-721
Phan, Huyen, P17-585
Phillips, Andy, C18-4, P15-434, C3-4, P19-712
Phillips, Anne, P11-373
Phillips, Sonia, P13-408
Philmus, Benjamin, P3-82, P5-132
Piasecka, Anna, P4-105
Piater, Lizelle, P18-665
Pidon, Hélène, P17-586
Pierce, Naomi, C7-5, P1-10
Pieterse, Corné, C7-6, P1-11, P1-2, P16-452, P16-465, P16-467, P9-251, P9-317, P9-327
Pilon-Smits, Elizabeth, P4-91
Pimprikar, Priya, P2-45
Pinedo, Ignacio, P9-295
Pinel, Agnès, P17-586
Pink, David, P11-380
Pislewska-Bednarek, Mariola, P15-431
Pitino, Marco, C21-3, P19-709
Piya, Sarbottam, P11-363, P9-259
Planas-Marquès, Marc, P6-139
Plasencia, Javier, P7-200
Plavec, Jelena, P19-706
Plissonneau, Clémence, C2-5, P11-391
Ploch, Sebastian, P4-117
Podar, Mircea, P4-118
Poinsot, Véréna, P2-20
Poinssot, Benoit, P17-511
Polanski, Krzysztof, C6-1
Pollmann, Stephan, P16-471
Pomp, Rikus, P17-613
Pontier, Dominique, C17-4, P9-331
Pontiggia, Daniela, C18-1
Popov, Georgy, P7-201, P9-304, P9-304
Porter, Stephanie, P2-46
Postel, Sandra, C9-5, P17-655
Potnis, Neha, P17-588, C23-2
Pound, Michael, P4-101, C12-4, P15-436
Poupin, Josefina, P8-229
Poupin, María, P9-295
Prakash, Narendra, P15-426
Praz, Coraline, P17-571
Prenzler, Kai, P20-721
Pretorius, Rudi, P7-193
Pretorius, Zakkie, C23-5, P11-393
Price, Morgan, P2-18
Price, Paul, C13-1
Prins, Reneé, C23-5, P11-393
Prior, Philippe, P7-165
Priya, Ranjan, P2-33
Proietti, Silvia, P1-2, P16-467
Prokchorchik, Maxim, P17-615
Pruitt, Rory, C5-5, P9-334
Pruneda-Paz, Jose, P14-420
Pulman, Jane, P16-453
Pupko, Tal, P11-352
Purayannur, Savithri, P17-589
Purtschert, Gabriela, P2-44
Putnam, Melodie, P11-350, P11-382
Qi, Mingsheng, P9-259, P9-296
Qian, Bin, P7-222
Qian, Chen, P18-695
Qian, Guoliang, P7-186
Qiu, Min, P17-567, P9-269
Qiu, Xufang, P9-269
Qu, Shaohong, P13-411
Qu, Ziwei, C22-5, P8-232
Quan, Clement, P2-47, C7-3, P1-12
Queiroux, Clothilde, P2-30
Quintero, Alejandro, P3-66
Quispe-Huamanquispe, Dora, P12-399
Raasch, Lars, P17-602
Raaymakers, Tom, P17-590
Råberg, Lars, P17-570
Radakovic, Zoran, P17-611
Radutoiu, Simona, P1-4, PL5-1
Raghavan, Chitra, P17-498, S2-3
Rahfeldt, Wolfgang, P17-591
Rahman, Motiur, P17-502
Rahman, Sharmin, P20-714
Rajasekar, Shanmugam, P11-365
Rakotondrafara, Aurelie, C14-5, P10-342
Rallapalli, Ghanasyam, P9-322
Rambani, Aditi, P11-363
Ramirez, Gabriela, P17-593
Ramnarayan, Ajay, P17-569
Ramos, Román, P16-460
Randall, Jennifer, P7-212, P7-216
Ranf, Stefanie, P17-602
Ranjan, Ashish, P18-689
Ranjan, Priya, C7-4, P1-9
Ransom, Elspeth, P11-380
Rapicavoli, Jeannette, P7-202
Raruang, Yenjit, P10-337
Rashid, M. Harunur, P17-595
Rathjen, John, P1-1, P11-376, C9-3, P17-653
Rathore, Ridhdhi, P4-114
Rawalt, Janiece, C4-1

Read, Andrew, P9-240, P9-297, P9-308
Ream, Walt, P11-350, P11-382
Reese, Tyler, P17-569
Reimer-Michalski, Eva-Maria, C15-3, P18-699
Reiner, Tina, P7-174
Reinhold-Hurek, Barbara, P4-115
Reissmann, Stefanie, C20-5, P6-151
Remigi, Philippe, C7-2
Rengel, David, P9-282
Rennie, Emilie, P2-39
Rensing, Stefan, P9-275
Rep, Martijn, P17-622
Resch, Jonathan, P17-569
Reshetnyak, Ganna, P9-263
Resnick, Adam, P9-242
Restrepo, Silvia, P17-529, P7-171, P9-328
Rey, Thomas, C7-3, P1-12
Reyes Chin Wo, Sebastian, P11-354, P11-385, C2-6, P11-392
Rhasid, Harun, P9-247
Rho, Hyungmin, P2-22
