



The New Zealand Statistical Association Newsletter

Number 84

January 2020

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Welcome

by VANESSA CAVE

Happy 2020 everyone!

The year ended with a flourish for the NZSA with a very successful **conference** in Dunedin and the presentation of the **NZSA awards**. Many congratulations to Varvara Vetrova, the recipient of the Worsley Research Award, and to Richard Arnold, the recipient of the Littlejohn Research Award. You can read more about their achievements and contributions to statistics in this **newsletter**. I'd also like to take this opportunity to thank on behalf of members all those involved in the organisation of the very successful 2019 conference, including Tilman Davies (Chair), David Fletcher, Matt Parry, Ting Wang and Timothy Bilton.

Our conference this year will be the Australian and New Zealand Statistical Conference (**ANZSC2020**), taking place on the Gold Coast from the 6th to the 10th of July. This conference will bring the NZSA together with other leading statistical communities in Australasia, including the Statistical Society of Australia, the International Institute of Business Analysis and the Australian Conference on Teaching Statistics. I hope to see many of you there! We plan to hold our AGM during this conference, utilizing technology to enable members to join remotely. (Note: at the recent AGM a rule change to the constitution was passed to allow virtual attendance at NZSA meetings).

The Statistical Society of Australia has decided to host an Inaugural **Joint Southern Statistical Meeting** in Darwin in 2022 (27 June -1 July). The Executive will work through the NZSA's potential involvement in this venture. I welcome your feedback and ideas.

Wishing you all a wonderful 2020!

Ngā mihi,

Vanessa



Kia ora koutou,

I hope that you all like me managed a break over Christmas and the New Year. Walking the Milford Track with friends and then exploring the wider Queenstown area gave me a much needed break. However I must confess that it already feels like things are getting busier and my work days getting longer. How does one keep to those New Year resolutions of looking after oneself and balancing work and the rest of life?

I am once again very grateful to the dedicated team of correspondents who have provided the content for this newsletter. Without their contributions there would not be a newsletter. I also need to acknowledge the superb proof reading skills of Harold Henderson and Catherine Cameron. Despite my best attempts they always seem to find numerous typos and other errors that I have missed.

The next newsletter is planned for July, contributions are always welcome, copy to me by mid-June please.

Ngā mihi,
Marie



Conferences

2019 NZSA Conference

by TILMAN (LOCAL ORGANISING COMMITTEE CO-CHAIRS)

The 2019 NZSA conference was held in Dunedin in the final week of November.

A report on (and photograph of) the recipients of two NZSA awards can be found later in the Newsletter, [here](#).

Harmonic Analytics Student talk award winners were: Yonshi Deng, UoA (Best student talk), Kevin Cheng, UoA and Kien Tran, VUW (Highly commended student talk), and David Chan, UoA, Khandoker Akib Mohammad, VUW and Olivia Angelin-Bonnet, Massey (Honorable mention student talk).

There was also a student poster award with the winners being: Anna Redmond, UoO (Best student poster) and Sarah Croft, UoO (Honorable mention student poster).



Student award winners (from L to R): Khandoker, Kian, Olivia, David, Kevin, Yongshi, Vanessa Cave (NZSA President), Glenn Thomas (Harmonic Analytics) and Anna.

See more photos from the 2019 conference at:

<https://www.flickr.com/photos/111101747@N06/albums/72157711950005191/>

2020 Conferences

ANZSC2020



ANZSC2020 is a joint meeting of the New Zealand Statistical Association and the Statistical Society of Australia that will be held in Australia, on the Gold Coast. Our societies last met together in Auckland in 2006! The conference is also joint with the International Institute of Business Analysis.

The main meeting will run July 6-9 with the teaching conference OZCOTS (a separate registration) running on the 9th and 10th.

There will also be 5 professional development workshops on offer immediately preceding the conference on July 5th.

Confirmed keynote speakers are **Ian Anderson** (Deputy Secretary for Indigenous Affairs) **Kerrie Mengersen** (QUT), **Renate Meyer** (University of Auckland), **Frauke Kreuter** (University of Maryland), **Iain Johnstone** (Stanford), **Vivek Chinchalker** (National Australia Bank), and **Robert Gould** (UCLA).

Abstracts for contributed talks are being accepted until January 31 2020, with notification in February. Early bird registration rates apply until March 27.

Pre-conference Workshops

The Organisers are pleased to announce the following pre-conference workshops to be held on Sunday, 5 July 2020 at the Mantra Legends Hotel at Surfers Paradise, QLD: **Visualisation for Data Science** with Ian Westbrooke and Jennifer

Brown. This workshop will help participants to understand the principles of data visualisation and how to implement those principles using the package ggplot in R

Simplify your statistical life: Git for collaborating with yourself and others with Peter Baker Git is currently the most popular Version Control System employed by software developers and statisticians alike. This hands-on one day tutorial will step participants through the basics of version control using Git and specific Github features.

From machine learning to statistical modelling (Frequentist & Bayesian), via logistic regression in Autostat with Samantha Low-Choy and Clair Alston-Knox This workshop will step you through the interpretation, advantages and shortcomings of three common paradigms: machine learning, classical statistical modelling (relying on p-values and Wald's confidence intervals for inference); and Bayesian statistical modelling (relying on Markov chain Monte Carlo to simulate from the posterior).

Business Skills for Business Analytics with Mark Griffin and River Paul This workshop will step through each of the stages involved in a business analytics project.

Registrations are now open!

We are currently negotiating a fifth workshop to be held on the same day: **Gaining Skills in Biostatistical Consultancy** - Details to follow.



The International Statistical Ecology Conference (ISEC2020), will be held on June 22-26 2020 in Sydney Australia. Abstract submission is now closed, registration is open. Bursaries are available to presenters from developing countries. For details go to the conference website <http://www.isec2020.org>

We have an exciting and diverse scientific program planned at the interface between statistics and ecology, with plenary talks by **Christl Donnelly** (Imperial College, London), **David Borchers** (St Andrews), **Di Cook** (Monash), **Kiona Ogle** (Northern Arizona) and **Mark Bravington** (CSIRO), and invited sessions on reproducible science and methods for high throughput community data.

The most excellent ISEC2020 training program includes a one-day Skills Showcase on June 22, with 90-minute introductory tutorials on spatial capture-recapture, multivariate analysis, hidden Markov models, disease modelling, data visualisation and more.

