Lukas Eigentler

PhD student (Heriot-Watt Univ. and Univ. of Edinburgh)

Education

since 2016   **PhD Student**, *Maxwell Institute Graduate School in Analysis and its Applications, Heriot-Watt University and The University of Edinburgh*, Edinburgh, United Kingdom.
- Research:
  - Analytical derivation of conditions for pattern onset in models for dryland vegetation. Investigation of effects caused by nonlocal dispersal of seeds and temporal variations in precipitation regimes (seasonality and intermittency) on the existence of patterns, using an integro-PDE models, integrodifference equations, and a hybrid impulsive model (combination of PDEs with integrodifference equations).
  - Coexistence of plant species competing for the same limiting resource in semi-arid landscapes. Analytical derivation of a metastability property that acts as a coexistence mechanism in a multi-species reaction-diffusion model and investigation of pattern existence and pattern stability using a numerical continuation method.

  (Supervisor: Prof Jonathan Sherratt)
- Taught courses: SMSTC Homogenisation 1, SMSTC Applied Analysis 1 & 2, SMSTC Pure Analysis 1 & 2, SMSTC Probability 1 & 2, F11MS Modelling and Simulation in Life Sciences, F11SS Stochastic Simulation.

2013–2016   **BSc Mathematics First Class Honours Degree**, *University of Dundee*, Dundee, United Kingdom.
- Final year project:
  Functional Calculus of Self-Adjoint Linear Bounded Operators in Hilbert Spaces:
  Literature review of major concepts in measure theory and functional analysis with main focus on the spectral theorem for self-adjoint linear bounded operators. (Supervisor: Dr Dumitru Trucu)
- Courses: Main focus on mathematical biology, fluid dynamics & numerical methods for ODEs and PDEs.

2012–2013   **Undergraduate course Technische Mathematik**, *Universität Innsbruck*, Innsbruck, Austria.
60 ECTS.

2004–2012   **Matura with distinction**, *Bundesrealgymnasium Adolf-Pichler-Platz*, Innsbruck, Austria.

Publications

[1] EIGENTLER, L. and SHERRATT, J. A.: Effects of precipitation intermittency on vegetation patterns in semi-arid landscapes. *Physica D* 405 (2020), p. 132396. DOI: 10.1016/j.physd.2020.132396.

[2] EIGENTLER, L. and SHERRATT, J. A.: Spatial self-organisation enables species coexistence in a model for savanna ecosystems. *J. Theor. Biol.* 487 (2020), p. 110122. DOI: 10.1016/j.jtbi.2019.110122.

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[3] EIGENTLER, L.: Intraspecific competition can generate species coexistence in a model for dryland vegetation patterns. *bioRxiv preprint* (2020). DOI: 10.1101/2020.01.13.903179.

[4] EIGENTLER, L.: Intraspecific competition in models for vegetation patterns: decrease in resilience to aridity and facilitation of species coexistence (2020). arXiv: 2002.05677 [q-bio.PE].

[5] EIGENTLER, L. and SHERRATT, J. A.: An integrodifference model for vegetation patterns in semi-arid environments with seasonality (2019). arXiv: 1911.10964 [q-bio.PE].

[6] EIGENTLER, L. and SHERRATT, J. A.: Metastability as a coexistence mechanism in a model for dryland vegetation patterns. *Bull. Math. Biol.* 81.7 (2019), pp. 2290–2322. DOI: 10.1007/s11538-019-00606-z.

[7] EIGENTLER, L. and SHERRATT, J. A.: Analysis of a model for banded vegetation patterns in semi-arid environments with nonlocal dispersal. *J. Math. Biol.* 77.3 (2018), pp. 739–763. DOI: 10.1007/s00285-018-1233-y.

Talks & Posters

08/2020 (upcoming) **XL Dynamic Days Europe**, *Nice*.
Invited speaker at minisymposium "Pattern forming fronts in reaction-diffusion systems"

04/2020 (upcoming) **First Edinburgh-Vienna Workshop on Advances in PDEs**, *TU Vienna*.

04/2020 (upcoming) **Models in Population Dynamics, Ecology, and Evolution (MPDEE) 2020**, *University of Leicester*.

02/2020 **Dynamical Systems Applied to Biology and Natural Sciences (DSABNS) 2020**, Trento.

01/2020 **SIAM UKIE Annual Meeting 2020**, *International Centre for Mathematical Sciences*, Edinburgh.
Winner of Best Poster Prize.

10/2019 **Applied Analysis Seminar**, *University of Strathclyde*, Glasgow.

09/2019 **Philip Maini's 60th birthday workshop**, *University of Oxford*.

07/2019 **MMEE 2019**, *University of Lyon*.

07/2019 **Equadiff 2019**, *University of Leiden*.
Invited speaker at minisymposium "Nonlocal dynamical systems"

05/2019 **LMS Research School: PDEs in Mathematical Biology: Modelling and Analysis**, *International Centre for Mathematical Sciences*, Edinburgh.

