converging

CHAIR'S REPORT

James Stafford

Over the last ten years, the department has been utterly transformed and continues to be in a state of acceleration. Gone are the days when we would engage in one maybe two academic searches in a good year. 2017–18 saw nine searches and in 2018–19 we will conduct eight on the St. George campus alone. Gone are the days when staff were expected to do every job in the department. Today, our 14 staff members have highly specialized roles. Student enrollment continues to blossom. While the Faculty of Arts & Science aims to stabilize enrollments for the Faculty, we continue to experience annual enrollment increases in our major and specialist programs of over 500 students. There are currently 3,100 major and specialist students in all of our programs — and almost 4,000 if we include those students enrolled in a minor program. The department has the largest undergraduate program at the University of Toronto, Canada and likely North America. In fact, we are larger than many smaller post-secondary school institutions.

To guide the department's rapid development to 2021, we held our first retreat in the history of the department. (Read more on page 24.) The department is now ready for a major long-term strategic planning exercise, which Radu Craiu, our incoming chair, will shepherd.

In line with departmental growth, the scope of our academic enterprise has expanded, as well — much of which is described in this issue. Professional programs in the department include the Masters of Financial Insurance, as well as two new data science programs at the undergraduate and graduate level. Our new programs have significantly increased the level of industry engagement and have led to complementary activities like our biannual data analysis competitions, which attracted hundreds of student applications. (Read more on page 20.) Both data science programs are joint with computer science and partnerships with other units within the Faculty — a significant new enterprise for our department. As research across the Faculty becomes more data-intensive we have engaged in an increasing number of joint academic searches. These include searches with the departments of astronomy & astrophysics, computer science, psychology and sociology. Our intention is to keep expanding our partnerships and negotiations with other units are already underway.

This latter trend is mirrored within Canada's statistical sciences community by the ascension of the Canadian Statistical Sciences Institute (CANSSI). In partnership with the department, the Faculty of Arts & Science has moved aggressively to establish CANSSI Ontario as a regional site of Canada's only Data Science Institute. Negotiations are nearing completion and the process has raised both the department's profile and morale.

Of course, data science and the growth of data-intensive research is an international trend that has led to an internationalization of our student body. Of our 4,000 students, approximately 60 percent are international.

Improving the learning experience of these students is a major undertaking which has led to a new, expansive peer-to-peer mentorship program. (Read more on page 3.) The mentorship program has been accompanied by efforts to establish a Statistical Sciences Student Learning Center, including international student services, meeting space for mentorship groups and teaching training. Training in statistical education is in itself a new enterprise for the department that has blossomed with the recruitment of a number of innovative teaching stream faculty members whose interests lie within the realm of statistical reasoning, literacy, communication, consultation and collaboration.

So why has the department grown so enormously and so successfully? External forces — largely the global increase in interest in data — have fueled growth. But at its core, the support we've received from the Faculty of Arts & Science, and the unwavering commitment of our staff, have allowed those external forces to be a truly transformative force.

INSIDE

MASTERS OF FINANCIAL INSURANCE

Sebastian Jaimungal
Director of the Masters of Financial Insurance program

We created the Masters of Financial Insurance (MFI) professional program in September 2016 to address the growing need for skilled professionals with the unique blend of data science, mathematical finance and insurance. Since then, the MFI program has developed and grown quickly. Our original goal was to admit 5, 10 and 15 students in 2016-17, 2017-19 and 2018-19. However, due to the demand and quality of the applicant pool, our cohort exploded to 10, 13 and 25 excellent students, respectively.

The last year saw not only a growth in students, but also the addition of an outreach administrator, and a large expansion in the office and student spaces on the 4th floor of the Stewart Building. Our new space contains a dedicated classroom, and collaborative as well as quiet spaces for MFI students and other graduate students in statistical sciences.

The MFI program's fall reception has become a must-go event for current and potential industry partners. 2017 saw over 100 attendees with 80 percent coming from the finance industry. The reception helped many students secure summer positions early on in the recruitment cycle. Students were also invited to the Master of Mathematical Finance Symposium in January 2017, which provided additional networking opportunities and exposure to cutting-edge topics in the industry.

One of the key features of the MFI program is its strong connection to industry, and this connection is built into how courses are delivered. In the fall semester, while most courses lay theoretical foundations, students are exposed to industrial seminars — intense one-off lectures delivered by industrial professionals. In the second semester, a substantial number of case studies and applied courses are taught by industrial leaders, which allows students to get exposure to the problems industry is facing.

Industry professionals co-teach courses, deliver seminars and visit classes to speak about their field of expertise, providing students with unique learning opportunities and key insider knowledge about the finance and recruitment world.

To date, 100 percent of MFI students have secured work placements with many being offered full-time positions post-graduation in a wealth of diverse organizations, including Great-West Life, the Royal Bank of Canada and the Ontario Ministry of Finance.

Going forward, the MFI program is committed to continuing to build strong relationships with industry and to evolve to meet future recruitment demands. To aid this objective, the MFI program proposes to establish an Advisory Board to inform the program of directions of future growth, and ultimately ensure that our students have a competitive advantage in the marketplace.

UNDERGRADUATE PROGRAM IN STATISTICS

Alison Gibbs
Associate chair, undergrad studies in statistics

The last two years have been an exciting time of growth and renewal for our undergrad program in statistics. Rapid growth is not without its challenges, but they are far outweighed by the energy and excellence our students bring to our department.

With more than 3,900 students enrolled, we are now officially the largest undergrad program in the Faculty of Arts & Science. To keep up with a rapidly evolving discipline and allow our students to stay ahead of the job market, we are in the midst of a major curriculum renewal.

We have introduced a new stream of second-year courses, as well as new and revised courses in machine learning. In addition, we have redesigned our Introduction to Statistical Reasoning and Data Science course to reflect our new program goals. We have also made this course a requirement for all students in statistics major and specialist programs to make sure that they get a glimpse at the many fascinating facets of the modern practice of statistical thinking. The development of oral and written communication skills continues to be a major component of the course.