The pre-conference short courses are:

- A statistical view of deep learning in ecology. Jennifer Hoeting (University of Colorado)
- Level-up your R package. Nick Golding and Saras Windecker (University of Melbourne)
- Spatial modelling and visualization of species distribution and disease risk using R and INLA. Paula Moraga (University of Bath)
- Multivariate modelling and joint species distribution models in ecology. Scott Foster (CSIRO), Otso Ovaskainen (University of Helsinki), Gordana Popovic and David Warton (UNSW Sydney)
- With great power comes great responsibility: Stan for modern ecological modelling. Daniel Simpson (University of Toronto) and Andrew MacDonald (Université de Montréal)

Best regards, The ISEC2020 Local Organizing Committee <http://www.isec2020.org>

Follow us on:

Twitter @isec2020

Facebook International Statistical Ecology Conference (ISEC)

Obituary

Ken Russell

by PETER THOMPSON AND HAROLD HENDERSON



Ken Russell (ex Victoria University of Wellington) passed away peacefully in Wollongong on 16 July. He was suffering from cancer.

Before he came to New Zealand, Ken had kidney failure and needed dialysis. While at VUW he had a successful kidney transplant and for most of his life had a working NZ kidney alongside his two non-working Australian kidneys. His New Zealand kidney performed sterling service throughout and it was the cancer that took him in the end.

Although not unexpected, Ken's passing has come far too soon. He was still relatively young and had yet to reach the hallowed three-score years

and ten. He is fondly remembered by his friends and colleagues.

Ken was an adjunct Professor of Mathematical Science in the School of Computing and Mathematics at Charles Sturt University. He joined CSU in 2011 after many years at the University of Wollongong, where he was Director of the Statistical Consulting Service for most of the time. He taught many mainstream and service Statistics subjects in that time, and held several teaching awards, including an ALTC Citation for outstanding contributions to student learning. His research specialty was Experimental Design

He took over as Technical Editor of the Australian and New Zealand Journal of Statistics during the 2004-5 year and served for 6 years until 2010-11.

Ken continued his membership of NZSA until his retirement in 2015. His book on "Design of Experiments for Generalized Linear Models" was published at the end of 2018. A link to the book is [here](#).

Stories of interest

Meet the NZSA Executive

Each newsletter some of the current NZSA executive introduce themselves. The brief they have been given is to provide a photograph and a paragraph answering some or all of the following three questions.

- What is your current role on the NZSA executive? How long have you been doing it?
What (if any) other roles have you had?
- What is your job/connection to the NZ statistics community?
- What do you enjoy doing outside of work?

Nokuthaba Sibanda



I have been on the Executive Committee since 2018, starting off as a member of the Continuing Professional Development subcommittee. Currently I serve as a committee member.

In my professional life, I am a Senior Lecturer in Statistics at the School of Mathematics and Statistics at Victoria University of Wellington. I'm also a Senior Research Fellow in Biostatistics at the Centre for Women's Health Research at Victoria. I first joined Victoria as a Consulting Statistician in 2007 and subsequently got on the academic track in 2009.

Outside of work I enjoy the occasional run or walk and skiing in winter. Most of my weekends are taken up commuting between Wellington and our home in the Bay of Plenty, with my favourite radio station keeping me company! I also enjoy spending time with family and friends.

Shirley Wu



I have been the R users group representative on the NZSA Executive Committee since 2015.

I have worked for Harmonic Analytics, a leading NZ-owned data science company, since 2004. I am currently their Operations Manager but have previously held different analytical roles in the company. I have a statistics background and we pride ourselves on using statistics to help organisations solve complex challenges and make better decisions on issues that matter.

Outside of work I enjoy group fitness, sketching and watching dance performances.

NZSA Awards 2019

Worsley Early Career Award

The Worsley Research Award recognizes outstanding recent published research from a New Zealand statistician in the early stages of their career. In particular, applicants must be within seven years of confirmation of their PhD. New Zealand is fortunate to have some excellent young statisticians, so this year's recipient is joining a distinguished group.

Varvara Vetrova

University of Canterbury

Varvara's research is in the intersection between applied statistics and machine learning.

Her contribution lies in methods for fine-grained image recognition with small sample sizes and imbalance classes, and statistical methods for bivariate data analysis.

These methods have numerous applications.



Littlejohn Research Award

The Littlejohn Award is the Association's premier research award, recognizing excellence based on publications during the five calendar years preceding the date of the award. The members of the Awards Committee were presented with a particularly difficult choice this year, with multiple excellent nominations.

Richard Arnold

Victoria University of Wellington

A background in physics has led Richard to successfully apply techniques of mathematical and computational modelling across a wide range of statistical problems.

These include the theory and practice of directional statistics, and applications in ecology, reliability, linguistics and seismology.



International Awards

Hadley Wickham

Kiwi wins prestigious international statistics award for his outstanding contributions to the profession was the headline in the NZ Herald when Hadley received the International Committee of Presidents of Statistical Societies (COPSS) award in July 2019. Hadley's citation read:

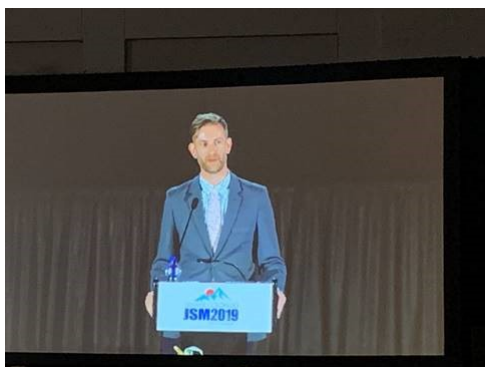
For influential work in statistical computing, visualization graphics and data analysis;

for developing and implementing an impressively comprehensive computational infrastructure for data analysis through R software;

for making statistical thinking and computing accessible to large audience;

and for enhancing an appreciation for the important role of statistics among data scientists.

A link to the NZHerald article is [here](#).



Bruce Weir

NZSA member Bruce Weir of the University of Washington in Seattle was the recipient of the 2019 Genetics Society of America (GSA) Elizabeth W. Jones Award for Excellence in Education.

Bruce received the award for his contributions to the training of basic and applied population and quantitative geneticists from across the globe.

More about both Bruce and the award can be found [here](#).





The *International Data Science in Schools Project* (IDSSP, www.idssp.org) is a cross-disciplinary project involving an **international Curriculum Team** of computer scientists and statisticians from the **leading professional organizations for both disciplines**. Its purpose is to promote and support the teaching of Introductory Data Science with an emphasis on the final two years of secondary school. The first phase of the project, the development of **curriculum frameworks for data science** (an online report), has been completed. Although the overarching focus is on learning from data and many elements of the frameworks are recognisable from introductory statistics, many others are not, e.g., modules on: the data-handling pipeline, dynamic and interactive visualization, geo-located/map data, text data analytics, supervised machine learning, unsupervised machine learning, image data, time series, recommender systems, and network.

