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IMS Grace Wahba Award and Lecture

The IMS is pleased to announce the creation of a **new award and lecture**, to honor Grace Wahba's monumental contributions to statistics and science. These include her pioneering and influential work in mathematical statistics, machine learning and optimization; broad and career-long interdisciplinary collaborations that have had a significant impact in epidemiology, bioinformatics and climate sciences; and outstanding mentoring during her 51-year career as an educator. The inaugural Wahba award and lecture is planned for the 2022 IMS annual meeting in London, then annually at JSM.

Grace Wahba is one of the outstanding statisticians of our age. She has transformed the fields of mathematical statistics and applied statistics. Wahba's RKHS theory plays a central role in nonparametric smoothing and splines, and its importance is widely recognized. In addition, Wahba's contributions straddle the boundary between statistics and optimization, and have led to fundamental breakthroughs in machine learning for solving problems arising in prediction, classification and cross-validation. She has paved a foundation for connecting theory and practice of function estimation, and has developed, along with her students, unified estimation methods, scalable algorithms and standard software toolboxes that have made regularization approaches widely applicable to solving complex problems in modern science discovery and technology innovation. Wahba is listed as a

Grace Wahba

Highly Cited Researcher in Mathematics by ISIHighlyCited.com; her work has received more than 50,000 citations, according to Google Scholar.

Over the years, Wahba pursued her passion for research driven by real problems, and let natural curiosity be her guide. This led to a groundbreaking career in statistics at a time when the odds of a woman earning international acclaim in the field were slim, to say the least.

In establishing the **IMS Grace Wahba Award and Lecture,** the IMS further affirms its commitment to honoring outstanding statisticians, regardless of gender, to supporting diversity in statistical science and in its membership, and to inspiring statisticians, mathematicians, computer scientists and scientific researchers in general. The lecture will be a highlight at IMS meetings, and an intellectually inspiring presentation with broad appeal to a large audience.

The committee members Jianqing Fan, Sunduz Keles, Douglas Nychka, Bernard Silverman, Daniela Witten, Wing H. Wong, Bin Yu, Ming Yuan, and Hao Helen Zhang, are working on the details of the award—including **raising the endowment fund** (contribute via https://imstat.org/shop/donation/). Updates will be forthcoming.

IMS Bulletin

Contact information

IMS Dues and Subscriptions Office

IMS Business Office
Executive Director, Elyse Gustafson

Executive Committee

IMS Members' News

Kenneth Lange elected to US National Academy of Sciences

The US National Academy of Sciences has announced the election of 120 members—59 of whom are women, the most elected in a single year—and 30 international members in recognition of their distinguished and continuing achievements in original research. Among them is IMS Fellow Kenneth Lange.

Kenneth Lange is the Maxine and Eugene Rosenfeld Professor of Computational Genetics and Chair of the Department of Human Genetics, at the University of California, Los Angeles, and a professor of statistics and of biomathematics. He previously served as chair of the Department of Biomathematics for nine years and has held permanent or visiting appointments at the University of New Hampshire, University of Michigan, University of Helsinki, MIT, Harvard, and Stanford. He has authored four advanced textbooks and published nearly 200 scientific papers.

Kenneth Lange

Two themes dominate Lange's research. One is the development of novel mathematical methods in optimization theory, applied probability, and computational statistics. The other is a devotion to realistic biological modeling. Although there is bound to be a tension between these two poles, the advancement of the biomedical sciences depends on bridging the gap. His contributions to genetic epidemiology, population genetics, membrane physiology, demography, oncology, and medical imaging highlight some of the connections. Many of his landmark papers predate by a decade or more the current flood of biological applications of hidden Markov chains, Markov chain Monte Carlo, and high-dimensional optimization.

Lange has also made important software contributions to the human genetics community. His program Mendel is the "Swiss army knife" of statistical genetics packages. He and faculty colleague Eric Sobel are constantly adding new utilities, with a recent emphasis on special handling of the enormous data sets generated by SNP (single nucleotide polymorphism) association studies.

Neil Risch, Michael Boehnke, Daniel Weeks, Eric Sobel, Eric Schadt, and Laura Lazzeroni are among his former graduate students. This list constitutes a Who's Who of statistical genetics. He continues to mentor and inspire bright students who combine mathematical talent with biological curiosity.

Lange was elected a Fellow of IMS in 2012, for "groundbreaking developments in statistical computing and statistical genetics as a prolific and rigorous scholar and mentor." He was awarded the COPSS George W. Snedecor Award in 1993.

Kerrie Mengersen delivering ISI President's Invited Lecture at WSC

Professor Kerrie Mengersen is the International Statistical Institute President's Invited Speaker for the Virtual World Statistics Congress, WSC2021 (July 11–16, 2021: https://www.isi2021.org/). Kerrie Mengersen is Distinguished Professor of Statistics at Queensland University of Technology, and an incoming Vice-President of the ISI. Her work spans Bayesian statistics, computational statistics, environmental, genetic and health statistics, statistical consulting and citizen science. She was a guest on the Stats+Stories podcast "Stats in Celebration of Earth Day" and "Explaining Bayes Better". These (and many others) are available to listen to at https://statsandstories.net/episodes.

More Members' News

International Prize in Statistics winner Nan Laird in podcast episode

The International Prize in Statistics is the top award in the field of statistics. As we reported in the last issue, this year it was awarded to Harvard biostatistician Professor Nan Laird. Among other things, Laird helped develop the statistical methods that allow researchers to extract detailed information from longitudinal studies.

In episode 45 of the ACEMS podcast, *The Random Sample*, Nan Laird talks with host Louise Ryan about the award, and looks back at some of the highlights of her career. Joining them is one of Laird's colleagues from the Harvard TH Chan School of Public Health, Professor Garrett Fitzmaurice. (ACEMS is the Australian Research Council Centre of Excellence for Mathematical & Statistical Frontiers.)

Listen to the episode wherever you get your podcasts, or via https://acems.org.au/podcast/episode-45-international-statistics-prize.

Daniel Remenik awarded Rollo Davidson Prize and MCA Prize

Daniel Remenik, Associate Professor in the Department of Mathematical Engineering, Center for Mathematical Modeling, at the Universidad de Chile, has been awarded two prizes recently.

The **Rollo Davidson Prize** for 2021 was awarded jointly to **Ioan Manolescu**, Université de Fribourg, in recognition of his outstanding work on critical physical systems in two dimensions, particularly the random cluster and Potts models; and to **Daniel Remenik**, in recognition of his transformative contributions to the understanding of the KPZ fixed point. (Rollo Davidson was an accomplished mathematician of remarkable potential, and Fellow-elect of Churchill College, Cambridge, who died in a mountain climbing accident on the Piz Bernina in 1970. He was 25. The Rollo Davidson Trust was founded in 1975 in his memory, with initial funding coming from the royalties of two collections of papers published in 1973–74 by Rollo's friends and colleagues. The Trust awards an annual Prize for young probabilists.)

The Mathematical Council of the Americas (MCofA) awards five **MCA Prizes** to mathematicians who are no more than 12 years past their PhD at the date of the Mathematical Congress of the Americas. The winners are invited to give a lecture on their work at the Congress. Daniel Remenik was among the five winners of the 2021 MCA Prizes, which will awarded on the occasion of the Third Mathematical Congress of the Americas (Buenos Aires, July 19–24, 2021). The list of winners is at http://mcofamericas.org/latest-news/mcofamericas-2021-prizes.

Richard Samworth awarded European Research Council Advanced Grant

IMS Fellow Richard Samworth, who holds the Professorship of Statistical Science at the University of Cambridge, has been awarded an Advanced Grant from the European Research Council. His project title is "Robust statistical methodology and theory for large-scale data." ERC Advanced Grants support excellent researchers at the career stage at which they are already established research leaders with a recognised track-record of research achievements. Candidates have to demonstrate the ground-breaking nature, ambition and feasibility of their scientific proposal.

Grace Wahba: Career Profile and Impact

Grace Wahba is an American statistician and emerita I.J. Schoenberg-Hilldale Professor of Statistics at the University of Wisconsin–Madison. She has made fundamental contributions to mathematical and applied statistics, optimization, and machine learning. In particular, she laid the foundations for smoothing noisy data and is regarded as "the mother of smoothing splines." Her work ingeniously integrated advanced mathematics such as reproducing kernel Hilbert spaces (RKHS), state-of-the-art tuning criterion such as generalized cross validation (GCV), and powerful computational methods based on the representer theorem into a broad class of regularization approaches. These approaches, now field standards, profoundly impacted practical applications in science, engineering, and medicine.

Grace Wahba's career overview

Grace Wahba obtained her bachelor's degree in mathematics from Cornell University in 1956, her master's in mathematics from the University of Maryland in 1962, and her PhD in statistics from Stanford University in 1966. She joined the University of Wisconsin at Madison in 1967 as the first female faculty member in the Department of Statistics, and remained on the faculty for 51 years, retiring in 2018.

Grace Wahba is an outstanding statistician. She has had a foundational influence on the fields of mathematical and applied statistics, optimization and numerical computation, and machine learning. Throughout her career, Wahba collaborated actively and broadly in many interdisciplinary areas, emphasizing the importance of understanding the scientific context of data before developing and applying new statistical methods, and has made seminal contributions to climatology, epidemiology and bioinformatics.

Contributions in Statistics

Grace's early work focused on spline models for noisy observational data. When she joined UW–Madison, she had a half-time appointment at the Math Research Center (MRC), which was known as a stronghold for splines and approximation theory, with research led by world-leading spline experts Iso Schoenberg, Carl de Boor and Larry Schumaker. The group was interested in solving the spline smoothing problem, but lacked a unified framework for feasible and scalable optimization. In statistics, Parzen was already applying RKHS in time series analysis. However, Grace provided the breakthrough that connects RKHS to optimization and curve fitting on empirical data. Kimeldorf and Wahba (1971) were the first to formulate the cubic smoothing spline problem in the RKHS framework, and to derive the solution as the minimizer of a regularization problem. Kimeldorf and Wahba proved the famous "Representer Theorem" using Euclidean geometry, showing how to find a function in an infinite dimensional RKHS given noisy values of a finite number of bounded linear functionals. The theorem has become the foundational principle for theoretical investigation and practical implementation of cubic smoothing splines, as well as a whole menagerie of penalized likelihood problems and regularization methods. Theoretically, this result sheds light on many corners of mathematical statistics, particularly asymptotics for nonparametric statistics. Computationally, the theorem had far-reaching applications—from the 1970s, when solving a 10×10 linear system was just barely doable, to today's massive high dimensional datasets. In recent decades, the focus of much theoretical research has shifted from parametric statistics (estimating finite-dimensional models) to nonparametric statistics (estimating infinite-dimensional models such as curves and surfaces). Wahba's RKHS continues to grow in importance as one of the most elegant, flexible and reliable theoretical tools for understanding efficient estimation of high-dimensional smooth functions.

