

BENEDIKT PETKO

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Education

Imperial College London, Faculty of Natural Sciences, Department of Mathematics 2015–2023

Centre for Doctoral Training – Mathematics of Random Systems 2019-Present

- Study towards **PhD in Mathematics**, specialisation in stochastic analysis
- Courses in stochastic simulation, deep learning, stochastic analysis

MSci Mathematics with a Year in Europe 2015-2019

- **First-Class Honours, 84%** final average
- Modules including: Stochastic Calculus and SDE, Markov Processes, PDE

Summer school of machine learning and applied statistics July 2019

- Introduction to machine learning, time series, spatial point processes; **awarded** departmental bursary

Swiss Federal Institute of Technology in Zurich, Department of Mathematics September 2017-August 2018

Exchange Programme

5.35/6 GPA achieved (ECTS weighted average)

Modules including: Probability Theory, Measure Theory, Functional Analysis, Partial Differential Equations, **Machine Learning (lead a group** of three to complete 4 group projects, **designing algorithms** for solving classification and regression tasks), Theoretical Computer Science (**lead a group** of three to complete 9 theoretical assignments)

Gymnazium Matyase Lercha, Brno 2007–2015

Czech Maturita (Czech Language and Literature, Mathematics, English, German – all at grade excellent)

Research experience

Fourth year MSci project September 2018-Present

- Studied theory of abstract **regularity structures** with Prof Martin Hairer
- **Proved** an extension theorem for modelled distributions
- Supplementary reading in wavelet analysis, differentiable extensions of functions

Exchange student at University of British Columbia, Vancouver, Canada July 2017–August 2017

- Project in applied mathematics with Dr Roger Donaldson
- Fully **funded** by Imperial College bursary
- **Worked independently, formulated hypotheses and tested** them on simulated data
- Digital image processing, tested **multi-frame image restoration** techniques to increase resolution
- Reviewed recent developments in **super-resolution**, studied image processing and optimization literature
- Compared time and frequency approach to frame alignment in terms of robustness to noise
- Tested and compared several optimization methods to reconstruct a simulated signal with high resolution
- Discovered total variation optimization with constraints yields the best resolution gains
- Compiled findings into 18-page draft, **presented** work to academic staff
- Improved programming skills in **Python** – NumPy, SciPy, CVXOPT libraries

Second year group project June 2017

- Project in **partial differential equations** with Prof Gustav Holzegel
- Reading on the wave equation; analytical solutions, decay estimates and the energy method
- Worked in a **team** of five peers, compiled findings into 33-page article
- Presented work to academic staff; grade 80%

First year poster project

June 2016

- Project in statistics (Bayesian inference) with Dr Daniel Mortlock
- Applied the Metropolis algorithm on exoplanet radial velocity data
- Implemented in **MATLAB**, inferred mass and distance of an exoplanet from its star
- Presented work to academic staff; grade 90%

Intern at Masaryk University, Brno, Czech Republic

September 2013–June 2014

- Conception and elaboration of an own high school scientific project on sparse sampling in nuclear magnetic resonance spectroscopy, with Dr Jiri Novacek
- Gained experience with **analysing complex data, using accuracy and attention to detail**
- **Independently studied** the Fourier transform and necessary signal processing theory,
- Simulated signal in Octave programming language and tested 6 sparse sampling schemes' effect on sensitivity and resolution of reconstructed spectrum
- Studied noise distribution and spectral artifacts incurred by sparse sampling
- Presented work to a committee in the national competition, placed 3rd nationwide

Teaching experience

Tutor for Imperial College London

October 2018–Present

- Leading group tutorials for first year students, 2 hours every week
- Covered topics in lecturing style, moderated problem-solving discussions
- Planning content and preparing material

Volunteer for IntoUniversity North Kensington, London

November 2015–June 2016

- Responsible for mentoring a 13-year-old pupil to encourage the development of confidence and public speaking skills
- Developed ability to **communicate effectively** and provide advice and encouragement
- Managed time effectively to balance volunteering and academic commitment

Skills

Coding: Python

Teaching: 250+ hours of teaching as a private tutor

Languages: English (full professional proficiency), German (professional working proficiency), Czech (native speaker), Spanish (limited working proficiency), Mandarin (post-beginner)

Achievements

Scholarship awarded by Bakala Foundation

2015–2019

- 16 candidates selected out of 270, based on a written application and an interview
- Prestigious national scholarship covering all costs of undergraduate study

McKinsey's Digital Race

November 2016

- 3 day exclusive event including case study competition

Deutsche SchülerAkademie

July–August 2014

- Selective three weeks course of university level analysis in Waldenburg, Germany

Course of German and its national history (three weeks scholarship in Marburg, Germany)

August 2011

Other interests

Piano playing (16 years), sports (fitness)