Other new developments in undergraduate courses and programs in statistics include new focus areas in the applied statistics specialist program. We have entered new partnerships with programs across the University and added specializations in ecology, evolutionary biology, economics, biochemistry and physics.

Another result of collaboration across units is our new Statistics and Scientific Inquiry in the Life Sciences course. The course provides life sciences students with a unique introduction to statistical methods, deeply embedded in current life science practice and research.

Our enrolment growth has also resulted in growth in our teaching staff. We've been fortunate to have Professor Bethany White join us and welcome Professor Nathalie Moon who will be joining us in 2018.

Support & leadership for a growing student community

Our second-year mentorship program provided support to 85 students, an increase from 60 in our previous year, while our first-year program grew from 100 students to over 400 students. We have a number of returning mentors, as well as former mentees transition into mentorship roles. Mentors valued the leadership experience they've gained and appreciated how the program helped to increase their involvement within the U of T community.

A big 'thank you' to our alumni

This year, four of our recent graduates, Sheeza Khan, Janice Tang, Bowei Xiao, and Khairi Yi visited the Statistical Consultation, Communication, and Collaboration course. We are grateful for the wisdom and advice they generously shared with our students.
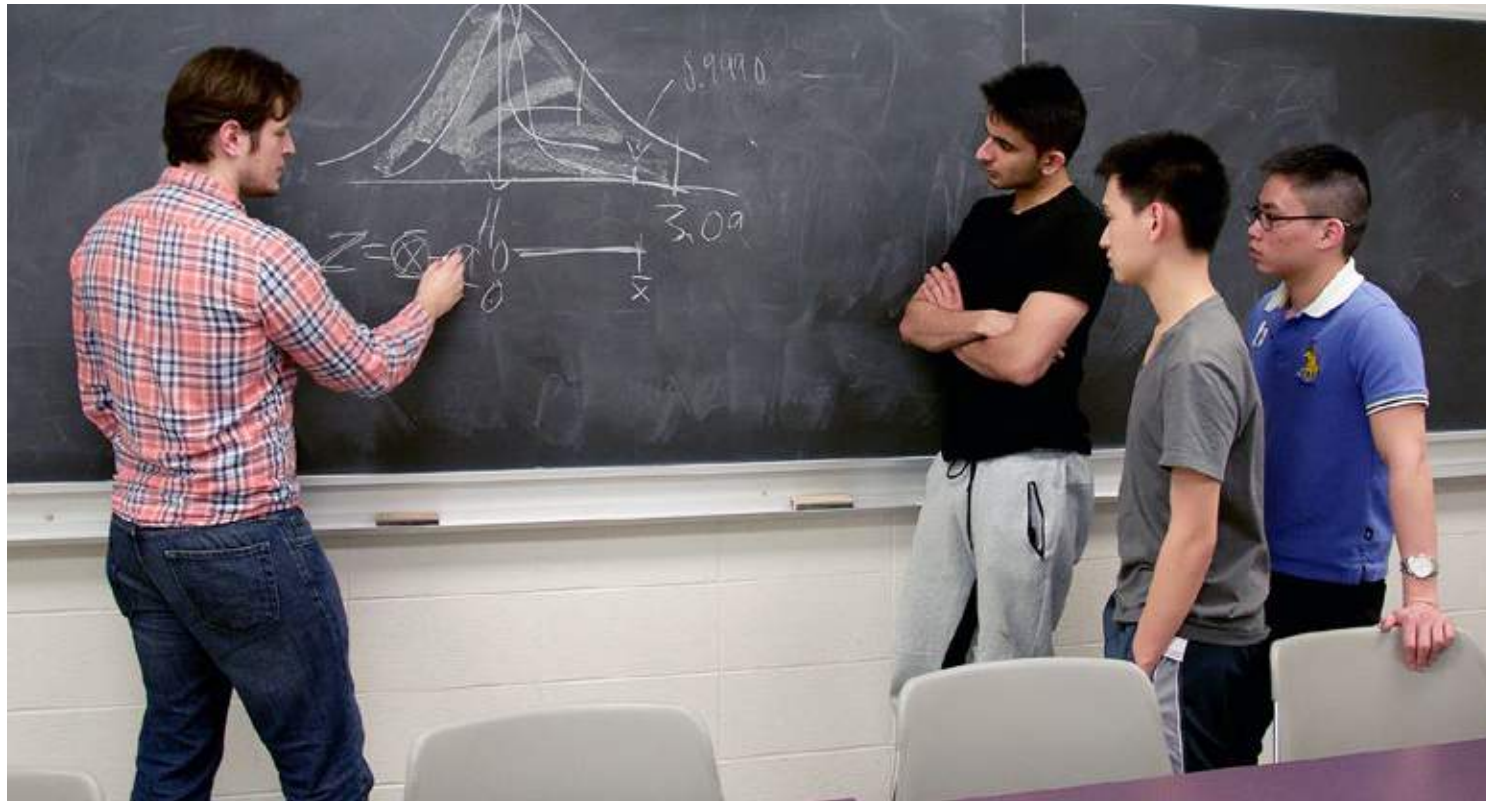
UNDERGRADUATE PROGRAM IN ACTUARIAL SCIENCE

Vicki Zhang
Associate chair, undergrad studies in actuarial science

The actuarial profession is marching into the age of big data. Increasingly, employers in various fields that measure and manage risk require new hires with a sophisticated knowledge in statistics and data science.

To stay current with new trends and demands, we proposed major modifications to both the specialist and major programs in actuarial science.

We added two new mandatory courses for our students: Introduction to Statistical Reasoning and Data Science and a first-year computer science course. Together, these courses will provide early exposure to statistical learning and computation.

We also added a brand new core course for specialists, called Statistical Quality Methods, to provide the next generation of actuarial students with cutting-edge statistical techniques and data science methods. A follow-up course covering more advanced data science and machine learning topics has been included in the higher-year elective list for actuarial students.

