

Statistically Speaking...

News and views from the Statistics Department

Official Newsletter of the Department of Statistics, University of Warwick

Issue 6: June 2015

News and Events

Welcome to the fifth issue of "Statistically Speaking..." - a publication designed for current and past students and staff of the Statistics Department at the University of Warwick.

Thank you to all who contributed to this issue or participated in its production in any way.

Vassili Kolokoltsov, Eleanor Ingram

Dr Martine Barons helps tackle Food Poverty in Birmingham

One of the (many) new opportunities generated by the [workshop on evidence-based decision support for food security](#) held in the department in April, was an invitation for Dr Martine Barons to join Birmingham Food Council's food poverty workshop "food insecurity — a city-level response?" held on Monday 11th May. The purpose of the workshop was to gather the expertise of all on the subject of a city-wide approach to food poverty by identifying the current drivers, possible future drivers, what can be learned from other places, future possibilities and strategies.

Election Exit-Poll

The exit-poll design and analysis methods developed by David Firth (with political scientist John Curtice from the University of Strathclyde) were used again at the recent General Election by all of the major UK broadcasters.

At 10pm on election day the on-air seats prediction (simultaneously on BBC, ITV and Sky) based on the exit poll was: Con 316, Lab 239, SNP 58, LD 10, others 27. The actual result of the election was Con 331, Lab 232, SNP 56, LD 8, others 23.

The 2015 exit-poll prediction was thus not "spot on" as it had been in 2005 and 2010. Many commentators had warned beforehand that the 2015 election would be an especially difficult one to predict. The exit-poll prediction was startlingly different from what had been indicated by commercial pre-election voting-intention polls. The exit poll strongly indicated the Conservatives as largest party, and the ultimate outcome of a small Conservative majority was clearly not ruled out. This was in stark contrast to predictions from pre-election polls, which had consistently shown Conservative and Labour neck-and-neck with neither party close to an overall majority.

51st Gregynog Statistical Conference

Staff and PhD students recently attended the 51st Gregynog Statistical Conference at Gregynog Hall, Wales held jointly with the Universities of Aberystwyth and Swansea. The conference comprised two central tutorials, a series of talks and a poster session (which was an innovation this year). One tutorial was given by Idris Eckley (Lancaster) and Tim Park (Shell UK) on "Locally stationary time series methods" with a particular focus on sensor data, the other by Philip Protter (Columbia) on "Liquidity theory" who made a technical topic more palatable with his broad range of anecdotes. The talks were given on a broad range of statistical topics (ranging from characterising plant roots to prudential regulation of banks) by Maggie Chen (Swansea), Paul Jenkins (Warwick), Kim Kenobi (Aberystwyth), Ioannis Kosmidis (UCL) and Gareth Peters (UCL). But not everything was about research - Everyone had time to enjoy the scenic surroundings of Gregynog Hall, Powis Castle and of the course the traditional cake, Welsh ales and giant Jenga (with minor modifications to the rules...)!

Make sure you keep your diary free for next year's conference: 15th-17th April 2016.

Murray Pollock



TRAVEL REPORT
KING ABDULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
WINTER ENRICHMENT PROGRAM INTERNATIONAL UNDERGRADUATE
POSTER COMPETITION 2015

Between 17th and 25th January 2015, I participated in the Winter Enrichment Program (WEP) Research Poster Competition for Undergraduates held at King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia. The annual poster competition offers a small group of international undergraduate students from varying backgrounds and around the world the opportunity to present their research to an interdisciplinary panel of renowned professors and faculty members.

The majority of the week consisted of talks by various members of the university including the Dean for Graduate Studies, the deans of the three research divisions (Biological and Environmental Science and Engineering; Computer, Electrical and Mathematical Science and Engineering; Physical Science and Engineering) and the Dean of Admissions. In addition, there were a number of Keynote lectures, specifically for participants of WEP, given by influential professors from around the world, on topics ranging from astronomy to robotics.

On Thursday 20th January, the poster competition took place in the University's main auditorium. This gave the 32 international undergraduate students, the 25 KAUST PhD students and the 25 KAUST PostDoc researchers the opportunity to present their research to not only the panel of judges but their peers from around the world. It was insightful to see the incredible range and variety of research carried out not only at KAUST, but by students from different parts of the globe, from USA to UK to Singapore.

Coming from a very theoretical background compared to a majority of the students taking part in the competition, it was interesting to see how different areas of mathematics have incredibly powerful applications in topics ranging from nanofilm fluid dynamics through to weather system prediction. This is something that I hope to learn more about over the summer of 2015 when I am likely to be spending 3 months at KAUST, working with Professor Mohamed-Slim Alouini and Dr Anas Chaaban on developing an algorithm to solve optimisation problems that consist of both Integer Programming and Convex Optimisation, with a particular aim of solving problems relating to electrical engineering.

