# AniMove 2024

Day1

- **Movement Analysis** (*Kamran Safi, Martina Scacco, Anne Scharf*)
  - Introduction into movement data collection
  - Defining movement, space and time. Projections, intro to SF and time zones.
  - Introduction to Move2: load, manipulate & export movement data
  - Data visualization
  - Properties of Movement: track metrics (time lag, distance, speed, azimuth and turning angle). Outliers. Interpolation & thinning and consequences on track metrics.

Day2

- **Movement Analysis** (*Kamran Safi, Martina Scacco, Anne Scharf*)
  - Trajectory Centered Analysis: Net square displacement, fist passage time, recursion, variance components of movement (variance of dBBMM)
  - Movement models: Discrete movement models (white noise, random walk, autoregressive walk, corr random walk, markov chain) and continuous time movement models (white noise, brownian motion, OUP, CVM, OUF) (*by Eliezer Gurarie*)
  - Segmentation: FPT, Lavielle, BCPA (with smoove), Multi-state random walks (with momentuhmm), range-shift estimation (with marcher), hierarchical migration models (with TuktuMigration) (*by Eliezer Gurarie*)
  - Area centered analysis: overview of space use estimators (MCP, kernel density estimators, LoCoH, UD of dBBMM)

Day3

- **Continuous time movement models (ctmm)** (*Christen Fleming, Ines Silva*)
  - Autocorrelation and continuous-time movement models
  - Home-range estimation
  - Home-range meta-analysis
  - Population-range estimation
  - Occurrence distributions
  - Experimental design of animal tracking
  - Measures of interaction
  - Continuous-time speed and distance estimation

Day4

- **Remote sensing** (*Ines Standfuss*)
  - Introduction to remote sensing (theory)
  - Remote sensing practical unit
    - Download and get a first glimpse of satellite images
    - Some preprocessing tasks for satellite images
    - Raster data manipulation (generate higher-order information layers)
    - Vegetation phenology based on remote sensing time series

- **Environmental annotation** (*Elham Nourani*)
  - Introduction of wind components
  - Introduction and demonstration of Env-Data service on Movebank
  - Downloading ECMWF data directly in R
  - Annotating tracks with dynamic environmental data (e.g. of wind) in R
  - Plotting annotated tracks two ways + creating an animation

- **Auxiliary sensors** (*Hannah Williams*)
  - Introduction to inertial measurement units
  - Resolving posture from static acceleration component
  - calculation of Dynamic Body Acceleration metrics for activity
  - classification of behaviour using DBA, orientation, and pressure
  - deadreckoning procedure

Day5

- **Resource selection function** (*Björn Reineking*)
  - RSF as a model of range distribution (third-order selection)
  - RSF: habitat selection and geographic availability
  - Inhomogeneous Poisson point process likelihood and temporal autocorrelation
  - Selection: use-availability in geographic and environmental space
  - (Numerical integration)
- **Step selection function** (*Björn Reineking*)
  - SSF as a discrete-time model of movement
  - SSF: habitat selection and movement kernel (geographic availability)
  - Numerical integration in SSF
  - SSF and simulation of trajectories
  - Ecological realism in SSF: temporal variation of selection and movement; home-ranging; barriers; long-term goals