

## Next Generation Data Management in Movement Ecology

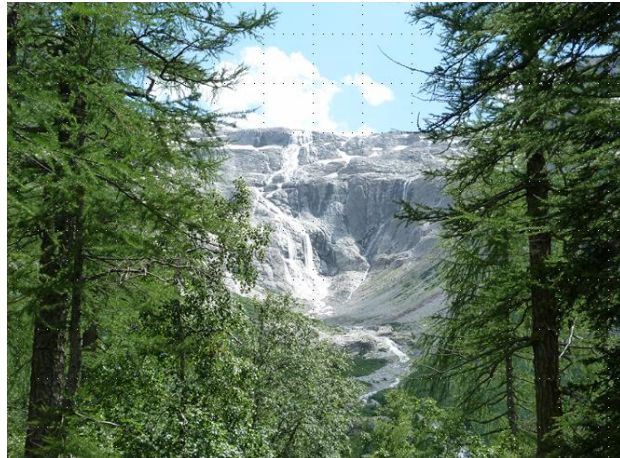
**Organizer:** Francesca Cagnacci, Biodiversity and Molecular Ecology Dept., Research and Innovation Centre, Fondazione Edmund Mach

**Teachers:** Ferdinando Urbano (database consultant, Italy), Francesca Cagnacci (FEM - Italy), Mathieu Basille (University of Florida, USA), Anne Berger (IZW, Germany), Hamish Campbell (University of New England, Australia), Timothy Giles (SLU, Sweden), Sarah Davidson (Movebank), Antonio Galea (database consultant, Italy), Duccio Rocchini (FEM, Italy).

**Venue:** The Campus at Fondazione Edmund Mach, via Mach 1, San Michele all'Adige, Trento, Italy: between mountains and vineyards (<http://www.fmach.it/eng>)

**Dates:** I module (Introduction to Spatial Databases): **July 1-3 2015**; II module (Wildlife Tracking Data Management): **July 6-10 2015**.

**Format:** An intense, two stages-course, with a mix of technical and theoretical lectures and, hands-on exercises and special topic lectures. The first module (three days) will provide an introduction to spatial databases and SQL (using PostgreSQL/PostGIS as reference database system). The second module (five days) will focus onto wildlife tracking data management, with ample reference to use and integration of remote sensing datasets, and statistical analysis through R. The two modules can be joined independently, or in combination. Basic knowledge of SQL and spatial databases is however essential to follow the second part.



**Participation:** This course is open to all PhD and MSc students. Participation of post-docs, researchers, technicians and managers is also fostered. There will be room for a maximum of 20 PhD students from the IRSAE network and 15 attendees outside the network, so strong competition for attendance is expected.

The courses are supported by the International Research School in Applied Ecology (IRSAE [www.irsae.no](http://www.irsae.no)). **Fees and costs** are therefore:

**IRSAE participants-** Fees, board and lodging are covered for participants from IRSAE partners, who may also apply for a mobility grant to cover travel costs, after admission to the course (see application form at (<http://irsae.no/grants/>)).

**No IRSAE participants- Students:** I module: 50 €; II module: 90€. **Researchers/Managers:** I module: 80€; II module: 120€. Food and lodging in the campus can be booked at 80 €/day. Alternative lodging possibilities are available in the area.

**Evaluation and Credits:** ECTS credits will be assigned, after positive grades in a final exam.

**Registration:** Email the application form (**email subject:** Data Management School 2015), containing a brief description of your PhD project and description of the relevance of the course to your research, along with a CV to Francesca Cagnacci ([francesca.cagnacci@fmach.it](mailto:francesca.cagnacci@fmach.it)) or Lucrezia Gorini ([lucrezia.gorini@hihm.no](mailto:lucrezia.gorini@hihm.no)). **Deadline: April 30, 2015. Notification of acceptance: May 15, 2015**

**More and upcoming info/material on:**

- <http://www.fmach.it/CRI/education/Next-Generation-Data-Management-in-Movement-Ecology>
- <http://irsae.no/courses-conferences-and-workshops/upcoming-courses>

**Scientific content:**

The advancement of a movement ecology theoretical framework has been paralleled by technological progress that allows ecologists to obtain a huge amount and diversity of empirical animal movement data sets. In addition to the increasing spatial and temporal resolution and size of datasets available from tagging technology, locations of animals come with complex associated information related to the environmental context, such as population density, weather, habitat types and vegetation indexes based on remote sensing. However, this fast-growing process has not been followed by an equally rapid development of procedures to manage and integrate animal movement data sets, thus leaving a gap between the acquisition of data and the overarching scientific questions. This two-stage course is designed to support this process: what to do with these data? How to handle, manage, store and retrieve them, and how to eventually feed them to analysis tools? In the first module of the course, participants will be exposed to basics of spatial databases, the reference technology for data management, and SQL Language. Then, the second part will focus on the specific requirements of wildlife data, and specifically wildlife tracking data and related information. General topics of interest in tracking data management will be also discussed, such as use of remote sensing data, concept of landscape variability, big data, dissemination of information on the web and data sharing. Last but not least, we will consider how database can interface with statistical tools, such as those provided by R Programming language.

**Summary course schedule (more info on the websites):**

Introduction to Spatial Databases	Tue, 30 <sup>th</sup> June	Afternoon: arrivals at FEM, San Michele all'Adige
	Wed, 1 <sup>st</sup> July	General introduction to relational databases and spatial databases SQL Language and basic querying applications
	Thu, 2 <sup>nd</sup> July	Advanced SQL querying and problem solving
	Fri, 3 <sup>rd</sup> July	Case studies, interactive querying
Wildlife Tracking Data Management	Sun, 5 <sup>th</sup> July	Afternoon: arrivals at FEM, San Michele all'Adige
	Mon, 6 <sup>th</sup> July	Requirement analysis of wildlife tracking data management Creation of a wildlife tracking database on PostgreSQL/PostGIS Extending the database with other meta-information
	Tue, 7 <sup>th</sup> July	From data to information: associating locations to animals Integration and management of spatial ancillary information Disseminating data on the web: review of the main available tools
	Wed, 8 <sup>th</sup> July	From locations to steps: the movement trajectory How to extract environmental information related to location data Data quality: how to detect and manage outliers
	Thu, 9 <sup>th</sup> July	Integrating animal's activity with tracking data Movement ecology and landscape variability Data sharing and dissemination
	Fri, 10 <sup>th</sup> July	Analyze movement data in a statistical environment: R