To date these frameworks have been endorsed by organisations including the American Statistical Association, the Royal Statistical Society, BCS

(The Chartered Institute for IT, previously known as the British Computer Society), The International Statistical Institute, The Statistical Society of Australia, the Teaching Statistics Trust (UK), ACEMS (Australian Research Council Centre of Excellence for Mathematical and Statistical Frontiers) and our own NZSA. Our representatives on the project are Chris Wild on the Curriculum Team and Anna Fergusson and Michelle Dalrymple on the **Advisory Group**.

It is envisaged the Frameworks developed to date will be used not just in schools, but also as a valuable source of information for data science courses in community colleges and universities.

The supporting societies are currently pondering how to build on this work, seeking the funding to support a major international project to complete a second phase of the project in which these frameworks inform the development of pedagogies, teaching, learning and assessment resources for both students and teachers.

For further information please email **Chris Wild** or idssp.info@gmail.com, or visit www.idssp.org.

Updates

Student & Early Career Statisticians Network

by LISA THOMASEN



Statistical Society of Australia (SSA) Young Statisticians Conference

In October I had the opportunity to attend the SSA Young Statisticians conference in Canberra. The conference began with a trivia night hosted by the Canberra branch of the SSA which my team ended up winning. Being part of a quiz team was a great way to meet people.



The Australian Parliament building in Canberra with Telstra Tower in the background

The conference was run as a single stream and included interesting speakers from a variety of universities, industries and government departments. It's interesting to see that no matter where you work, statisticians are bound to be frustrated by colleagues with abysmal data management skills!

There were two NZ attendees, myself and **Rajas Kulkarni**. The next Young Stats Conference will be held in 2021. Keep an eye out for the details, as these conferences are a great way to meet statisticians across the ditch.



Lisa Thomassen at the conference venue: the Manuka Oval – home of AFL in Canberra

Dunedin Conference Networking Event

At the November conference in Dunedin, we hosted a S&ECS networking event at the University of Otago Staff Club. The drinks and nibbles were sponsored by Minitab and the NZSA. This is the third year running that Minitab has sponsored this event and we're really grateful for their continued support. Follow Minitab on LinkedIn for tips and case studies discussing how Minitab is used in industry: <https://www.linkedin.com/company/minitab>

This event was well attended and the staff club proved to be an ideal venue. Thanks to **Timothy Bilton** for running the event on the night and to **Harold Henderson** for providing photographic evidence of the event.



Networking in progress



*NZSA President **Vanessa Cave** (left) joins in the networking*



*The S&ECS networking event was sponsored by **Minitab**.*

Wellington S&ECS Rep

I am pleased to welcome **Louise McMillan** onto the S&ECS team as our Wellington rep. Louise got into statistics after discovering the delight of Bayesian statistics. She recently completed her PhD at the University of Auckland and is now working as a postdoc at Victoria University of Wellington. Her research is focused on animal population genetics methodology and method-based clustering.

If you're a student or early career statistician in the Wellington region, get in touch with Louise (louise.mcmillan@vuw.ac.nz) to share your ideas for upcoming events or let her know your preferred snacks for the screening of the Ihaka lectures happening in a couple of months.



Louise McMillan – our new Wellington rep

NZSA Conference Bingo

At the 2019 NZSA Conference in Dunedin, the S&ECS network hosted a game of conference bingo which had free NZSA 2020 memberships up for grabs as prizes. The bingo involved ticking off 16 tasks throughout the conference which included attending the AGM, asking a question after a talk and interacting with the NZSA on social media.

There were three people who completed their bingo forms and won themselves a free NZSA membership. Congratulations to **Rodelyn Jaksons**, **Amanda Hughes** and **Glenn Thomas** for completing their forms! Thanks to everyone who gave the game a go and a massive thanks to **Timothy Bilton** for promoting and running the bingo throughout the conference.

To get involved with the S&ECS network, connect with us on Facebook or LinkedIn or email one of our regional reps!

Facebook group

<https://www.linkedin.com/groups/5159587/>

<https://www.stats.org.nz/profiles/>



The BINGO sheets



*From left: Timothy Bilton Otago S&ECS rep with the BINGO winners; **Rodelyn Jaksons**, **Amanda Hughes** and **Glenn Thomas***

News from the Statistics Education Teams

Statistics Education News

by MAXINE PFANNKUCH



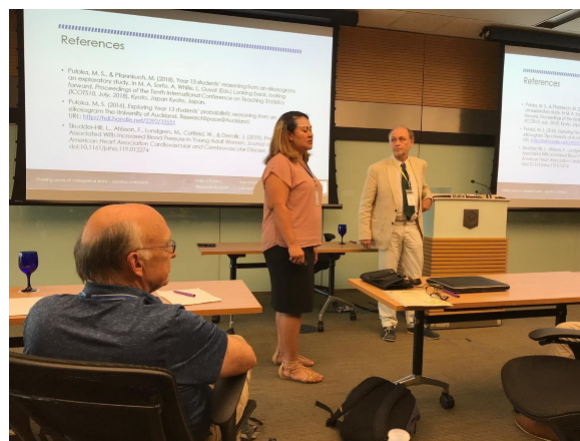
New journal for statistics teachers

A brand-new online journal to showcase high quality, peer-reviewed lesson plans for statistics teachers has been launched. Statistics & Data Science Educator (SDSE) aims to recognise the innovative work of New Zealand teachers as well as provide resources for teachers seeking new ideas to engage with new content and teaching approaches. The journal publishes lesson plans from early childhood to tertiary levels. **Maxine Pfannkuch** is managing editor, with **Anna Fergusson** in the role of website and technical editor. The journal arose from concern among members of the New Zealand Statistical Association education committee, of which both are members, that teaching resources for the local statistics curriculum at the school and tertiary level needed to be improved. For a lesson plan to be published in the journal, it must have been trialled with a class, with student feedback captured, artefacts produced, and teacher reflections on implementation. The lesson plan must also be supplemented with teacher notes so teachers can gain more knowledge about the content and pedagogy employed. It is hoped that the journal will be recognised as a place where teachers can obtain high quality teaching resources.