Rials, Timothy, P4-118
Rice, J Hollis, P11-363, P9-259
Richard, Manon, P17-596, C2-1
Richards, Alicia, P11-364, P11-365
Richards, Jonathan, P11-356, P17-597, P9-306
Richter, Hanna, P17-622
Rickauer, Martina, P11-371
Rico, Maria, P17-598
Rietman, Hendrik, P17-485
Rieu, Ivo, P17-570
Rigali, Sebastien, P7-169
Rikkerink, Erik, P17-514
Rivas, Susana, P16-471
Rivi, Melissa, P17-569
Robatzek, Silke, P9-321
Robb, Jane, P17-503
Roberts, Mary, P2-42
Roberts, Robyn, C14-5, P10-342
Robertson, Alison, P19-705
Robertson-Albertyn, Senga, C10-2
Robinson, Steve, P11-351
Rocha, Eduardo, C7-2
Rocha, Raquel, P7-203
Rodenburg, Sander, P9-301
Rodrigues, Maria Aurineide, P16-454
Rodrigues Marques, João Paulo, P7-163
Rodriguez, Andres, P7-209
Rodriguez, Patricia, P7-204
Rodríguez Hervá, José Juan, P3-80
Roelsgaard, Pernille, P7-190
Roevenich, Hanna, P17-617
Rogan, Conner, P17-527
Rojas, Clemencia, P17-574
Rojas, Sandy, P8-229
Rolfe, Stephen, P11-351
Rolshausen, Philippe, P4-116
Rom Mas, Eugenia, P12-403
Roman-Reyna, Veronica, P1-1
Ronald, Pamela, P17-564, P17-627
Roper, M. Caroline, P7-202, P4-116
Roquigny, Roxane, P5-126, C16-4, P5-136
Rosa, Cristina, P13-413, P7-191
Rosahl, Sabine, P15-432, P17-579
Rose, Laura, P4-117
Roth, Mitchell, P20-715
Roth, Ronelle, C13-3, P2-61
Rottschaefer, Susan, P17-522, S4-2
Round, Adam, P9-288
Rouse, Douglas, P17-551
Rouse, Matthew, S6-5
Roux, Fabrice, P3-74
Roux, Milena, P17-565
Rouxel, Thierry, P7-199, C2-5, P11-391
Rovenich, Hanna, P6-146, P9-298
Roy, Alex, P11-366
Roy, Sonali, C1-5, P2-59
Roy Choudhury, Swarup, P17-574
Roychoudhry, Suruchi, P18-662, C15-4, P18-700
Rubalcava, Ruben, P17-556
Ruck, Amy, P17-582
Rudd, Jason, P18-680, P6-144, C18-4, P15-434, S6-3
Rudin, Nicole, P17-569
Ruegger, Paul, P4-116
Rufian, Jose, P17-640
Ruhe, Jonas, P3-75
Rui, Lu, P17-635
Rutten, Twan, P9-258
Rutter, Brian, P18-690
Ryan, Elizabeth, P2-18
Ryan, Patrick, P16-471
Ryazanov, Sergey, P3-75
Rybak, Kasia, P17-585
Ryder, Lauren, S2-1
Ryu, Choong-Min, P9-266, P3-76, P3-77, P3-78, P3-79, P5-127, P5-128
Sabale, Mugdha, P4-115
Sacco, Melanie, P17-599
Sagdieva., Muyassar, P2-54
Sager, Lauren, P17-486
Sahoo, Dipak, P17-495
Sahoo, Manas, P15-426
Sahu, Binod, P17-496
Saijo, Yusuke, P17-641
Saintenac, Cyrille, C18-4, P15-434
Saito, Kirara, P5-129
Saitoh, Hiromasa, P11-368, P17-543, P17-600, P17-626, P9-279, P9-287, C24-4, P17-651
Sakakibara, Hitoshi, P2-51
Sakulkoo, Wasin, P7-205, S2-1
Salazar, Joren, P7-169
Salvucci, Anthony, P12-401, P6-137
Sanchez-Rangel, Diana, P7-200
Sanders, Dale, C21-3, P19-709
Sang, Yuying, P9-285
Sanguankiattichai, Nattapong, P9-303
Sanjay, Saikia, P2-52
Santamaría Hernando, Saray, P3-80
Santos, Mary, P11-374
Sapp, Melanie, P4-117
Sarkar, Abhijit, P4-115
Sarris, Panagiotis, P17-566, C9-6, P17-656, P17-505
Saska, Ivana, P18-676
Sato, Ryusuke, P7-206
Sato, Yoshikatsu, P7-198
Sattely, Elizabeth, C4-3, P3-85
Saucet, Simon, P7-207
Saunders, Diane, P12-395, P4-102, C23-5, P11-393, PL4-4
Saur, Isabel, P17-601, C9-3, P17-653
Sauter, Tobias, P20-721
Savatin, Daniel, C18-1
Saville, Barry, P11-344
Savory, Elizabeth, C21-5, P19-711
Sbeiti, Abed Al Latiff, P11-371
Scalliet, Gabriel, P9-249
Schachtman, Daniel, C10-5, P4-120
Schadt, Christopher, P4-118
Schaefer, Amy, C22-3, P8-230
Schäfer, Wilhelm, P18-660