Not only have actuarial skills become more in demand, the profession has also become more diverse in the past decade. Technical content and professional requirements have significantly increased. That is why we recently changed the structure of our higher-year specialist program to include a number of required core courses, covering foundational knowledge of actuarial science, in addition to elective courses.

To make our students even more competitive in the entry-level job market, we are also working closely with the Dean's office of the Faculty of Arts & Science to add a mandatory Professional Experience (PE) element to the actuarial science specialist program.

In the meantime, we have started to offer second- and third-year actuarial core courses in the summer terms to provide our students with the flexibility to take internships during other academic terms. During the most recent annual advisory board meeting, our industry advisers applauded our efforts in curriculum development and confirmed that the new curriculum is better in line with the direction and future the profession envisions.

DATA SCIENCE PROGRAMS

Nathan Taback
Director of data science programs

In data-intensive research fields and commercial endeavours, there is a high demand for students completing degrees in computer or statistical sciences who can think algorithmically as well as statistically. These students are expected to understand how to utilize databases and other data warehouses, scrape data from internet sources and program solutions to complex problems in multiple languages.

To meet this demand, we recently created a new undergraduate specialist program in data science and a graduate-level data science concentration.

New Undergraduate Specialist Program in Data Science

In response to the demand for undergraduate students trained in data science, the departments of computer science and statistical sciences have developed a new specialist program in data science. Approved in spring 2018 by the University, the program will be led by me, the program's inaugural director. Admission to the program will be competitive and limited, and we will welcome our first cohort in September 2018.

New students will take courses both in computer science and statistical sciences. A unique feature of the program is practical training in data science through newly developed integrative and capstone courses, jointly taught by both departments. Students will combine their expertise in computer and statistical science to produce and communicate analyses of complex large-scale datasets. Courses will cover data exploration and preparation, data visualization and presentation and computing with data. These topics will be explored through case studies and collaboration with industry and researchers in other fields.
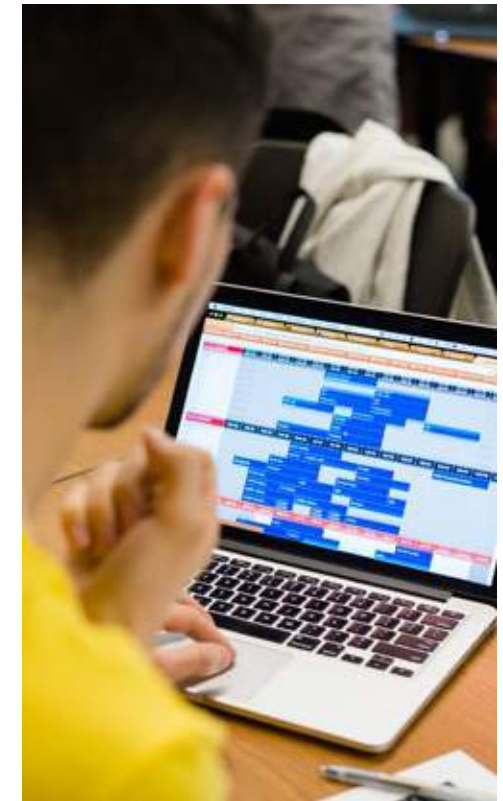
The program also introduces data science workflows and professional skills, such as oral and written communication, and ethical skills for data science.

Masters of Science in Applied Computing: Data Science Concentration

Jointly with the master program of science in applied computing, our department has also developed a data science concentration. The first cohort of eight students accepted into the program will start their eight-month internships at the beginning of May 2018.

The organizations that have hired our data science interns include Scotiabank, SickKids, Deloitte, and many more. Academic supervisors from our department include Sebastian Jaimungal, Lei Sun, David Duvenaud and Qiang Sun.

CONGRATULATIONS TO OUR OUTSTANDING FACULTY

Many compliments to our faculty! In 2017 and 2018, they received many prestigious awards and accolades for excellence in research and teaching.

### Double "trouble": Congratulations to Radu Craiu and Lei Sun

Lei and Radu are the only couple to receive Canada's most prestigious mid-career statistics award, the Centre de recherches mathématiques (CRM) and Statistical Society of Canada (SSC) Prize in Statistics. (What are the odds!) Radu won the award in 2016 and Lei followed shortly by winning the next year. The CRM-SSC award recognizes a statistical scientist's professional accomplishments in research during the first 15 years after receiving a doctorate.

In addition to the CRM-SSC award, Lei also received the NSERC's Discovery Accelerator Supplements (DAS) Award. The DAS Program provides resources to researchers who have a superior research program that is highly rated in terms of originality and innovation, and who show strong potential to become international leaders within their field.

All good things come in threes — at least for Fang Yao

Fang became a Fellow of the American Statistical Association for groundbreaking contributions in functional data analysis and nonparametric statistics, excellent teaching and advising, and for outstanding editorial services, which includes being an Associate Editor for nine statistical journals. He was also elected a member of the International Statistical Institute and received a Discovery Accelerator Supplements (DAS) Award. Congratulations, Fang, for a very successful 2017 and 2018.
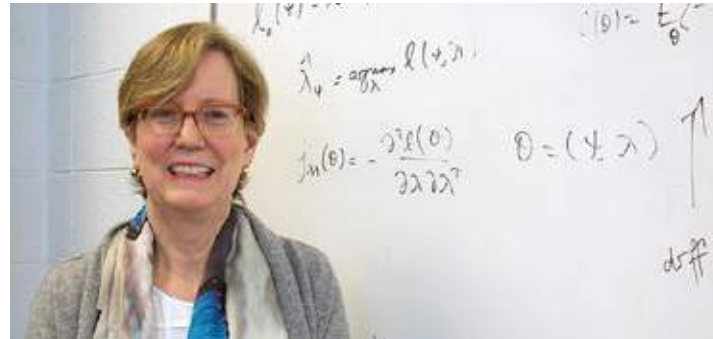
Nancy Reid Elected Fellow of the Royal Society

Few people can say that their signature appears in the same book as Sir Isaac Newton's. As of this July, Nancy is able to stake that claim, after signing the Royal Society's charter book.

