

# IMS Bulletin

### March 2022

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Read it online: imstat.org/news

### Remembering Sir David Cox 1924–2022

### "A giant in the field of statistics" passes away

Prominent British statistician Sir David Cox has passed away at the age of 97. Cox, who was described on the awarding of the inaugural International Prize in Statistics as "a giant in the field of statistics," made many contributions including introducing logistic regression, the proportional hazards model and the Cox process, a point process named after him.



In the Royal Statistical Society's announcement of his passing, it is noted that, "As well as his immense contributions to statistical research, Sir David will be remembered as a

boundlessly generous and supportive friend to generations of statisticians. His kindness and humility were as remarkable as his genius.

"His long career in statistics, which included a remarkable 25 years editing the statistics journal *Biometrika* (1966–1991), carried on well into his 90s. In 2014 he gave an RSS 180th anniversary lecture on *Statistics past, present and future*, and in 2018 he spoke *In gentle praise of significance tests* at the RSS Annual Conference.

"He received the Royal Statistical Society's highest honour, the Guy Medal in Gold, in 1973 (the same year he was elected a fellow of the Royal Society), and was RSS President during the period 1980–1982. He was knighted in 1985 and in 2010 was awarded the Royal Society's prestigious Copley Medal, an award previously given to other towering figures such as Stephen Hawking and Albert Einstein."

In addition, Cox was a Foreign Associate of the US National Academy of Sciences (1988), a Fellow of IMS, ASA, the British Academy, the Royal Society, the Royal Society of Edinburgh, the Royal Society of Canada; an honorary member of the American Academy of Arts and Sciences, the Royal Danish Academy of Sciences and Letters and the American Philosophical Society. He gave the IMS Wald lectures in 1990, the Rietz lecture in 1973, and the COPSS Fisher lecture in 1989.

You can read Nancy Reid's "A Conversation with Sir David Cox" in *Statistical Science*, 1994, Vol. 9, No. 3, 439–455.

A full obituary will be published in due course.



### NOMINATIONS OPEN FOR 2023 INTERNATIONAL PRIZE

The International Prize in Statistics is awarded every two years to an individual or team *"for major achievements using statistics to advance science, technology, and human welfare."* Sir David Cox won the inaugural Prize, in 2017; Brad Efron in 2019 and Nan Laird in 2021. Nominate the 2023 winner: see page 3.

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### **IMS Members' News**

### Cynthia Rudin wins \$1 million Artificial Intelligence Prize, a 'New Nobel'

IMS and ASA Fellow Cynthia Rudin has won the 2022 Squirrel AI Award for Artificial Intelligence for the Benefit of Humanity from the Association for the Advancement of Artificial Intelligence (AAAI). This award, the most prestigious in the field of artificial intelligence, is comparable to the Nobel Prize and the Turing Award. It carries a monetary reward at the million-dollar level.

Rudin's citation reads, "For pioneering scientific work in the area of interpretable and transparent AI systems in real-world deployments, the advocacy for these features in highly sensitive areas such as social justice and medical diagnosis, and serving as a role model for researchers and practitioners."

Cynthia Rudin is a professor of computer science, electrical and computer engineering, statistical science, mathematics, and biostatistics & bioinformatics at Duke University, and directs the Interpretable Machine Learning Lab. Previously, Rudin held positions at MIT, Columbia, and NYU. She holds an undergraduate degree from the University at Buffalo, and a PhD from Princeton University. Rudin is also a three-time winner of the INFORMS Innovative Applications in Analytics Award, was named as one of the "Top 40 Under 40" by Poets and Quants in 2015, and was named by Businessinsider.com as one of the 12 most impressive professors at MIT in 2015. She is a fellow of the American Statistical Association, the Institute of Mathematical Statistics, and AAAI.

Prof. Rudin is past chair of both the INFORMS Data Mining Section and the ASA's Statistical Learning and Data Science Section. She has also served on committees for DARPA, the National Institute of Justice, AAAI, and ACM SIGKDD. She has served on three committees for the National Academies of Sciences, Engineering and Medicine, including the Committee on Applied and Theoretical Statistics, the Committee on

Law and Justice, and the Committee on Analytic Research Foundations for the Next-Generation Electric Grid. She has given keynote/invited talks at several conferences including KDD (twice), AISTATS, CODE, Machine Learning in Healthcare (MLHC), Fairness, Accountability and Transparency in Machine Learning (FAT-ML), ECML-PKDD, and the Nobel Conference.