Another important challenge in applying a spline in practice or more generally, using regularization methods based on optimization in an RKHS, is the choice of one (or more) so-called smoothing-parameter, which balances off the fit to the data and the RKHS squared norm of the function being estimated. For a long time, without supercomputing power, this was done in an ad hoc way, and the results were less than satisfactory. With Svante Wold (1975), Wahba first proposed the automatic tuning procedure based on leaving-out-one cross validation. Later, Wahba provided a major breakthrough by realizing that "the cubic spline has the square integral of the second derivative as penalty and that is related to human perception of smoothness", and by inventing generalized cross-validation (GCV, Golub, Heath, Wahba, *Technometrics*, 1979; Craven and Wahba, *Numerische Mathematik*, 1979). Wahba provided a deep analysis of GCV, proved its theoretical properties and developed efficient code for its implementation. GCV has become a standard method for tuning parameter selection, and has far-reaching applications in science and industry.

This ground-breaking work led to a series of fundamental papers, published by Wahba in the 1970s and 80s, which paved the way for smoothing splines and regularization methods in a broad range of topics including likelihood estimation, classification and density estimation.

Wahba's book *Spline Models for Observational Data* (SIAM, 1990) is a classical text on smoothing splines. The scope of the book is phenomenal, covering a broad range of topics including

time series, spline smoothing, nonparametric regression, likelihood estimation and density estimation. Wahba labored for decades to polish a viewpoint of RKHS and smoothing splines, which has proven to be exceptionally valuable and applicable. Her presentation provides the most ambitious construction of theoretical machinery for the RKHS in modern mathematical statistics. The book now has over 8,000 citations. Since the 1990s, with the ever-increasing size and complexity of big data, Wahba's seminal work on the use of smoothing splines has become more important. The links between RKHS theory and high-dimensional optimization are widely used in statistical machine learning. They have led to a huge explosion of work on sparse optimization, along with other new approaches for tuning models.

During 1993–95, Wahba developed the Smoothing Spline ANOVA models, a unified and powerful way of generalizing ordinary ANOVA, which can be characterized as projections in the tensor product of several Euclidean spaces, to projections in tensor products of several RKHS, which allows for main effects and interactions between heterogeneous variables of all kinds. More recently, LASSO-type models have been broadly used for building sparse and interpretable models in high dimensional data analysis. Wahba also made insightful contributions to modern high dimensional tools. Leng, Lin and Wahba (2006) showed that if the LASSO is tuned for prediction, in general it is not consistent for model selection.

Contributions in Machine Learning

In addition to being a great statistician, Wahba is also a pioneer of the field of machine learning. In 2013, Wahba contributed an essay, "Statistical Model Building, Machine Learning, and the Ah-Ha Moment," to the COPSS 50th Anniversary book *Past, Present, and Future of Statistical Science*, showing her deep insight and influential contributions on the intersection of statistics and machine learning. In the interview for her Pfizer Colloquium at the University of Connecticut in 2018, when asked for her perspective about the relationship between statistics and machine learning, Wahba answered "I think there is a great deal of overlap there and we should join them, not beat them. I expect my PhD students to get a minor or even a masters in CS, and I see CS students doing the reverse. I claim my area is Statistical Machine Learning".

Wahba's work on RKHS, regularization and GCV have made a fundamental impact on the machine learning community. In machine learning, support vector machines (SVMs) are a popular class of large-margin classifiers with wide applications and successful performance. However, for a long time, they were a black box to statisticians, as their large-sample properties were completely murky. Wahba's work illuminated the connection between SVMs and RKHS. The magic moment occurred at a conference in Mt.

Holyoke in 1996 where statisticians and computer scientists came together, and at that time, it was realized that SVMs could be obtained as an optimization problem in the RKHS framework by simply replacing the square loss function with the hinge loss. This important connection immediately ignited intensive interest in RKHS and the "Representer Theorem" within both the statistics and computer science communities, about 30 years after Wahba's pioneering work in 1971. Since then, Wahba and her collaborators Lin, Lee, and Zhang developed extensive theory to uncover the mystery of SVMs, namely, the SVM is estimating the sign of the log odds ratio, exactly what you want for classification. Her group also extended the binary SVM framework to multiclass SVMs and unbalanced classification problems. These results provide a full and precise understanding of SVMs from a statistical perspective.

One common and challenging feature of modern massive datasets is high dimensionality: "large p, small n". This poses computational challenges for nonparametric statistical methods and flexible learning algorithms. Wahba's RKHS theory and Representer Theorem overcome this obstacle by providing an elegant framework to formulate more powerful classifiers such as support vector machines and sparse modeling, which implicitly project the observed data into a higher-dimensional feature space before building classification decision rules. Her work has substantially advanced the fields of sparse modeling, model selection and high dimensional data analysis. Her spline book introduced the RKHS machinery to the machine learning research community.

Wahba has had long-term, fruitful collaborations with machine learning researchers in CS, developing state-of-the-art algorithms for analyzing heterogeneous, complex data sets. In particular, her collaborations with Steve Wright in the Madison CS department resulted in providing crucial algorithms in a series of joint papers. Included is work on regularized logistic regression as a tool to find multiple dichotomous risk factors. Of particular interest is Lu, Keles, Wright and Wahba (*PNAS, 2005*) involving protein clustering based on sequence data—see more below.

Contributions in Interdisciplinary Scientific Research

In parallel to her mathematical research, Wahba has had a major impact on applied problems. She has worked on cutting-edge statistical problems that are motivated by applied science. Her research focuses on developing new and improved statistical models and machine learning methods to extract important information from demographic studies and clinical trials.

Wahba's passion for solving real-world applications with mathematical and statistical tools can be traced back to 1965, when she was working at IBM. One key problem was how best to estimate the attitude of a satellite given star sensors and an ephemeris, a table of actual positions (direction cosines) of a set

of stars. Mathematically, this amounts to finding a rotation matrix that best maps the observed direction cosines to the true direction cosines. Wahba first proposed the mathematical formulation of the problem, which is the well-known "Wahba's Problem" in today's applied mathematics. Since she published the problem in her *SIAM Review* paper "A Least Squares Estimate of Satellite Attitudes" (1965), the problem led to thousands of scientific papers on the problem including a number of solutions such as Davenport's *q*-method, QUEST and SVD-based methods. Wahba's problem and its solution have turned out to have important applications in satellite control using sensors such as multi-antenna GPS receivers and magnetometers.

Throughout her career, Wahba successfully established long-term collaborations with other scientific researchers on real-world problems. Among them were collaborations in meteorology and ophthalmology.

Wahba's meteorology collaboration began with Don Johnson, the editor of the *Monthly Weather Review*. At the time, weather forecast models observed data from scattered weather stations and needed to smooth and interpolate the observations onto a computational grid, which were then used in a gridded forecast model. Wahba and then-student Jim Wendelberger improved this method significantly using her splendid thin-plate spline framework. Her work immediately ignited intense research interests and efforts in numerical weather prediction models. Wahba and her collaborators then developed a long series of results related to splines and GCV with applications in numerical weather prediction. For her outstanding contributions to the application of statistics in atmospheric and climate science, Wahba received the 1998 Statistical Climatology Achievement Award.

Wahba also was involved in a 24-year collaboration with two ophthalmologists, Drs. Ron and Barbara Klein from the Department of Ophthalmology and Visual Sciences at UW–Madison, on an epidemiological study of diabetic retinopathy. Since the 1980s, Wahba and her students joined the Kleins' team to develop new statistical methods for discovering underlying mechanisms of age-related eye disease and diabetes. Most of the efforts focused on analyzing data from the Beaver Dam Eye Study. These fruitful collaborations resulted in important publications in ophthalmology and visual sciences. In one of their recent papers, they showed that mortality runs in families in parallel with modifiable risk factors such as smoking, BMI and socioeconomic variables. Wahba presented these results at various lectures, including her Neyman Memorial Lecture (1994) and the Wald Lectures (2003).

Later on, Wahba significantly expanded her research areas to bioinformatics and statistical genetics. Lu, Keles, Wright, and Wahba (PNAS 2005) developed a novel and effective optimization framework for kernel learning — Regularized Kernel Estimation (RKE) — and applied the results to clustering proteins based on pairwise Blast scores. This involved placing each sequence in a low-dimensional space so that distance between proteins in this representation reflects similarity. They achieved a visualizable 3D sequence space of globins and then a new protein's function can be deduced based on its cluster membership. Later her group also used RKE to examine the relative influence of familial, genetic and environmental covariates in flexible risk models.

Such long-term collaborations between biologists and quantitative scientists are unusual, and attest to the significant impact of Wahba's work on scientific investigations.

Educational Achievements

Wahba has been a great mentor for many outstanding statisticians. She is best known as the mother of UW–Madison's spline school, and as the primary driving force for data smoothing methods, theory and applications. She led one of the most active and productive research groups on smoothing splines, sparse modeling and support vector machines. Wahba is passionate about working with students, as she said at the Pfizer Colloquium interview, "My biggest thrill as a professor is listening to a student explain their ideas." She is renowned for her generosity in sharing ideas with students, collaborators and junior faculty, and for her unwavering support for junior faculty in promoting their careers and helping them through hardships.

During her spectacular 51-year career at UW–Madison, Wahba nurtured many talented statisticians, including 39 PhDs and nearly 370 academic descendants (according to the Mathematics Genealogy Project). Many of her PhD students have become successful researchers and senior leaders.

