

Jessie Renton

Research Interests

I am broadly interested in modelling biological and social processes, using analytical and computational methods such as agent-based modelling, stochastic processes and dynamical systems. My PhD research has focused on the invasion dynamics of mutant cells in epithelia, considering how the structure and dynamics of the tissue affect evolutionary outcomes. This is relevant to oncogenesis as cells must obtain a number of mutations in order to become malignant. For my masters I undertook a project on the evolution of language, looking at the effect of social structure and how it can lead to dialect formation.

Education

- 2016– **PhD in Mathematical Biology**, *University College London, UK*.
- PRESENT Thesis: “Evolutionary dynamics in epithelia,” supervised by Prof. Karen Page.
Expected submission: May 2021
- 2013– 14 **Junior honours year of MPhys Mathematical Physics**, *University of Washington, USA*.
Study abroad programme.
- 2011– 16 **MPhys Mathematical Physics: 1st class**, *University of Edinburgh, UK*.
MPhys project: “The effect of population structure on spontaneous dialect formation,” supervised by Prof. Richard Blythe. Modules include advanced statistical physics, biological physics, modelling and visualisation, and dynamical systems.

Awards

- 2019 **Sir George Jessel Studentship**, £1800 prize awarded by UCL during PhD.
- 2017 **LMS travel award**, support for poster presentation at MMEE conference.
- 2016– 20 **EPSRC PhD Studentship**, full PhD funding for four years.
- 2013 **Certificate of merit**, awarded by the University of Edinburgh during MPhys.

Publications

- [1] Jessie Renton and Karen M. Page. Evolution of cooperation in an epithelium. *Journal of the Royal Society Interface*, 16:20180918, 2019.
- [2] Jessie Renton and Karen M. Page. Cooperative success in epithelial public goods games., *In preparation*.

Conferences

- Jul. 2019 **Society of Mathematical Biology**, *University of Montreal, Canada*.
- Apr. 2019 **Evolution evolving**, *University of Cambridge, UK*.
- Jul. 2018 **European conference on theoretical and mathematical biology**, *University of Lisbon, Portugal*.
- May 2018 **Physical biology circle meeting**, *Francis Crick Institute, London, UK*.
- Jul. 2017 **Mathematical models in ecology and evolution**, *City, University of London, UK*.
- Apr. 2017 **British applied mathematics colloquium**, *University of Surrey, UK*.
- Mar. 2017 **Physical biology circle meeting**, *EMBL Heidelberg, Germany*.

Presentations

- [1] Cooperation between cancer cells: modelling evolutionary public goods games in an epithelium. Talk at the London Mathematical Society Virtual Graduate Student Meeting, 2020.
- [2] Evolution of cooperation in an epithelium. Poster presented at the meeting of the Society of Mathematical Biology, Montreal, 2019.
- [3] Evolution of cooperation in an epithelium. Talk at the Institute for the Physics of Living Systems meet-up, UCL, London, 2019.
- [4] Evolution of cooperation in an epithelium. Talk at the UCL Mathematics Postgraduate Seminar, London, 2018.
- [5] Invasion dynamics in epithelia. Talk at the UCL Mathematics Postgraduate Seminar, London, 2018.
- [6] Towards a model for invasion dynamics in epithelia. Poster presented at the Mathematical Models in Ecology and Evolution meeting, London, 2017.

Teaching

University College London

- 2017– 18 **Tutorials**, taught small group tutorials covering material from first year modules: applied maths, mathematical methods I&II and Newtonian mechanics.
- 2017– 19 **Python labs**, ran computer lab sessions for an introductory python module and marked final projects.
- 2017– 20 **Marking**, various courses including mathematical methods, biomathematics and introductory python.

Activities & work experience

- 2018– 19 **UCL postgraduate seminar series**, organised and chaired the Department of Mathematics postgraduate seminars.
- 2015– 16 **Freelance science writing**, wrote articles for the science dissemination magazine 'International Innovation' on a variety of topics in physics, mathematics, engineering and computer science. Communicated complex ideas to an intended audience of scientists who are non-specialists in the field.
- 2015– 16 **Mentoring**, took part in a mentoring scheme for first and second year physics students while in my masters year at the University of Edinburgh.
- 2010– 11 & 2015 **Administration**, worked in the Psychology office at the University of East London and later in the Physics office at the University of Edinburgh.

Additional Skills

Computing: Programming in Python and Java. Experience with cluster computing e.g. using Slurm job scheduling. Linux, MacOS and Windows operating systems.

Languages: Intermediate Spanish