Read more at https://aaai. org/Pressroom/Releases/ release-21-1012.php

> Cynthia Rudin [left] was presented as an IMS Fellow, at the IMS awards session at JSM Denver in 2019, by then-President Xiao-Li Menq



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### m = access published papers online

### IMS Members' News

### Institute of Electrical and Electronics Engineers Awards for C.R. Rao, David Donoho

Each year, the Awards Board of the Institute of Electrical and Electronics Engineers, IEEE, recommends a select group of recipients to receive IEEE's most prestigious honors. These are the men and women whose exceptional achievements and outstanding contributions have made a lasting impact on technology, society, and the engineering profession.

Calyampudi Radhakrishna (C.R.) Rao was recently awarded honorary membership in the IEEE. Rao was honored, "For contributions to fundamental statistical theories and their applications to engineering and science, particularly in signal processing and communications."

The IEEE's Jack S. Kilby Signal Processing Medal was awarded to David L. Donoho, "For groundbreaking contributions to sparse signal recovery and compressed sensing."

The Institute of Electrical and Electronics Engineers, IEEE, is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity.

For more about their annual awards, please visit https://corporate-awards.ieee.org/ recipients/current-recipients/

### **International Prize in Statistics 2023: Nominations open now**

The International Prize in Statistics—one of the highest honors in statistics—is awarded every two years to an individual or team *"for major achievements using statistics to advance science, technology, and human welfare.*" This prestigious award is stewarded by the five major statistical organizations working cooperatively to develop it: IMS, the American Statistical Association, International Biometric Society, International Statistical Institute, and Royal Statistical Society.

### **Nominations are invited**

Nominations for the 2023 International Prize in Statistics are open. When choosing a nominee for the prize, consider the following points:

- The prize will be awarded for a **single work or body of work**, rather than "lifetime achievement." Not only should powerful and original ideas be recognized by the prize, but also contributions that led to breakthroughs in other disciplines or works with important practical effects on the world.
- Generally, the prize will be awarded to individuals, but in some cases, groups of individuals working on similar ideas—or even teams of individuals or organizations—could be recognized.
- The recipient(s) must be living at the time of selection for the award.
- The 2023 International Prize in Statistics will be announced in early 2023 and presented at the ISI World Statistics Congress in July 2023.

For details of what to include please visit https://statprize.org/nominations.cfm. Unsuccessful nominations are carried over for one selection cycle (two years). Email your nomination to nominations@statprize.org by August 15.



#### Annals of Statistics: Enno Mammen, Lan Wang https://imstat.org/aos @https://projecteuclid.org/aos

Annals of Applied Statistics: Ji Zhu https://imstat.org/aoas @https://projecteuclid.org/aoas

Annals of Probability: Christophe Garban, Alice Guionnet https://imstat.org/aop @https://projecteuclid.org/aop

Annals of Applied Probability: Kavita Ramanan, Qiman Shao: https://imstat.org/aap © https://projecteuclid.org/aoap

Statistical Science: Sonia Petrone https://imstat.org/sts @https://projecteuclid.org/ss

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IMS Monographs and IMS Textbooks: Mark Handcock https://www.imstat.org/journals-andpublications/ims-monographs/

#### IMS Co-sponsored Journals and Publications

Electronic Journal of Statistics: Grace Yi & Gang Li https://imstat.org/ejs @https://projecteuclid.org/ejs

Electronic Journal of Probability: Bénédicte Haas Mhttps://projecteuclid.org/euclid.ejp

Electronic Communications in Probability: Siva Athreya

Mhttps://projecteuclid.org/euclid.ecp

Journal of Computational and Graphical Statistics: Galin Jones, Faming Liang https://www.amstat.org/ ASA/Publications/Journals.aspx Dilog into members' area at imstat.org

Probability Surveys: Mikhail Lifshits https://imstat.org/ps @https://www.i-journals.org/ps/

Statistics Surveys: Marloes Maathuis https://imstat.org/ss @https://projecteuclid.org/euclid.ssu