Awards and Honors

Wahba's extraordinary scientific achievements have been recognized by many honors and awards. She is an Elected Member of the US National Academy of Sciences, the American Academy of Arts and Sciences, American Association for the Advancement of Science, and the International Statistical Institute, and a Fellow of IMS, SIAM and ASA.

For her outstanding contributions to the field of statistics and society, Wahba received a long list of prestigious awards, including the first Parzen Prize for Statistical Innovation in 1994, the 1996 COPSS Elizabeth Scott Award, the 2009 Gottfried Noether Senior Scholar Award, and the inaugural Leo Breiman Award in 2017 for her contributions to Statistical Machine Learning. In addition, Wahba delivered the 2003 Wald lectures, the 2004 COPSS Fisher Lecture, the ASA President's Invited Address at JSM 2007, and the 2018 Pfizer Colloquium.

Caucus for Women in Statistics marks 50 years

Tomi Mori is the 2021 President of the Caucus for Women in Statistics. She is a Professor in the Department of Biostatistics at St. Jude Children's Research Hospital, Memphis, TN. She writes:

2021 is the 50th anniversary of the Caucus for Women in Statistics (CWS), an international professional statistical society formed in 1971 with the mission to advance the careers of women statisticians through advocacy, shared resources and learning opportunities, increasing their professional participation and visibility, and promoting research that impacts women statisticians around the world.

I recently had the honor of interviewing Donna Brogan, our founding president, as a part of the 50th anniversary past president interview project. She recounted the amusing story of how CWS began in a women's bathroom. As a young and aspiring female statistician with the big idea of forming a women's statistician group, Brogan decided to place a flyer in the women's bathroom asking people to come to her hotel room to brainstorm at the 1969 annual ASA meeting in New York City. About ten women showed up, agreed to collaborate in the creation of an advocacy group for women in statistics, and worked together to fulfill this goal during the next two years. With no internet or email, most of the preparatory work was undertaken through handwritten letters and face-to-face meetings at annual ASA meetings. In 1971 the Caucus for Women in Statistics was officially established, recognized by the ASA, and permitted to organize a scientific session during annual meetings. Donna Brogan served as the first CWS President from 1971–73.

Some of the most notable CWS achievements over the years include co-sponsorship with the ASA Committee on Women in

Statistics to establish and begin to offer the Gertrude M. Cox Scholarship in 1989, the Florence Nightingale David Award in 2001 given by the Committee of Presidents of Statistical Societies (COPSS), and special lectures given by awardees of the Elizabeth L. Scott Award and F.N. David Award in 2018. CWS has also collaborated with many professional societies, including ASA, IMS, the Statistical Society of Canada, the International Biometric Society, the International Chinese Statistical Association, the International Indian Statistical Association, the Korean International Statistical Society, and, more recently, Women in Machine Learning. Over the years CWS has built a network of more than 300 students and professional statisticians in addition to co-founding the Women in Statistics and Data Science Conference (WSDS).

To celebrate the 50th anniversary of CWS, we are planning a variety of events including a virtual conference, invited sessions at the Joint Statistical Meetings (JSM) and the Women in Statistics and Data Science (WSDS) conference, a special CWS event at JSM and WSDS, and CWS giving day. We also host the monthly **Madam Presidents Happy Hour** (https://cwstat.org/madam-president-happy-hour/), which takes place over Zoom on the fourth Thursday of each month from 3–4 p.m. ET. It is open to everyone regardless of CWS membership and allows those who participate to meet, and learn from the experiences of past CWS presidents. We also produced the **CWS Past Presidents Interview Series** on YouTube (https://www.youtube.com/results?sp=mAEB&search_query=CWS+Past+Presidents+Interview+Series).

Please check our webpage, https://cwstat.org for upcoming events and email cws@cwstat.org with questions or requests for more information.

IMS Travel Awards: Congratulations to all winners

We present the nine winners of the IMS New Researcher Travel Awards…
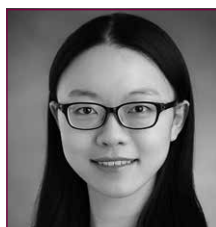
Marta Catalano
University of Torino

Yifan Cui, National
University of Singapore

Rui Duan
Harvard University

Lan Gao, University of
Southern California

Yuqi Gu
Duke University

Guanyu Hu, University of
Missouri–Columbia

Taeho Kim
University of Haifa

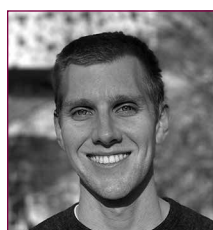**Zilin Li,** Harvard T.H. Chan
School of Public Health

Mbanefo Solomon Madukaife
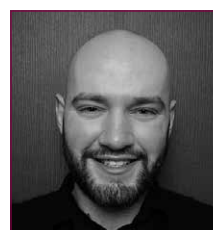University of Nigeria, Nsukka

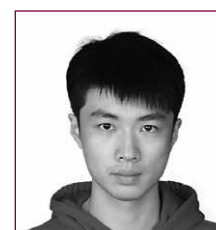## …and the 16 winners of the 2021 IMS Hannan Graduate Student Travel Awards

Joshua Agterberg
Johns Hopkins University

Blair Bilodeau
University of Toronto

Jacob R. Bradley
University of Edinburgh

Siyu Heng
University of Pennsylvania

Inkoo Lee
Florida State University

Tianyu Pan, University of
California, Irvine

Konstantinos Pantazis
Univ Maryland, College Park

Stefan Stein
University of Warwick

Patrick Vossler, University
of Southern California

Yisha Yao
Rutgers–New Brunswick

Xiufan Yu
Penn State University

Yichi Zhang, North Carolina
State University

Lili Zheng, University of
Wisconsin–Madison

Chen Zhong
Tsinghua University

Ying Zhou
University of Toronto

Yuchen Zhou, University of
Wisconsin–Madison

Radu's Rides: Notes to my Past Self

Contributing Editor Radu Craiu shares some advice that would have come in handy as a new researcher:

Once upon a time we were young and insolent (some of you still are). It was a time of questioning the authority of the discipline's stars and the norms they had created, while enviously eying their accomplishments and dreaming of surpassing them. Take, for instance, graduate school: a complicated and sometimes perplexing place where immeasurable talent is waiting to erupt on the grand stage of one conference or another, or to dazzle the world with an arXiv preprint (most cannot possibly dream about dazzling with a published paper, review times being what they are). Back then, we shared the cocky confidence that we would get there (or somewhere equally important) as soon as a few pesky little details were dealt with. Reading all those immortal papers which we were all trying to improve upon, we should have wondered about our future role in the Stat-o-sphere: player or spectator? Instead, we were taking in the imaginary splendour of what could be, while ignoring, like all young people, the dangers of what *is*. Looking back, I wonder what words of wisdom, what warnings and encouragements, I could proffer to my younger self. How could *he* benefit from *my* lived experience? The matter of career advice is like Medusa's hair, not only made of multiple threads each with its own life and potential to damage, but also annoyingly elusive. If you do not believe me, read on.

How do I choose my mentors? In grad school you could choose a well-established researcher whose word will travel faster and further in the community, but who will likely be busier and less inclined towards intellectual hand-holding. Or, you could bet your future on a junior professor, who will be more available at all hours, will scare you less and will still remember the trials of a young academic life. However, this simple and rather cold calculation is vastly incomplete as it ignores the personality aspect that is crucial in any mentor–mentee relationship. Most interesting projects will have more downs than ups and the associated strain is easier to navigate if those involved are congenial. Later in life, keep in mind that *simpatico* mentors and collaborators are to be cherished, so invest generously and do not ever take them for granted.

Should I doggedly pursue one theme throughout most of my career, or adopt a more protean approach to selecting research topics? Either path comes with a price tag. The obsessive, while highly respected in their narrow field, risk not being known outside it; the fickle will be vaguely known by many, but not really "at home" in any group. The annals of the discipline may be kinder to the former, as long as the field of their devotion has the stamina to survive. But more importantly, deciding whether to put all your ideas in the same basket or not has to do with temperament as much as anything else. If some contentment is to be achieved, you should follow your curiosity wherever it leads you.

Should I work on topics defined by others or try to create my own? Currently, there is large, unidirectional bandwagon movement in our discipline—people getting on and few getting off. Ten years ago, my answer would have been more nuanced, but right now I believe that building your own wagon is better in the long run. Alas, there is higher risk in finding your own line of inquiry. If, after a while, you find yourself alone studying it, interpret this as a sign that you need to move on to something else. If your problems become the problems of many, you have meaningful work to do.

Should I publish often or seldom? Publishing at high frequency is associated with publishing small, so large productivity will be met with skepticism unless it is accompanied by depth. Writing more slowly allows distillation of ideas, proper accounting of others' related work and consequential concatenation of MPUs (minimum publishable units) for larger impact in more visible venues. Big ideas have a tendency to outlive incremental ones, by a lot.

How do I know the impact of my work? You will likely not know for sure, exceptional cases notwithstanding. There are many ways, some more futile than others, to measure impact, and most of them will influence elements in your career path at some point or another. Promotions, awards and grants will be milestones by which you will be judged, and don't be surprised if sometimes they may feel like millstones. People will count your papers (see previous point), but also your citations, and they will want to recognize the name of the journals where you publish. Alas, none of these are sure bets for the *long-term* impact of your work. Timing is as important in science as it is in sports—the topic *du jour* will always be more favoured by the Impact Gods, at least in the short run. Finding a good vein of problems to work on (see answer to your second question) will go far in promoting your merits.

How do I stay sane? For some reason, this feels like a timely question... maybe it is easier to mention a few of the things you should avoid, and a big one is toxic negativity. In your professional life this implies staying away from: people who drag their (and others') personalities into scientific debate, unfounded criticisms, or working in toxic environments where infighting reigns supreme. Try not to compare your CV or any other element of your career path with others, and rein in your impostor syndrome—but not by letting all other aspects of life burn into the fire of your ambition. Don't forget to stop and look at something beautiful that doesn't end with QED.