In May 2018, The Royal Society announced that Nancy is one of 50 U.K. and Commonwealth scientists selected to become the society's newest fellows. She shares this year's honour with some of the world's most eminent researchers and innovators, including Tesla founder Elon Musk. Congratulations, Nancy!

Alison Gibbs honoured with 3M National Teaching Fellowship

Alison is one of 10 post-secondary teachers from across Canada recognized for excellence in educational leadership and teaching. She received a lifetime membership in the Society for Teaching and Learning in Higher Education, an invitation to the society's annual conference this June, and a chance to interact with other 2018 recipients at a four-day retreat next fall.

Alison's "passion for statistics is infectious and leads students to take more courses and use statistics in their daily lives," Maclean's magazine said in announcing the teaching honours.

Our students continue to inspire us with their ability to produce outstanding work and excel in teaching. Each year, we give out awards to a select number of graduate students to celebrate student excellence.

GRADUATE STUDENT AWARDS

Jeffrey Negrea
Andrews Academic Achievement Award 2016-17

Victor Veitch
Doctoral Award 2016-17

Wei Deng & Erik Lingley
Teaching Assistant Award 2016-17

Jingyu Bao
MFI Academic Achievement Award Recipient 2017

Yiwen (Sophia) Zhang
MFI Ambassador Award Recipient 2017

Kaiwen (Kevin) Jiang
MFI Business Acumen Award Recipient 2017

Daniel Flam-Shepherd
Andrews Academic Achievement Award 2017-18

Haosui (Kevin) Duanmu
Doctoral Award 2017-18

Jeffrey Negrea & Lin Zhang
Teaching Assistant Award 2017-18

Three cheers to the following PhD students, who succeeded to nab some of the most prestigious postgraduate student awards.

PhD STUDENT AWARDS

Incoming PhD student **Rui Mao** has been awarded the **Connaught International Scholarship** for Doctoral Students.

• • •

Our PhD student **Jeffrey Negrea** was awarded the **Vanier Canada Graduate Scholarship**.

• • •

Our PhD student **Yanbo Tang** was awarded the **Doctoral NSERC Scholarship**.

• • •

Incoming PhD student **Chau Lung Ngan Spark Tseung** was awarded the first **Edwin S.H. Leong Scholarship** — one of the most prestigious graduate admissions awards offered by U of T.

• • •

Victor Veitch won the **2018 Pierre Robillard Award** of the Statistical Society of Canada. This award recognizes the best PhD thesis in probability or statistics defended at a Canadian university in a given year. Victor's thesis, called *(Sparse) Exchangeable Random Graphs* was written under the supervision of Daniel M. Roy and has made foundational contributions to network data analysis and more generally, the problem of modeling relational data.

• • •

Incoming PhD student **Xinyi Zhang** has been awarded the **Ontario Trillium Scholarship** for exceptional research experience and potential combined with an outstanding university academic record.

JAMES STAFFORD

After ten years as department chair, James (Jamie) Stafford is handing over the reins. A big "thank you" from the entire team for the outstanding leadership, quick wit and good humour you have provided us with over the last ten years. Congratulations on a job well done!

As befits one who specializes in longitudinal studies, Jamie's Chairship has lasted a goodly amount of time. And as befits one who is interested in spatial processes, Jamie has dealt with the space requirements of this Department in exemplary fashion. But more to the point, under his capable Chairship, our Department has been catapulted into a new and modern era.

— Andrey Feuerverger

Congratulations Jamie on a successful two terms as Chair. Especially appreciated has been your support for the development of Statistics at UTSC which has grown tremendously over the past few years. Your involvement and encouragement has been critical in achieving this. All the best for your future endeavours.

— Mike Evans

Jamie was my first undergraduate research student, and the best! I have been uniquely privileged to work with him on many projects since then. He has been an enthusiastic champion of the Canadian Institute of Statistical Sciences — indeed he effectively launched this national effort years ago as head of the National Program on Complex Data Structures. Working with him to build resources for statistical science across the country has been exceptionally rewarding, and he can take pride in the impact CANSSI now has on the research landscape in Canada.

— Nancy Reid

Dear Jamie, thank you for all the support since I arrived in Toronto in 2001. And thank you for the transformative experience at DoSS since 2014.

— Lei Sun

Jamie, you brought your runner's stamina and your researcher's astuteness to the chair's job and the department has emerged as a clear winner. I am grateful for your transformative efforts and wish you all the best in the many years to come.

— Radu Craiu

You can be proud of all that you have accomplished. You have successfully advanced the department in the evolving areas of the discipline. You have greatly extended the integration of the department with other cognate disciplines in the university, and most importantly, you have nurtured a friendly, open atmosphere where science can be earnestly discussed. Be proud of all that you have done. I am.

— David Andrews

Jamie, you have been an excellent department chair thanks to your great sense of humour and your approachable, easy-going personality. Although you were constantly busy with your duties as department chair, you always made sure that graduate students have what they need, both for their work and for social and academic events. PhD students in the current and new cohorts will be very fortunate to have you as a potential supervisor, and I look forward to the terrific research you will do!

— Jeffrey Negrea

Working with Jamie has been a pleasure. His vision, energy, positive attitude, and — yes, of course — boisterous, bellowing laughter, has been instrumental in advancing DoSS and positioning it for its undeniably shining future. Thanks, Jamie!

— Sebastian Jaimungal

Jamie, you possess the rare ability that comes with experience and reflexivity: to know when to ask questions about things and when to give all of us at DoSS the freedom to puzzle through a problem ourselves. You are a genuine leader, and we have all been so fortunate to benefit from your vision for the past ten years!

— Angela Fleury

Thanks to the department's faculty and staff for the heartfelt words, photos, mandalas and songs you submitted to celebrate Jamie. You can see all of them at JAMIESTAFFORD.TUMBLR.COM

Primeval Silence

Broken, then pieced together

By a new language

— A mathematical haiku
by Radu Craiu, published in the
2018 *Journal of Humanistic
Mathematics*

FACULTY PROFILE

RADU CRAIU

Seventeen years ago, Radu Craiu joined U of T's Department of Statistical Sciences. Since then, he has become a tremendous asset – both as a researcher and an administrative faculty member.

