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## Disentangling socio-ecological interactions using geo-tagged photographs

Maxime Lenormand, Patrizia Tenerelli, Sandra Luque

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# Disentangling socio-ecological interactions using geo-tagged photographs

**Maxime Lenormand | Irstea, France**

**Patrizia Tenerelli | Irstea, France**

**Sandra Luque | Irstea, France**

**CCS 2017 | Cancùn, Mexico**

*September 18, 2016*

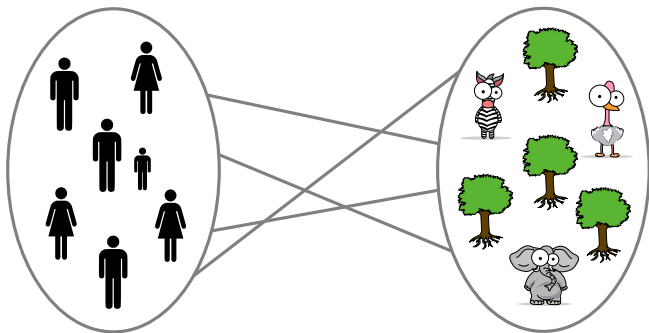


# ALTER-Net High Impact Actions

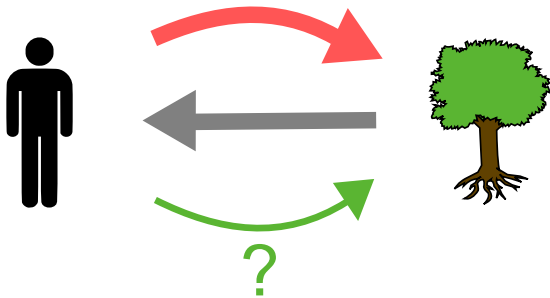


# Motivation

How can we use **ICT data** to model and visualize **complex socio-ecological interactions** to better understand how **people** interact with **natural spaces**?



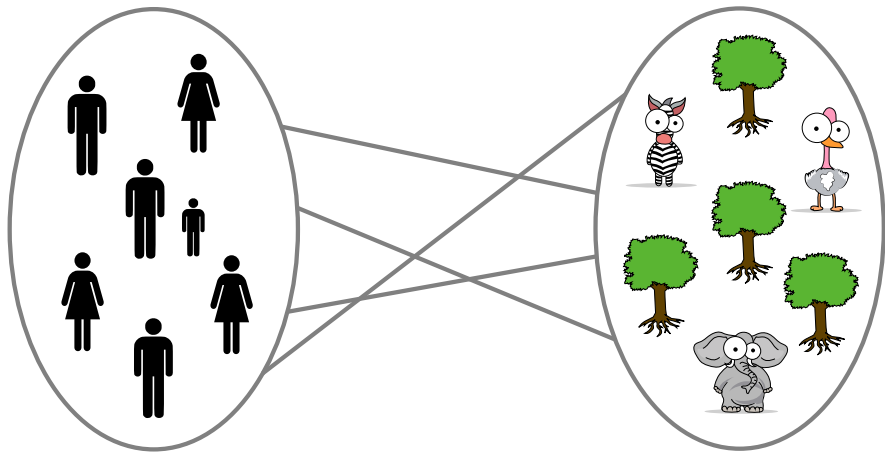
# Cultural ecosystem services



"Nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences"

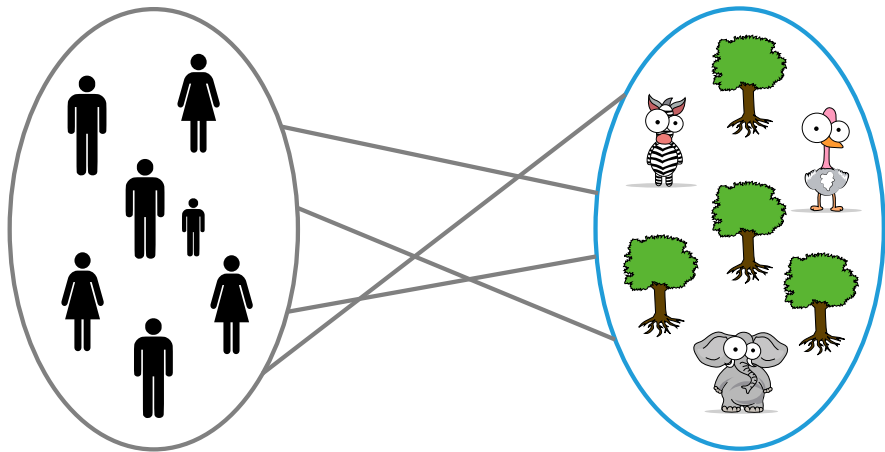
**Millennium Ecosystem Assessment** (2005) *Ecosystems and Human Well-Being: Synthesis*. Island Press, Washington.

