PROFILE

Alex James is an Associate Professor in the School of Mathematics and Statistics at the University of Canterbury. She completed her BSc(Hons) in Mathematics at the University of Newcastle-upon-Tyne, followed by a Masters with some of the world's leading experts in nonlinear dynamics at UCL. She did her PhD on combustion theory at the University of Leeds with John Brindley, a global champion of British Applied Mathematics. After finishing her PhD, she was quickly snapped up as a lecturer by Sheffield Hallam University in 2001 before moving to New Zealand to take up her position at UC in 2004.

I first encountered Alex when I was a PhD student at the University of Leeds and I saw Alex, a recent PhD graduate, give a talk with Jon Pitchford at a dynamical systems conference. I still remember this talk 18 years later, partly because Alex and Jon with their references to obscure 1970s British punk are a naturally entertaining combination. But partly because giving a conference talk as a double act seemed, at the time, to be mould-breaking. In the 16 years I have worked alongside Alex at Canterbury, I have come to learn that Alex excels at mould-breaking in numerous areas and is never afraid to think outside the box. Alex's research record is as varied as it is prodigious. She has published over 50 journal papers, including not one but two Letters to Nature. Alex is an incredibly versatile applied mathematician, having worked on seemingly everything from the chemical reactions that take place inside bombardier beetles to the organising principles of complex ecosystems. From optimal foraging theory to the mathematics of invasive species. And from social network analytics to the causes of gender inequity in academia. These are just a few examples that reflect Alex's approach to research, which is innovative yet extremely practical, always grounded in reality and usually based closely on real data. Not one to do research for the sake of doing research, Alex is motivated by enhancing understanding of real-world problems and providing useful answers to important questions.

Alex's ability to talk to people from a range of backgrounds and disciplines means she is able to make connections and communicate the usefulness of mathematics widely in different domains. On several occasions I have been in a meeting where someone (often me!) is trying to explain something mathematical to a non-mathematician. With brows becoming increasingly knitted, Alex will chime in with an analogy or a different way of explaining something and all becomes clear. As a result of this ability, her research has had impact in a range of areas outside academia, including conservation management, child protection services, management of the *Mycoplasma bovis* outbreak, and identifying causes of the gender pay gap. I have recently had the privilege of working closely with Alex on mathematical models to inform New Zealand's response to COVID-19. Without Alex's creativity, modelling expertise, ability to home in on the important question, and knack for extracting insight from messy data, this work would undoubtedly not have had the impact it has.

Alex is a beacon for the benefits that mathematical modelling can bring to policy-makers and managers in industry and government. Alex has long-established research collaborations with scientists at DOC and several CRIs. In her role as Deputy Director of the CoRE Te Pūnaha Matatini, Alex has forged connections with numerous government departments and agencies including MSD, MBIE, MPI, Oranga Tamariki, TEC, and regional councils. Alex played a pivotal role in developing the vision and aims of Te Pūnaha Matatini to deliver internationally recognised cutting-edge research in complex systems, as well as being relevant and useful to New Zealand's economy, ecosystems, and society. This was instrumental to the success of Te Pūnaha Matatini's bid in the 2014 CoRE funding round and the subsequent achievements and impact of the Centre.

Alex does so much to help others on campus, whether they are students, early-career researchers, or department colleagues. Always generous with her time, she is in demand as a supervisor and unfailingly kind and supportive to her students. She has supervised over 18 Masters and PhD students and postdoctoral fellows, including Rachelle Binny, Lisa Hall, Julie Mugford, and Scott Graybill. She is an exceptional teacher of mathematics, especially for students who are combining maths with other subjects. Often some departmental colleagues will be sitting in the tea room debating some point of pedagogy or whether students benefit more from X, Y or Z. The next day, Alex will often come back and say "I know the answer now because I asked my students". This extremely simple but effective approach of actually talking to students and finding out what works for them epitomises Alex's open-mindedness and innovation to different ways of enabling students to become independent learners.

Alex is always keen to promote the public service messages that mathematical modelling can provide. She has given talks and activities for school children on multiple topics including how to reduce spread of an infectious disease. She was given the UC Students' Association "Vaccine Enthusiast Award" in 2019 after a particularly passionate differential equations lecture on herd immunity. Her philosophy is that mathematics should be interesting and it should be useful. Do we really need to make our students learn how to solve THAT differential equation or integrate THAT function? Or can we skip forward a bit to a more exciting topic that will pique their interest and have them coming back for more next year? She has given an invited talk at the NZ Association of Mathematics Teachers conference on this topic.

Alex's achievements have been recognised by numerous awards and accolades. She won the NZMS Research Award in 2018 and has been a Fellow since 2015. She has been an invited plenary speaker at the AustMS conference, Society for Mathematical Biology conference, and more. Her excellence in teaching was recognised in 2008 with a UC Teaching Award. She serves the Applied Mathematics and Science community in various ways. She sits on the NZ Research Information System Stewardship and Oversight Group. She served as NZMS Secretary and Newsletter Editor from 2013 to 2015. She is an Editorial Board member for Letters in Biomathematics and Theoretical Ecology. She has been on many conference organising and invited speakers committees, and has organised special sessions on equity and diversity and early career workshops. She was instrumental in empowering postgraduate students to establish and organise their own conference (initially the South Island Mathematics and Statistics Postgraduate Conference in 2006, now the NZ Mathematics and Statistics Postgraduate Conference). This event has since gone from strength to strength and is now a regular fixture.

I have learned immeasurably from working with Alex for the last 16 years — and not just about teaching and research in mathematics, my knowledge of bicycle maintenance, famous mathematicians and the geographical intricacies of the Lancashire accent would not be the same otherwise! I consider myself very lucky to have Alex as a colleague and a friend.

Mike Plank