From publishing a wide array of high quality papers, to crafting mathematical haikus, or taking over as our new department chair: Radu is a jack of all trades with a striking breadth of research expertise.

To quote the Statistical Society of Canada: "He has published papers about such important and diverse topics as statistical computation, MCMC methodology, copula applications, and competing risk models. In addition, Radu joined forces with the biostatistician Lei Sun, not only to get married and raise two delightful children, but also to publish several important papers about statistical genetics including its relation to winner's curse and false discovery rates."

His excellence in research earned him the 2016 Centre de recherches mathématiques (CRM) and Statistical Society of Canada (SSC) Prize in Statistic, Canada's most prestigious mid-career statistics award.

In addition to being an accomplished researcher, Radu has also contributed to the development of our department in many ways — first, as associate chair for graduate affairs and chair of the one-and-only "Social Heartbeat Committee", responsible for organizing social activities within the department. This July, Radu is going to embark on his latest challenge: taking on the role of department chair.

Congratulations, Radu, and many thanks for your outstanding commitment to our department.

PROFILE

ANDREY FEUERVERGER

PROFESSOR EMERITUS

Professor Andrey Feuerverger has been with the University since 1974 and our Department since its inception in 1977. He has made major contributions to the department and to the field of statistical sciences during this time. Andrey retired in July 2017. Many thanks to him from the entire department for his dedication, tenacity and uncompromising intellectual curiosity!

Andrey has always held a deep love for mathematics, which led him to earn his bachelor of honours in mathematics from McGill. His first encounter with statistical sciences, on the other hand, turned out to be somewhat serendipitous.

"The Province of Quebec was giving out a hundred dollars for each actuarial exam. That was a lot of money at the time, so I sat in on a course in mathematical statistics and did the exam," he says. "It was the greatest thing that could have happened, and I took to it like a duck to water."

His new-found love for statistics, in combination with his passion for mathematics, took him to the University of California at Berkeley, where he graduated with a PhD in statistics before returning to Canada with his wife, Grace, in 1972. He found his first job at the University of Alberta in Edmonton where he enjoyed its frontier character. Two years later, he received an offer from the University of Toronto — it was "an offer he couldn't refuse".

Over the course of his career, Andrey's research focus has primarily been on statistical theory as well as its applications to a variety of areas such as finance, tomography, and text-based data.

Throughout the early parts of his career, he studied transform methods, the use of wavelets in statistics, as well as methods of deconvolution for noisy data.

Andrey's research has also crossed over into techniques for medical imaging. His research broke ground in discovering the connections between positron-emission tomography and the statistical problem of random coefficient regression.

In recent years he also dabbled in machine learning and worked with students on the Netflix competition problem for collaborative filtering algorithms to predict user ratings for films.

Andrey has authored over fifty refereed scientific publications and has collaborated with such authorities as Peter Hall, one of the most influential theoretical statisticians in the history of statistical sciences. Andrey has also taught a wide variety of courses in statistics, at every level and every class size, and has over the years been involved in the design of many graduate and undergraduate courses and programs, including the Masters in Mathematical Finance Program.

"Because of its many facets and its connections with so many other areas, statistics is one of the most amazing and beautiful subjects in the world."
— Andrey Feuerverger

In addition to his vast knowledge of statistics and probability, he is also known for the occasional student prank. "I became interested in learning Mandarin, in part because so many of our students come from China," he says. "It always was a pleasant surprise to see how our students would react when I suddenly started talking in Mandarin halfway through a lecture without warning. They would do a double-take!"

Although Andrey is officially retired, he is actively continuing in research. He is planning on returning to "some previous loves, while not letting go of statistics" by taking a closer look at certain connections that exist between statistical ideas and analytic number theory.

Congratulations, Andrey! We're looking forward to seeing you around the department as you continue on your research adventures.

A WARM WELCOME TO...

Our department has continued to recruit exceptional talent from across the spectrum of academic administration and statistical sciences — leading our research, teaching our students and forging partnerships across the University and industry sectors.

2016

David Duvenaud

David is an assistant professor of statistics and computer science and a founding member of the Vector Institute. Previously, he was a postdoc in the Harvard Intelligent Probabilistic Systems group, working with Ryan Adams on optimization, synthetic chemistry, Bayesian inference, and neural networks. His work focuses on generative models and developing new model classes in which efficient inference is possible, with a focus on latent-variable models with meaningful structure.

Dehan Kong

Dehan is an assistant professor, tenure stream, with a PhD in statistics from the North Carolina State University. His work focus on big data-related areas such as neuroimaging data analysis, high dimensional data analysis, functional data analysis and machine learning. Dehan is interested in developing novel and rigorous statistical procedures to answer relevant and important scientific questions arising from the real data.

Stanislav Volgushev

Stanislav is an assistant professor with a diploma in mathematics from Ruhr University Bochum, Germany. Core topics of his research are non- and semi-parametric methods that deal with distributional effects in data. This includes methods such as quantile regression and copulas that focus on models and inference for conditional and joint distributions. Recently, he has also started working on computationally feasible inference procedures for large-scale data sets.

Bethany White

Bethany is an associate professor. She holds a master's of mathematics and doctor of philosophy from the University of Waterloo. Her research relates to the impact of structured technology-enabled activities and course formats on students learning and attitudes of statistics. Blended course delivery and experiential education are two areas of particular interest to her. Bethany has conducted a number of Scholarship of Teaching and Learning (SoTL) projects on the use of service learning, personal response systems, and web applet activities in statistics.

2017

Patrick Brown

Patrick is an associate professor and a biostatistician leading the geospatial research team at the Centre for Global Health Research. His work combines statistical methods for spatial and spatio-temporal data, statistical computing and software for spatial modeling, as well as understanding spatial variation in the declining rate of mortality worldwide.

