

Alison Parton

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Research focuses include environmental and ecological applications of Bayesian statistics, currently this involves the mechanistic modelling of animal movement in continuous time. Interested in the development of models for complex ecological systems that are, foremost, reproducible and efficient, whilst being accessible and intuitive for applied practitioners.

Education

University of Sheffield <i>PhD in Probability and Statistics</i>	Sheffield <i>Sep 2014–present</i>
University of Sheffield <i>MMath (Hons)</i> First Class Honours	Sheffield <i>Sep 2010–Jul 2014</i>
Don Valley School <i>A level</i> Mathematics A* Physics A* Biology A Chemistry A	Doncaster <i>Sep 2008–Jul 2010</i>
Ridgewood School <i>GCSE</i> 15 passes, all at A*/A, including English and Maths	Doncaster <i>Sep 2003–Jul 2008</i>

Research Experience

Thesis, University of Sheffield <i>Bayesian inference for continuous-time step-and-turn movement models</i> Supervisor: Professor P.G. Blackwell Mechanistic modelling of animal movement is often formulated in discrete time despite problems with scale invariance, such as handling irregularly timed observations. A natural solution is to formulate in continuous time, yet uptake has been slow, with lack of implementation often excused by a difficulty in interpretation. This thesis aims to bolster usage by developing a continuous-time model with interpretable parameters, similar to those of popular discrete-time models that use turning angles and step lengths. Movement is defined by a joint bearing and speed process, with parameters dependent on a continuous-time behavioural switching process, creating a flexible class of movement models. Methodology is presented for Bayesian inference given irregular, noisy observations, involving augmenting observed locations with a reconstruction of the underlying movement process.	Sheffield <i>Sep 2014–present</i>
Master's dissertation, University of Sheffield <i>Quantitative paleoclimate reconstruction</i> Supervisor: Professor C. Buck	Sheffield <i>Sep 2013–Jul 2014</i>
Sheffield Undergraduate Research Experience (SURE) <i>Bayesian methods for meta-analysis of clinical trial data</i> Supervisor: Professor J. Oakley	Sheffield <i>Jun 2013–Aug 2013</i>

Research Publications

Patterson, T.A., **Parton, A.**, Langrock, R., Blackwell, P.G., Thomas, L. and King, R. (2017)
Statistical modelling of individual animal movement: an overview of key methods and a discussion of practical challenges

Advances in Statistical Analysis, doi:10.1007/s10182-017-0302-7

Parton, A., Blackwell, P.G. (2017)

Bayesian inference for multistate 'step and turn' animal movement in continuous time

Journal of Agricultural, Biological and Environmental Statistics, doi:10.1007/s13253-017-0286-5

Parton A., Blackwell P.G. and Skarin A. (2017)

Bayesian inference for continuous time animal movement based on steps and turns

In: Argiento R., Lanzarone E., Antoniano Villalobos I., Mattei A. (eds) Bayesian Statistics in Action. BAYSM 2016. Springer Proceedings in Mathematics and Statistics, vol 194, doi:10.1007/978-3-319-54084-9

Presentations

Invited.....

EURING analytical meeting

Inferring animal movement and behaviour in cont. time from irregular and noisy GPS obs.

Barcelona

Jul 2017

Research.....

National Centre for Statistical Ecology (NCSE) summer meeting

Inferring animal movement and behaviour in cont. time from irregular and noisy GPS obs.

Kent

Jun 2017

Probability in the North East (PiNE)

A hybrid MCMC sampler for inferring animal movements and behaviours from GPS observations

Sheffield

Jan 2017

Statistics research group

A hybrid MCMC sampler for inferring animal movements and behaviours from GPS observations

Sheffield

Oct 2016

International Statistical Ecology Conference (ISEC)

Bayesian inference for continuous time animal movement based on steps and turns

Seattle

Jul 2016

Bayesian Young Statisticians Meeting (BAYSM)

Bayesian inference for continuous time animal movement based on steps and turns

Florence

Jun 2016

Moving 2 Gather

The 'step and turn' animal movement model in continuous time

Nantes

Dec 2015

National Centre for Statistical Ecology (NCSE) summer meeting

The 'step and turn' animal movement model in continuous time

Falmouth

Jun 2015

Miscellaneous.....

Machine learning reading group

Regression for classification

Sheffield

May 2017

Sheffield R User Group

Can you trust the humble statistician? An intro to unit testing in R

Sheffield

Sep 2016

Probability and Statistics seminar

Some good practices for code writing: version control and reproducibility

Sheffield

Aug 2016

Prizes and Grants

BAYSM <i>Best presentation for applications</i>	Florence 2016
University of Sheffield <i>Wendy Wright prize for probability and statistics</i>	Sheffield 2014
Sheffield Undergraduate Research Experience (SURE) <i>Two month research studentship</i>	Sheffield 2013

Academic Activities

Peer review <i>Reviewed for Methods in Ecology and Evolution, Ecological Monographs</i>	2016–Present
Conference organisation <i>Committee member for the Research Students' Conference</i>	2016–Present
Seminar series coordinator <i>Coordinated the Mathematical Biology seminar series at the University of Sheffield</i>	Feb 2016–Jun 2016

Teaching Experience and Outreach Activities

Lydgate Primary School <i>Code Club volunteer</i>	Sheffield May 2017–Present
Weekly after-school club for children aged 9–11, offering the opportunity to learn to code in Python and Scratch. Involved with the identification of fun projects and methods for engaging young students of differing ages and abilities.	
University of Sheffield <i>Graduate Teaching Assistant</i>	Sheffield Sep 2014–Present
Lectured and assessed a short course at level 2 (5 lectures). The self-contained course concerned the use of probability within legal cases. A selection of previously taught case studies were used, along with the identification and development of a number of new studies. Provided oversight and marking for a group coursework assessment.	
Tutorial demonstration and marking across levels 1-3 and MSc in mathematics, chemistry, computer science departments. Courses include probability, statistics and programming in both R and Python.	
Sheffield Hallam University <i>PopMaths volunteer</i>	Sheffield Sep 2014–Present
Annual 'pub style' quiz event for children aged 13–18 from across South Yorkshire, encouraging interest in mathematics and problem solving.	
University of Sheffield <i>Disability and Dyslexia Support Worker</i>	Sheffield Sep 2011–Jun 2014
Professional note taking, study and pastoral support.	

Technical Skills

Programming languages

Proficient in: R, Python, HTML/CSS, version control (Git). Experience of: C++.

Code optimisation (including Rcpp and parallelisation) and unit testing in R.

R markdown, notebooks, and LaTeX for document production and reproducibility.

Creator and webmaster for the Mathematical Biology research group and the Research Students' Conference.

Operating systems

Unix, Windows

References

Up to 4 references available on request