02/2019 **Advances in Pattern Formation: New Questions Motivated by Applications**, *Ben-Gurion University of the Negev*.

11/2018 **MACS PhD Seminar**, *Heriot-Watt University*, Edinburgh.

07/2018 **ECMTB 2018**, *University of Lisbon*.
Invited speaker at minisymposium "Spatial patterns across ecology: differences and similarities".

04/2018 **CDT Colloquium 2018**, *University of Oxford*.

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04/2018 **MACS Poster Session**, *Heriot-Watt University*, Edinburgh.

12/2017 **MACS Christmas Conference**, *Heriot-Watt University*, Edinburgh.

09/2017 **3**$^{\text{rd}}$ **MIGSAA Annual Colloquium**, *International Centre for Mathematical Sciences*, Edinburgh.

Organised Events

05/2019 **SIAM Student Chapter Symposium 2019**, *International Centre for Mathematical Sciences*, Edinburgh.
Co-organiser.

12/2018 **Scottish Mathematical Biology Forum**, *International Centre for Mathematical Sciences*, Edinburgh.
Member of organising committee.

09/2017 **3**$^{\text{rd}}$ **MIGSAA Annual Colloquium**, *International Centre for Mathematical Sciences*, Edinburgh.
Co-organiser.

Awards, Prizes & Grants

2020 **IMA Small Grant**, *Institute of Mathematics & and its Applications*.
Award to attend XL Dynamics Days Europe (£600).

2020 **Poster Prize**, *SIAM UKIE Annual Meeting 2020*.
Award for best poster at the conference (£75).

2019 **IMA University Liaison Grant**, *Institute of Mathematics & and its Applications*.
Funding obtained for the Edinburgh SIAM & IMA Student Chapter (£400).

2019 **ESMTB Travel Support**, *European Society of Mathematical and Theoretical Biology*.
Funding to attend MMEE 2019 (€100).

2019 **Laura Wisewell Travel Scholarship**, *The University of Edinburgh*.
Funding to attend Advances in Pattern Formation: New Questions Motivated by Applications (£500).

2018 **ESMTB Travel Support**, *European Society of Mathematical and Theoretical Biology*.
Funding to attend The Helsinki Summer School on Mathematical Ecology and Evolution 2018 (€200).

2018 **Researcher Development Fund**, *The University of Edinburgh*.
Funding to attend The Helsinki Summer School on Mathematical Ecology and Evolution 2018 (£250).

2018 **Laura Wisewell Travel Scholarship**, *The University of Edinburgh*.
Funding to attend ECMTB 2018 (£400).

2016-2020 **PhD Funding**, *The Maxwell Institute Graduate School in Analysis and its Applications*.
(approx. £60,000)

2016 **British Association 1939 Prize, Class Medal**, *University of Dundee*.
Best year 4 student in the School of Science and Engineering (£100).

2015 **Ede & Ravenscroft Prize, James Durham Prize, Boyack Bursary**, *University of Dundee*.
Best year 3 student in the School of Engineering, Physics and Mathematics (£1,483).

2014 **Class medal**, *University of Dundee*.
Best year 2 Mathematics student.

2013 **Leistungsstipendium**, *Universität Innsbruck*.
Scholarship for extraordinary academic achievement in the academic year 2012/13 (€726.72).

Professional Memberships

2019-2020 **President of the Edinburgh SIAM & IMA Student Chapter**.
2018-2019 **Vice-president of the Edinburgh SIAM Student Chapter**.

Teaching

2019–2020 **F17CA Calculus A**, *Heriot-Watt University*.
2019–2020 **F17SG Mathematics for Scientists 1**, *Heriot-Watt University*.
2018–2019 **F10AM Mathematical Biology A**, *Heriot-Watt University*.
2018–2019 **F10AN Mathematical Biology B**, *Heriot-Watt University*.
2018–2019 **F19MO Ordinary Differential Equations**, *Heriot-Watt University*.
2018–2019 **F17SG Mathematics for Scientists 1**, *Heriot-Watt University*.
2017–2018 **F10AM Mathematical Biology A**, *Heriot-Watt University*.
2017–2018 **F10AN Mathematical Biology B**, *Heriot-Watt University*.
2017–2018 **F19MO Ordinary Differential Equations**, *Heriot-Watt University*.
2017–2018 **F17GA Problem Solving**, *Heriot-Watt University*.
2017–2018 **F17SG Mathematics for Scientists 1**, *Heriot-Watt University*.
2017–2018 **F17XB Mathematics for Engineers and Scientists 2**, *Heriot-Watt University*.
2017–2018 **F18XC Mathematics for Engineers and Scientists 3**, *Heriot-Watt University*.
2017–2018 **F18XD Mathematics for Engineers and Scientists 4**, *Heriot-Watt University*.