Fanny Chevalier

Fanny is an assistant professor of statistics and computer science. Fanny's research lies at the intersection of human-computer interaction (HCI) and information visualization (Infovis). Her primary focus is on interactive visualization for the visual exploration of rich and complex data, visualization education, computing tools supporting the flow of creativity, the design and perception of animated transitions, and sketch-based interfaces.

Katrina Mintis

Katrina officially became the executive assistant to the chair in December 2017. She graduated from Dalhousie University in 1992 with a degree in business administration. After working for TD Bank and a martial arts school, Katrina joined U of T in February 2017. Before joining our department, she worked as a special events coordinator at OISE and a department assistant for anthropology.

Daniel Simpson

Daniel joined our department in July 2017. He is an assistant professor and received his PhD from Queensland University of Technology in 2009. After postdoctoral positions in Sweden, Norway, Finland and the UK, he was most recently a reader at the University of Bath. His work is in spatial statistics, computational statistics and Bayesian statistics.

2018

Dee Keilholz

Our new communications officer Dee joins us from U of T's Munk School of Global Affairs. She is an Emmy Award-winning journalist, now communications professional, with a focus in story-driven content and content strategy. She has spent the last eight years uncovering and telling stories that champion innovation and change, writing and editing web content, blogging, interviewing, producing video content and developing brand narratives.

Megan Whitehead-Douglas

Megan joins the department as our new internship and mentorship administrator. She has been with the University of Toronto for over ten years and has held positions in the Career Centre, the Faculty of Law, Rotman Management, Enrolment Services and most recently, OISE, where she is also pursuing a Master's Degree in Education. She brings a passion for career exploration and support to her new role with an emphasis on learning more about opportunities beyond expectations. She loves trying new foods, even if her 5-year-old son won't participate.

RESEARCH & STUDY LEAVES

A Year Filled with Leadership in
Education and Research

During her study leave year in 2015–16, Alison Gibbs dedicated herself to research and scholarships, leadership in statistics education, personal professional development, as well as developing teaching materials. Part of her leave was devoted to preparing a major curriculum renewal project — an ongoing effort and major focus of hers for the next three years.

During the first part of her leave, Alison developed online modules for introductory statistics, which are available as an open educational resource through eCampus Ontario. The new modules are, in essence, a modern technology-rich online textbook for introductory statistics. They include learning objectives, videos with quiz questions, notes and learning activities, data sets and their stories, and much more.

Alison also collaborated with post-doctoral fellow Einat Gil on research aimed to understand secondary school students' reasoning about covariation and big data. Their work led to several invited or refereed publications and presentation.

Another collaborative research project with a group of endoscopists and U of T's department of nutritional sciences led to a series of papers on colon cancer screening and dietary interventions for people with Type 2 diabetes.

Alison continued her work with Nathan Taback on the effect of innovations in the pedagogical format of one of the department's foundation courses, STA220, on student achievement and attitudes towards statistics. This work resulted in presentations at the University of Toronto Teaching and Learning Symposium in May 2016, the Statistical Society of Canada meeting on June 2016, and a paper. During her leave, Alison and Nathan were awarded a Faculty of Arts & Science Teaching Stream Pedagogical Grant to support this work.

During his 2017–18 sabbatical leave, Sam Broverman worked on new editions of many of his books and study guides. Among his achievements: finishing the seventh edition of his book Mathematics of Investment and Credit, which was published in October 2017. The book is an official reference for the Society of Actuaries Financial Mathematics professional examination.

Sam also travelled to Vienna in July 2017 to participate in the annual International Insurance Mathematics and Economics Conference. In addition to attending talks, he also entertained fellow attendees by singing Bye Bye Blackbird at the event's banquet.

GAMES, FUN & CAREERS

A SUCCESSFUL, INNOVATION-FILLED YEAR FOR THE ACTUARIAL SCIENCE CLUB

The University of Toronto Actuarial Science Club (Act Sci Club) is the official union to provide assistance and resources to undergraduate actuarial science students.

In keeping with tradition, Act Sci Club organized November Social in the last academic year — an event where students from all years played games and had a lot of fun (Yeyeye!). We also hosted a series of career development events. Our events included our annual resume workshop — which experienced growth in student participation and received wide acclaims. In addition, we organized a career fair, and many other info sessions, involving major insurance companies.

Having tried our best to support the career development of actuarial students last year, the upcoming 2018–19 academic year will see the establishment of monthly career events. We developed new, innovative formats for workshops geared towards building students' resumes and teaching interview and networking techniques. Our goal is to offer participants as much hands-on practice as possible.

In addition to academic events co-developed with the Casualty Actuary Society, this year will also be the first time that Act Sci Club collaborates with the Statistics Student Union to host an all-day Career Panel, named Diverse Career Paths U Have. Act Sci Club will continue to organize office visits, info sessions and career fairs. These strongly career-oriented events will offer better support to help actuarial students with their career path.

Act Sci Club is proud to have supported actuarial students for many years, We are looking forward to remaining a cornerstone of the actuarial science student community for years to come.

For more information, please visit UOFTACTSCICLUB.COM or FACEBOOK.COM/GROUPS/UTACTCLUB

ALUMNA PROFILE

MONICA DULGHERU

If your last Amazon order arrived on time and was in fact what you had ordered, you'll partly have to thank Monica Dulgheru for that. In 2014, she joined Amazon as a business intelligence engineer and is now one of the company's senior data scientists, crafting supply chain management solutions. After graduating with a double degree in math and business administration, Monica worked for three years in the banking industry before enrolling at U of T for her master in statistics. She shares some of her insights she gained as a student at our department and why she fell in love with statistical sciences.

How did your time as a student at U of T prepare you for what you're doing now?

On top of the required stats curriculum, I decided to take an Intro to Machine Learning course (CSC 2515) with professor Richard Zemel, as an elective. Combined with my statistics knowledge, it allowed me to pass the Amazon interview process. Artificial Intelligence is exploding right now and machine learning is the buzzword of the day — which is good because it makes people more open to adopting and implementing model-based solutions but detrimental when they think every question can be answered with machine learning. Having a statistics background gives me a good grounding to guide others on my team as we choose which models (or heuristics) are best suited for the problem at hand.