Schäffer, Milena, P17-602
Schattat, Martin, P7-189, P9-321
Schedel, Sindy, P9-258
Scheel, Dierk, P18-693, P9-276
Scheibel, Katherine, P9-299
Scheikl, Daniela, C23-3, P13-415
Scheler, Björn, P7-174
Scheller, Henrik, P2-39
Schipper, Kerstin, P4-98, P6-147
Schloeffel, Maria, P17-603
Schmeitzl, Clemens, P16-439
Schmidt, Nikola, P17-568, C9-5, P17-655
Schmutz, Jeremy, P14-419
Schnabel, Elise, P2-23
Schneeberger, Korbinian, P15-430
Schneider, William, P9-300
Schneiter, Roger, C20-3, P6-149
Schnepf, Vera, P7-174
Schoelz, James, P7-208, P7-209
Schoina, Charikleia, P9-301
Scholten, Nicola, P16-468
Schornack, Sebastian, P19-704, P2-47, P9-321, C7-3, P1-12
Schots, Arjen, C20-4, P6-150
Schreiber, Karl, P17-556, P17-604
Schroeder, Carsten, P9-235
Schuhmacher, Rainer, P16-439, P7-218
Schüller, Christina, P7-218
Schultheiss, Holger, P20-719
Schultz-Larsen, Torsten, P7-214, C14-3, P10-340
Schulz, Barbara, P1-7
Schulze, Sarina, P17-568, C9-5, P17-655
Schulze-Lefert, Paul, P15-430, P15-431, P17-601, P5-1, PL3-3
Schumacher, Julia, P12-400
Schumacher, Karin, C13-3, P2-61
Schurack, Selma, P7-178
Schuster, Mariana, P11-375
Schuurink, Robert, P16-442
Schwartz, Allison, P9-302
Schweizer, Gabriel, P11-375, P9-275
Schwessinger, Benjamin, P11-376, P17-627, P6-137
Scott, Barry, P2-52
Seabolt, Savanna, P18-681
Sedzielewska Toro, Kinga, P2-48
Segal, Lauren, P7-210
Segretin, Maria, P9-303, C17-5, P9-332
Seguel, Aldo, P16-469, P9-313
Seidl, Michael, P9-298, P9-301, C2-2, P11-388
Seifbarghi, Shirin, C8-5, P12-406
Seitz, Nicholas, P18-683
Sekine, Ken-Taro, P17-624
Selig, Patrick, P16-470
Šemanjski, Maja, P17-603
Senthil-kumar, Muthappa, P17-574
Seo, Eunyoung, P17-605
Sernestrand, Joji Grace, P17-606
Seruga Music, Martina, P11-377, P19-706
Sessa, Guido, P7-201, P9-290, P9-304
Sessitsch, Angela, P4-111
Seto, Derek, P17-607
Shah, Jyoti, P18-673
Shakirov, Zair, P2-54
Shan, Baby, P18-694
Shan, Libo, P17-532, P17-562, P17-608
Shank, Elizabeth, P4-93
Shao, Dandan, P9-305
Shapiro, Lori, C7-5, P1-10
Sharifi, Rouhallah, P3-76
Sharma, Mohit, P9-271
Sharma Poudel, Roshan, P7-211, P9-306
She, Yi-Min, P9-285
Sheikh, Arsheed, P18-691
Shen, Mingzhe, P17-629
Shen, Qian-Hua, P17-647
Shen, Yuanjia, S5-5
Shen, Zhouxin, P17-637
Sher, Andrew, P2-21
Shi, Xuetao, S2-5
Shibata, Arisa, P19-703
Shibuya, Masatoshi, P17-620
Shibuya, Naoto, P17-512, P17-610, P17-620, P17-642
Shidore, Teja, P9-307, C5-2
Shigenobu, Shuji, P2-38
Shih, Wei-Che, P17-609
Shimada, Hikaru, P17-620
Shimamoto, Ko, P17-544
Shimoda, Yoshikazu, C1-4, P2-58
Shin, Ki Hun, P17-540
Shinya, Tomonori, P17-610
Shirakawa, Tomomi, P17-642
Shirasu, Ken, P12-394, P17-541, P17-575, P18-657, P18-676, P19-703, P7-207, PL7-1
Shkedy, Dafna, P11-352
Shrestha, Subidhya, P7-211
Shulse, Christine, P2-49
Sibisi, Phumzile, P17-633
Sibout, Richard, P2-25
Siddique, Shahid, P16-455, P17-611
Siegle, Megan, P17-569
Sikder, Maniruzzaman, P12-403
Singer, Esther, P11-378

AUTHOR INDEX

Singh, Davinder, P17-522, S4-2
Singh, Dharmendra, P17-612
Singh, Karam, P15-428, P18-668, P9-238, S4-3
Singh, Pallavi, P9-240, P9-308
Singh, Prashant, P17-496
Singh, Richard, P16-455
Sirisathaworn, Thanyaluk, P9-265
Sivasithamparam, Krishnapillai, P9-250
Sivitilli, Dominic, P2-53
Skandalis, Nicholas, P20-716