# Spatio-temporal network



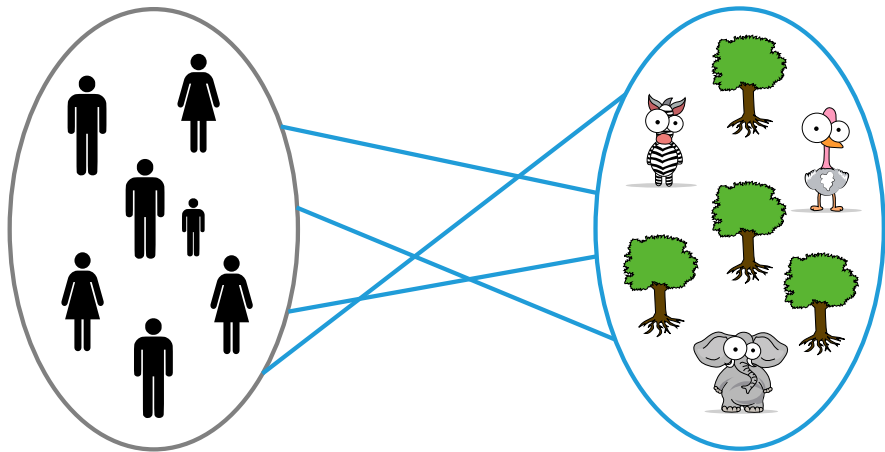
$\Delta_t$  Time window

# Spatio-temporal network



$\Delta_t$  Time window

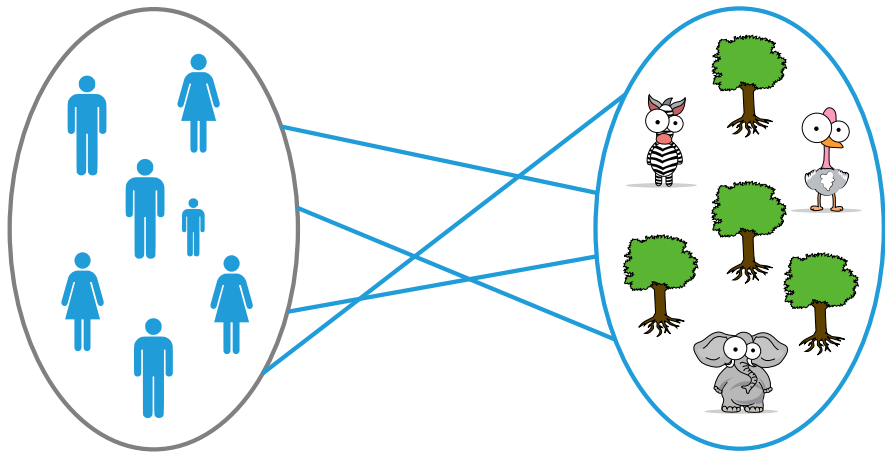
# Spatio-temporal network



$\Delta_t$  Time window

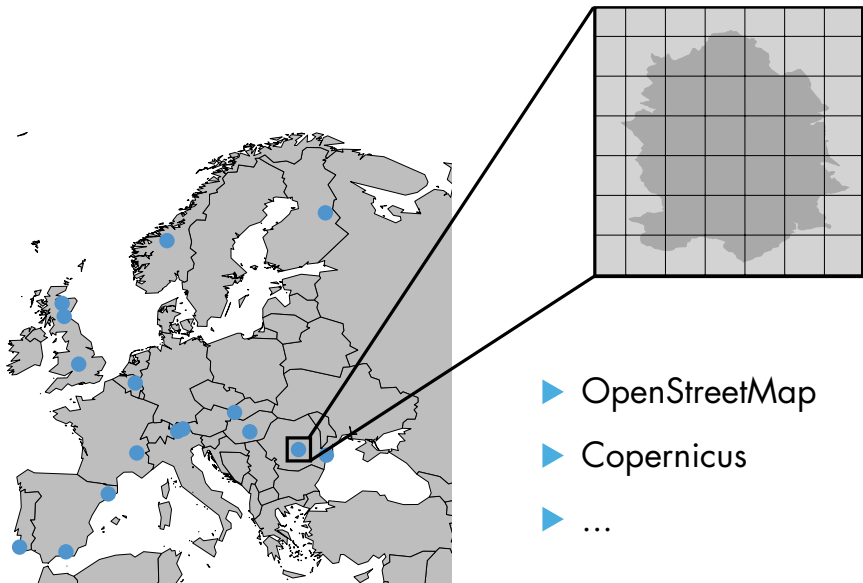


# Spatio-temporal network




$\Delta_t$  Time window


# Ecosystems



# Modeling CES flows using Flickr

flickr Explore Create  Sign In [Sign Up](#)



 eMammal [+ Follow](#)

PRO eMammal 219 Followers • 3 Following 206,458 Photos Joined 2010

Photostream

Albums

Favorites

Groups

More ▾



# Cultural ecosystem services

From more than **100,000** to **17,500** photos

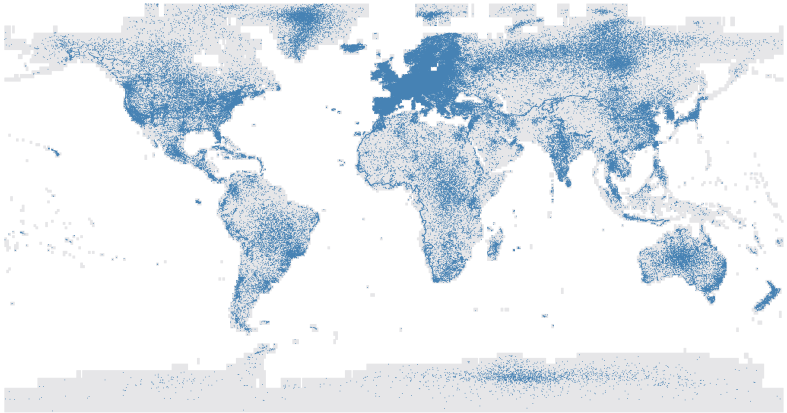