Preview of Special IMS Lectures

IMS Medallion Lecture: Nancy Ruonan Zhang

Nancy Ruonan Zhang is a Ge Li and Ning Zhao Professor of Statistics in The Wharton School at University of Pennsylvania. Her research focuses primarily on the development of statistical and computational approaches for the analysis of genetic, genomic, and transcriptomic data. In the field of Genomics, she has developed methods to improve the accuracy of copy number variant and structural variant detection, methods for improved FDR control in genomic studies, and methods for analysis of single-cell RNA sequencing data. In the field of Statistics, she has developed new models and methods for change-point analysis, variable selection, and model selection. Dr. Zhang has also made contributions in the area of tumor genomics, where she has developed analysis methods to improve our understanding of intra-tumor clonal heterogeneity.

Nancy obtained her PhD in Statistics in 2005 from Stanford University. After one year of postdoctoral training at University of California, Berkeley, she returned to the Department of Statistics at Stanford University as Assistant Professor in 2006. She received the Sloan Fellowship in 2011, and formally moved to University of Pennsylvania in 2012. At Penn, she is a member of the Graduate Group in Genomics and Computational Biology, and currently serves as the Vice Dean of the Wharton Doctoral Program.

Nancy's Medallion lecture will take place at the online JSM, August 8–12, 2021.

DNA copy number profiling from bulk tissue to single cells

The completion of the human genome two decades ago gave birth to the expansive and cross-disciplinary field of Genomics, and along with it, our own community of Statistical Genomics. From microarrays to high throughput sequencing, from genome-wide association studies to the recent advances in single cell profiling, wave after wave of technological innovation have fed Statistics with new data challenges that spurred methodological and theoretical developments. In this lecture, I will focus on two specific areas of genomics: single cell sequencing and DNA copy number profiling, and describe the critical role of Statistics in their scientific development. I will start with DNA copy number profiling in bulk tissues, review the scientific background and early models, and describe how these models have adapted to adjust to the shifting sands of technological change. I will briefly survey the statistical developments that were seeded by these scientific inquiries, from change-point detection to multi-channel scan statistics to latent variable modeling. On the scientific side, I will focus on DNA copy number profiling in cancer and its role in the study of cancer cell evolution.

Despite our best computational efforts, bulk tissue sequencing can only tell us so much about how DNA copy number varies between single cancer cells within a tumor. Since cancer is, quite simply, a Darwinian evolution of cells driven by somatic mutations, it is important to detect and study these cell-to-cell DNA copy number variations. For example, the copy number heterogeneity for a given tumor has been found to be a useful prognostic marker. In the second half of my talk, I will turn to the modeling of data from single cell technologies, which have revolutionized the field

of biology during the last decade. I will describe how the large, sparse data matrices from single cell experiments have inspired new models and statistical problems. I will also describe, to some detail, a specific method that we developed for allele-specific copy number estimation at the single cell level. The method, Alleloscope[1], enabled the discovery of previously hidden types of variation within tumor cell populations.

Apart from the framing of problems and the proposal of their (partial) solutions, I hope to convey through this talk some lessons that I have learned about the role of Statistics in today's scientific process. Science, as always, is driven by technology, and today's fast-paced turnover in technology gives us large data sets where exploratory hypothesis generation is a primary challenge, and where low hanging fruits often render statistical inference an afterthought. Through my own winding journey on the problem of copy number estimation in bulk and single cell sequencing data, I will reflect on common pitfalls and emerging opportunities.

[1] Wu C-Y, Lau BT, Kim H, Sathe A, Grimes SM, Ji HP, Zhang NR (2021) Integrative single-cell analysis of allele-specific copy number alterations and chromatin accessibility in cancer. *Nature Biotechnology*, forthcoming.

JSM now held virtually. Check website for updates: https://ww2.amstat.org/meetings/jsm/2021/

2021 JSM

Statistics, Data, and the Stories They Tell
Virtual Conference
August 8–12, 2021

IMS Lawrence Brown PhD Student Award: Ilmun Kim

Ilmun Kim is a research associate at the Statistical Laboratory at the University of Cambridge, mentored by Richard Samworth and Rajen Shah. He completed his PhD at Carnegie Mellon University in 2020 under the joint supervision of Larry Wasserman and Sivaraman Balakrishnan. His research interests are broadly in the areas of nonparametric inference and high-dimensional statistics. Currently, his research focuses on developing statistical methods for nonparametric testing problems. He is also interested in asymptotic theory, concentration of measure and minimax theory as tools for understanding modern statistical problems.

Ilmun will deliver his Lawrence Brown PhD Student Award lecture at the online JSM, August 8–12, 2021.

Statistical power of permutation tests

A permutation test is a nonparametric approach to hypothesis testing, routinely used in a variety of scientific and engineering applications. The permutation test constructs the resampling distribution of a test statistic by permuting the labels of the observations. The resampling distribution, also called the permutation distribution, serves as a reference from which to assess the significance of the observed test statistic. A key property of the permutation test is that it provides exact control of the type I error rate for any test statistic whenever the labels are exchangeable under the null hypothesis. Due to this attractive non-asymptotic property, the permutation test has received considerable attention, and has been applied to a wide range of statistical tasks including testing independence, two-sample testing, change point detection, classification and so on.

Once the type I error is controlled, the next concern is the type II error, or equivalently the power of the resulting test. Despite its increasing popularity and empirical success, the power of the permutation test has not been fully explored beyond simple cases. While some progress has been made, existing results are often restricted to conventional asymptotic settings where underlying parameters are held fixed as the sample size increases. The goal of this work is to attempt to fill this gap by developing a general framework for studying the power of the permutation test under finite-sample scenarios.

To this end, we introduce a simple method for analyzing the non-asymptotic power of the permutation test based on the first two moments of a general test statistic. The utility of the proposed method is illustrated in the context of two-sample and independence testing under both discrete and continuous settings. In each setting, we introduce permutation tests and investigate their minimax performance. Specific examples of test statistics that we analyze include weighted U-statistics for multinomial testing and Gaussian kernel-based statistics for density testing. We also introduce exponential concentration bounds for permuted U-statistics, which allow us to obtain a sharper condition for the power analysis. Building on these exponential bounds, we propose permutation tests that are adaptive to unknown smoothness parameters without losing much power. This talk is based on joint work with Sivaraman Balakrishnan and Larry Wasserman.

# Introducing the 2021 IMS Class of Fellows

Ery Arias-Castro

University of California, San Diego

For fundamental contributions to nonparametric statistics including clustering, graphs and networks, sparse estimation, and statistical learning; and for extensive editorial service.

Yuri Bakhtin

Courant Institute of Mathematical Sciences at New York University

For the groundbreaking work on random dynamical systems including stochastic PDEs.
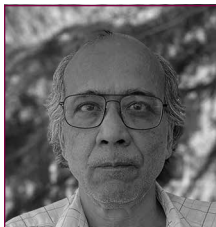
Prabir Burman

University of California, Davis

For contributions to model selection, nonparametric estimation for independent and dependent observations, multifold cross-validation, and repeated learning-testing methods for estimation of prediction errors.

Ismaël Castillo

Sorbonne University

For path-breaking contributions to the theory of Bayesian nonparametrics and high-dimensional Bayesian inference.

Kwun Chuen Gary Chan

University of Washington

For outstanding contributions to the methodology of preferential sampling design, observational data, and complex lifetime data; for substantive leadership in the application of statistics in public health and biomedical research.

Sandrine Dudoit

University of California, Berkeley

For excellent research on the statistical foundations & implementation of statistical genomic methods with particular focus on high-throughput methods for gene expression profiling; for development of open-source statistical software for biomedical data analysis, especially her role in founding & contributing to Bioconductor, an open-source development platform; for excellent teaching and graduate & postgraduate student mentoring; and for extraordinary university leadership.
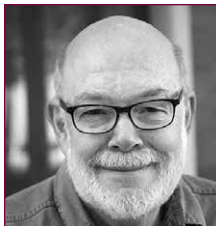
Charles J. Geyer

University of Minnesota

For fundamental contributions to Markov chain Monte Carlo methods, likelihood methods, and statistics genetics.

Alan Hammond

University of California, Berkeley

For making major advances in two of the most difficult and deepest questions of modern probability arising from central questions of statistical physics, and for substantial progress on rigorous study of self-avoiding walk.

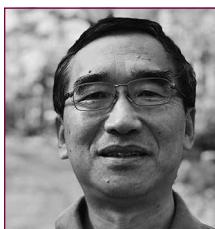## Scott H. Holan

University of Missouri

For significant research contributions to time series, spatial statistics, spatio-temporal modeling, for applications to official statistics, and for his dedicated service to the statistics profession.

Mark Holmes

University of Melbourne

For wide-ranging and creative research in theoretical and applied probability.

Jian Huang
University of Iowa
For fundamental contributions to high-dimensional statistics, survival analysis, and statistical genetics and genomics.

Gareth James
University of Southern California
For seminal contributions to functional data analysis, high-dimensional statistics, and statistical learning.

Nicole Alana Lazar
Pennsylvania State University
For significant contributions to empirical likelihood and neuroimaging analysis, and for leadership to the profession.

Jing Lei
Carnegie Mellon University
For fundamental and innovative contributions to sparse Principal Component Analysis, conformal prediction, network analysis, and spectral methods, optimal transport, cross-validation, and differential privacy, as well as applied work on the analysis of tissue and single-cell RNA sequencing data and autism.

Lexin Li
University of California, Berkeley
For influential contributions to sufficient dimension reduction, tensor regression, and neuroimaging applications, and for outstanding service to the profession.

Yehua Li
University of California, Riverside
For outstanding contributions to the theory and methods of functional data analysis, especially on non and semiparametric regression methods, dimension reduction, model selection, and statistical inference on both independent and spatially dependent functional data.

Huazhen Lin
Southwestern University of Finance and Economics
For outstanding contributions to theory and methods for survival analysis and semiparametric/nonparametric modeling; for dedicated service to the profession; and for strong leadership in statistics education and development in China.

Steven MacEachern
The Ohio State University
For fundamental and influential contributions to Bayesian statistics and inference, especially in the area of Bayesian nonparametrics, for dedicated mentoring of students and young researchers, and service to the profession.

Marianthi Markatou
University at Buffalo
For outstanding accomplishments on fundamental research in robust statistics and for a strong commitment to the advancement of statistical science through interdisciplinary research and professional service.

Florence Merlevède
Université Gustave Eiffel, France
For outstanding contributions to the field of dependent random variables, especially for fundamental results concerning the conditional limit theorems, rates of convergence in the central limit theorem, and large random matrices.