Skelly, Michael, C15-5, P18-701
Skepper, Jeremy, C13-3, P2-61
Skinner, Wendy, S6-3
Sklenar, Jan, P17-541, P7-164, P9-321, P9-322, C9-3, P17-653, C9-6, P17-656
Slootweg, Erik, P17-613
Smakowska, Elwira, P15-429, P17-513, P17-617, C6-3, P14-423, C9-3, P17-653
Smant, Geert, C20-4, P6-150
Smart, Christine, P13-410
Smith, Amy, P6-145
Smith, Damon, P18-689
Smith, John, P17-614, C17-3, P7-226
Smith, Laurie, P17-516
Smith, Oney, P9-300
Smits, Theo, C16-5
Smoker, Matthew, P17-533
Sniezko, Richard, P12-398
Soanes, Darren, S2-1
Sohn, Kee Hoon, P17-615, P17-646
Solanki, Shyam, P17-616, P9-306
Solomon, Peter, P11-379, P17-580, P7-184, S6-6
Soltis, Nicole, C18-5, P15-435
Sømark, Kenneth, P17-565
Somerville, Shauna, P9-299
Someya, Nobutaka, P7-194
Somssich, Imre, P11-359
Sonbol, Fathi-Mohamed, P5-2
Sones, Darren, P9-279
Song, Gaoyuan, P9-319
Song, Geun Cheol, P3-77, P3-78, P5-127, P5-130
Song, Hyeunjeong, P2-50, P2-43
Song, Jikui, P9-284
Song, Junqi, P15-427, P17-614, C17-3, P7-226
Song, Tianqiao, P17-567
Sonti, Ramesh, P13-414
Sooväli, Pille, P18-685
Sorel, Maud, P16-471
Sormany, François, P9-274
Sornaraj, Pradeep, P17-502
Sorroche, Fernando, P2-16
Soudiere, Olivier, P14-417
Speed, Dequantarius, P18-662
Spencer, David, C3-4, P19-712
Sperschneider, Jana, S4-3
Spinelli, Francesco, P3-65, P4-88, P4-89
Spink, John, P4-114
Spoel, Steven, C15-5, P18-701
Spokely, Benjamin, P17-569
Spörhase, Pia, P16-439
Sreedasyam, Avinash, P14-419
Stacey, Gary, P1-3, C13-4, P19-707
Stacey, Minviluz (Bing), C1-6, P2-60
Stadler, Alexander, P16-439
Stahl, Dietmar, P20-721
Stahl, Mark, P17-533
Stam, Remco, C23-3, P13-415
Stamler, Rio, P7-212, P7-216
Standaert, Robert, P17-538
Stanimirovic, Sabrina, P18-692
Staskawicz, Brian, P9-302
Stasko, Anna, P16-473
Steenkamp, Paul, P18-665
Steffenson, Brian, P17-486
Stegmann, Martin, P17-617
Stehlik, Daniel, P9-243
Stein, Nils, P15-430
Steinwand, Michael, P16-474
Stenger, Drake, P7-158
Stephens, Jennifer, P16-450
Stergiopoulos, Ioannis, P12-401, P6-137
Steuernagel, Burkhard, S6-5
Stevens, Danielle, C21-5, P19-711
Stevenson, Clare, P9-287
Stiller, Jiri, P7-156
Stillman, Kyra, P11-369
Stjelja, Suzana, P12-402
Stodghill, Paul, P6-141
Stoll, Thomas, P9-238
Stopka, Sylwia, C13-4, P19-707
Stougaard, Jens, P1-4, P5-1
Strawn, Marcus, P16-474
Strelkov, Stephen, P11-351
Stringlis, Ioannis, P1-2
Strom, Noah, P17-569
Studholme, David, P9-315
Stukenbrock, Eva, PL7-3
Stulemeijer, Iris, P11-357
Stumo, Zach, P20-721
Stumpe, Michael, P9-314
Su, Jing, P17-544
Subramaniam, Rajagopal, P18-677
Sueldo, Daniela, P17-618
Suetsugu, Noriyuki, P9-278
Sukarta, Octavina, P17-613, P17-619
Sukumaran, Sunitha, P9-290
Sumit, Rishi, P17-496
Sun, Guangchao, P7-213
Sun, Jongho, P1-4, C1-5, P2-59
Sun, Tongjun, P16-475
Sun, Ying, P9-309
Sura de Jong, Martina, P4-91
Surana, Priyanka, P11-384, C6-5, P14-425
Sussman, Michael, P11-365
Suzaki, Takuya, P7-198
Suzuki, Maruya, P17-620
Swaminathan, Sivakumar, P17-495
Swanson, Britt, P17-569
Szurek, Boris, P9-240, P9-263, P9-328, C8-4, P12-405
Tabasum, Nadra, P7-164
Tabima, Javier, P11-350, P11-382, C23-4, P13-416
Tacconi, Gianni, P4-89
Takagi, Hiroki, P11-368, C24-4, P17-651
Takahashi, Akihiro, P17-621
Takahashi, Shohei, P17-512, P17-620
Takano, Yoshitaka, P15-431, P17-641