People in statistics education research

Anna Fergusson has had an exceptionally busy and successful second half of this year presenting talks and workshops based on her PhD research about how to introduce statistics teachers to modern data, data wrangling, and computational thinking or coding. In July she presented at the 11th International Research Forum on Statistical Reasoning, Thinking and Literacy (SRTL) in Los Angeles, USA. In August in Denver, USA, Anna gave two workshops at the American Statistical Association (ASA) Teachers' Workshops as part of the Joint Statistical Meeting as well as participating in an invited panel on Data Science Education. A plenary talk at the Auckland Mathematics Teachers Saturday Morning occurred in September, while in October she was a keynote speaker at the New Zealand Mathematics Teacher Association (NZAMT) conference in Wellington for which she also gave a workshop. Prior to NZAMT Anna presented her research at the NZCER/Victoria University of Wellington Mathematics and Statistics Education Research Symposium. Anna is awaiting the ASA publication for teachers featuring statistical modelling activities, for which she was graphics editor.

Anne Patel presented her PhD research on middle school students' emerging conceptual development in a data modelling environment at SRTL. At SRTL **Maxine Pfannkuch** was a discussant, whose role was to present an overview of the main themes emerging from the conference presentations. Papers are rewritten as journal articles in the light of feedback from the conference.



*Malia at her IASE presentation with IASE president
Joachim Engel, Germany*



SRTL participants at UCLA, Los Angeles

In August at the International Association for Statistical Education (IASE) Satellite Conference, in Kuala Lumpur, Malaysia, **Malia Puloka** presented her PhD pilot study research on how undergraduate students pose questions involving categorical data and the resultant confusion about the nature of the question. **Amy Renelle** also presented her PhD research on undergraduates' thinking about the nature of randomness at the IASE satellite conference as well as at the NZCER/Victoria University of Wellington Mathematics and Statistics Education Research Symposium in October. **Stephanie Budgett**, the Proceedings Editor for the Satellite conference as part of her role as Vice-President on the IASE Executive Committee, attended and produced the proceedings a few months later. See [here](#).

Rachel Passmore presented her PhD research on capstone courses and in particular statistics capstone courses, at the 12th Southern Hemisphere Delta Conference on the Teaching and Learning of Undergraduate Mathematics and Statistics in Perth in November. The Faculty of Science at Auckland University now requires all undergraduate students to do a capstone course as part of their degree. Rachel was awarded the Margaret Goldstone Travel Award to find out more about the implementation and rationale for capstone courses, which she will undertake in the UK early next year.

Pip Arnold has been busy working on learning indicators and developing resources to support statistics teaching and learning in the New Zealand Curriculum and Te Marautanga o Aotearoa for the Year 1 to Year 11 levels as part of her Beeby Award. Her involvement in the updating and writing of the ASA GAISE (Guidelines for Assessment and Instruction in Statistics Education) document, to be published next year, shows a distinctive NZ statistics education research influence.

Chris Wild has continued to run his Data to Insight MOOC twice each year with the help of **Mike Forster**. His main focus, however, was the International Data Science in School Project, for which he was a lead writer. Currently he is working on finding ways to develop his software package iNZight so that it can become a useful and easily accessible analytical tool for researchers and policy developers in the developing world and for people who need an analytical tool that is easy to use.

Rhys Jones was approached by Sage publishing to write a book to help humanities students develop their maths skills to explore data confidently. The book, entitled *Essential Maths Skills for Exploring Social Data*, will be published in early 2020.

Statistics Teacher's Day, 29 November 2019, Auckland. The Department of Statistics, UoA, and the Auckland Mathematics Association organized and ran a very successful Statistics Teacher Day with 273 teachers attending. The day was very ably led by the convenors, **Emma Wilson** and **Anna Fergusson**. The plenary speaker was **Ben Stevenson**, University of Auckland, who gave a very well-received talk on *Adventures in Statistical Ecology*. Workshops for teachers ranged from introducing new teachers to the current NZ statistics curriculum to introducing teachers to what a future statistics curriculum might include. Pip, Anna, Stephanie, Amy and Anne gave workshops.

Other regional associations that ran mathematics and statistics teacher days at the end of 2019 were: Northland Mathematics Association, The Bay of Plenty Mathematics Association, Manawatu Mathematics Association, Wellington Mathematics Association, and the Otago Mathematics Association.

CensusAtSchool Project. During 2019 the CensusAtSchool project team ran their 2019 census. Over 30,000 students participated, with

four press releases occurring, with the latest press release in August being about 15 to 18-year-olds perceptions of smoking cigarettes and smoking marijuana. **Chris Wild** and **Rachel Cunliffe** are Co-Directors of the Project and **Atakohu Middleton** writes press releases. **Anne Patel** is responsible for the teaching resources on the website. See: www.censusatschool.org.nz.

Australian Conference on Teaching Statistics (OZCOTS) 9-10 July 2020, Gold Coast, Queensland, Australia. This conference is held as a separate program stream in the joint Australian Statistical Society and NZSA Conference. The theme for the conference is *Statistics education in today's world*. The deadline for abstract submission is January 31. See: <https://anzsc2020.com.au/ozcots-conference/>

IASE 2020 Roundtable Conference, Nanjing, China, 6-10 July 2020. The theme of the conference is New Skills in the Changing World of Statistics Education. The deadline for submissions has closed. Pip Arnold is the Proceedings Editor for the conference. See: <https://iase-web.org/conference/roundtable20/>

The 14th International Congress on Mathematical Education, Shanghai, China, 12-19 July 2020. IASE runs two special topic groups, one on statistics, the other probability. The deadline for submission of papers is closed. See: <https://www.icme14.org/static/en/index.html>



Our members

Following the teachers' conference at Hutt Valley High School in October (NZAMT16), we acquired two new members; **Liz Sneddon** of Auckland, and **Barbara Costelloe** of New Plymouth. Both Liz and Barb are very experienced leaders in mathematics and statistics teaching, and we look forward to their input.

We congratulate **Derek Smith** and his team on the success of the NZAMT16 teachers' conference. It ran smoothly with the help of new purpose-built software, and gave attendees many opportunities to consider all the changes that are happening in NZ mathematics and statistics education.

Chris Franklin, our overseas (USA) member, was at the conference, and said:

I was amazed at where NZ teachers are: their confidence and competence, and their interest. Anna Fergusson's keynote at the conference was a huge boost to statistics education in NZ

John Harraway has retired from the committee, but he won't be forgotten. He recruited some other fine Otago people on to the committee: five of them!

