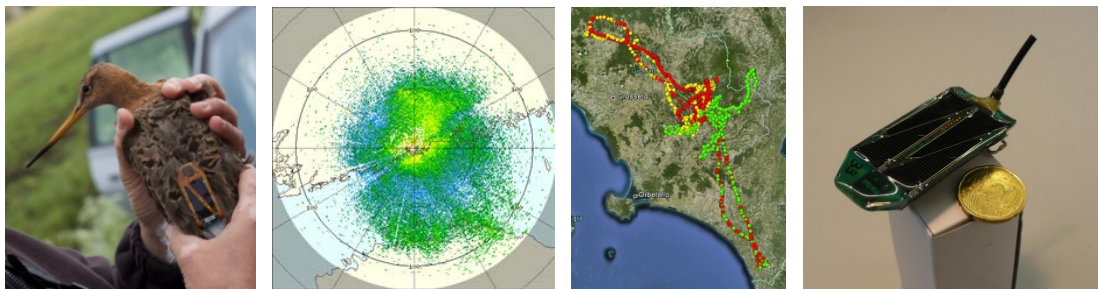


## Summer Course Animal Movement Analysis

### 2-7 July 2017, Amsterdam

The aim of this course is to provide participants with skills to assist them in working with animal movement data including data management and organization, working with large tracking datasets, data exploration, visualization and analysis of movement data. The course content is relevant for participants studying movement in a broad range of taxa and environments, however there is an emphasis on birds in the course exercises (based on an existing set of bird tracking data) and most guest lectures. Participants will learn about the strengths and weaknesses of different tracking technologies for diverse taxa in terrestrial and marine environments. The course will combine several guest lectures from international experts, predominantly hands-on computer work, field experiments, presentations given by participants and focal workshops on the last day of the course. During the course different software packages will be used with most of the work conducted in R, and participants will learn some basic programming and database skills. Course participants are expected to familiarize themselves with R before the beginning of the course, and materials for self-tuition will be provided in advance..



The target group of this course is scientists at the PhD level, with a background in ecology, however MSc students and Postdocs or other researchers interested in attending are welcome to contact us. The course is limited to a minimum of 25 and maximum of 35 participants. In case of too many applications, candidates will be selected according to the following criteria a) scientific motivation and research topic(s), b) time of application, and c) geographic distribution. Participation in the course will be confirmed by 15 May 2015.

**Guest speakers and workshop instructors:** Giacomo Dell’Omo<sup>1</sup>, Silke Bauer<sup>2</sup>, Felix Liechti<sup>2</sup>, Grant Hopcraft<sup>3</sup>, --  
<sup>1</sup>Animal Tracking, TECHNOSMART, Italy <sup>2</sup>Swiss Ornithological Institute, Switzerland, <sup>3</sup>University of Glasgow, UK

#### Course coordinators

Judy Shamoun-Baranes, [Shamoun@uva.nl](mailto:Shamoun@uva.nl), Computational Geo-Ecology, University of Amsterdam  
 Willem Bouten, [w.bouten@uva.nl](mailto:w.bouten@uva.nl), Computational Geo-Ecology, University of Amsterdam

#### Course instructors

Judy Shamoun-Baranes, Willem Bouten, Wouter Vansteelant ([W.M.G.Vansteelant@uva.nl](mailto:W.M.G.Vansteelant@uva.nl)), Emiel van Loon ([E.E.vanloon@uva.nl](mailto:E.E.vanloon@uva.nl)) Computational Geo-Ecology, University of Amsterdam

**Course registration:** Complete the online registration form: <https://www.pe-rc.nl/postgraduate-courses/AMA> . Contact Claudius van de Vijver (PE&RC) ([claudius.vandevijver@wur.nl](mailto:claudius.vandevijver@wur.nl)) in case of difficulties. Registration deadline is 1 May 2015.

**Options for accommodations:** Accommodation is not included in the fee of the course, but there are several possibilities in Amsterdam. Options in the vicinity of the University of Amsterdam are: [Casa 400](#) / [Hotel V](#)

**Credits:** 2 ECTS

**Course wiki:** xxx

## Prerequisites

During the course participants will be using different software packages. To be able to follow the exercises, participants will be expected to be familiar with R (beginner level) and SQL (structured query language). Short tutorials will be provided for SQL as well as R which participants must review before the course if they are not familiar with these scripting languages.

## Tentative course schedule

*L = lecture, C = computer exercise, D = group discussion, F = field work*

The course will be conducted in Science Park 904, 1098 XH Amsterdam. The lectures and computer exercises will be held in room F 2.04.

### Sunday evening,

**Meet and greet dinner and ice breaker poster session**

### July 2

*(time and location to be determined)*

### Monday, July 3

**Software: SQLiteStudio, R**

9:30 – 10:00	F 2.04	Arrival and coffee
10:00 – 10:30	L	<b>Opening and brief introduction</b> , <i>Judy Shamoun-Baranes and Willem Bouten</i>
10:30 – 12:00	L	Introduction to course dataset & working with databases, <i>Judy Shamoun-Baranes</i>
	C	Working with a relational database: exploration and management of movement data, selecting, filtering and aggregating data
12:00 – 13:00	Oerknal	Lunch break
13:00 – 14:00	L F 2.04	<b>Navigating between food and predators: movement and population regulation of Serengeti herbivores</b> , <i>Grant Hopcraft</i> .
14:00 – 14:30	C	Working with databases continued
14:30 – 15:00	L	Introduction to exercise: calculating basic movement statistics and visualizing data in R. <i>Wouter Vansteelant</i>
	C	Calculating basic movement statistics in R: distance, speed, angle
15:00 -15:30		<i>Coffee break</i>
15:30 – 17:00	C	Continue exercises. Calculating basic movement statistics in R Visualizing data in R: scatter plots and histograms
17:00 – 18:00		Drinks

