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## Poplar rust dispersal along the Durance River valley: inference of dispersal kernel and consequences

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# Workshop on Evolutionary Dynamical Systems and Applications (EDySA) and Training on Mathematics and Modeling.

From 27 November to 01 December 2023



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## Short summary

The use of mathematics for solving and understanding real-life problems has continued to gain significant momentum.

Governments and research institutions have heightened their focus on providing support tools for decision-making through basic and applied research. Notably, initiatives such as Onehealth and Sustainable Sciences have gained further traction, underscoring the ongoing trend of prioritizing innovative approaches to address pressing global challenges. The workshop takes a leading role in advancing the field of evolutionary dynamical systems, with a primary focus on exploring the latest advancements. Its main objective is to enhance the capabilities of disease control units by fostering fundamental skills. These essential capacities will have practical



## Aims and Scopes

The primary objectives of this workshop are as follows:

- bring together worldwide leaders in the field to encourage their collaboration with young Senegalese researchers;
- share recent developments in applied and theoretical mathematics;
- promote the role of population dynamics models as tools for decision-making including health policies.

Throughout the workshop, we will delve into the realms of mathematical modeling and explore the theoretical tools pertaining to differential equations. The significance of mathematical modeling as a crucial decision-making instrument has grown substantially in recent times and is being increasingly utilized. Distinguished speakers will shed light on the various scenarios in which mathematical models are applied, their defining characteristics, and their contributions to shaping control strategies. Additionally, we will also discuss the limitations of these models. From a theoretical perspective, our focus will encompass difference equations, ordinary differential equations,

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## Organizing committee

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10:00-12:30      **LECTURE 1(2H30)**      *Routine incidence data: how to adjust it to estimate true incidence, and how to use it responsibly (**Oumar Billa**, Northwestern University, USA)*

**12:30-13:30**      **Lunch Break**

**Lunch Break**

13:30-15:45      **LECTURE 2 (2H15)**      *DHS data: what it is, how to extract data, and how to make maps (**Ousmane Diallo**, Northwestern University, USA)*

15 min break

16:00-18:00      **LECTURE 3 (2H)**      *EMOD: what is it, how it can be used (**Mor Absa LOUM**, University Iba Der Thiam de Thiès, Sénégal)*

November 28, 2023 (Tuesday)

09:00-13:00      **LECTURE 4 (4H)**      *Propriétés spectrales autour des opérateurs irréductibles: Applications en dynamique des populations (**Luther Mann**, Université de Yaoundé 1 & Centre for Research in Infectious Diseases, Cameroon)*  
 Include 15 min break

**13:00-14:00**      **Lunch Break**

**Lunch Break**

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November 29, 2023 (Wednesday)

09:00-13:00      [LECTURE 6 \(4H\)](#)      *Exponentielles de matrices, Systèmes différentiels linéaires à coefficients constants et Comportement asymptotique des solutions*(**Ousmane Koutou**, Joseph Ki-Zerbo University, Burkina Faso)  
 Include 15 min break

**13:00-14:00**      **Lunch Break**      **Lunch Break**

14:00-15:15      [LECTURE 6 \(1H15\)](#)      *Exponentielles de matrices, Systèmes différentiels linéaires à coefficients constants et Comportement asymptotique des solutions*(**Ousmane Koutou**, Joseph Ki-Zerbo University, Burkina Faso)  
 15 min break

16:00-17:30      [LECTURE 4 – Next \(1H30\)](#)

*Propriétés spectrales autour des opérateurs irréductibles: Applications en dynamique des populations* (**Luther Mann**, Université de Yaoundé 1 & Centre for Research in Infectious Diseases, Cameroon)

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## Speakers

November 30, 2023 (Thursday)

09:45-10:00

**Opening**

**Opening**

10:00-10:35

**Jaline Gerardin**  
(Northwestern University,  
USA)

*Perennial malaria chemoprevention with and without  
malaria vaccination to reduce malaria burden in young  
children*

10:35-11:10

**Luther Mann** (University of  
Yaoundé 1 & Centre for  
Research in Infectious  
Diseases, Cameroon)

*Balancing effective control of the epidemic outbreak  
and evolutionary management of antimicrobial  
efficiency*

**11:10-11:25**

**Break**

**Break**

11:25-12:00

**Mor Absa LOUM**  
(University Iba Der Thiam de  
Thiès, Sénégal)

*EMOD project modeling transmission and interventions  
in the KKT area*

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15:00-15:35

**Coura Baldé** (African Institute for Mathematical Sciences, Sénégal)*OPV Virus Evolution: Assessing the Risk of cVDPV Outbreak*

15:35-16:10

**Folashade Augusto** (The University of Kansas, USA)*Double Wahala: Modeling the effects of prescribed fire and rising temperature on tick-borne diseases***16:10-16:25****Break****Break**

16:25-17:00

**Frédéric Fabre** (Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement, France)*A mechanistic-statistical approach to infer dispersal and demography from invasion dynamics, applied to a plant pathogen*

17:00-17:35

**Lena Tendeng** (Université Cheikh Anta Diop, Sénégal)*Contrôle optimal appliqué à un modèle épidémiologique*

December 01, 2023 (Friday)



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10:35-11:10

[PhDs session:](#)**Ndeye Khady Gningue** (Ecole Polytechnique de Thiès, Sénégal)**Sylvere Kezeta** (University of Yaoundé 1, Cameroon)**Malick Pane** (University Iba Der Thiam de Thiès, Sénégal)**Fallou Seck** (Ecole Polytechnique de Thiès, Sénégal)**11:10-11:25****Break****Break**

11:25-12:00

[PhDs session:](#)**Khady Ndiaye** (University Iba Der Thiam de Thiès, Sénégal)**Moussa Kane** (Université Cheikh Anta Diop, Sénégal)

12:00-12:35

**Christian Selinger** (Swiss Tropical and Public Health Institute, Switzerland)*Modeling the prospective impact of seasonal malaria chemoprevention in Northern Cote d'Ivoire***12:35-14:00****Lunch Break****Lunch Break**[EXCURSION](#)[EXCURSION](#)