XuanLong Nguyen
University of Michigan

For contribution to the profession as a teacher, editor, and researcher, for contribution to the analysis of data, models both in theory and practice, and for leadership in the understanding of mixture models and hierarchical models.

Daniel J. Nordman
Iowa State University

For fundamental contributions to the theory and applications of computer-intensive nonparametric methods, including the Bootstrap and Empirical Likelihood, for time series and spatial data.

Natesh Pillai
Harvard University

For significant contributions to Markov Chain Monte Carlo Methods, mixing times of Markov chains and bridging the gap between applied probability, statistics, and computation.

Philippe Rigollet
Massachusetts Institute of Technology

For outstanding contributions to the analysis of statistical versus computational trade-offs, to the theory of aggregation, and to statistical optimal transport.

Johan Segers
UCLouvain

For path-breaking work on extremes of time series and his fundamental contributions to the theory and application of copulas.

Thomas A. Severini
Northwestern University

For distinguished contributions to semiparametric inference, asymptotic theory of likelihood inference, and Bayes/frequentist comparative inference.

Yiyuan She
Florida State University

For novel and sustained contributions to high dimensional and robust statistics, for excellence in mentoring, instruction, and service to the profession.

Aleksandra (Seša) Slavković
Pennsylvania State University

For novel contributions to the development of statistical disclosure techniques and algebraic methods, for contributions to graduate research, and for contributions to editorial and other publication activities of the IMS and other statistical organizations.

Peter Xuekun Song
University of Michigan

For path-breaking developments in likelihood inference, for outstanding contribution in medical research, and for exceptional service and mentorship.

Rui Song
North Carolina State University

For significant contributions to machine learning methods, dynamic treatment regime, and efficient and non-standard statistical inference.

Zhiqiang Tan
Rutgers, The State University of New Jersey

For seminal contributions to statistical theory and practice, including Monte Carlo sampling and causal inference, to significant contributions in collaborative research, and for contributions to the profession, including via editorial and organizational efforts.

Nian-Sheng Tang

Yunnan University

For excellent research accomplishments on statistical inference with missing data and distinguished contributions to the promotion of statistics in developing regions.

Bálint Virág

Univerisity of Toronto

For remarkable contributions to graph and group theory, random matrix theory, random Schrödinger operators, and Kardar–Parisi–Zhang universality.

Xiao Wang

Purdue University

For significant contributions to nonparametric statistics, shape-restricted inference, and functional data analysis, and for dedicated professional service and students' mentoring.

Changbao Wu

University of Waterloo

For important and original research contributions to survey sampling theory and official statistics, especially for the development of model-calibration theory and techniques, empirical likelihood methods for complex surveys, and robust inferential procedures for analyzing non-probability samples.

Min-ge Xie

Rutgers, The State University of New Jersey

For outstanding contributions to statistical research especially confidence distributions, fusion learning, meta-analysis, estimating equations, and statistical applications in biomedical sciences, industry, engineering, and environmental science. For exemplary service to the profession and university.

Guosheng Yin

The University of Hong Kong

For outstanding contributions in survival analysis, change-point detection and high-dimensional data analysis, and clinical trial methodologies, and for exemplary service to the profession.
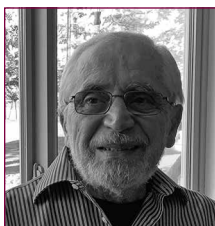
Ruben H. Zamar

University of British Columbia

For fundamental contributions in Robust Statistics, introducing the Min-max bias estimates, cell contamination in High Dimensional data, and many other useful procedures for robust estimation in Multivariate data.

Zhengjun Zhang

University of Wisconsin–Madison

For significant contributions to extreme value statistics and risk management, including tail dependence measure and nonlinear dependence measure construction and inference, max-linear competing factor models, nonlinear time series models for high-frequency financial data; and for conscientious editorial and other services to the profession.

Wang Zhou

National University of Singapore

For significant contributions to limit theorems, empirical likelihood, random matrices, and Schramm–Loewner evolution.

Yijun Zuo

Michigan State University

For pioneering and path-breaking contributions to the area of data depth, theory and methodology, and its applications.

Recent papers: supported and affiliated journals

Annales de l'Institut Henri Poincaré (B), Probabilités et Statistiques

The Probability and Statistics section of the *Annales de l'Institut Henri Poincaré* is an international journal that publishes high-quality research papers. The journal, supported by the IMS, deals with all aspects of modern probability theory and mathematical statistics, and their applications. The editors are Grégory Miermont and Christophe Sabot. Access papers at **https://projecteuclid.org/aihp**

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Observational Studies

Observational Studies, an IMS affiliated journal, is an open-access, peer-reviewed journal that publishes manuscripts on all aspects of observational studies, including study protocols, methodologies, descriptions of data sets, software and analyses of observational studies. The editor is Dylan Small. Read it at **http://obsstudies.org/index.php**

2021 papers to date

Carver Medal 2021

IMS Council has approved the nomination of Tati Howell, *IMS Bulletin* Editor, for the 2021 Carver Medal, as recommended by the Committee to Select the Carver Award. Tati receives the award for her outstanding service, efforts, and dedication as the assistant editor and the editor of the *IMS Bulletin* during the past 20 years.

Tati Howell

We asked those who have worked with Tati over the last 20 years to share with us their thoughts on this award.

Bernard Silverman, IMS Past President writes: "When I was IMS President (2000–2001), it was clear to me how important an attractive and informative *Bulletin* was, and how much we needed a professional approach, especially at a time when desktop publishing and the developing internet meant that people expected high standards. The aim of a good society bulletin is both to keep members informed of activities and to help build the society as a community. Fortunately, the IMS was able to devote some resources to this project, and by luck Tati Howell was keen to take up the challenge. Her approach was transformational. We are truly fortunate to have someone who combines all the skills needed to get good and interesting articles written, to obtain items like obituaries, to publicize conferences in an attractive way, and to present all this material in such an appealing and professional format. It's always interesting to receive and read the *Bulletin*, always on time and never even a typo! Tati took instinctively to the IMS and I am so glad that she and the *Bulletin* are so obviously thriving 20 years later. My heartiest congratulations to her on this award, which is richly deserved!"

Elyse Gustafson, IMS Executive Director writes: "Tati has been a joy to work with for the last 20 years. She is intuitive in her work, loves our members and wants to create something special for our community. Tati exemplifies the characteristics of a Carver Medal award winner."

Edsel A. Peña, IMS Executive Secretary writes: "Tati Howell is highly dedicated, very efficient, and continues to do an exceptional job as Editor of the *IMS Bulletin* and the IMS eNews. She also represents the Institute in a positive light in its events worldwide. She is a pleasure to work with and is truly deserving of the 2021 IMS Carver Medal."

Xuming He, *IMS Bulletin* Editor (2007–2010) writes: "I have really enjoyed working with Tati, as an editor, contributor, and of course a longtime reader of the *IMS Bulletin*. The way Tati prepared every issue of the *Bulletin* made it clear to me that she is not taking it as a job but rather as her passion."

Anirban DasGupta, *IMS Bulletin* Editor (2014–2016) writes: "Tati Howell is an institution and a glorious personality in the IMS. I would have been proud to have been a small fraction of what she has been as a dedicated and selfless member of the profession. The IMS clock will probably stop if we didn't have Tati. She is an exemplary person, an epitome of sincerity, constancy, reliability and concern, Tati is a bright candle in the profession. I am very grateful that I know her."

[*Editor's Note: It is a privilege to work in this way with, and for, such a brilliant international community of people whose research is endlessly interesting. I consider myself truly lucky that I love my job. Thank you, IMS.*]

The *Annals* Quadfecta 23

Librarian Margaret Fulford and Professor Jeffrey S. Rosenthal, University of Toronto, write:
The Institute for Mathematical Statistics (IMS) produces four flagship "Annals" research journals: *The Annals of Statistics, of Probability, of Applied Probability, and of Applied Statistics*. This led us to wonder which authors have accomplished the "Quadfecta" of publishing at least one paper in all four of these journals.

To investigate this question, we used MathSciNet to retrieve citations for all articles in the two "Applied" *Annals*. We then wrote a computer script to extract and compare all of the corresponding Mathematical Reviews author identification numbers, identifying 88 in common. Finally, we performed additional MathSciNet searches to determine which of those 88 authors had also published in the other two *Annals* (and when).

To our surprise, we found a total of 23 authors who have completed this Annals Quadfecta (see Table 1) — quite a high number, especially since the most recent *Annals* (*of Applied Statistics*) only commenced in 2007. These authors span quite a time frame, with year of first publication (in any journal) ranging from 1965 to 2012. But they have all accomplished the same special feat, of publishing at least once in all four of the IMS *Annals* journals.

We look forward to revisiting this question in future years, to see how quickly this "*Annals* Quadfecta" list grows, as time goes by.

Author Name	ID	Any	*AOS*	*AOP*	*AOAP*	*AOAS*	**Quadfecta**
Laurens de Haan	78885	1970	1974	1974	1998	2008	**2008**
Persi Diaconis	57595	1974	1979	1977	1991	2008	**2008**
Paul D. Feigin	65725	1976	1981	1981	1996	2009	**2009**
Avi Mandelbaum	119045	1981	1983	1987	1995	2009	**2009**
Michael Woodroofe	184490	1965	1974	1976	2008	2009	**2009**
Richard A. Davis	212811	1979	1984	1979	1993	2011	**2011**
Tze Leung Lai	109310	1971	1973	1973	2003	2011	**2011**
Wei-Liem Loh	306422	1988	1991	1992	1992	2011	**2011**
Jeffrey S. Rosenthal	334864	1992	1995	1994	1993	2011	**2011**
Benjamin Yakir	341906	1993	1993	2005	1998	2011	**2011**
Soumendra N. Lahiri	310114	1989	1992	1993	2009	2012	**2012**
Jingchen Liu	826318	2007	2012	2012	2012	2011	**2012**
Natesh S. Pillai	814778	2007	2012	2013	2012	2014	**2014**
David Siegmund	161745	1966	1974	1976	2016	2011	**2016**
M. H. A. Davis	55125	1972	1989	1974	1994	2017	**2017**
Stuart Geman	72335	1977	1982	1980	1995	2017	**2017**
Domenico Marinucci	656088	1999	2001	2018	2016	2009	**2018**
Andrew B. Nobel	326596	1992	1996	1998	2018	2008	**2018**
Tailen Hsing	89130	1984	1991	1995	1994	2019	**2019**
Lester Mackey	1051801	2012	2013	2014	2019	2017	**2019**
Bruno Rémillard	239911	1986	2007	1994	2019	2009	**2019**
Frederi G. Viens	607725	1996	2007	2000	2019	2014	**2019**
Gareth O. Roberts	306203	1990	2008	1991	1995	2020	**2020**

Table 1: A list of all 23 authors who have published in all four IMS *Annals* journals, showing their name, Mathematical Reviews author identification number, year of first publication in any MathSciNet-indexed journal, year of first publication in each of the four *Annals*, and year in which they completed their Quadfecta. (The list is ordered by Quadfecta year, and alphabetically by name within each year.)

