MICHAEL F. ADAMER

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EMPLOYMENT

ETH Zürich, *September 1 2020 -*
Basel, Switzerland

· **Postdoctoral Researcher**
Short Summary: I am working on time series anomaly detection for early prediction of certain intensive care unit complications and other machine learning guided applications for personalised medicine, such as image segmentation for medical imaging data.

Compulsory Austrian Army Service, *January 6 - July 3 2020*
Austria

· Aid to the non-commissioned officer for economical matters.

Max Planck Institute for Mathematics in the Sciences, *August 5 - December 31, 2019*
Leipzig, Germany

· **Postdoctoral Researcher**
Short Summary: I am working on adapting the holonomic gradient descent algorithm for its use in statistics. Holonomic gradient descent is an optimisation procedure which uses the theory of D-modules to convert gradients into matrix multiplications, with the benefit of increasing the efficiency of gradient descent methods.

EDUCATION

University of Oxford, Oxford, UK *October 2015- October 2019*

· **Doctor of Philosophy**
Mathematical Institute and Doctoral Training Centre, Systems Biology

Thesis title: Algebraic Methods for Chemical Reaction Networks with Extrinsic Noise
Short Summary: Chemical reaction networks are a prime example of the emergence of polynomial equations in the natural sciences. The equations are usually heavily parameterised, typically one parameter per reaction which cannot be derived from first principles, and often the parameters cannot be measured. In my thesis I develop techniques to investigate networks with random parameters, both constant parameters sampled from a uniform distribution and parameters evolving in time according to a given stochastic process. These stochasticity assumptions render the systems under study polynomial systems with random coefficients. The methods I use to investigate these models draw from results in algebraic geometry, intersection theory, graph theory and applied stochastic processes.

· **Master of Physics, MPhys**, 4-year integrated masters *2011-2015*
First Class Honours, Masters project supervisor: Julia Yeomans.

ACADEMIC ACHIEVEMENTS

2012 - 2019	Completed 6 academic papers and published in top journals including, Nature Communications, Royal Society Interface, Advances in Applied Mathematics
2018	Poster Prize at the European Conference for Mathematical Biology, Lisbon
2018	Doctoral Training Centre Short Project Publication Prize
2015 - 2019	EPSRC Scholarship (DPhil Funding)
2012 - 2015	Fowler Prize of Merton College (multiple awards)
2011	Austrian Physics Olympiad Gold Medallist

PROGRAMMING EXPERIENCE

Python (main programming language)

- Machine learning piplines using scikit-learn, Tensorflow and Pytorch
- Time series of coupled SDEs and SPDEs, including temporally correlated noise
- Power spectra methods for simulated time series
- Glacier modelling using spatial elevation data
- SageMath: graph theoretic methods for power spectra
- Main libraries: numpy, scipy, matplotlib, pandas, tensorflow, keras, scikit-learn

C/C++

- Co-developed a program to computationally prove a phyiscs theorem
- Occasional user

Other Programming Languages

- Macaulay2: computer algebra software, co-developed a package
- Basic user: MATLAB, Mathematica, R, Shell

LANGUAGES

English: fluent

German: native

Spanish: basic

French: basic

Portuguese: basic

EXTRA-CURRICULAR AND HOBBIES

Extra-curricular

- Talks at numerous conferences including, SIAM Annual General Meeting, SIAM Conference on Applied Algebraic Geometry
- Undergraduate Teaching: Introduction to Programming, General Relativity, Further Mathematical Biology, Stochastic Modelling for Mathematical Biology, Mathematical Biology Short Option, Geometry and Dynamics, Marker for College examinations and admissions tests
- Delivered the 2018 Christmas Lecture at the Natural History Museum, Oxford

Hobbies

- Former President of the Oxford University Mountaineering Club
- Former President of the Oxford University Austrian Society

- Sports: rock climbing, mountaineering, skiing, running
- Playing the guitar: acoustic and electric
- Travelling: visited 5 continents