Why did you decide to study statistics?

It always felt to me like the most elegant of the maths.

What is one of your fondest memories of your time at U of T?

My cohort was great fun. I still keep in touch with many of them and in fact would not have considered Amazon if it was not for a classmate who started working in Seattle.

What advice would you give our current students?

Jobs today are increasingly interdisciplinary. Get a strong deep foundation in one speciality but make sure you are clear about how that fits into a larger context: what other disciplines can you apply your knowledge to; what other disciplines are competing with yours to solve the same sort of problems; maybe take a course or two in one of those disciplines. Oh, and of course: get very comfortable with programming.

What do you do for fun?

On a weekend, you're most likely going to find me with friends and family at a play, on a wine tour, or cooking up liver mousse parfait.

NEW RESEARCH TEAMS AND HEALTH SCIENCE CENTRES TO FACILITATE COLLABORATION

The Canadian Statistical Sciences Institute (CANSSI) had a very busy year. Among other achievements, CANSSI is proud to have launched three new Collaborative Research Teams (CRTs), bringing the total to twelve. These teams work with scientists and statisticians from at least two Canadian regions to advance science through the development of new statistical techniques and models. The newest teams are:

Statistical methods for challenging problems in public health microbiology, with team leaders Leonid Chindelevitch from SFU and Alexandre Bouchard-Côté from UBC and partners at Centre Hospitalier Universitaire Sainte-Justine, Western University, Université de Montréal, and SFU

Spatial Modeling of Infectious Diseases: Environment and Health, with team leader Mahmoud Torabi from the University of Manitoba, and partners at University Waterloo, Saskatchewan, Calgary and Alberta, the Public Health Agency of Canada and Universite de Montréal

Towards Sustainable Fisheries: State Space Assessment Models for Complex Fisheries and Biological Data, with team leader Joanna Mills Flemming, Dalhousie, and partners at UBC, University Geneva, DTU Denmark, University Laval, Fisheries and Oceans Canada, and the Galway-Mayo Institute of Technology

CANSSI has also launched a network of Health Science Collaborating Centres to facilitate research collaborations between health scientists and statistical scientists, to offer experiential learning to graduate students, and to initiate projects on emerging issues in health and statistics. The network includes the **Collaborating Centre for Statistical Omics** at the University of Toronto and McMaster University.

In addition, the institute is working with researchers in industry, computer science and applied mathematics to develop a national network in data science research and training — the opportunities for new statistical partnerships seem nearly endless.

A novel partnership with the National Institute for Statistical Sciences in the U.S. saw a special two-day workshop on R and Spark for analysis of big data, led by Professor E James Harner, and held in the charming (and very low-tech) Birge-Carnegie library at Victoria University. The course introduces data structures in R and their use in functional programming workflows relevant to data science and covered the initial steps in the data science process.

A heartfelt thank you...

...to the Faculty of Arts & Science and the Department of Statistical Sciences for generously supporting CANSSI's operations with contributions from our 30 institutional members across the country.

ASA DATAFEST 2018
READY, SET, ANALYZE!

For the third year in a row, our department initiated ASA DataFest, a data science contest for U of T undergrad students, sponsored by the American Statistical Association (ASA). DataFest is like a hackathon, but instead of a programming problem, students test their skills on a data analysis challenge.

This year, job site Indeed provided the initial data set, along with a series of potential questions to investigate. Our 27 student teams had two days to wrangle the data before presenting to a panel of judges, which had the difficult task to pick between the many outstanding ideas students brought forward.

In the end, "Team Cinnamon" nabbed the win for "Best in Show." The team, consisting of Zack Chiu, Jason Li, Zelin Li and Xiaoke Meng, convinced the judges with their analysis of higher income predictors for different income brackets.

"We learned that what sets job seekers apart from the competition in lower-income brackets are certain licenses. In the middle-income bracket it is experience and for jobs that offer $100,000 and more, education matters most," says Jason Li, a U of T math and statistics student, and added: "I would definitely recommend to any student to take part in this competition. It's intense, but also exhilarating and definitely worth the time."

Many thanks to...

Nathan Taback for taking the lead on organizing the event.

Gillis Aning for managing logistical and administrative tasks.

Wei Deng and **Alex Stringer** for their around-the-clock help at the event.

Fanny Chevalier and **Stanislav Volgushev** for acting as judges.

Bethany White for developing an awesome judging rubric.

Alison Gibbs for developing a team selection algorithm.

James Stafford for supporting this event from the beginning.

EXPLORING THE "PEAKS" OF SPATIAL STATISTICS

You know your event was a success when one of your invited speakers is so smitten that they want to "steal your idea" and replicate the event at their own department. On April 18, graduate students and top researchers gathered for Research Day, hosted by our department, at the Fields Institute to talk innovation in spatial statistics.

For this year's event, we invited for leading experts in spatial statistics: McGill's Alex Schmid, Murali Haran from Pennsylvania State University, Mikyoung Jun from Texas A&M University and University of British Columbia's James Zidek.

Doctor Haran explained his work modelling Antarctic ice sheets, using spatial methods to forecast the behaviour of glacial ice in the West Antarctic, while Doctor Jun presented her work modelling global rainfall using log-Gaussian Cox processes.

The event also included a statistical sciences graduate student speakers Kamal Rai, Philippe Casgrain, Lei Sun, and UBC PhD student Joe Watson. Student speakers presented on a wide range of topics from calibrating spatio-temporal models for air pollution to ways to tackle the spatial preferential selection problem. The presentations gave our students the opportunity to showcase — and practice to present — their research.

The poster competition was also quite a success. We had twelve participants presenting on a diverse range of topics, including submissions on statistical genetics, MCMC, portfolio theory, random graphs, gaussian process inference, and more. The poster competition was judged by the four invited speakers and our own Nancy Reid and Jeffrey Rosenthal. The winner of the poster competition was Ali Al-Aradi with his poster titled "Outperformance and Tracking via Convex Analysis."