COPSS 2021 Award Winners

In the last issue, we briefly announced the winners of this year's Committee of Presidents of Statistical Societies (COPSS) awards. Here's some more background on them all:

Alicia Carriquiry to deliver the 2021 Florence Nightingale David Award Lecture

Nancy Gordon (Chair of the Award Committee) and Daniel Nettleton (Iowa State University) write: The Committee of Presidents of Statistical Societies (COPSS) has selected Alicia Carriquiry, President's Chair in Statistics at Iowa State University, to be the 2021 COPSS Florence Nightingale David Award and Lectureship. Professor Carriquiry will receive the award during the 2021 Joint Statistical Meeting, where she will also deliver the F.N. David Lecture titled "Statistics in the Pursuit of Justice: A More Principled Strategy to Analyze Forensic Evidence." The F.N. David Award, sponsored jointly by COPSS and the Caucus for Women in Statistics, recognizes Carriquiry for her contributions to the profession that have spanned over 30 years.

Carriquiry researches applications of statistics in human nutrition, bioinformatics, forensic sciences and traffic safety and has published over 140 peer-reviewed articles in academic journals. Carriquiry's research has been used to make a difference in the world. She has worked with various government and health agencies around the world to improve health and nutrition, including the National Center for Health Statistics, the National Institutes of Health, the European Union and the World Health Organization.

For the past six years, Carriquiry has been the director of the Center for Statistics and Applications in Forensic Evidence (CSAFE), a National Institute of Standards and Technology (NIST) Center for Excellence. With more than 80 researchers from across six universities, CSAFE is developing statistically sound and scientifically solid methods to analyze and interpret evidence, providing the forensic community with accessible tools, open-source databases and educational opportunities.

Carriquiry has published cutting-edge work on source matching for bullet markings, glass fragments, footwear impressions and handwriting analysis. Her work potentially could have a significant and beneficial impact on the U.S. criminal justice system.

Carriquiry received a master's degree in animal science from the University of Illinois and a master's and doctoral degree in statistics and animal genetics from Iowa State University. She joined the Iowa State faculty in 1990 and has held various leadership roles at the university.

As the first female faculty member promoted to full professor in the Department of Statistics at Iowa State University, Carriquiry continues to advocate for female and early-career faculty by providing them with opportunities for success. The Department now has 15 other female faculty members who have benefited from the path Dr. Carriquiry blazed before them and from her subsequent advocacy and support.

Carriquiry is a fellow of several statistical associations, including the ASA, ISI, IMS and ISBA. She is an elected member of the National Academy of Medicine and a fellow of the American Association for the Advancement of Science. She joined the Intelligence Science and Technology Experts Group of the US National Academies. In 2018, Carriquiry became a technical advisor for the Association of Firearm and Tool Mark Examiners, and in 2020 was elected an associate member of the American Academy of Forensic Sciences.

Wing Hung Wong to deliver the 2021 COPSS Distinguished Achievement Award Lecture

Daniela Witten (University of Washington, Chair of the Award Committee) writes: COPSS has selected Professor Wing Hung Wong to be the recipient of the 2021 COPSS Distinguished Achievement Award and Lectureship (DAAL). Professor Wong will give the COPSS Distinguished Lecture at the 2021 Joint Statistical Meetings.

Professor Wong serves on the faculty of Stanford University, where he is currently Professor of Statistics, Professor of Biomedical Data Science, and holder of the Stephen R. Pierce Family Goldman Sachs Professorship in Science & Human Health. Before joining the Stanford faculty in 2004, he held teaching positions at the University of Chicago, The Chinese University of Hong Kong, UCLA, and Harvard University. He chaired the Stanford Department of Statistics from 2009 to 2012.

His research contributions include mathematical statistics, where he clarified the large sample properties of sieve maximum likelihood estimates in general spaces; Bayesian statistics, where he introduced sampling-based algorithms into Bayesian computational inference; and computational biology, where he developed tools for the analysis of microarrays and sequencing data, and applied them to study gene regulatory systems.

Professor Wong was the winner of the COPSS Presidents' Award in 1993. He was elected to the National Academy of Sciences in 2009 and the Academia Sinica in 2010. He was a founding member of the Hong Kong Academy of Sciences in 2015.

As the recipient of the 2021 COPSS

COPSS Award Winners continued

DAAL, Professor Wong will give a talk at the 2021 Joint Statistical Meetings titled "Understanding human trait variation from the gene regulatory systems perspective." Genome-wide association studies have shown great success in identifying genetic loci relevant to a number of human traits, such as disease susceptibility and anthropometric features. However, such direct statistical associations provide limited information on the underlying biological processes relevant to the trait. Professor Wong will argue that the integration of gene regulatory information is critical to achieving a better understanding of these genotype-phenotype relations. He will review research by his lab and others on the inference of context-specific gene regulatory relations based on bulk or single cell data from diverse cell types, tissue types, and developmental contexts. He will also describe his lab's ongoing efforts to exploit this information to build multi-layer statistical models capable of providing a more mechanistic understanding of human trait variation.

COPSS George W. Snedecor Award Winner: David Dunson
Kerrie Mengersen (Queensland University of Technology, Chair of the Award Committee) and Sudipto Banerjee (University of California, Los Angeles) write: COPSS has selected Professor David B. Dunson, currently Arts & Sciences Distinguished Professor in the Department of Statistical Sciences at Duke University, to be the recipient of the 2021 George W. Snedecor Award.

This award, established in 1976, honors an individual who was instrumental in the development of statistical theory in biometry and recognizes a noteworthy

publication within three years of the date of the award. The award, given biennially (odd years) since 1991, consists of a plaque and a cash honorarium of $2,000 and is presented at the Joint Statistical Meetings. The recognized publication is: Miller, J.W. and Dunson, D.B. (2019). Robust Bayesian inference via coarsening. *Journal of the American Statistical Association*, 114, 1113–1125. DOI: https://doi.org/10.1080/01621459.2018.1469995

David Dunson has maintained an astounding research portfolio throughout his career with over 400 peer-reviewed scholarly manuscripts appearing in leading journals, and co-authored a leading textbook on Bayesian statistical science. Interpreting the field of biometry in the broader sense as that of quantitative methods in biological and health sciences, about 120 of David's papers in the top echelon of journals in our profession have been directly instrumental in advancing statistical theory related to biometry. His scholarly manuscripts, without exception, tackle the many challenging curiosities in modern science by developing theoretically rigorous statistical frameworks, stochastic process models, and computational algorithms for the complex and high-dimensional data generated in scientific laboratories across a variety of scientific disciplines.

In the recognized publication, Miller and Dunson (2019) offer a very innovative and fundamentally different approach to Bayesian inference that is based upon the idea of "coarsening" and is referred to as "c-Bayes". Briefly, rather than conducting inference based upon the usual posterior distribution of the parameters conditional on the event that the data has been generated from a posited model, c-Bayes conditions on the model-generated data being a sufficiently close approximation to the observed data. Miller and Dunson's c-Bayes approach has proven particularly potent

in consolidating robustness of inference against perturbations from misspecified and dubious modeling assumptions. The manuscript adeptly elucidates the underlying theoretical issues surrounding bias, calibration, measurement error, over-dispersion, and over-fitting. Miller and Dunson offer impressive novelty in theory, methods, and computation.

A particularly appealing example in biometry that is presented in the paper applies c-Bayes for robust clustering in flow cytometry—a high-throughput technology for detecting and measuring physical and chemical characteristics of a population of cells or particles. Traditionally, this clustering is performed manually by defining piecewise linear boundaries between regions using one of several automated clustering algorithms. One key challenge here is that the populations are not well-approximated by any parametric distribution, and further, the number of populations is not known in advance. Miller and Dunson (2019) cogently demonstrate the substantial inferential advantages of c-Bayes over nonparametric Bayesian models such as mixtures of Gaussian distributions and other alternatives. It is worth pointing out that the manuscript has already garnered close to 100 citations in just two years since its publication. This is a remarkable achievement for an article focusing on statistical theory and methods and is a further testament to the impact and relevance of this research. Several papers primarily authored by biologists and scientists engaged in a variety of data-intensive health-oriented research are also taking note of c-Bayes.

Based upon David's overall career contributions to the advancement of statistical theory in biometry and, more specifically, this stimulating and highly innovative research manuscript, the conferral of the 2021 George W. Snedecor Award on this outstanding scholar is richly deserved.