Takeda, Naoya, P2-51
Takeda, Takumi, P17-543
Takemoto, Daigo, P2-52
Takken, Frank, P17-548, P17-596, P17-622, C24-5, P17-652
Talbot, Adam, P11-380
Talbot, Nicholas, P7-205, P9-279, S2-1
Tamayo, Javier, P8-229
Tamo, Fukamizo, P17-642
Tanaka, Aiko, P2-52
Tanaka, Shigeyuki, P9-310
Tang, Dingzhong, P17-635
Tanui, Collins, P7-193
Tao, Xiaorong, P17-623
Tardin, Marie-Claire, P11-371
Tatarinova, Tatiana, P11-371
Tate, Dominique, P18-681
Tateda, Chika, P17-624
Tax, Frans, C9-5, P17-655
Taylor, Greg, P11-344
Taylor, Jemma, P17-505
Taylor, Jennifer, S4-3
Taylor, Kyle, P17-530
Teillet, Alice, P17-614
Teixeira, Marcella, P17-625
Teixeira, Paulo, P17-634, P9-311
Tekete, Cheick, P17-498, S2-3
Telli, Osman, P9-315
Tellier, Aurelien, C23-3, P13-415
Temme, Nora, P20-721
Templeton, Matthew, P17-514
ten Have, Sara, P9-253
Tenhaken, Raimund, P16-455
Teper, Doron, P9-290, P9-304
Terauchi, Akira, P18-696
Terauchi, Ryohei, P11-368, P17-543, P17-600, P17-626, P9-279, P9-287, P9-294, C24-4, P17-651
TerAvest, Dan, P20-715
Terrettaz, Céline, C16-5
Tetyuk, Olena, P4-101, C12-4, P15-436
Thakur, Shalabh, P17-513, C2-4, P11-390
Thao, Amanda, C18-5, P15-435
Thapa, Shree Prasad, P11-381
Thareau, Vincent, C2-1
Theologidis, Ioannis, P20-716
Thevenet, Damien, C15-2, P18-698
Thiébeauld, Odon, C17-4, P9-331
Thiel, Heike, P16-456
Thieron, Hannah, C3-4, P19-712
Thiessen, Nina, P11-344
Thilliez, Gaetan, P9-237
Thomas, Nicholas, P17-627
Thomashow, Linda, P3-81, C4-1
Thomma, Bart, P17-630, P4-107, P9-298, C14-4, P10-341, C2-2, P11-388
Thordal-Christensen, Hans, P7-214, C14-3, P10-340
Tian, Dongsheng, P17-643
Tian, Long, P4-108
Tian, Miaoying, P9-305, P9-312
Tian, Zhendong, P16-450, P9-239
Tiedje, James, P4-112, P4-97
Timilsina, Sujan, C23-2
Timm, Collin, P4-109, P4-113
Timmermann, Tania, P9-313
Tomaz, Juarez, P17-584, P17-628
Tomczynska, Iga, P9-314
Tomita, Reiko, P17-624
Tor, Mahmut, P9-315
Toruño, Tania, P17-629, P18-663
Tosa, Yukio, P17-488
Toth, Katalin, P1-3
Toufexi, Alexia, C17-5, P9-332
Toulotte, Justine, C7-3, P1-12
Tournay, Robert, P2-53
Toyoda, Kazuhiro, P16-464, P17-621, P5-129
Toyota, Masatsugu, C21-3, P19-709
Tran, Tuan Tu, C8-4, P12-405
Tran Minh, Tuan, P9-236
Tran-Nguyen, Lucy, P11-348
Traore, Sy, P17-648
Tregidgo, Nick, P9-288
Tremblay, Arianne, P18-681
Tringe, Susannah, P11-369, P4-118, C10-5, P4-120
Triplett, Lindsay, P17-510, P9-307, C5-2
Trippe, Kristin, C4-5, P3-87
Trippel, Christine, C20-5, P6-151
Trujillo, Cesar, P17-529
Trujillo, Marco, P17-575
Truman, William, P16-458
Tsai, Ching-Hsiu, P7-172, P7-215
Tschaplinski, Timothy,P4-109, P14-421, P2-33, P4-113, C7-4, P1-9
Tsuda, Kenichi, P16-441, P16-453, P17-642
Tuan, Tran, P9-240
Tudzynski, Paul, P7-178, P9-268
Tungadi, Trisna, C16-2, P5-134
Turina, Massimo, P13-413, P7-191
Turnbull, Dionne, P16-450
Turner, Marie, P9-282
Tuskan, Gerald, P14-419, P14-421, P17-554, P2-33, P2-55, P4-113, P4-118, C7-4, P1-9
Tyler, Brett, P19-705, C5-3, P9-333
Tzelepis, Georgios, P6-142
Tzima, Aliki, P20-716
Uauy, Cristobal, C18-4, P15-434, C23-5, P11-393
Uemura, Aiko, P17-600, C24-4, P17-651
Ul-Hasan, Sabah, P2-18
Ullmann, Steffen, C20-5, P6-151
Ulm, Roman, P17-539
Umarov, Bakhtiyor, P2-54
Upadhyaya, Narayana, P17-522, C21-4, P19-710, S4-2, S6-1
Urban, Martin, P9-249, S6-2