New Zealand's new journal: Statistics and Data Science Educator (SDSE)

Our own online refereed statistics teaching journal was launched in September. *SDSE* is now online at <https://sdse.online/>. The committee congratulates **Maxine Pfannkuch** (Managing Editor SDSE) and **Anna Fergusson** (Website and Technical Editor SDSE). We look forward to seeing it progress further, with teachers around

the country contributing and reviewing lesson plans. The website notes its NZSA basis:

Statistics and Data Science Educator is an online journal set up for teachers by members of the New Zealand Statistical Association (NZSA) Education Committee under the auspices of NZSA. It has peer-reviewed lesson plans for teachers at all levels, early childhood to graduate.

The journal aims to improve the quality of teaching resources and the designing of tasks. Task design has a critical influence on students' reasoning processes, what they learn, and on how they experience and understand the nature of statistical activity and thinking.

The Ministry's Review of Achievement Standards (RAS) within its review of NCEA

The Ministry of Education's RAS will get going fully next year. At present they are finalising the Subject Expert Groups (SEGs) for each subject. We hope to support and be represented on the SEG for Statistics.

This SEG will have the extremely important job of clarifying the big ideas and essential learning in our subject, and stating these in the newly-created 'Learning Matrix' for the last three school years of the subject. They will then create a new 'Assessment Matrix' detailing the four Achievement Standards for each year, and their relationships. They then need to write these Achievement Standards, and examples of how they will work.

So if you have case studies with stories and dataset, please feed them to us!

We hope to be part of some massive progress in the learning of statistical skills, and to assist the Ministry with its aims of improving wellbeing (of teachers and students), credibility (of the qualifications), and coherence (of the whole system).

We've had some inputs into the Ministry's processes along the way. They include a paper in May (*Learning Area and Subjects in Mathematics and Statistics*), and a visit to both Ministry and NZQA in Wellington in October by a team of five of us (**Chris Wild, Anna Fergusson, Pip Arnold, Michelle Dalrymple, Derek Smith, Mike Camden**). Chris led a presentation, at both meetings, on the state of school statistics education, and on what the committee had to offer.

The Ministry says:

The Review of Achievement Standards will commence in 2020 as part of the NCEA Review Change Package.

The achievement standards are due to be reviewed every five years. The RAS presents an opportunity to bring the curriculum to the forefront of teaching and learning to address equity and parity issues, teacher and student workload issues and to ensure that the standards are fit for purpose for today's context and into the future.

We will be reviewing:

- All subject matrices
- All achievement standards
- All assessment resources, teaching and learning guides, and exemplars.

The Ministry used Science as a trial. If you want a glimpse of the future, it is [here](#)

The Ministry's NCEA Change Package 2019 is [here](#).

Its Review of Achievement Standards is [here](#).

NZQA's 2020 proposed Statistics Digital Innovation trial

NZQA hopes to trial external assessment in statistics, and has invited us to participate in this trial. We hope to have two members on their team.

The International Data Science in Schools Project

For the IDSSP, see: <http://www.idssp.org/>. It released its Curriculum Frameworks for Introductory Data Science in September. For more see Chris Wild's article earlier in the [newsletter](#).

International engagement continues

This includes these activities:

- Collaboration continues between ourselves and the ASA/NCTM committee in the USA, with some of our members involved in writing of their resources (see below).
- Members are involved in the International Data Science in Schools Project: <http://www.idssp.org/>.
- **Anna Fergusson** presented workshops with a data science focus at JSM/MWM, held July 28-August 1 in Denver, Colorado.
- ASA/NCTM is on track to release two resources this year, including one titled *Focus on Statistics - Investigations for the Integration of Statistics into High School Mathematics Classrooms*, a collection of data-centric investigations for High School students, for which Anna was the graphics editor. The second resource is a statistics book for teacher educators with **Christine Franklin** as one of the co-authors.
- **Pip Arnold** is a member of the Pre-K-12 *Guidelines for Assessment and Instruction in Statistics Education (GAISE)* second edition writing team. The *GAISE II* document signals progression in statistics education from the original *GAISE* which was published in 2005. The *GAISE II* document is designed to support both teaching and learning, and policy direction, both in the United States and internationally. *GAISE II* will be rolled out April 2020 at the 100th anniversary NCTM conference in Chicago, Illinois.

- **Rhys Jones** has been asked to join the Royal Statistical Society's new Teaching Statistics Special Interest Group.
- In setting up *SDSE*, **Maxine Pfannkuch** has been exchanging ideas with **Catherine Case**, Editor of *Statistics Teacher*, about criteria for good lesson plans and including an Editor's Note.

ASA/NCTM = American Statistical Association / National Council of Teachers of Mathematics
 JSM/MWM = Joint Statistical Meetings / Meeting Within a Meeting of ASA/NCTM

What we released

We sent out three 'statements', since June:

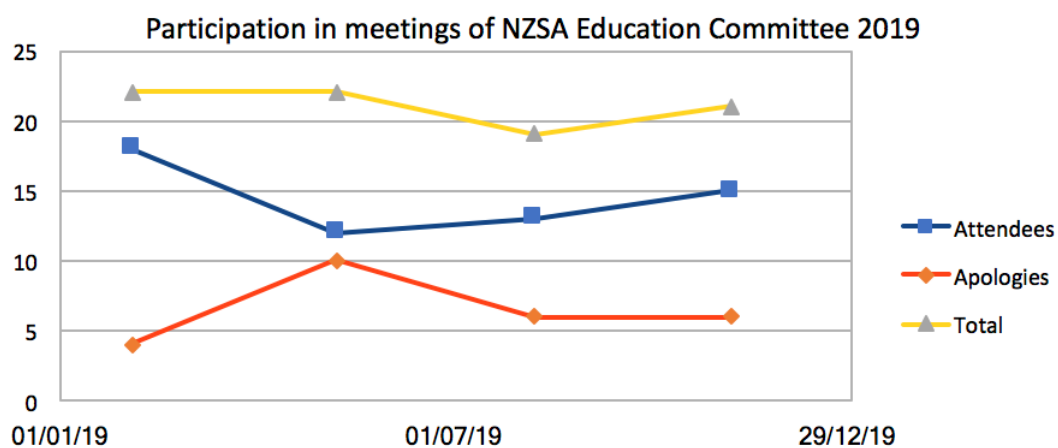
- *Statement to NZQA about AS91035, AS91264 and AS91582 clarifications and student exemplars*, August 2019
- *Learning Area and Subjects in Mathematics and Statistics*, 11 July 2019. This is a statement for the Ministry, and other stakeholder groups, about ensuring that mathematics and statistics has substantial options in the new NCEA system.
- Kim Hill on RNZ on Saturday 7 Sept 2019 10.05 am and 31 Aug 11.40 am: David Spiegelhalter, Hadley Wickham respectively.