Every Flickr photos has been classified and validated following the Common International Classification of Ecosystem Services



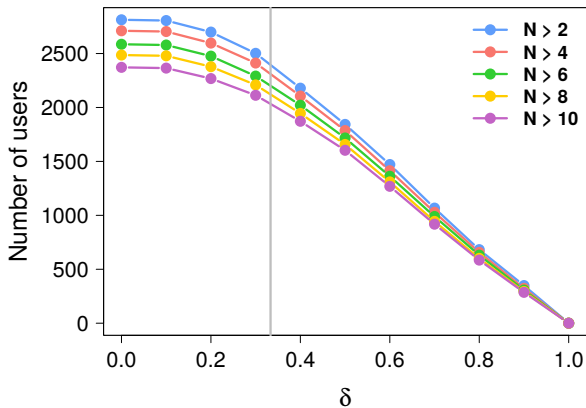
# Flickr users

Identification of users' place of residence



# Flickr users


## Identification of users' place of residence




**13,000** photos taken by **2,300** users

# Flickr group & survey

flickr Explore Create  Log In [Sign Up](#)



 Help us to protect the environment! [+ Join Group](#)

416 Members • 5.8K Photos • 3 Discussions Group Since June 11, 2017

[Overview](#) [Discussions](#) [Photos](#) [Members](#) [Map](#)

## Photo pool

[View 5,800 photos](#)

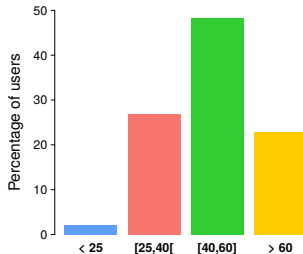
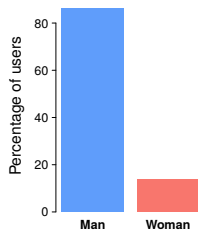
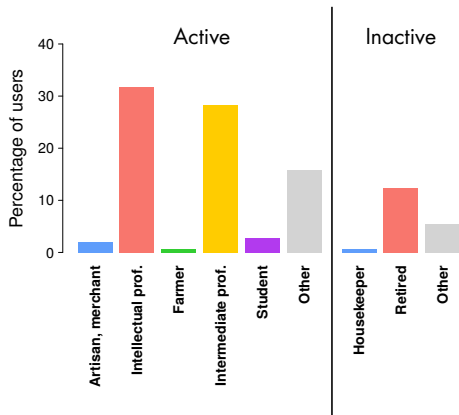