Having presented my research poster at KAUST, I have gained valuable experience in how to present to academics and like-minded students, this is a skill that I will take with me into the future, and will be especially relevant when I present my research in April at the British Conference of Undergraduate Research 2015 (BCUR 2015) at the University of Winchester.

My experience at KAUST offered me an insight into research at a world leading university, specialising in science and technology, with a vision of becoming the top research institution in the world. I believe that KAUST is a truly unique institution and is more than capable of rising higher than its spot as the number 12 ranked research university in the world.

I wish to thank KAUST for inviting me to Saudi Arabia and funding my flights, visa and accommodation; Hector Zenil (University of Oxford) - with whom I carried out my research; staff from the Wolfram Science Summer School, particularly Stephen Wolfram, Todd Rowland and Jason Cawley - where I started my research; the University of Warwick GRP on Innovative Manufacturing which funded my trip to the summer school and Professor Wilfrid Kendall who helped to arrange the funding.

Daniel Wilson-Nunn

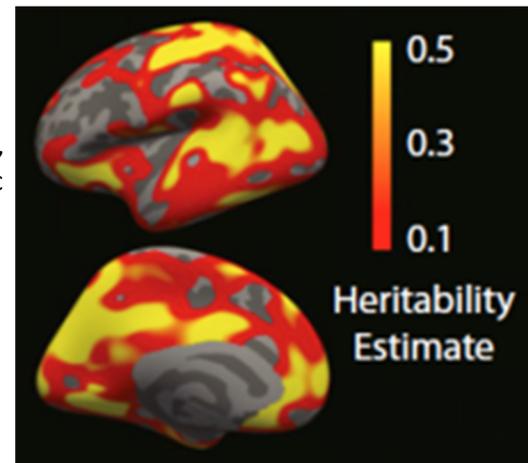
SET for Britain: our research in the House of Commons

On March 2015, I attended the SET for Britain-Mathematics event in London. With the encouragement of my supervisor, Prof. Vassili Kolokoltsov, I applied and was selected to present our work on The Evolutionary Game of Pressure and Resistance. SET for Britain is scientific poster competition referring to early-career researchers, divided into five subject areas, Chemistry, Physics, Engineering and Biological/Biomedical science being the other four. It takes place ever since 1997 in the House of Commons, and based on my experience, it consists a unique opportunity both on a scientific but also on a social point of view. From the scientific perspective the fact that each competitor is expected to describe his work in terms intelligible to an interested lay person, and not to a Learned society, is challenging enough on its own. On one hand you have to communicate the practical significance of your research in couple of minutes sort talks, on the other you have the chance to familiarize yourself with a wide range of research subjects. It is truly amazing how many different approaches you may come across with in a three hours session, and equally surprising how effectively the basics of those approaches can be communicated avoiding strict technicalities. But to my understanding, the network opportunities is by far the most important aspect of this event. Imagine a prestigious scientific conference, only less academically formal and without a target subject, lasting only for one evening, with participants from every field of your science, also attended from top-class industry representatives and members of parliament! In other words, imagine the perfect environment for an early -career researcher to advertise his work and introduce himself.

Stamatios Katsikas

With his former student Tian Ge, Tom Nichols had a paper published in the *Proceedings of the National Academy of Sciences of the USA*, (PNAS). PNAS is an esteemed general science journal that publishes only a small amount of statistical methodology. Their work provides a critical speed-up to a quantitative genetic model, making it feasible to estimate heritability on very high dimensional data, like Magnetic Resonance Images of the brain.

Ge, T., Nichols, T. E., Lee, P. H., Holmes, A. J., Roffman, J. L., Buckner, R. L., Sabuncu, M. R., Smoller, J. W. (2015). Massively expedited genome-wide heritability analysis (MEGHA). *Proceedings of the National Academy of Sciences of the United States of America*, 112, 201415603. doi:10.1073/pnas.1415603112



What's on

WDSI Workshops

Big Data & Computational Scalability
Wednesday, 1st July
MS.02

For more information, and to register, visit:
<http://www2.warwick.ac.uk/fac/sci/wdsi/event/s/yobd/computational/>

Further WDSI Workshops

Never Mind the Big Data Here's the Big Models
Tuesday, 15th December
MS.01

CRiSM Seminars

Seminars will be held in D1.07 (Complexity)

Friday 12th June
14:00—16:00

Sara van der Greer (Zurich)
Daniel Simpson (Warwick)