Urwin, Peter, P7-155
Usadel, Björn, C15-3, P18-699
Ussery, David, P4-118
Üstün, Suayib, P9-235, P9-241
Uszkoreit, Simon, P7-188
Vaghchipawala, Zarir, S5-5
Vailleau, Fabienne, P9-282
Valdez, Kevin, P17-599
Valkenburg, Dirk-Jan, P17-622
Vallad, Gary, C23-2
Vallat, Armelle, C15-2, P18-698
Valls, Marc, P6-139
Van Butselaar, Tijmen, P17-590
van Damme, Mireille, P17-630
Van de Peer, Yves, P9-251
van den Ackerveken, Guido, P16-442, P16-459, P17-590, P17-622
van den Berg, Grardy, P17-630
van den Burg, Harrold, P16-476, P17-622, P17-631
van der Burgh, Aranka, P6-143
van der Hoorn, Renier, P17-581, P17-606, P6-139
van der Linden, Gerard, P17-638
Van Dijken, Anja, P16-452
van Elsas, Jan Dirk, P4-111
van Hulten, Marieke, P17-631
van Schaik, Casper, C20-4, P6-150
van Schalkwyk, Hester, C23-5, P11-393
van Thiel, Daniela, P9-241
van Verk, Marcel, P1-2, P16-465, P16-452
Van Wees, Saskia, P16-452, P16-467
van Wees, Saskia, P16-465
van't Hof, Pieter, C20-3, P6-149
Varden, Freya, P9-316
Varize, Camila, P4-99
Varrelmann, Mark, P16-456
Varveri, Christina, P20-716
Vassilakos, Nikon, P20-716
Vasudevan, Balaji, S5-5
Vaughan, Martha, P16-477
Ve, Thomas, P17-646
Veach, Allison, P4-118
Vega-Arreguin, Julio, P7-168
VelaArias, Alexis, C11-5, P7-225
Velásquez, André, P16-453, P17-632, P9-324
Veley, Kira, P11-373
Vemanna, Ramu, P17-574
Vemula, Chandra Kaladhar, P17-589
Venables, Barney, P18-673
Venkateshwaran, Muthusubramanian, P2-15
Venter, Eduard, P17-578, P17-633
Venturi, Vittorio, P4-88, C22-3, P8-230
Verbeek, Ruben, P12-403, P16-455
Verbon, Eline, P9-317
Verchot, Jeanmarie, C11-5, P7-225
Verdier, Valerie, P17-498, S2-3
Vereecke, Danny, P7-212, P7-216
Verhoff, Stephanie, P16-448
Verma, Sandhya, P9-335
Verrascina, Ilaria, C18-1
Vertes, Akos, C13-4, P19-707
Vetukuri, Ramesh, P17-570, P6-142
Vickerstaff, Robert, P17-576
Vijayapalani, Paramasivan, P9-318
Vijayaraghavan, Anupama, P11-373
Vilgalys, Rytas, P4-118
Villano, Clizia, P17-511
Vinatzer, Boris, P4-108, C23-1
Vincent, Thomas, C21-3, P19-709
Vion, Patrice, P2-55
Virginie, Gasciolli, P2-25
Visel, Axel, P2-18
Visser, Richard, P17-517, P17-638, P17-485
Vlachakis, Georgios, P16-476
Vleeshouwers, Vivianne, P17-517, P17-638, C20-1, P17-485
Vlot, A. Corina, P18-661
Voegele, Ralf, P9-296
Vogel, Christine, C16-3, P5-135
Vogel, John, P17-557
Voigt, Christian, PL6-3
von Hoyningen-Huene, Avril, P4-101, C12-4, P15-436
Von Wettberg, Eric, P2-26
Vorholt, Julia, C16-3, P5-135
Vossen, Jack, P17-639, P9-321
Wada, Masamitsu, P9-278
Wagstaff, Carol, P11-380
Wakatake, Takanori, P19-703
Walch, Mathilda, P2-16
Walcott, Ron, P11-352
Walker, Gregory, P17-492, P17-604
Walker, Jonathan, P17-569
Walker, Simon, C1-5, P2-59
Walley, Justin, P9-319, C6-5, P14-425
Walsh, Callee, C4-5, P3-87
Wan, Li, P17-634
Wan, Wei-Lin, P17-603, C20-2
Wan, Ying, P17-539
Wang, Bing, P17-495
Wang, Caixia, P18-694
Wang, Changchun, P6-146
Wang, Chao-Wen, P17-609
Wang, Dan, P13-411
Wang, Dong, P2-42, PL4-1
Wang, Gaoyan, P2-18
Wang, Guo-Liang, S2-5, P13-411, P17-635, P18-667, P9-280, PL6-1
Wang, HaiXia, P16-450
Wang, Haonan, P9-326
Wang, Ing-Nang, P13-412
Wang, Jie, P20-715
Wang, Jingyu, P11-359
Wang, Jun, P17-643
Wang, Ken-Der, P17-599
Wang, Lanlan, P17-643
Wang, Lei, P17-636, C20-5, P6-151
