

# Early career researchers conference (2020/2021)

Sheffield joint SIAM-IMA Student Chapter

Our very first activity was organizing a UKIE-wide conference. The event was aimed at early career researchers and featured 25 talks by postdoctoral researchers, postgraduate students and undergraduates. Attendees joined the virtual event from all over the world, including the UK, USA, India, Kosovo, Malta, and the Philippines. There were four keynote speakers: Dr Aretha Teckentrup and Dr Kostas Zygalakis from the University of Edinburgh, Dr Silvia Gazzola from the University of Bath, and Dr Matthew Allcock, a research mathematician at EDF. There was also a presentation from IMA representative, Erica Tyson. We offered a variety of talk formats ranging from 20 minutes to blitz 5-minute talks. In addition, we ran a poster showcase of undergraduate and postgraduate work.

After opening remarks, Dr Gregory Chaplain (Imperial) opened day 1 with his work on Elastic Meta-surfaces. Followed by the first keynote lecture by Dr Silvia Gazzola (Bath) who introduced inverse problems and challenges associated with them. Chemist Dr Robert Shaw (Sheffield) also discussed some applications of Functional Analysis to Quantum Chemistry. Talks in the afternoon included postgraduate student Erin Russell (Bristol), who talked about inverse eigenvalue problems for some special stochastic matrices, followed by Alex Trenam's (Bath), who talked about topology optimization of structural electrolyte microstructures (e.g., in batteries). Our second keynote speaker, Dr Aretha Teckentrup (Edinburgh) also talked about a problem in approximation theory. Day 1 concluded with a session on careers, with an emphasis on opportunities for mathematicians and statisticians in industry.

Agnesa Smajli (Sheffield City College) opened day 2 by talking about the impact of certain macroeconomics variables impact the economic growth in the Balkans. Other talks included: undergraduate student Millie Tobin (Manchester Metropolitan) who argued in favour of a multifractal (and deterministic) for financial time series; our second keynote speaker, Dr Konstantinos Zygalakis (Edinburgh) who gave a talk in the intersection of statistics (Bayesian inference), stochastic simulation and numerical analysis.; and Savvas Melidonis (Heriot-Watt) followed along similar lines. The afternoon talks discussed modelling for biological applications. This included Computer Science undergraduate student Sam Armstrong (Sheffield) who discussed his work on agent-based modelling to evolutionary simulation for food-web evolution and Purna Singh (Sheffield), who discussed the dilemma of whether tolerance or resistance to a disease is preferable. We also heard from our final keynote speaker when Dr Matthew Allcock (EDF), a research mathematician in industry, discussed uses of Extreme Value Theory in risk management. Other talks on Day 2 included: Raphael Fortulan (Engineering, Sheffield Hallam) also introduced dynamical systems in modelling very complex power systems with renewable energy sources and Yang (Tina) Zhou (Bath), who reported on her work on a project with the MET office.

Other activities at the conference included a session about careers in industry for mathematicians, lunch breaks with games on Gather Town, a quiz hosted by PhD student Joseph Martin and a poster showcase and competition (judged by independent academics) with prizes awarded in undergraduate and postgraduate categories. We had 110 registered participants from a variety of (UKIE) universities including Cambridge, Exeter, Glasgow, Greenwich, Keele, King's College, Limerick, Liverpool, London School of Economics, Newcastle, Open University, Reading, Salford, Southampton, Sussex, and York.

The feedback on the conference was very positive. Attendees felt the conference was well organised and ran, and they were happy with the quality of the talks. They appreciated the broad range of topics presented and that we had speakers at different career stages, from undergraduate to PhD students, to postdoctoral fellows, to lecturers and senior lecturers. The careers panel was also well-received.