CRiSM Workshops

27-29th July

Flexible Models for Longitudinal Survival Data
with Applications in Biostatistics

7-9th September

Non-likelihood Based Statistics Modelling

Other Statistics Seminars:

SF@W

Friday, 5th June (A1.01)
14:00—15:00
Antoine Jacquier (Imperial)

RSS West Midlands Local Group Meetings

More information can be found via the group's website
<https://sites.google.com/site/rsswmlg/forthcoming-meetings>

Young Researchers' Meeting

Meetings take place on Tuesdays in C0.06

Mathematical Sciences in the Industrial Workplace

Rolls Royce Learning and Career Development Centre was the setting for the 4th IMA Employers forum on 12th February 2015. 20 University delegates met with representatives from Rolls Royce, DSTL, AMEC, AWE, MBDA, SOFINEL, STFC Rutherford Appleton Laboratory, GCHQ, Smith Institute, EDF Energy, Met Office, EPSRC and the Institute of Mathematics and its Applications (IMA) to discuss the employment of graduates and PhDs in the mathematical sciences. The talks and discussions were focused around the preparation of students for work in commerce and industry and employer support for their career progression.

Dr. Steve King (Rolls Royce) spoke on the identity of mathematicians in engineering. It is commonplace for engineering firms to have clear career progression for Engineers, including routes to chartership (CEng) on which promotion may depend. Equivalent routes for Mathematicians and Statisticians to acquire CMath or CStat are less common and they often felt constrained to follow the engineering route in order to progress. Dr King outlined the improvements Rolls Royce were making to recognise the valuable contribution of these branches of the mathematical sciences to their businesses and enable them to make progress in their chosen discipline. Some of the key attributes that Rolls Royce are looking for in graduate or postgraduate applicants are strong educational achievement, the ability to apply knowledge to solve problems, working in mixed skills teams, communication, self management, motivation, customer focus, languages, mobility and work experience. PhD applicants can be direct entrants rather than going through the graduate training scheme. Dr King illustrated the centrality of the mathematical sciences to Rolls Royce by demonstrating that the gas turbine required maths at every stage.

Erica Tyson, formerly of Rolls Royce and now the IMA's universities liaison officer, outlined the importance of preparing undergraduates in the mathematical sciences for the industrial workplace. Their analytic skills are often highly prized, but in some cases they did not have the experience of working in groups, giving presentations or mathematical modelling. Additionally, there is not the same culture of gaining work experience as there is in engineering, putting students at a disadvantage. Helping out at open days, educational outreach and organising student societies or events can all be used to demonstrate communication skills, project management and leadership, enhancing a student's employability.

Dr Alan Stevens, retired for Rolls Royce, outlined a range of approaches he had employed for a variety of problems handed to him by the engineers and how some poor approaches had potentially serious consequences. He concluded that mathematical sciences were sorely needed in engineering.

The final speaker was Dr. Karen White of DSTL, who spoke on turning a maths graduate into a defence scientist. Dr White noted that out of 85 vacancies, mathematical sciences degrees had been marked as suitable in 28 of them. The vacancies are likely to be titled 'analyst', 'scientist', 'engineer' rather than statistician or mathematician but that applicants should not be deterred by this; DSTL are very interested in data science, modelling and simulation, operational analysis and optimisation, etc. Dr White went on to describe the graduate training programme at DSTL, which includes generic course for all, e.g. high impact writing, presentation skills along with role-specific training which may include secondment to a customer's business. They have a chartership programme with 24 professional bodies including the RSS and IMA and there are special interest groups for statistics and for maths. DSTL also offer research scholarships and diverse career opportunities, including on the front line.

During the discussion, the other employers reiterated the applicant attributes outlined by the speakers and are pleased to see that some universities are beginning to include opportunities to develop these skills within their courses, but would like to see students make more progress. They pointed out that many of them offer summer internships and year-in-industry opportunities which can become job opportunities as well as providing the much-needed boost to the CV. Some of the strategies outlined to provide continuing professional development for mathematical sciences include mentors, special interest groups, seminars, reading groups, conference attendance and submitting conference papers. Delegates indicated that DSTL, Rolls Royce, AWE and others were keen to have collaborations with universities, for example in joint Masters projects. The sticking point is often that they are not in a position to offer funding and that the project must be acceptable to both the industrial partner and the academic institution. Academics that had put a good deal of effort into building relationships had seen a great many brought to fruition.

This was a valuable insight into the opportunities and challenges for statisticians and mathematicians who want to work in industry and commerce. The bottom line seems to be: work hard in your studies, but do other things, too!

If you are interested in the IMA employers forum or conferences in data science or mathematics in defence, visit www.ima.org.uk

Martine Barons