#### **IMS-Supported Journals**

ALEA: Latin American Journal of Probability and Statistics: Daniel Remenik © http://alea.impa.br/english

Annales de l'Institut Henri Poincaré (B): Giambattista Giacomin, Yueyun Hu https://imstat.org/aihp © https://projecteuclid.org/aihp

Bayesian Analysis: Mark Steel © https://projecteuclid.org/euclid.ba

Bernoulli: Davy Paindaveine https://www.bernoulli-society.org/ @https://projecteuclid.org/bj

Brazilian Journal of Probability and Statistics: Mário de Castro https://imstat.org/bjps @https://projecteuclid.org/bjps

#### **IMS-Affiliated Journal**

Observational Studies: Nandita Mitra Mhttps://https://obs.pennpress.org/

Probability and Mathematical Statistics: Krzysztof Bogdan, Krzysztof Dębicki © http://www.math.uni.wroc.pl/~pms/

Stochastic Systems: Shane Henderson Mhttps://pubsonline.informs.org/journal/stsy

### **IMS co-sponsors webinar series:** Asia-Pacific Seminar in Probability and Statistics

The Asia-Pacific Seminar in Probability and Statistics (https://sites.google.com/view/apsps/home) is a monthly online seminar, broadcast on a mid-month Wednesday via Zoom. The seminar series was created as a permanent forum for good research in the field, intended "to counterbalance the restrictions imposed on us by the pandemic and to still promote scientific exchange and cooperation." Topics include: probabilistic models for natural phenomena, stochastic processes and statistical inference, statistical problems in high-dimensional spaces, asymptotic methods, statistical theory of diversity. The organizers—Sanjay Chaudhuri (NUS, Singapore), Mark Holmes (University of Melbourne, currently at UBC, Vancouver), Estate Khmaladze (VUW, Wellington; Chair), Krishanu Maulik (ISI, Kolkata), Spiro Penev (UNSW, Sydney), Masanobu Taniguchi (Waseda University, Tokyo), Lijiang Yang (Tsinghua University, Beijing), and Nakahiro Yoshida (University of Tokyo)—seek an emphasis on novelty, beauty, and clarity. Presentations are intended to be accessible to good postgraduate students in probability and mathematical statistics.

The February seminar will be (or was, depending on when you are reading this) recorded on Wednesday, 16 February, 2022. A year ago, on 17 February, 2021, the speaker was Nakahiro Yoshida. Now the speaker is his younger colleague, Teppei Ogihara, University of Tokyo, speaking on "Efficient estimation for ergodic jump-diffusion processes." The abstract for this and recordings of all talks, since the first one in November 2020, are on the APSPS website: https://sites.google.com/view/apsps/previous-speakers?authuser=0.

If you are interested in receiving announcements about the next speakers, or want to discuss future seminars, send an email to any of the Board members listed above.

### **The First International Cherry Blossom Prediction Competition**

We are pleased to announce a new international prediction competition, "When will the cherry trees bloom?" Compete for prizes of up to \$5,000 and help scientists better understand the impacts of climate change! The competition is open to all.

The competition organizers will provide all the publicly available data on the bloom date of cherry trees they can find. Competitors will use this data, in combination with any other publicly available data, to create reproducible predictions of the bloom dates at four locations around the globe.

**The competition is open throughout February 2022** and seeks statisticians and data scientists of all levels, from experts to students just beginning to use statistical software. Complete submissions include a short narrative and a link to a publicly accessible Git repository.

For complete details or to contact the organizers, please visit **https://competition.statistics.gmu.edu**. A recording of the kickoff event will be made available on the competition website.

A big thanks to RStudio, the American Statistical Association, Caucus for Women in Statistics, George Mason University's Department of Statistics for their support, and partnerships with the International Society of Biometeorology, MeteoSwiss, USA National Phenology Network, and the Vancouver Cherry Blossom Festival—as well as Mason's Institute for Digital InnovAtion, Institute for a Sustainable Earth, and the Department of Modern and Classical Languages. Sponsors and partners will be updated on the website.