David Spiegelhalter's views of statistical education in NZ

On September 7, Kim Hill asked David Spiegelhalter if they taught statistics in UK schools. This is an edited version of some of what he said:

Yes, but not as well as in New Zealand. New Zealand is the world leader in statistics education. I take full credit for stealing from New Zealand's way of teaching statistics in schools. It's quite extraordinary the progress that's made. You may not know from inside in New Zealand, but New Zealand has a fantastic reputation for education both in statistics and computing. It is an amazing achievement.

We did meet during 2019



Local News

Statistics at ...

AgResearch Statistics Group

by MARYANN STAINCLIFFE



AgResearch has been a long-time supporter of its Statisticians being actively involved in NZSA. This includes enabling AgResearch Statisticians to serve on the NZSA executive and subcommittees, help organise NZSA conferences and events, and participate in NZSA activities. Not only does this involvement help raise AgResearch's profile with potential employees, but it's hugely beneficial for ongoing professional development of both technical and leadership skills. Currently AgResearch has three staff serving on the NZSA committee: **Vanessa Cave** (President), **Harold Henderson** (Membership Secretary) and **Alasdair Noble** (Convenor of the Education Committee). Additionally, **Timothy Bilton** organised the young statistician function at the conference.



Tim explaining conference bingo



The Department of Biostatistics and Epidemiology (DoBE) at AUT will be starting 2020 in a new office location on the North Campus. We have one new member since the last newsletter, data manager **Isabel Johnson**, and welcomed back returning member **Stéphane Janicot** as Research Officer. Also in January 2020, **Nathan Henry** will be joining the team.

Head of Department **Nick Garrett** continues to be involved in research projects in gambling and addictions, Maori health, Pacific health, family violence, physical activity, substance abuse, and mental health. **Priya Parmar** has been working on developing the first satellite centre of Global Burden of Disease (GBD) for NZ. **Melanie Moylan** has been appointed to the Occupational Health, Safety and Performance Council in the Australasian Sleep Association, and some of her collaborative work in the ICU space was presented at the European Respiratory Society in Madrid, Spain in September. **Ben Elliot** is involved in developing strategic data management systems and processes, as well as developing and assisting with data management solutions for research projects.

DoBE members are key named investigators in major projects including the NSC-funded PREVENTS study, a randomised controlled trial (RCT) of health and wellness coaching, which has entered the analysis phase steered by National Institute of Stroke and Neuroepidemiology (NISAN); the Ministry of Health (MoH)-funded Effectiveness of a Face-to-Face Intervention for

Problem Gambling RCT, steered by the Gambling and Addictions Research Centre (GARC); continued work on GARC's National Gambling Survey, funded by MoH; the MBIE-funded Harmonised study, a Māori-centred project including a stepped wedge trial of a private social platform app for healthy relationships amongst taitamariki; HRC-funded hearing and respiratory studies from the Pacific Island Families study; HRC-funded Auckland Regional Community Stroke Study (ARCOS V); the Violence Intervention Program for the District Health Board; and analysis of NZ Health Survey data on mental health and substance use through a consortium with Ko Awatea at Counties Manukau Health.

Our members also supervise/advise numerous postgraduate students in the Faculty of Health and Environmental Sciences, assisting in the design of their projects and fully supporting their statistical needs. Collectively in 2019, the 7 full-time and 2 part-time members of the Department have co-authored papers in fields such as stroke, oxygen therapy, diarrheal disease, and GBD.

Lastly, after nearly a decade in DoBE, being a core contributor to many research projects, Associate Professor **Alain Vandal** joined the Department of Statistics at University of Auckland in July 2019. He continues to work collaboratively with DoBE and continues to support our ongoing projects. We would like to congratulate him on his new appointment and wish him the very best for the future.



Victor Miranda (in collaboration with **Thomas Yee**) has completed initial work on *Quantile Modelling for 1-parameter distributions using vector generalized linear models* (Miranda-Soberanis & Yee, 2019). Unlike usual quantile regression, the distribution is specified and the quantile function is transformed to become linear or additive predictors. This framework is coupled with the ability to fit smoothers and the underlying strong assumption of the distribution can be relaxed so as to offer semiparametric-type analysis. The new link functions are available in the `VGAMextra` package for `R` (Miranda-Soberanis, 2018). Currently he is extending this modelling framework to 2-parameter distributions and has solved a decades-old problem implementing the two-parameter canonical link function of the negative binomial distribution (NBD).



Victor

Victor also attended the 2019 NZSA Meeting from 26 - 29 November in Dunedin, hosted by the University of Otago, where he introduced this methodology with a paper entitled *Vector generalized linear models and two-parameter links with applications to quantile regression and the NBD*.

Nate Wichitaksorn was invited to make a presentation at the 2019 Sydney Time Series and Forecasting Symposium organized by the University of Sydney Business School where he also had a research visit during November 11-15, 2019. Nate presented a paper entitled *Analyzing Stock Returns through Mixture of Normal and Generalized Pareto Distributions*.

Nate was also invited to give a talk at International Conference in Economics and Business and had a research visit at Can Tho University in Vietnam during December 2-7, 2019. At the conference, he presented research work related to dependence modeling through copulas and seemingly unrelated Tobit models.



Auckland University of Technology's School of Sport and Recreation continues its commitment with dedicated academic staff in statistics. Over the past six months, Dr **Robert Borotkanics** provided a number of training workshops to the postgraduate students, which were well received. Additionally, 203 one-on-one consultations and training sessions were carried out with postgraduates since June 2019. **Lauren Keaney** (PhD Candidate) presented on lifestyle factors and immunological biomarkers applying Frailty model analyses at the recent Sport and Exercise New Zealand Conference, receiving the Best Oral Presentation award. **Lesley Sommerfield** (PhD Candidate) similarly presented on injury risk reduction of a sport intervention, applying Poisson models, at the 2019 Australian Strength and Conditioning Association Annual Conference. **Josh McGeown** (PhD Candidate) presented in-press results of his ROC analyses as an ACC sponsored speakers at the BrainStorm International Concussion Conference.

From the School of Sciences, **Sharita Meharry** completed her Master's (MLLS), graduating with honours (Primary Supervisor Dr Borotkanics). In November 2019, she presented her results on NZ Grade 3 breast cancer mortality and differential biomarker and ethnicity factors, which utilized the NZ Breast Cancer Register, at the 2019 New Zealand Breast Cancer Research Workshop, held at the University of Waikato.

