

# Astrostatistics & data mining

**Invited Lecturers:**     **Dan Foreman-Mackey** (University of Washington)  
                                  **Daniela Huppenkothen** (New York University)  
                                  **Robert Lupton** (Princeton University)  
                                  **Benjamin Wandelt** (IAP, Paris)

**SOC:**                       Coryn Bailer-Jones (MPIA, Heidelberg)

## **School program:** Lectures, Exercises, Science talks

### *Monday, September 12<sup>th</sup>, 2016*

08:30 - 13:30 Registration

09:45 - 10:15 Welcome, organisational remarks

10:15 - 11:00 Bayesian fundamental (lect+exer) (*Benjamin Wandelt*)

11:00 - 11:45 Bayesian fundamental (lect+exer) (*Benjamin Wandelt*)

11:45 - 12:30 Bayesian fundamental (lect+exer) (*Benjamin Wandelt*)

12:30 - 14:00 Lunch

14:00 - 14:30 Stellar spectroscopy with Gaia - The Big Data challenge (*René Andrae*)

14:30 - 15:15 Principles & practice of MCMC (*Dan Foreman-Mackey*)

15:15 - 15:45 Coffee break

15:45 - 16:15 Help with software set-ups

16:15 - 17:00 Bayesian hierarchical models (*Dan Foreman-Mackey*)

17:00 - 17:45 Exercises (*Dan Foreman-Mackey*)

### *Tuesday, September 13<sup>th</sup>, 2016*

09:00 - 09:45 Bayesian & frequentist hypothesis testing (*Daniela Huppenkothen*)

09:45 - 10:30 Counting statistics (*Daniela Huppenkothen*)

10:30 - 11:00 Coffee break

11:00 - 11:45 Image formation and source detection (*Robert Lupton*)

11:45 - 12:30 Issues and good practice in image processing (*Robert Lupton*)

12:30 - 14:00 Lunch

14:00 - 14:30 Squeezing information out of weak lensing surveys and getting it wrong (*Björn-Malte Schäfer*)

14:30 - 15:15 Statistics in large scale structure (lect+exer) (*Benjamin Wandelt*)

15:15 - 15:45 Coffee break

15:45 - 16:15 The first Gaia data release (*Coryn Bailer-Jones*)

16:15 - 17:45 Exercises (*Daniela Huppenkothen*)

16:15 - 17:30 Exercises (*Robert Lupton*)

18:00 - 19:30 Social dinner at MPIA

19:30 - 21:30 Discussion of school exercises; Gaia data release I and II

### ***Wednesday, September 14<sup>th</sup>, 2016***

09:00 - 09:45 Issues with real data (*Dan Foreman-Mackey*)

09:45 - 10:30 Statistics in large scale structure (lect+exer) (*Benjamin Wandelt*)

10:30 - 11:00 Coffee break

11:00 - 12:30 Statistics in large scale structure (lect+exer) (*Benjamin Wandelt*)

12:30 - 13:30 Lunch

14:00 - 18:00 Excursion: Castles of Neckarsteinach – Hiking , boat trip on the Neckar

### ***Thursday, September 15<sup>th</sup>, 2016***

09:00 - 09:45 Interpolation and smoothing (*Robert Lupton*)

09:45 - 10:30 Wiener filters and the like (*Robert Lupton*)

10:30 - 11:00 Coffee break

11:00 - 11:45 Time series: Fourier methods (*Daniela Huppenkothen*)

11:45 - 12:30 Time series: stochastic processes (*Daniela Huppenkothen*)

12:30 - 14:00 Lunch

14:00 - 14:30 An empirical view of star cluster dissolution through hierarchical modelling (*Morgan Fouesneau*)

14:30 - 15:15 Exercises (*Robert Lupton*)

15:15 - 15:45 Coffee break

15:45 - 16:15 Measuring the UV background at the end of reionization with ABC (*Frederick Davies*)

16:15 - 17:00 Exercises (*Robert Lupton*)

17:00 - 17:45 Exercises (*Daniela Huppenkothen*)

19:00 - 22:00 Pub evening

### ***Friday, September 16<sup>th</sup>, 2016***

09:00 - 10:30 Gaussian processes (*Dan Foreman-Mackey*)

10:30 - 11:00 Coffee break

11:00 - 11:45 Special timing: Linking time series & spectra (*Daniela Huppenkothen*)

11:45 - 12:30 Exercises (*Daniela Huppenkothen*)

12:30 - 14:00 Lunch

14:00 – 14:30 Visualisation of time series via neural networks (*Nikos Gianniotis*)

14:30 - 15:15 Exercises (*Dan Foreman-Mackey*)

15:15 - 15:30 Farewell, departure