Organizers: Jonathan Auerbach and David Kepplinger (George Mason University) and Elizabeth Wolkovich (University of British Columbia)

### **ENAR Presidential Invited Address**

The 2022 ENAR/IMS Spring Meeting will take place in a hybrid format, both in-person at the Marriott Marquis Houston, TX, and online. Virtual participants will have access to the



educational program, invited and contributed oral presentations, the Presidential Address, poster presentations, and virtual networking opportunities through the virtual meeting platform. The in-person ENAR 2022 Spring Meeting will have a focus on safety: proof of a COVID-19 vaccination will be required during the registration process and masks will be worn by all meeting participants, in all indoor meeting spaces. More on the meeting at https://enar.org/meetings/spring2022/. A highlight of the program is the ENAR President's Invited Address, which this year will be given by Joel B. Greenhouse, Carnegie Mellon University.

#### **Proof in Medicine: The Role of Statistical Thinking**

In 2009, Hal Varian from Google famously predicted that "the sexy job in the next 10 years will be statisticians." Was he wrong? Have Data Scientists replaced Statistical Scientists? In this talk I not only agree with Varian (duh!) but argue that statisticians today have never been more critical to contributing to the advancement of the biomedical and public health sciences.

Although there is a wide range of activities that engage statistical scientists, the one common element central to all of them is statistical thinking. Good statistical thinking, in part, requires a nontrivial understanding of the real-world problem; involves judgments about the relevance of the data and models; and evaluates the viability of alternative explanations for observed results.

Using case studies from the history of medicine, I will illustrate how statistical thinking has always been a core element in what is now called the data sciences, and plays a central role in helping the scientific community reach consensus about causal questions of interest. Joel B. Greenhouse is Professor of Statistics at Carnegie Mellon University, and Adjunct Professor of Psychiatry and Epidemiology at the University of Pittsburgh. He is a Fellow of ASA and the American Association for the Advancement of Science, and an elected Member of the ISI. He is also a recipient of CMU's Robert E. Doherty Prize for Educational Leadership, and the William & Francis Ryan Teaching Award for Effectiveness in Teaching.

Greenhouse has served as President of ENAR and is currently on the Board of the IBS. He has served on several NAS committees, as well as a number of data and safety monitoring boards and scientific advisory committees for the NIH, the Veterans Administration, and the US Departments of Education and Transportation. Greenhouse is one of the Editors-in-Chief of *Statistics in Medicine*, and is a past editor of the *IMS Lecture Notes—Monograph Series*.

His research interests include applications of Bayesian methods in practice, and methodological issues related to the use of research synthesis, especially as it is used to synthesize evidence for making policy and for scientific discovery.

### **Sacks Award Winners at JSM**

The National Institute of Statistical Sciences (NISS) Jerome Sacks Award for Outstanding Cross-Disciplinary Research recognizes sustained, high-quality, cross-disciplinary research involving the statistical and data sciences. Three recent award recipients, who represent the cutting edge in statistical research, will speak during an invited session hosted by NISS at JSM: Marc Suchard, professor of computational medicine, biostatistics, and human genetics at the University of California, Los Angeles (2021 award winner); Francesca Dominici, Clarence James Gamble Professor of Biostatistics, Population, and Data Science at the Harvard T.H. Chan School of Public Health and co-director of the data science initiative at Harvard University (2020 winner); and Jeremy Taylor, the Pharmacia Research Professor of Biostatistics, Computational Medicine, and Bioinformatics at the University of Michigan (2019 winner).

This session will focus on new developments and challenges in the cross-disciplinary research on health data science. Today, statisticians and biostatisticians actively collaborate with biomedical scientists, computer scientists, and mathematicians to work at the frontier of biological, medical, and public health research. Transdisciplinary collaboration not only develops the foundation of health data science but accelerates the pace of scientific discovery and innovation.

#### 2022 Sacks Award Nominations

Nominations are being sought for the 2022 Sacks Award. To nominate an individual, submit as one PDF document the following information to officeadmin@niss.org by April 1:

- Nomination letter (maximum two pages)
- Supporting letters from two individuals (other than nominator)

• The nominee's most current CV An award of \$1,000 will be presented during the NISS reception at the Joint Statistical Meetings in Washington, DC, August 6–11.

Send questions or comments to the same email, officeadmin@niss.org.

### **Special IMS Lecture Previews**

### **IMS Medallion Lecture: Hugo Duminil-Copin**



Hugo Duminil-Copin received his PhD from the University of Geneva in 2012. He is permanent professor at the Institut des Hautes Études Scientifiques in France and full professor at the University of Geneva.