Dr Robert Borotkanics travelled to the United States and gave a Grand Rounds presentation at the Johns Hopkins School of Medicine, entitled, *P-values and other Monsters that go Bump in the Night: Implications for Informatics*. He also just recently accepted a position as Associate Editor for the Australian Health Review. The AHR is interested in health services, clinical studies and policy analyses with a NZ focus. Robert is keen for statisticians in the wider NZSA community, working in relevant areas, to publish in this Journal. More background is available [here](#).

Fonterra R & D Stats Team

by LISA THOMASEN



After many years of campaigning for more statistics resource for the Fonterra Research & Development Team based in Palmerston North, our team has finally increased to three members. **Maree** and I welcomed **Xin Zhou** to our team in October. Xin recently completed his PhD at

Massey University in Palmerston North. After the chaos of a recent restructure, we are hoping to make some headway with our data management plan which includes a new emphasis on unique identifiers.

Nicholson Consulting

by PIP BENNETT



2019 was an exciting and busy year for us here at Nicholson Consulting. We have welcomed Data Scientist **Conrad MacCormick** and Business Engagement Manager **Sara Palmer** as we continue to grow. The launch of Impact Labs, a collaborative new business with our CE **Kylie Reiri**, owner **Todd Nicholson**, former NZ Prime Minister **Bill English** and **Emily Mason** from Frank Advice has gone well. Impact Labs enables philanthropic investors to make the most effective, targeted contributions to social improvements in NZ. **Ernestynne Walsh** and **Pip Bennett** attended a week long training in

Sydney to get up to date with the latest fraud detection technology from SAS. We also had other interesting projects going on over the past 6 months as we continue to work with organisations such as ACC, DOC, NZ Customs, the Vodafone Foundation, the Electrical Authority and NZ Rugby. Coming into Christmas Nicholson Consulting looked back at a busy and rewarding year where we worked on projects that both inspired us and made a difference. I for one am excited about the projects we have coming up in 2020, stay tuned ...



We have had several new people join the team in the last six months.

Rodelyn Jaksons has started working at the PFR Lincoln site. She recently submitted her PhD in Bayesian spatio-temporal modelling with applications in epidemiology and invasive pest modelling. At present, she is working with entomologists to better predict timings of peak infestations and some spatial statistics projects.

Daniel Bentall has started with us at our Lincoln site after completing the Master of Applied Data Science program at Canterbury University, which included a summer studentship at PFR. He is now working on building a platform for developing deep learning solutions to computer vision problems and working on a number of such problems in parallel.

Blake List recently completed a Master of Applied Data Science at the University of Canterbury before joining the data science team at PFR. He currently employs his knowledge of language

and artificial intelligence for projects related to natural language understanding and text analytics.

Heather Jenkins has been studying statistics at Massey University in Palmerston North, and is moving to Christchurch over the Christmas holiday. Her poster about her Massey project won the Best Poster award at the Statistics in Ecology and Environmental Monitoring conference in Wellington.

Cori Qian, Kate Richards and Rodelyn Jaksons attended the NZSA conference hosted by the University of Otago in Dunedin. Cori and Rodelyn presented on their research, while **Rolf Turner** (UoA) presented work he had done in collaboration with Kate. It was a great event, which showcased the interesting and useful work statisticians are doing.

Ruth Butler attended Biometrics by the Botanical Gardens in Adelaide, and chaired a session on Modelling the Environment.



David Harte has returned to SRA full time as opposed to part-time with us and part-time with GNS Science. Currently he is part of a team working on a Science Challenge project on modelling time-varying hazards such as earthquakes, landslides etc, including socio-economic impact with a unified treatment of uncertainties.

Our friend and colleague, **Fraser Jackson**, formerly of Victoria University, frequently joins us for our Wednesday lunch-time meetings.

Alistair Gray is working on collecting and

analysing monthly recreational fishing reports with a view to estimating overall catch of key fishstocks. (Regrettably for Alistair, this does not seem to involve hands-on participation in generating the data). **Peter Thomson** is using hidden Markov models to analyse wind-farm data. **Robert Davies** is analysing road crash data from across the ditch. **John Maindonald** writes occasional book reviews, comments to the ANZSTAT email list, as well as being a source of information on a remarkable range of statistical topics.

Interesting happenings

Preparing for the statistics workplace: What sort of workplace skills should statistics students start developing while they are at university? Professional Teaching Fellow Dr **Andrew Balemi**, a former head of marketing science for Colmar Brunton, offers his top tips. Details [here](#).

Taking aim at predators: **James Russell** featured in the Faculty of Science feature 'Take 10' recently. He discussed how he used science to protect New Zealand's unique fauna by removing the threats posed by introduced mammals. Details [here](#).



James Russell

Change the frame, folks: Professional Teaching Fellow Dr **Rhys Jones** recently told Newsroom why saying you're bad at maths is not, and should not be, a badge of honour. Mathematical competence, he asserts, is no less important than reading or writing. Details [here](#)

The statistics of singing: **Brendon Brewer's** love of singing as a hobby has led his academic work in a new direction. He's working with a well-known European singing school to determine the signature of sound colour in the singing spectrum. The analysis is in its preliminary stages, and Brendon discusses some of the issues on his blog [here](#).



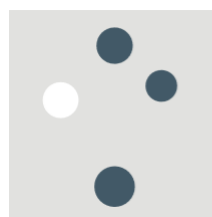
Brendon Brewer

CensusAtSchool / TataurangaKiTeKura: The statistical educational project that we administer in partnership with Stats NZ and the Ministry of Education has gone through a recent re-branding courtesy of the creative mind of Rachel Cunliffe. New laptop stickers, in te reo and English, and a new banner can now be seen around the place.



New CensusAtSchool sticker

New journal for statistics teachers: A brand-new online journal to showcase high quality, peer-reviewed lesson plans for statistics teachers has been launched. **Statistics & Data Science Educator** (SDSE) aims to recognise the innovative work of New Zealand teachers as well as provide resources for teachers seeking new ideas. The journal publishes lesson plans for early childhood to tertiary levels.