**Tuesday, July 4**

**Software: R, Google Earth**

9:00 – 9:15			Coffee
9:15 – 10:15	L	F 2.04	<b>Fundamentals of GPS tracking and other bio-logging sensors applied to the study of animal movements, <i>Giacomo Dell’Omo</i></b>
10:30 – 11:00	L		Interactive introduction to experiment: Working with GPS loggers, <i>Willem Bouten</i>
11:00 – 13:00	F		Experimenting with GPS loggers including lunch break: pick up bagged lunch at Oerknal
13:15 – 14:15	L	F 2.04	<b>The role of timing in migratory animals linking communities world-wide. <i>Silke Bauer</i></b>
14:30 – 15:00	C		Visualizing GPS data (trajectories, summary plots) and exploring GPS performance characteristics
15:00 – 15:30			<i>Coffee break</i>
15:30 – 16:30	C		Continue exercises
16:30 - 17:15	D		Student presentations of experiment results and group discussion
17:15 – 18:00			Drinks

**Wednesday, July 5**

**Software: R, SQLiteStudio**

9:00 – 9:15			Coffee
9:15 – 10:15	L	F 2.04	<b>How internal and external factors shape migration strategies among soaring birds, <i>Wouter Vansteelant</i></b>
10:30 – 10:45	L		Introduction to exercise: Integrating environmental data and animal movement data, <i>Wouter Vansteelant</i>
10:45 – 12:00	C		Integrating environmental data with tracking data in R
12:00 – 13:00		Oerknal	Lunch (+ group photo)
13:00 – 14:00	L	F 2.04	<b>Monitoring biomass in the aerosphere by radar and relating it daily flight patterns of individuals, <i>Felix Liechti</i></b>
14:00 – 15:00	C		Integrating environmental data with tracking data in R & time budget analysis
15:00 – 15:30			<i>Coffee break</i>

15:30 – 17:00	<b>C</b>	Continue exercises
17:00 – 18:45		Drinks & pizza dinner
19:00 – 20:00		Special activity: active movement workshop
		Location: <b>Studio xx</b> , University Sports Center

**Thursday, July 6**

**Software: R, SQLiteStudio**

9:00 – 9:15		Coffee
9:15 – 10:15	<b>L F 2.04</b>	<b>Movement strategies of a generalist seabird, <i>Judy Shamoun-Baranes</i></b>
10:20 – 12:00	<b>L</b>	<b>Introduction to exercises: home range analysis and utilization distributions, <i>Emiel van Loon</i></b>
	<b>C</b>	Calculating home ranges, utilization distributions, core areas and areas of intensive use: exercise in R
12:00 – 13:00		Lunch break
13:00 – 13:30	<b>C</b>	Continue Calculating home ranges, utilization distributions, core areas and areas of intensive use
13:30 – 14:00	<b>L</b>	<b>Taking it one step further: from animal space use descriptions to ecological and behavioural inferences, <i>Emiel van Loon</i></b>
14:00 – 15:00	<b>C</b>	Group-work to conduct habitat preference/avoidance analysis
15:00 – 15:30		<i>Coffee break</i>
15:30 – 16:00	<b>D</b>	Continue exercise
16:00 – 17:00	<b>D</b>	Participant presentations and discussion led by Emiel van Loon
17:00		Travel to restaurant
18:00		Group dinner – Restaurant Bazar, Amsterdam

## **Friday, July 7**

9:00 – 9:15		Coffee
9:15 – 10:15	L F 2.04	Using accelerometers to study behaviour, <i>Willem Bouten</i> (interactive lecture)
10:15 – 10:40	L	Brief introduction to workshops (instructors)
10:40 – 10:55		Break & time to select workshop
11:00 – 12:00	C	Workshops:
	C Room?	1. Analysis of geolocation data including analysis of data collected prior to course (Felix Liechti)
	C Room?	2. Visualizing tracking data with CartoDB (Judy Shamoun-Baranes)
	C GIS STudio	4. Annotating and classifying accelerometer data (Willem Bouten)
	C F 2.04	5. Working with Brownian Bridges (Emiel van Loon)
	C Xxx	6. Attachment techniques for bio-loggers (Giacomo Dell’Omo)
12:00 - 13:00		Lunch break
13:00 – 15:30	C	Group projects continued
15:30 – 16:30	D F 2.04	Student presentations & course evaluation
16:30 – 17:00		Closing drinks

### **Course instructors & guest speakers:**

**Judy Shamoun-Baranes, Willem Bouten, Emiel van Loon, Wouter Vansteelant:**

Computational Geo-Ecology, IBED, University of Amsterdam, The Netherlands

<http://www.science.uva.nl/ibed-cge>

**Silke Bauer:** Swiss Ornithological Institute, Switzerland

**Giacomo Dell’Omo:** Animal Tracking, TECHNOSMART, Italy, <http://www.technosmart.eu/>

**Grant Hopcraft:** University of Glasgow, UK

<http://www.gla.ac.uk/researchinstitutes/bahcm/staff/granthopcraft/>

**Felix Liechti:** Swiss Ornithological Institute, Switzerland