COPSS Leadership Academy

The COPSS Leadership Academy is a new initiative for emerging leaders in statistics created by the Committee of Presidents of Statistical Societies, spearheaded by Bhramar Mukherjee. This new award recognizes the increasingly important role that early-career statistical scientists are playing in shaping the future of the discipline and is designed both to call attention to the efforts of these individuals and to provide a mechanism for them to share their vision for the field with each other and the statistical community. Awardees will be members of the Leadership Academy for three years. This exciting initiative recognizes junior members of the international statistical community with outstanding contributions to the field of statistical science in one or more of the following areas: education, training, and mentoring; original research and software development; impactful and ethical practice; and service to the profession and to society. The selection committee has named the following nine to the 2021–2024 COPSS Leadership Academy:

Emma Benn

Emma Benn, Associate Professor, Department of Population Health Science and Policy, Icahn School of Medicine at Mount Sinai: *For unmatched dedication to increasing diversity in the statistical sciences; for outstanding contributions to health disparities research; and for significant contributions to educating the next generation of clinical and statistical scientists.*

Claire Bowen, Lead Data Scientist, Privacy and Security, Urban Institute: *For contributions to the development and broad dissemination of Statistics and Data Science methods and concepts, particularly in the emerging field of Data Privacy, and for leadership of technical initiatives, professional development activities, and educational programs.*

Claire Bowen

Tamara Broderick

Tamara Broderick, Associate Professor, Department of Electrical Engineering and Computer Science, MIT: *For significant contributions to Bayesian nonparametrics and machine learning.*

Jeff Goldsmith, Associate Professor, Department of Biostatistics, Mailman School of Public Health, Columbia University: *For exemplary leadership in teaching and training students in biostatistics, data science, and public health.*

Stephanie Hicks, Assistant Professor, Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health: *For notable contributions to the analysis of high-throughput and single cell methods and data analysis; and for significant educational, mentoring, and outreach efforts to expand and diversify the community of data scientists.*

Jeff Goldsmith

Stephanie Hicks

Jonas Peters, Professor of Statistics, University of Copenhagen: *For path-breaking contributions to statistical issues in connection with causality research, for an extraordinary active role in research dissemination and for outstanding inspiration of junior researchers.*

Aaditya Ramdas, Assistant Professor, Department of Statistics and Data Science, Machine Learning Department, Carnegie Mellon University: *For significant contributions to sequential nonparametric inference, uncertainty quantification in machine learning, and statistical methods for reproducibility, as well as the development of an array of unique courses and tutorials, along with extensive mentorship and outreach activities.*

Jonas Peters

Aaditya Ramdas

Alisa Stephens-Shields, Assistant Professor of Biostatistics, Department of Biostatistics, Epidemiology and Informatics, Biostatistics and Epidemiology, University of Pennsylvania of Medicine: *For exemplary leadership in interdisciplinary collaboration; for contributions to education in causal inference; and for dedicated effort to increasing the pipeline of talented students into the profession.*

Alisa Stephens-Shields

Lingzhou Xue, Associate Professor of Statistics, Department of Statistics, Pennsylvania State University: *For his innovative contributions to the theory and methodology of high-dimensional statistics and statistical learning, and for his outstanding and prolific service to the profession and to society.*

Lingzhou Xue

The awards will be presented at the 2021 Joint Statistical Meeting. We are so excited to see how this exemplary group of leaders will continue to shape the future of our profession.

IMS meetings around the world

Joint Statistical Meetings: 2021–2026

JSM 2021 Virtual

UPDATED

August 8–12, 2021. Online.

w https://ww2.amstat.org/meetings/jsm/2021/

The theme of the 2021 JSM is "**Statistics, Data, and the Stories They Tell.**" The ASA has made the hard decision to once again hold JSM virtually. Updates for the website are in the works, so check back often for new information. Registration opens May 17; early registration deadline is June 15.

IMS sponsored meetings: JSM dates for 2022–2026

| **2022 Joint Statistical Meetings** August 6–11, 2022 Washington DC | **IMS Annual Meeting @ JSM 2023** August 5–10, 2023 Toronto, Canada | **JSM 2024** August 3–8, 2024 Portland, Oregon, USA | **IMS Annual Meeting @ JSM 2025** August 2–7, 2025 Nashville, TN, USA | **JSM 2026** August 1–6, 2026 Boston, MA, USA |

10th Bernoulli–IMS World Congress 2021

UPDATED

NOW ONLINE July 19–23, 2021

w https://www.wc2020.org/mail/m-e02.html

The congress, hosted by Seoul National University, is now in virtual format. This Congress will have 14 (plenary) named lectures, one public lecture, 40 invited sessions featuring 120 speakers, contributed talks, and poster sessions. Prior to the Congress, a two-day **Young Researchers Meeting** will also be held [*see below*].

2022 IMS Annual Meeting

June 27–30, 2022. London, UK

w TBA

Mark your calendars for the 2022 IMS Annual Meeting. Held in London immediately before COLT, with extra workshop planned [*see announcement on next page*]. Program and Local Chair: Qiwei Yao.

Bernoulli-IMS Young Researchers Pre-Meeting 2021

UPDATED

ONLINE July 17–18, 2021

w https://www.wc2020.org/sub03_04.php

The Bernoulli Society and the IMS are co-sponsoring a two-day pre-meeting for Young Researchers (broadly defined as doctoral students, post-doctoral fellows or equivalent, and even early-stage assistant professors/lecturers) right before the Bernoulli–IMS 10th World Congress in Probability and Statistics [*see announcement above*]. This event will be virtual; following the original plans, the event will be hosted according to the time zone of Seoul, Korea (GMT+9). Registration (free) is required for access to the program.

The main objectives are: (1) to stimulate interest of international young researchers in a rapidly emerging field; (2) to give support and perspective to young researchers with regard to mapping out their future career, especially those from developing countries; and (3) to allow young researchers with common research interests to network amongst their peer group.

The two-day Young Researchers pre-meeting 2021 dedicates the first day to the academic theme of Data Science. The second day is dedicated to a series of presentations and group discussions that pertain to career development. The invited/plenary speakers of full-length talks include Claudia Klüppelberg (Technical University Munich, and President of Bernoulli Society), Song-Xi Chen (Iowa State University and Peking University), Eric Laber (Duke University), Myunghee Cho Paik (Seoul National University), Andreas Kyprianou (University of Bath), Yunjin Choi (University of Seoul), and Parthanil Roy (Indian Statistical Institute). This is complemented by several mini-talks, group discussion, and poster session by the young participants. There will be ample networking opportunities for the young participants via innovative "virtual coffee break" or similar platforms.

More IMS meetings around the world

These IMS sponsored or co-sponsored meetings are rearranged. Please check for updates.

AWAITING NEW DATES:

7th Bayes, Fiducial and Frequentist Statistics Conference (BFF7) http://www.fields.utoronto.ca/activities/20-21/BFF7

8th Workshop on Biostatistics and Bioinformatics
https://math.gsu.edu/yichuan/2020Workshop/

REARRANGED/UPDATED AGAIN:

Frontier Probability Days — NOW IN DECEMBER 2021, Las Vegas, Nevada
w http://lechen.faculty.unlv.edu/FPD20/
The conference has been rescheduled again, from May 16–18, to the end of 2021. The exact dates will be determined soon. Registration will be open until Oct 16, 2021.

WNAR/IMS/KISS/JR Annual Meeting NOW ONLINE, June 13–16, 2021
http://www.wnar.org/event-3977784

Mathematical Statistics and Learning June 29–July 2, 2021, Barcelona, Spain.
w https://www.msl2020.org/

10th Bernoulli–IMS World Congress NOW ONLINE
July 19–23, 2021, ~~Seoul, South Korea~~
w https://www.wc2020.org/
The congress is now in virtual format.

Statistics in the Big Data Era NOW IN 2022 June 1–3, 2022, UC Berkeley, CA, USA
The conference has been rescheduled again, from June 2021 to June 1–3, 2022.
w https://simons.berkeley.edu/workshops/statistics-big-data-era

One World ABC Seminar: Ongoing and online
w https://warwick.ac.uk/fac/sci/statistics/news/upcoming-seminars/abcworldseminar
The One World Approximate Bayesian Computation (ABC) Seminars are fortnightly seminars that take place via Zoom on Thursdays at 11:30am, UK time. The idea is to gather members and disseminate results and innovation during these weeks and months under lockdown. Register to receive the webinar link via email. The organizers welcome proposals for future talks. This webinar is part of the larger One World seminar initiative [*see below*].

One World Probability Seminar (OWPS): Ongoing and online
w https://www.owprobability.org/one-world-probability-seminar/future-seminars
Thursdays, 14:00 UTC/GMT. Please subscribe to the mailing list for updates about the upcoming seminars and other events: https://www.owprobability.org/mailing-list

IMS sponsored meeting
2022 ENAR meeting:
March 27–30, 2022. Houston, TX, USA
w https://enar.org/meetings/future.cfm
2023 ENAR meeting:
March 22–25, 2023. Nashville, TN, USA
w https://enar.org/meetings/future.cfm

2022 IMS–COLT Joint Workshop
July 1, 2022. London, UK
w https://bguedj.github.io/colt-ims-2022.github.io/
The 2022 IMS Annual Meeting [*see announcement on previous page*] will be immediately followed by the first IMS–COLT joint workshop, a one-day meeting in a hybrid format (on-site in central London, and online), linking the IMS and COLT communities of researchers. (COLT is the annual Conference on Learning Theory, and will take place in 2022 immediately after this IMS–COLT workshop day.) Committee: Benjamin Guedj (chair), Peter Grünwald, Susan Murphy.

IMS annual meeting
Bernoulli–IMS 11th World Congress in Probability and Statistics *and 2024 IMS Annual Meeting*
August 12–16, 2024, Ruhr-University Bochum, Germany
w TBC

Seminar on Stochastic Processes (SSP) 2022
March 17–19, 2022
Lehigh University, Bethlehem, PA, USA
w https://wordpress.lehigh.edu/ssp2021/
The SSP at Lehigh University is postponed to 2022. Speakers are: Alexei Borodin, Jennifer Chayes, Tadahisa Funaki, Sarah Penington, Makiko Sasada), with the SSP Tutorial Lecture by Greg Lawler planned for March 18, 2022. Details forthcoming.

IMS Asia Pacific Rim Meeting 2022
January 4–7, 2022, Melbourne, Australia
w http://ims-aprm2021.com/
The sixth IMS-APRM was scheduled to take place in Melbourne in January 2021; it is now postponed until January 2022. IMS-APRM will provide an excellent forum for scientific communications and collaborations for the researchers in Asia and the Pacific Rim, and promote communications and collaborations between the researchers in this area and those from other parts of the world. The program covers a wide range of topics in statistics and probability. Invited Session Proposals submitted in 2020 are being kept on file.

Employment Opportunities

International Calendar of Statistical Events

IMS meetings are highlighted in maroon with the *ims* logo, and new or updated entries have the ◆NEW◆ or ◆UPDATED◆ symbol.
Please submit your meeting details and any corrections to Elyse Gustafson: **erg@imstat.org**

At the time of writing, some meetings are known to be **POSTPONED** or canceled. Where new dates are known, they are included
here. Some meetings, marked **ONLINE** , are offering a virtual format. Please check meeting websites for updates.