**STATISTICS &
DATA SCIENCE
EDUCATOR**

Some successes to share:

- Marsden Fast Start grants: Senior lecturer **Dr Yalu Wen** and lecturer **Dr Ben Stevenson** have each been awarded \$300,000 by the Royal Society of New Zealand. Yalu's project is called *Exploring disease risk prediction using high-dimensional multi-omics data*, and Ben's is named *Estimating animal population size in an unobservable spatial obstacle course*.
- **Rachel Fewster** has been promoted to Professor. Rachel has been an excellent all-round contributor across teaching, research and service.
- **Hadley Wickham**, an honorary Professor in the Department of Statistics, has been awarded at this year's Joint Statistical Meetings in Colorado. This prize, sometimes referred to as the "Nobel Prize of Statistics", is presented to a person aged 40 and under in recognition of outstanding contributions to the profession of statistics.
- A **SEED grant** has again been awarded to support innovative teaching in stage one statistics. The project, led by **Rhys Jones** with **Anna Fergusson** and **Emma Wilson**, will be exploring ways to maximise the learning benefits of lectures for students in large-scale statistics and data-science courses.
- Four students who tutor in our Māori and Pacific peer support network, **Tuākana**, have been accepted onto high-calibre internship programmes this coming summer. **James Kohlhase**, will be at Ernst & Young; **Isaac Morunga** (Ministry of Education, Wellington); **William Taumoepeau** (PriceWaterhouse Coopers) and **Heremia Nicholls** (NZ Super Fund). This is excellent news for Tuākana and the students really deserve the internships.

New appointments:

The statistics department has been growing over the last few months with four new appointments. **Charlotte Jones-Todd**, who researches spatio-temporal statistics, joins us from Wales as a Lecturer. **Lisa Chen** has been the Chief Data Scientist at Harmonic Analytics, a major player in New Zealand and Asia-Pacific data science, and is looking forward to sharing her industry insights with students as a Professional Teaching Fellow. **Alain Vandal** did his PhD in the Department of Statistics in the late 1990s. Twenty years later, he's back as an Associate Professor in Biostatistics, enjoying renewing old ties and teaching the next generation of statisticians. **Simon Urbanek** will be joining us in February 2020, he is currently the Lead Inventive Scientist in the Statistical Computing Research group at US-based AT&T Labs.



Charlotte Jones-Todd



Lisa Chen



Alain Vandal



Simon Urbanek

(With thanks to **Atakohu Middleton** for allowing me to extensively plagiarise the last 3 department newsletters she wrote during 2019!)

University of Otago: The Centre for Biostatistics on Dunedin Campus

by ANDREW GRAY



There has been much to celebrate in the Centre for Biostatistics on Dunedin Campus over the past six months. This included our second birthday in November, four promotions within the Centre (including Drs **Ari Samaranayaka**, **Claire Cameron**, and **Ella Iosua**), and the birth of Ella's second child (congratulations to her and Terry!) We're missing Ella while she is away on parental leave, but we're also thrilled to have Dr **Michel de Lange** return.

We have continued to provide workshops on biostatistics to researchers at the University, including on introductory biostatistics (led by Associate Professor **Robin Turner** with Dr **Nicole Mealing**), Stata (led by Ari), and regression (led by Associate Professor **James Stanley** from the Wellington campus). We're very grateful to Nicole

and James for braving Dunedin's weather to visit us and hope you'll be back soon!

We greatly enjoyed the first year of biostatistics forums (organised by Claire and Dr **Jill Haszard**). Robin presented on biostatistics teaching at the New Zealand Statistical Association Conference and on over-diagnosis and over-treatment at the Health Services and Policy Research Conference.

We were pleased to host morning teas for the Centre for Pacific Health and our many research students, and enjoyed a mid-winter dinner with colleagues from Mathematics and Statistics here at Otago. We're very grateful to our wonderful administrator **Joanna Flanagan** for keeping us organised throughout the year and look forward to building on our vision for biostatistics at Otago in 2020.



We are excited that **Han Gan** will join us in January as a lecturer to fill the position left vacant by the departure of **Steven Miller** last year. Han, who is originally from Melbourne, works in the area of Probability Theory and joins us after a PhD from Monash University and a couple of post-docs in the States. Han presented his work on *Arcsine laws for permutation generated random walks* at the seventh Wellington workshop in Probability and Mathematical Statistics held at Victoria University of Wellington on Dec 5th and 6th.

Paul Brown and **Chaitanya Joshi** attended the Bayes on the Beach conference at the Gold Coast from Nov 25th - 27th. Paul presented his work on *Modifications to the LDS based marginalisation methods for the Integrated Nested*

Laplace Approximation as an invited talk and Chaitanya presented a poster on *New class of priors inspired by the Approximate Bayesian Computation (ABC) methods*.

Nick Lim successfully defended his PhD work (under the supervision of **Bob Durrant**) on *Ensemble Learning of High Dimension Datasets* and is currently working on finishing the corrections.

Chaitanya Joshi will step down as the Convenor of the Statistics group and is looking forward to his sabbatical for the first half of 2020. Chaitanya will spend some of his time at the Statistical and Applied Mathematical Science Institute (SAMSI) in the United States working on aspects of Bayesian robustness. Bob Durrant will take over the role of the Convenor and is looking forward to the pleasures of attending more meetings!



The Wellington Statistics Group is convened by John Haywood. In 2019 they organised/advertised the following meetings at Victoria University of Wellington:

- 28 February 2019: **Estate Khmaladze**, Victoria University of Wellington. *What can we say about Linear Regression? Extension to General Parametric Regression.*
- 9 March 2019, Women in Data Science Conference:
<https://data.sim.vuw.ac.nz/widsw2019/>
- 10 April 2019: **Richard Arnold**, Victoria University of Wellington. A Royal Society Te Apārangi Wellington Branch talk: *Statistics isn't the Problem.*
- 3 July 2019: **Annette Koo**, Measurement Standards Laboratory of New Zealand. A Royal Society Te Apārangi Wellington Branch talk: *Cheese, Platinum and Fundamental Constants – What is the Revision of the SI all about?*
- 27 September 2019: **John Hinde**, NUI Galway, and previously President of the

International Biometric Society. *Count Data Regression Models: Properties, Applications and Extensions.*

- 20 November 2019: **Flaviu Hodis**, Victoria University of Wellington. A Royal Society Te Apārangi Wellington Branch talk: *Motivation Beyond Carrots and Sticks.*

WSG was also heavily involved in the organisation of the Seventh Wellington Workshop in Probability and Mathematical Statistics, 5-7 December 2019, Victoria University of Wellington.

The **WWPMS2019 web page** includes the collected abstracts from the Workshop, the detailed program and links to most of the presentations, which are included in the Workshop Proceedings.

Financially WSG remains in a healthy position and we are grateful to all the WSG past and current sponsors: Victoria University of Wellington, Statistics New Zealand, the Ministry of Social Development and Statistics Research Associates Ltd.