

Matthew Asker

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PUBLICATIONS

First author:

- Coexistence of Competing Microbial Strains under Twofold Environmental Variability and Demographic Fluctuations - *New Journal of Physics*

Second author:

- Coupled environmental and demographic fluctuations shape the evolution of cooperative antimicrobial resistance - *Journal of the Royal Society Interface*
- Eco-evolutionary dynamics of cooperative antimicrobial resistance in a population of fluctuating volume and size - *Journal of Physics A: Mathematical and Theoretical*

GRANTS & AWARDS

- 2024: **ECR Travel Grant** - *London Mathematical Society*: an award of £500 to provide partial support for UK-based ECRs to attend conferences or undertake research visits.
- 2023: **Best talk in Applied Mathematics** - *University of Leeds*: a prize given to the best talk in the applied department at the annual PGR conference in the School of Mathematics.
- 2020: **PRACE Summer of HPC Scholarship** - *Partnership for Advanced Computing in Europe (PRACE)*: a scholarship covering accommodation, travel costs, and a stipend for an intensive 2 month research programme at a HPC centre in Europe.
- 2017: **Physics Entrance Scholarship** - *University of Manchester*: an award of £1000 for outstanding results (A*A*A*) in pre-university exams.

WORKSHOPS

- **L24EEDs Workshop**: I co-organised the [Leeds 2024 Eco-Evolutionary Dynamics workshop](#) on “Mathematical modelling of microbial communities: cooperation, dynamics, and resistance”, with ~80 attendees (9 invited speakers, 28 contributed speakers) from 9th-12th July 2024.

EDUCATION

- **University of Leeds** Leeds, England
PhD Applied Mathematics; Evolution of Populations in Fluctuating Environments Oct. 2021 – present
Supervised by Prof. M. Mobilia and Prof. A. M. Rucklidge
 - **Research**: Part of an international group using techniques from statistical physics and computational methods (Python, C++) to understand the eco-evolutionary dynamics of populations under varying environments. Relevant to the problems of antimicrobial resistance and species diversity.
 - **Project website**: Set-up and now manage the website eedfp.com as a hub for the overarching research project I work within, in collaboration with researchers from Virginia Tech and Imperial College London. Additionally used the site as the homepage for the workshop I co-organised (see above).
 - **Dissemination**: Gave a talk at the University of Leeds SoM PGR conference. Presented posters at 3 external conferences and attended 2 schools.
 - **Seminar organisation**: Organised the biweekly Joint Mathematics PGR seminar series (2 semesters) and the weekly Applied Mathematics PGR seminar series (2 semesters).
 - **Mathematics tutor**: Tutored multiple groups of students in MATH1005 Core Mathematics via in-person tutorials and online marking feedback. (4 semesters) Also marked exams for the course (3 semesters). Additionally marked for MATH1331 Linear Algebra with Applications (1 semester).
 - **Extended learning**: Taken the modules Advanced Mathematical Methods (90%), Advanced Nonlinear Dynamics (91%), and Advanced Evolutionary Modelling (93%) as well as 2 HPC courses. Regularly attended the Leeds Applied Nonlinear Dynamics seminar series, the Mathematical Biology seminar series, and many PGR seminars.
- **University of Manchester** Manchester, England
MPhys Physics with Theoretical Physics; Grade: First-Class Sep. 2017 – Jun. 2021

- **Research Project:** Modelled COVID-19 using a modified percolation model. Calculated the fractal dimension of the spread of the disease through [Germany](#) and the [USA](#) and used this as a proxy for disease spread. Fit a [percolation model with a travel term](#) to the data. Found that imposing lockdowns in the data corresponds to a decrease in the travel term in the model and vice versa. All code written in Python.
- **Peer Assisted Study Support (PASS) mentor:** Mentored 10 first year physics students (4 semesters). Prepared engaging activities for weekly meetings, and facilitated discussion surrounding problems in the course. Won the PASS Legacy Award in 2019, and nominated for the Innovation Award in 2020 as a mentor group.
- **Other relevant modules:** Mathematical Biology (94%), Statistical Mechanics (91%), Statistical Methods (86%), Advanced Statistical Physics (94%).

EXTRA-CURRICULAR ACTIVITIES

- **Football**

Player & Supporter

2004 – present

- When I'm not experiencing the highs and lows of my beloved [Ipswich Town](#), I enjoy playing 5-a-side football. I've often found that after 60 minutes, any writer's block I previously had has vanished.

- **Outdoors Explorer**

Enthusiast

My birth – present

- Regular hiker and runner with a sprinkle of backpacking and climbing mixed in.