Online and Ongoing

ONLINE *ims* COPSS–NISS COVID-19 Data Science
Webinar series **w** https://www.niss.org/copss-niss-covid-19-data-
science-webinar-series

ONLINE *ims* One World ABC Seminar
w https://warwick.ac.uk/fac/sci/statistics/news/upcoming-
seminars/abcworldseminar

ONLINE *ims* One World Probability Seminar
w https://www.owprobability.org/one-world-probability-seminar

ONLINE Video series: *The Philosophy of Data Science*
w https://www.podofasclepius.com/philosophy-of-data-science

June 2021

POSTPONED *ims* ~~June 2–4: Berkeley, CA, USA. Statistics in
the Big Data Era~~ now to be held in June 2022
w https://simons.berkeley.edu/workshops/statistics-big-data-era

ONLINE *ims* June 13-16: NOW ONLINE. WNAR/IMS/
KISS/JR Meeting **w** https://www.wnar.org/page-18098

June 14–17: New Orleans, USA. **Sixth International Conference
on Establishment Statistics (ICES VI) w** https://ww2.amstat.org/
meetings/ices/2021/index.cfm

June 14–18: Paphos, Cyprus. **International Symposium on
Nonparametric Statistics 2020 w** http://cyprusconferences.org/
isnps2021/

June 20–26: Portoroz, Slovenia. **8th European Congress of Mathematics w** http://www.8ecm.si/

June 28-July 2: Kunming, China. **ISBA 2021: World Meeting of the International Society for Bayesian Analysis w** https://bayesian.org/isba2020-home/

June 28–July 2: Edinburgh, UK. **Extreme Value Analysis w** https://www.maths.ed.ac.uk/school-of-mathematics/eva-2021

June 28–July 2: Nový Smokovec, Slovakia. **LinStat 2021 w** https://linstat2020.science.upjs.sk/

June 29–July 1: Nottingham, UK. **MIMAR (11th Modelling in Industrial Maintenance and Reliability) w** https://ima.org.uk/12183/11th-ima-international-conference-on-modelling-in-industrial-maintenance-and-reliability-mimar/

ims June 29–July 2 [NEW DATES]: Barcelona, Spain. **Mathematical Statistics and Learning w** https://www.msl2020.org

July 2021

⬡ONLINE July 11–16: NOW ONLINE. **63rd ISI World Statistics Congress 2021 w** http://www.isi2021.org/

July 5–9: Gold Coast, QLD, Australia. **2020 Australian and New Zealand Statistical Conference w** https://anzsc2020.com.au

July 15–18: Montreal, Canada. **Statistics 2021 Canada w** https://www.concordia.ca/artsci/events/statistics-2021.html

⬡ONLINE _ims_ July 19–23 (postponed from 2020): NOW ONLINE. **Bernoulli–IMS World Congress w** https://www.wc2020.org/

August 2021

August 5–7: Prague, Czech Republic. **3rd International Conference on Statistics: Theory and Applications (ICSTA'21) w** https://2021.icsta.net/

⬡ONLINE _ims_ August 7–12: NOW ONLINE. **IMS Annual Meeting at JSM 2021 w** https://ww2.amstat.org/meetings/jsm/2021/

2021 JSM Statistics, Data, and the Stories They Tell — Virtual Conference August 8–12, 2021

JSM has moved to **virtual format**

September 2021

NEW September 6–9: Manchester, UK. **RSS 2021 International Conference w** https://rss.org.uk/training-events/conference2021/

September 8–9: Cambridge, UK. **Induction Course for New Lecturers in the Mathematical Sciences w** https://ima.org.uk/13572/induction-course-for-new-lecturers-in-the-mathematical-sciences-2021/

September 19–22: Ribno (Bled), Slovenia. **Applied Statistics 2020 (AS2020) w** http://conferences.nib.si/AS2020

December 2021

ims Dates TBC: Las Vegas, USA. **Frontier Probability Days (rearranged from May 2021) w** http://lechen.faculty.unlv.edu/FPD20/

January 2022

ims January 4–7 (postponed from January 2021): Melbourne, Australia. **IMS Asia Pacific Rim Meeting (IMS-APRM2021) w** http://ims-aprm2021.com/

March 2022

ims March 17–19 (postponed from March 2021): Bethlehem, PA, USA. **Seminar on Stochastic Processes (SSP) w** https://wordpress.lehigh.edu/ssp2021/

ims March 27–30: Houston, TX, USA. **ENAR Spring Meeting w** http://www.enar.org/meetings/future.cfm

International Calendar *continued*

May 2022

May 12–18: Erice, Italy. 7th Workshop on Stochastic Methods in Game Theory **w** https://sites.google.com/view/erice-smgt2020/the-workshop

June 2022

ims June 1–3: Berkeley, CA, USA (rearranged from June 2021). **Statistics in the Big Data Era, and Peter Bickel's 80th birthday w** https://simons.berkeley.edu/workshops/statistics-big-data-era

ims June 27–30: London, UK. **IMS Annual Meeting w** TBC

June 27–July 1: Darwin, Australia. **Joint Southern Statistical Meetings 2022 (JSSM2022) w** https://statsoc.org.au/event-3529236

July 2022

ims July 1: London, UK. **IMS–COLT one-day workshop** (between IMS meeting and COLT meeting, details to be announced) **w** https://bguedj.github.io/colt-ims-2022.github.io/

July 10–15: Riga, Latvia. **XXXI International Biometric Conference (IBC2022) w** www.biometricsociety.org/meetings/conferences

July 18–22: Moscow, Russia. **European Meeting of Statisticians w** https://ems2022.org/

August 2022

ims August 6–11: Washington DC, USA. **JSM 2022 w** http://www.amstat.org/ASA/Meetings/Joint-Statistical-Meetings.aspx

August 21–25: Newcastle, UK. **International Conference for Clinical Biostatistics w** http://www.iscb.info/

July 2023

July 15–20: Ottawa, Canada. **64th ISI World Statistics Congress w** TBC

August 2023

ims August 5–10: Toronto, ON, Canada. **IMS Annual Meeting at JSM 2023 w** http://www.amstat.org/ASA/Meetings/Joint-Statistical-Meetings.aspx

August 2024

ims August 3–8: Portland, OR, USA. **JSM 2024 w** http://www.amstat.org/ASA/Meetings/Joint-Statistical-Meetings.aspx

ims August 12–16: Bochum, Germany. **Bernoulli/IMS World Congress in Probability and Statistics w** TBC

August 2025

ims August 2–7: Nashville, TN, USA. **IMS Annual Meeting at JSM 2025 w** http://www.amstat.org/ASA/Meetings/Joint-Statistical-Meetings.aspx

August 2026

ims August 1–6: Boston, MA, USA. **JSM 2026 w** http://www.amstat.org/ASA/Meetings/Joint-Statistical-Meetings.aspx

Are we missing something? If you know of any statistics or probability meetings which aren't listed here, please let us know.
You can email the details to Elyse Gustafson at ims@imstat.org, or you can submit the details yourself at https://www.imstat.org/ims-meeting-form/
We'll list them here in the Bulletin, and on the IMS website too, at imstat.org/meetings-calendar/

Membership and Subscription Information

Journals

The scientific journals of the Institute of Mathematical Statistics are *The Annals of Statistics*, *The Annals of Probability, The Annals of Applied Statistics*, *The Annals of Applied Probability*, and *Statistical Science*. The *IMS Bulletin* is the news organ of the Institute.

Individual Memberships

Each individual member receives the *IMS Bulletin* (print and/ or electronic) and may elect to receive one or more of the five scientific journals. Members pay annual dues of $105. An additional $110 is added to the dues of members for each scientific journal selected ($70 for *Stat Sci*). **Reduced membership dues** are available to full-time students, new graduates, permanent residents of countries designated by the IMS Council, and retired members.

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Subscriptions are available on a calendar-year basis. **Individual subscriptions** are for the personal use of the subscriber and must be in the name of, paid directly by, and mailed to an individual. Individual subscriptions for 2021 are available to *The Annals of Applied Probability* ($225), *The Annals of Applied Statistics* ($225), *The Annals of Probability* ($225), *The Annals of Statistics* ($225), *Statistical Science* ($185), and *IMS Bulletin* ($115). **General subscriptions** are for libraries, institutions, and any multiple-readership use. Institutional subscriptions for 2021 are available to *The Annals of Applied Probability*, *The Annals of Applied Statistics*, *The Annals of Probability*, and *The Annals of Statistics* (each title $525 online only / $618 print+online), *Statistical Science* ($301/$352), and *IMS Bulletin* ($146 print). Airmail delivery is no longer offered.

IMS Bulletin

The *IMS Bulletin* publishes articles and news of interest to IMS members and to statisticians and probabilists in general, as well as details of IMS meetings and an international calendar of statistical events. Views and opinions in editorials and articles are not to be understood as official expressions of the Institute's policy unless so stated; publication does not necessarily imply endorsement in any way of the opinions expressed therein, and the *IMS Bulletin* and its publisher do not accept any responsibility for them. The *IMS Bulletin* is copyrighted and authors of individual articles may be asked to sign a copyright transfer to the IMS before publication.

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A single 60-day online job posting costs just $329.00. We will also include the basic information about your job ad (position title, location, company name, job function and a link to the full ad) in the *IMS Bulletin* at no extra charge. See https://jobs.imstat.org

Advertising meetings, workshops and conferences

Meeting announcements here and on the IMS website at https://imstat.org/meetings-calendar/ are free. Submit your meeting details at https://www.imstat.org/ims-meeting-form/

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Issue		Deadline	Online by	Mailed
1:	January/February	**December 1**	December 15	January 1
2:	March	**February 1**	February 15	March 1
3:	April/May	**March 15**	April 1	April 15
4:	June/July	**May 1**	May 15	June 1
5:	August	**July 1**	July 15	August 1
6:	September	**August 15**	September 1	September 15
7:	Oct/Nov	**September 15**	October 1	October 15
8:	December	**November 1**	November 15	December 1

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Articles

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