Wang, Li, P7-217, P7-217, P9-240, P9-252, P9-308
Wang, Ming, P4-107, C14-4, P10-341
Wang, Mo, P17-635
Wang, Nian, S1-5
Wang, Pauline, P17-513
Wang, Peipei, P3-69
Wang, Peng, P7-175
Wang, Qunqing, P9-326, C5-3, P9-333
Wang, Ruyi, S2-5
Wang, Shumei, P9-239
Wang, Trevor, C1-2, P2-56
Wang, Wenjie, P17-550
Wang, Wenming, P18-684
Wang, Xiaodan, P9-239
Wang, Xiaodong, P11-353
Wang, Xiaofeng, C9-5, P17-655
Wang, Xiaohong, P9-325
Wang, Xiben, P11-344
Wang, Xiue, P18-695
Wang, Yan, P17-567, P9-269, P9-326
Wang, Yang, P17-567, P9-269
Wang, Yaru, P9-285
Wang, Yuanchao, P17-567, P9-269, P9-326, PL6-4
Wang, Yue, P13-411
Wang, Yuqing, P17-547
Wang, Zhilong, P13-411
Wangombe, Mary, P17-611
Warmerdam, Sonja, C20-4, P6-150
Watanabe, Megumi, P16-464, P17-621, P5-129
Waters, Robert, P2-18
Waterworth, Wanda, S5-5
Wawra, Stefan, C20-5, P6-151
Wechter, Patrick, P17-588
Weckwerth, Philipp, P17-637, P18-664
Wei, Hai-Lei, P9-320, P17-569
Wei, Qijian, P10-337
Wei, Yangdou, C8-5, P12-406
Wei, Zhongmin, P17-635
Weiberg, Arne, P4-107, C14-4, P10-341
Weigel, Detlef, P17-494
Weighill, Deborah, P12-397, P14-421
Weir, Bevan, C2-4, P11-390
Weisberg, Alexandra, P11-350, P11-382, P17-554, P4-99
Weller, David, P3-81, C4-1
Wellmer, Frank, P16-471
Welsh, Lydia, P16-450
Wemmer, Josh, P17-569
West, Christopher, S5-5
Westermann, Benedikt, P18-681
Weston, David, P4-113, P5-131
Westphall, Michael, P11-364, P11-365
Westwood, James, C21-2, P19-708
Wetmore, Kelly, P2-18
Weyhe, Martin, P18-693
Whisson, Steve, P9-239
Whitham, Steven, P17-582, P9-289, P9-296
Wiesenberger, Gerlinde, P16-439, P7-218
Wilbers, Ruud, C20-4, P6-150
Wild, David, C6-1
Wildermuth, Mary, P16-460, P16-474
Wiley-Kalil, Audrey, P2-15, P2-20
Wilkins, Katherine, P9-240
William, Vensel, P17-492
Williams, Nari, P13-409
Williams, Simon, P17-502, P17-580, P17-646, P18-659, P9-244, C24-3, P17-650, S6-1, S6-6
Williamson, Valerie, P11-383
Wilson, Daniel, P18-661
Wilson, Mark, P11-373
Wilson, Richard A., P7-192, P7-210, P7-213
Win, Joe, P11-368, P7-164, P9-321
Winlove, Peter, P18-671
Wintermans, Paul, Blank
Wipf, Heidi, P2-39
Wirthmueller, Lennart, P17-566, P9-322
Wise, Roger, P11-384, C6-5, P14-425
Witek, Kamil, S6-5
Withers, John, P16-479, P5-2
Witzel, Katja, P9-235
Woke, Tanja, P11-378
Wolters, Jaap, P17-638
Wong, Joan, P11-385
Wood, Kelsey, P11-385
Woods-Tor, Alison, P9-315
Worley, Jay, P9-245
Wouters, Doret, P17-517
Woyke, Tanja, P11-369
Wrzaczek, Michael, P9-322
Wu, Chih-Hang, P17-639
Wu, Dongliang, P9-312
Wu, Guichun, P7-186
Wu, Jianyan, P17-623
Wu, Jinbin, P6-143
Wu, Yufeng, P11-386
Wulff, Brande, S6-5
Wyatt, Nathan, P9-323
Wylie, Stephen, P9-250
Xia, Ye, P18-694
Xia, Yeqiang, P17-567
Xiang, Yu, P11-386
Xiao, Fangming, P17-550
Xiao, Jin, P18-695
Xiao, Yinghui, P13-411
Xie, Daoxin, C12-2
Xie, Joy, P17-569
Xie, Ke, P9-281
Xie, Xin, P9-280
Xie, Zhen, P20-713
Xin, Xiufang, P9-324
Xing, Liping, P18-695
Xiong, Guangyan, C18-5, P15-435
Xu, Liangsheng, P11-347
Xu, Ruo, P11-384
Xu, Weihui, C6-5, P14-425
Xu, Yi, P12-404, C8-3, S2-2
Xue, Li, P2-32
Xue, Pengya, P17-647
Yadeta, Koste, P17-640, P18-663
Yaegashi, Hiroki, P11-368
Yaeno, Takashi, P18-657
Yagame, Takahiro, P2-38
Yamada, Kenta, P17-642, P18-696
Yamada, Kohji, P17-641
Yamaguchi, Koji, P17-642, P17-644, S2-4, P18-696
Yamaguchi, Takahito, P7-194
