Bogdan Toader
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Education

2015 - present University of Oxford, UK

PhD in Industrially Focused Mathematical Modelling (Centre for Doctoral Training)
Title: Source reconstruction from hydrophone data
Advisors: Prof Jared Tanner, Dr Andrew Thompson
Industrial supervisors: Dr Stephane Chretien (NPL), Dr Peter Harris (NPL)

My research project, which I started in October 2016, is in collaboration with the National Physical Laboratory and focuses on grid-free compressed sensing. So far I developed theory for the feasibility super-resolution problem with non-negative measures. Future work includes developing NIHT-type algorithms for super-resolution.

During the first year of the CDT I gained a deep understanding of a broad range of topics in mathematical modelling and numerical methods for solving problems involving continuous and discrete systems through lectures and individual or team projects.

I have been exposed to a number of real-world applications of mathematics in the industry through seminars, company visits. As part of my research project I spend four weeks every year at NPL in London.

2009 – 2013 University of Manchester, UK

BSc (Hons) Computer Science and Mathematics with Industrial Experience
Result: 1st class degree - with a grade above 80%

Did research on how to prove the properties of dynamical systems (mainly equilibrium and stability related) using an automatic theorem prover (MetiTarski).

Broadened my mathematical skills and learned the basics of modern mathematics, including Numerical Analysis, Differential Equations, Matrix Analysis and Financial Mathematics.

Developed good ability to solve problems of object oriented programming. Proved the capacity to analyse, design and implement Java code.

Improved my team working skills while regularly collaborating with my group mates as part of the first year team project, the second year Software Engineering team project and the third year AI and Games team project.

In addition, I was part of the Staff-Student Consultative Committee during the third year, where I discussed and helped to solve issues in the School of Computer Science raised by students.

2005 – 2009 "Gheorghe Munteanu Murgoci" National College, Romania

Specialisation: Mathematics – Computer Science (Bilingual courses – English Language)
Romanian Baccalaureate: final grade of 9.91 (out of a maximum of 10). The modules taken include Mathematics (10), Physics (10) and English Language (10).
SAT – a standardised test for college admissions in the United States
all grades are out of 800
Modules taken include Mathematics Level 2 (780) and Physics (690).

Other Research Experience

July - September 2016 Deflating Magnetic Oscillations

A ten-week project with Culham Centre for Fusion Energy on using deflation to find multiple periodic solutions to a system of ODEs that describes the behaviour of plasma.

May - July 2016 Improved Source Reconstruction from Hydrophone Data

A ten-week project where I analysed how compressed sensing techniques can be applied to a problem proposed by the National Physical Laboratory. An extension of this work to grid free compressed sensing applied to the same problem is the focus of my PhD project for the following three years.

2012 - 2013 Formal Verification of Dynamical Systems

For my undergraduate final year dissertation I have undertaken a research project that involved using an automatic theorem prover (MetiTarski) to analyse the properties of dynamical systems.

Conferences and Other Activities

2018 Curves and Surfaces, Arcachon, France - Oral presentation
6th IMA Conference on Numerical Linear Algebra and Optimization, Birmingham, UK - Oral presentation
142nd European Study Group with Industry, Palanga, Lithuania
Worked on predicting the sustainable income according to rules from the central bank.
IEEE Data Science Workshop, Lausanne, Switzerland - Poster presentation
InFoMM Annual Meeting 2018, Oxford - Oral presentation
Research Workshop on Optimization and Big Data, KAUST, Saudi Arabia - Poster presentation
SIAM UKIE Annual Meeting, Southampton, UK - Poster presentation

2017 Summer School on Structured Regularization for High-Dimensional Data Analysis, Henri Poincare Institute, Paris
InFoMM Group Meeting, Oxford - Oral presentation
InFoMM Annual Meeting 2017, Oxford - Poster presentation

2016 Data Study Group, Alan Turing Institute, London
Implemented network model to solve problem proposed by Airbus.
116th European Study Group With Industry, Durham, UK
Implemented mixed integer programming solution to problem proposed by Syngenta.
InFoMM Graduate Modelling Camp, Oxford - won IMA Best Team Performance prize

Teaching Experience

2016 - present Integer Programming - University of Oxford
Michaelmas term 2016, 2017 - 3rd year undergraduate course
Lecturer: Prof Raphael Hauser

Continuous Optimization - University of Oxford
Hilary term 2017, 2018 - 4th year undergraduate course
Lecturer: Prof Coralia Cartis

Computational Mathematics - University of Oxford
Michaelmas term 2016, Hilary term 2017 - demonstrator for 1st year undergraduate Matlab classes
Lecturer: Dr Andrew Thompson

2010 – 2011 PASS (Peer Assisted Study Sessions) leader - University of Manchester
Weekly sessions with 1st year undergraduate students, assisting them with basic mathematics and programming.

Awards

2010 Golden Anniversary Prize
University of Manchester – for excellence in first year studies. Awarded to the students with the first five highest grades in the first year.

2006 – 2009 Bronze medal at the National Mathematical Olympiad in Romania in 2007, 2008 and 2009
Won various prizes at other national and regional mathematics contests, including the national contest organised by the editors of the Romanian mathematical journal "Gazeta Matematica" for students who regularly send solutions to the problems published in this journal.

Industry Experience

August 2013 – September 2015 Morgan Stanley – Technology Associate
I was part of the Pricing Technology team for the Interest Rate Derivatives business, where I used Scala and Perl on a daily basis to build and improve the pricing tools used by quantitative analysts and traders.

June – July 2012 Credit Suisse - Summer Internship in the Technology Department
I was part of the team that looks after the Unix servers in the Europe region. Apart from handling daily requests from users, I have developed good scripting skills.

June 2011 – May 2012 Morgan Stanley - Industrial Placement in the Technology Department
Worked as part of the Institutional Securities Group Technology division in one of the teams developing and supporting the equities trading systems. Acquired experience of working with large sets of data.

Outreach

2017-2018 Lord Williams's School, Thame **-** Ran an outreach session every year aimed at pre-final year students about doing research in applied mathematics

Technical Knowledge

Good knowledge of Matlab, Java, Scala, Linux, intermediate skills of Python, C++, Perl, R.

Languages

Native: Romanian
Acquired: English (fluent, grade B in the *Cambridge English: Advanced CAE* examination)

Other interests

Gliding, running, hiking, climbing, skiing, guitar