Hugo Duminil-Copin is a probabilist and a mathematical physicist. He works on statistical mechanics models such as percolation, the Ising model, the Potts model, random walks in random environments, random height functions. His research has made contributions to percolation theory, a branch of probability theory that is concerned with the behavior of connected clusters in random graphs. His research also has an impact on mathematical physics, complex analysis, and combinatorics. In addition, he makes significant contributions to statistical physics. Duminil-Copin has received a number of awards, including

the European Mathematical Society prize in 2016 and the Loève prize in 2017. This IMS Medallion Lecture will be given at the SPA 2022 meeting (June 27–July 1, 2022, in Wuhan, China: see poster below).

#### **Emergent symmetries in 2D percolation**

A great achievement of physics in the second half of the twentieth century has been the prediction of conformal symmetry of the scaling limit of critical statistical physics systems. Around the turn of the millennium, the mathematical understanding of this fact progressed tremendously in two dimensions with the introduction of the Schramm–Loewner Evolution and the proofs of conformal invariance of the Ising model and dimers. Nevertheless, the understanding is still restricted to very specific models.

In this talk, we will gently introduce the notion of conformal invariance of lattice systems by taking the example of percolation models. Percolation models are models of random subgraphs of a given lattice. They have a rich history and lie at the crossroad of several families of lattice models, in particular in two dimensions. In recent years, the understanding of their critical behaviour progressed greatly in the planar case.

We will explain some recent proof of rotational invariance for a large class of such percolation models, called the random-cluster models or Fortuin-Kasteleyn percolation. This represents an important progress in the direction of proving full conformal invariance. We will also explain what are the missing ingredients to prove the full conformal invariance.

This is based on joint work with Karol Kozlowski, Dmitry Krachun, Ioan Manolescu, and Mendes Oulamara.



### IMS Medallion Lecture: Bálint Tóth

Bálint Tóth is Professor (Heilbronn Chair) of Probability at the University of Bristol, UK, and research professor at the Rényi Institute of Mathematics Budapest, Hungary. He has worked on microscopic physical models of Brownian motion, quantum spin systems, limit theorems for random walks with long memory, and non-conventional stochastic processes, hydrodynamic limits, etc. In particular, he contributed to the theory of self-interacting motions, that is, motions that are "reinforced", "self-avoiding" or "self-repellent". In collaboration with Wendelin Werner he constructed the random geometric object later called the Brownian Web.



Bálint was an invited speaker of the International Congress of Mathematicians ICM-2018 (Rio de Janeiro), and of the European Congress of Mathematics ECM-2000 (Barcelona). He was plenary speaker at two Conferences on Stochastic Processes and their Applications SPA-2005 (Santa Barbara) and SPA-2014 (Buenos Aires). He is a member of Academia Europaea. Bálint served the probability community as Editor-in-Chief of the journals *Electronic Journal of Probability* (2009–11) and the *Annals of Applied Probability* (2016–18). Currently he is co-Editor-in-Chief of *Probability Theory and Related Fields*.

Bálint Tóth's Medallion Lecture will be given at SPA 2022 in Wuhan (see poster on the previous page).

### **Invariance Principles for Lorentz Gas Beyond Kinetic Limits**

Understanding the diffusive behaviour of particles suspended in a gas or fluid in thermal equilibrium is a major challenge of mathematically rigorous statistical physics, dating back to the ground-breaking works of Einstein, Smoluchowski, Langevin and other classics. In 1905 Hendrik Lorentz proposed a very simple looking model for study which turned out to be rather difficult to rigorously understand and still keeps us busy. Since the early times the model has been known under the name of Lorentz gas. The randomised version is the following: place spherical balls of small, fixed radius and infinite mass centred on the points of a Poisson point process of some fixed intensity in *d*-dimensional Euclidean space, where d=2 or d=3. Assume that the density of scatterers is sufficiently small so that with positive probability there is free passage out to infinity. Now, consider the trajectory of a point particle starting with randomly oriented unit velocity, performing free flight in the complement of the scatterers, and scattering elastically on them. This trajectory will be a stochastic process with randomness coming from the random placement of the fixed scatterers and the random initial velocity. Once these are fixed, otherwise, the motion is Newtonian, deterministic. A major problem in mathematical statistical physics is to understand the diffusive scaling limit of this particle trajectory. Indeed, the Holy Grail of this field of