Yamakawa, Hiromoto, P16-462

AUTHOR INDEX

Yamamoto, Mikihiro, P16-464, P17-621, P5-129
Yamamoto, Tatsuki, P2-38
Yamanaka, Yurie, P16-464
Yamato, Masahide, P2-38
Yamazaki, Akihiro, C1-4, P2-58
Yan, Qing, P3-82, P5-132
Yan, Shuangyong, P13-411
Yan, Xia, P9-279, S2-1
Yang, Bo, P9-326
Yang, Chao, P16-480
Yang, Cunchun, P16-482
Yang, Dongyong, P20-713
Yang, Fan, P7-220, C17-4, P9-331, C22-5, P8-232
Yang, Hsueh-Hui, P17-561
Yang, Huijun, P9-325
Yang, Jiue-In, P4-116
Yang, Li, P16-481, P17-634, P9-311
Yang, Lina, P16-450
Yang, Xiaobei, P17-643
Yang, Xiaohan, P14-419, P2-55
Yang, Yifan, P20-715
Yang, Yongil, P14-419, C7-4, P1-9, P2-33
Yang, Zamin, P4-113, P4-118
Yanoria, Jeanie, P17-506
Yao, Jian, P16-453, P9-324, P5-2
Yao, Nan, P18-681
Yashima, Kohei, P17-512
Yasuda, Takehiro, P7-196
Ye, Jian, P5-133
Ye, Wenwu, P17-567, P9-269, P9-326
Yeom, Seon-In, P11-367, P17-605
Yiheng, Hu, P11-376
Yin, Zhongchao, P17-643
Yokota, Shinso, P18-697
Yoon, Minsoo, P17-514
Yoshida, Akiko, P19-703
Yoshida, Issei, P17-620
Yoshida, Kentaro, P17-543, P17-626, P9-294
Yoshikuni, Yasuo, P2-18
Yoshimura, Satomi, P17-644
Yoshioka, Hirofumi, P17-644, P18-657
Yoshioka, Keiko, P17-491
Yoshioka, Miki, P17-644, P18-657
Yotsui, Izumi, P18-686
You, Quanyuan, P18-674
Young, Carolyn, C19-2
Young, Jeff, P8-227
Yourstone, Scott, P11-369, P4-110
Yu, Bin, P17-532
Yu, Fengqun, P11-349
Yu, Guotai, S6-5
Yu, Ke, Blank, P9-327, C7-6, P1-11
Yu, Keshun, P18-694
Yu, Neil, P17-535
Zambrano, Leidy, P11-346
Zambryski, Patricia, S5-3
Zamioudis, Christos, P1-2
Zander, Manuel, P11-348
Zapotocny, Ryan, P17-645
Zarate Chaves, Carlos, P9-328
Zechmann, Bernd, P4-98, P7-174, C20-5, P6-151
Zeier, Jürgen, P16-468, P18-658
Zeilmaker, Tieme, P16-442, P16-459
Zeng, Hongyun, P18-681
Zeng, Lirong, P11-387
Zeng, Weiqing, C18-3, P15-433
Zeng, Xuan, P17-643
Zess, Erin, P9-288
Zgadzaj, Rafal, P5-1
Zhai, Keran, P20-713
Zhai, Yi, P9-329
Zhan, Jiasui, P16-450
Zhang, Chong, P18-682, P18-683
Zhang, Chongyang, S2-5
Zhang, Chunquan, P9-289
Zhang, Haifeng, P7-222
Zhang, Jincan, C14-5, P10-342
Zhang, Kai, P17-635
Zhang, Li, C18-3, P15-433
Zhang, Ling, P17-647
Zhang, Li-Qun, P5-124
Zhang, Meixiang, P18-663, P9-330
Zhang, Qi, P17-567
Zhang, Qimeng, P9-330
Zhang, Shujian, P7-167, P9-264, C3-3, P20-717
Zhang, Shuxin, P17-532
Zhang, Ting, S2-5
Zhang, Weiguo, P17-521, P17-564
Zhang, Xiaoxiao, P17-646, C24-3, P17-650
Zhang, Xiaoyun, P3-69
Zhang, Xingguo, P11-349
Zhang, Xuehua, P16-483, P17-595, P17-649
Zhang, Yanli, P13-411
Zhang, Yu, P7-208, P7-209
Zhang, Yuelin, P17-563
Zhang, Zhanyuan, S5-5
Zhang, Zhengguang, P7-222
Zhang, Zhihao, C7-4, P1-9
Zhang, Zhimin, P9-284
Zhao, Bingyu, P17-648
Zhao, Wenyang, P17-623
Zhao, Xin Meng, P17-580
Zhao, Yancun, P7-186
Zheng, Xiaobo, P7-222
Zheng, Yi, P17-542
Zhong, Shaobin, P7-211
Zhong, Xionghui, C9-4, P17-654
Zhou, Bangjun, P11-387
Zhou, Bo, P17-506
Zhou, Man, P16-484
Zhou, Xueping, S2-2
Zhu, Lin, P17-567
Zhu, Min, P17-623
Zinkle, Allen, P4-109
Zipfel, Cyril, P17-511, P17-533, P17-541, P17-611, P17-617, P6-148, P9-324, C9-3, P17-653, C9-5, P17-655
Zodrow, Kristin, P18-662
Zou, Zhongwei, P17-649
Zuccarelli, Rafael, P16-454
Zuccaro, Alga, P2-34
Zupan, John, S5-3

NOTES

NOTES

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