

# Practicals & tutorials

Below you will find links to practicals & tutorials covering a range of topics and Tag Tools. The practicals and tutorials are designed to introduce and familiarise users with a number of different tools and concepts by using worked examples and case studies from marine and terrestrial ecosystems.

## (1) Practical 1: Data processing and visualization

Mark Johnson & Stacy De Ruiter

### Learning objectives

1. Gain confidence with using the tagtools to load, plot and process data.
2. Gain understanding of different data representations in the tagtools: vectors vs sensor structures, raw vs corrected.
3. Learn how to use the tools to quantify aspects of behaviour.
4. Learn how to compute and evaluate data quality metrics for 3d field sensors.
5. Learn how to derive orientation from acceleration and magnetometer.
6. Compute and visualize a dead-reckoned track while appreciating some of the sources of error.

### Download:

Practical 1 for Matlab & Octave users

Practical 1 for R users

## (2) Practical 2: Signal processing, filters, specific acceleration & postural dynamics

Mark Johnson & Stacy De Ruiter

### Learning objectives

1. Become familiar with plotting and interpreting movement data in the frequency domain.
2. Use spectrograms to locate intervals with periodic movement.
3. Use spectral averages to characterise movements.
4. Continue developing techniques for checking data quality and ameliorating problems.
5. Learn how filters can be used to emphasise different features of movement data.
6. Learn how to characterise propulsion movements using ODBA and MSA.
7. Gain an understanding of how filtering and appropriate sampling rates can help in detecting transient events such as prey capture attempts.

### Download:

Practical 2 for Matlab & Octave users

Practical 2 for R users

### (3) Practical 3: Tracks, pseudo-tracks, dead-reckoning and track reconstruction

**Mark Johnson & Tiago Marques**

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This practical explores tracking data from GPS and dead-reckoning. Increasing numbers of tags now include a GPS to collect positional information. These consume a lot of power and only obtain a position when the animal is at the water surface and can be affected by over-covering structures such as trees. As a result, GPS positions are often sparse and irregularly sampled, leaving open the question of how animals move inbetween these positions. In this practical, you will explore this by merging GPS and dead-reckoned tracks. With the GPS data, you will convert latitude and longitude data to a local level plane and compute some track statistics. You will then try some methods to dead-reckon a track from accelerometer and movement data. You will use a simple track fitting method to reconcile the GPS and dead-reckoned tracks, and examine errors.

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**Download:**

Practical 3 for Matlab & Octave users

Practical 3 for R users

### (4) Practical 4: Event detection, classification & statistics

**Stacy De Ruiter & David Sweeney**

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The practical (like all the ones before it!) contains more exercises than you are likely to be able to complete in the time available, but each section is designed to be relatively stand-alone, so please feel free to pick and choose the topics that are most interesting to you. Data are provided for each example, but please feel free to try to incorporate your own data as time and ambition allow. Many of the statistical analyses are much easier to do in R. This is because packages to do much more sophisticated stats are available, and they are better documented (i.e. you can determine exactly what they are doing with 1 the data and what the output means!). The tasks that I don't know how to do in Matlab are clearly marked and no Matlab code is given for them (although you are welcome to try to figure out a way!)

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**Download:**

Practical 4 for Matlab, Octave & R users

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