## Discussions

Title	Author	Replies	Last Replier	Latest Post
<a href="#">Clarification about the study</a>	<a href="#">SP.Pictures</a>	4	<a href="#">Fouaustral</a> <span>PRO</span>	2 months ago
<a href="#">ⓘ</a>	<a href="#">joepdeumes</a> <span>PRO</span>	2	<a href="#">joepdeumes</a> <span>PRO</span>	3 months ago
<a href="#">FAQ</a>	<a href="#">SP.Pictures</a>	3	<a href="#">SP.Pictures</a>	3 months ago

# Flickr group & survey

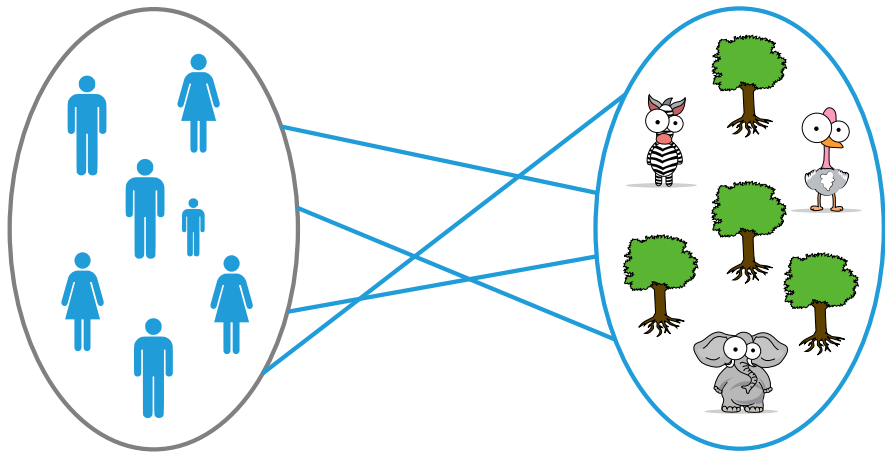
**8% response rate**



**90% of accuracy in the users' place of residence detection!**

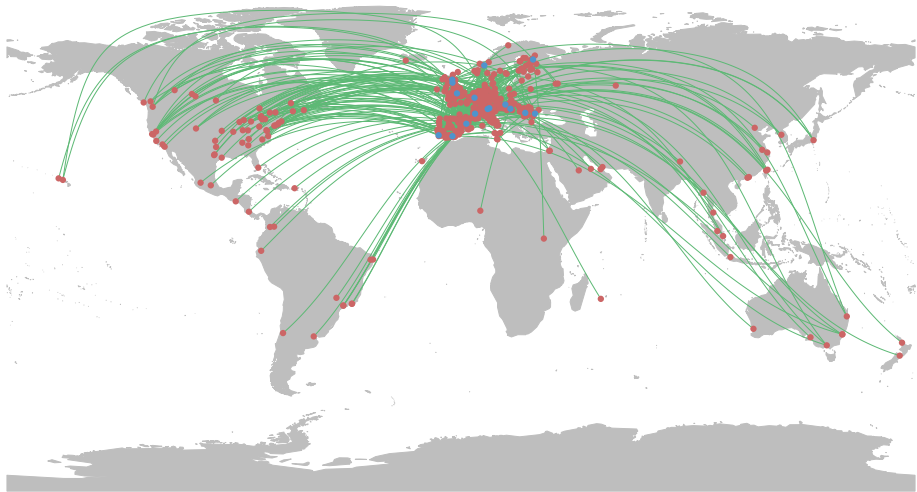


# Spatio-temporal network



$\Delta_t$  Time window

# Spatio-temporal network



# Take home messages

- ▶ Modelling of social-ecological interactions with a spatio-temporal network & ICT data

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**Diversity of spatio-temporal contexts,  
individuals and CES**

# Take home messages

- ▶ Modelling of social-ecological interactions with a spatio-temporal network & ICT data

**Diversity of spatio-temporal contexts,  
individuals and CES**



**Resilience planning**

# Take home messages

- ▶ Modelling of social-ecological interactions with a spatio-temporal network & ICT data
- ▶ Strong emphasis on the biases and uncertainties associated with Flickr data

# Acknowledgements