Many thanks to the Fields Institute and the Canadian Statistical Sciences Institute (CANSSI) for their support in making this event possible through their funding and their logistic support.

OUR DEPARTMENT TURNED 40

On April 28, 2017, faculty, students and alumni gathered at the Fields Institute to celebrate the 40th anniversary of U of T's statistical sciences department.

The day started with three presentations by our alumni Grace Yi (University of Waterloo), Ana-Maria Staicu (North Carolina State University) and Alexandra Chouldechova (Carnegie Mellon University), followed by some of our students presenting their latest research. After a poster presentation and research discussions, the crowd moved to Hart House for a social gathering to mingle, eat, drink and catch up with old and new acquaintances.

In addition to the April 28 event, we also hosted a seminar series to celebrate our department's anniversary. In October 2017, the department invited Victoria Stodden and Art Owen to speak at our 40th TALKS series.

Victoria Stodden, associate professor at the School of Information Sciences at the University of Illinois, presented a novel computational framework for statistical analysis of "organic data" — big data that is generated as a byproduct of human behaviour such as credit card transactions or Twitter posts.

Art Owen, professor of statistics at Stanford University, spoke about moment based estimation and inference for very large linear mixed effects models.
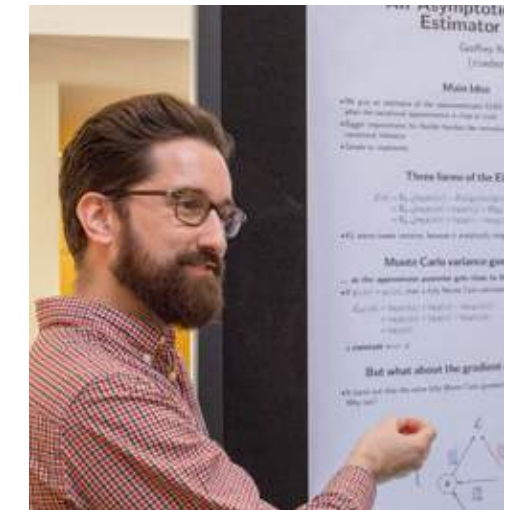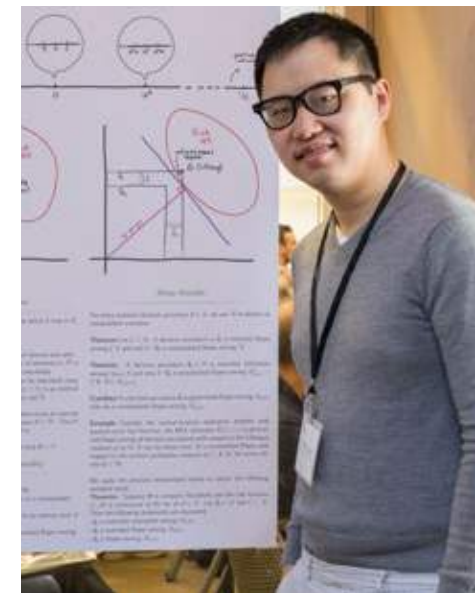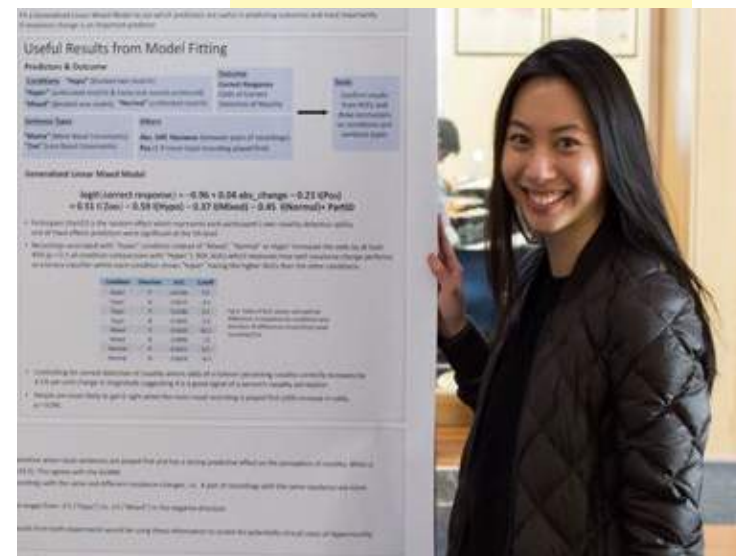
A HISTORIC STRATEGIC RETREAT

In September 2016, close to 40 people gathered at the Old Mill to hold a historic strategic retreat — the first of its kind in the history of the department.

This highly interactive event included research and teaching faculty, representing various perspectives and disciplines, such as computer science and engineering, as well as experts in a range of areas including curriculum development, members of the department's administrative team and the University's vice-dean for academic planning and strategic initiatives.

Over the course of two days, attendees brainstormed and collaborated to paint a vision of the future of the department, outline solutions on how to adapt to change and growth, and identify departmental opportunities and challenges.

The retreat majorly contributed to the development of departmental priorities and plans to guide our development to 2021. Many thanks to our fantastic facilitator Diana Royce of The Deerfield Group and to everyone who attended and shared their thoughts and insights.

FROM "SONG" TO "PONG"

KARAOKE, PING PONG NIGHTS WERE SMASHING SUCCESSES

In 2016 and 2017, faculty and students got together to sing their hearts out at the Monarch Tavern and compete in a friendly game of table tennis.

As incoming Chair Radu Craiu put it: "The tournament revealed that the [department] has untapped reservoirs of ping pong talent. Congratulations to the team of Jeff Rosenthal and Gareth Roberts who won the tournament after some tight sets. What can I say — some guys have all the luck."

Many thanks to the department's Social Heartbeat Committee who went above and beyond to organize both outings.

Please stay in touch!

Follow us on Twitter, Facebook and Instagram to connect with the Department of Statistical Sciences. Stay in the loop about our faculty, students, research and teaching and get updates on the latest developments in the world of statistical sciences.

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