research would be to prove the invariance principle (i.e., weak convergence to a Wiener process with non-degenerate variance) for the sequence of trajectories under diffusive scaling. This is too hard. An intermediate scaling regime is the so-called Boltzmann-Grad limit, when the scatterer density increases to infinity and scatterer radius decreases to zero so that the typical free flight between two successive scattering events stays of order 1. Classical results of Gallavotti (1970) and Spohn (1980) prove that in this limit the trajectory converges to a Markovian flight process (essentially a random walk), which, due to Donsker's theorem, under a second diffusive limit indeed converges to Wiener process. In a recent work (joint with C. Lutsko) we obtained new results interpolating between Gallavotti-Spohn and the Holy Grail which is still beyond reach. The method relies on a subtle probabilistic coupling between the physical Lorentz process and its Markovian approximation. I will present annealed and semi-quenched versions of this type of theorem, also extended to other similar models. Later in the lecture I will switch to another related problem: the weak coupling limit of Lorentz gas with smooth (rather than hard core) potential. Here, in the limit the interaction potential is scaled down while the relative density of scatterers is kept constant. The kinetic limit (somewhat analogous to Gallavotti-Spohn in the previous case) was obtained by Kesten and Papanicolaou in 1981, and a limit partially interpolating between Kesten-Papanicolaou, and the Holy Grail was proved by Komorowski and Ryzhik in 2006. Our coupling method seems to deliver a substantial improvement in this direction, too. This is still work in progress.

### IMS Lawrence D. Brown PhD Student Award Lecture: Chan Park



Chan Park is a fifth-year PhD candidate at the University of Wisconsin–Madison, advised by Dr. Hyunseung Kang. Before joining UW–Madison, he received a BS in Statistics in 2015 from Seoul National University, Korea. His research interests include developing flexible, nonparametric methods to infer causal effects in dependent and/or clustered data and to show the optimality of these methods.

Chan Park was one of three winners of the Lawrence D. Brown PhD Student Awards, and will be presenting this lecture in a special session at the 2022 IMS Annual Meeting in London, UK, June 27–30, 2022.

See https://www.imsannualmeeting-london2022.com/special-sessions for more information about the award session.

#### Assumption-Lean Analysis of Cluster Randomized Trials in Infectious Diseases for Intent-to-Treat Effects and Network Effects

In infectious diseases, cluster randomized trials (CRTs) are a popular experimental design to study the effect of interventions where an entire cluster of individuals, usually households or villages, are randomized to treatment or control. When analyzing data from CRTs in infectious disease settings, investigators primarily use parametric methods, usually a mixed-effect model to adjust for pre-treatment covariates and intra-correlations within clusters, and focus on the overall intent-to-treat (ITT) effect, i.e. the population average effect of the cluster-level intervention on the outcome. While simple, if the parametric models are mis-specified, the results may be misleading.

Also, individuals may not comply with the cluster-level intervention, potentially inducing meaningful spillover effects. For example, in CRTs of vaccine studies, some may actually not get vaccinated for various reasons (e.g. immunocompromised, severe side effects). However, their vaccinated peers may protect the unvaccinated individuals in the form of herd immunity. In causal inference, this protection is a type of spillover effect.

The main theme of our work is to

propose "assumption-lean" methods to analyze these two types of effects, the ITT effects and the network effects induced from noncompliance.

To study the ITT effects in an assumption-lean manner, we propose a modest extension of a nonparametric, "regression-esque" method that (i) are invariant to affine transformations of the outcome and (ii) have desirable asymptotic properties even when both the cluster size and the number of clusters are growing.

For the network effects induced by noncompliance, Kang and Keele (2018) showed that point-identification of these effects is generally infeasible in a CRT without strong assumptions. Instead, we follow an assumption-lean approach where we propose a new method to obtain sharp bounds of these effects. At a high level, our new method combines linear programming (LP) and risk minimization from supervised machine learning (ML) where a trained classifier from risk minimization shrinks the LP bounds for the network effects. Also, compared to existing approaches on bounds under, our bounds (i) use flexible ML classifiers to potentially make the bounds

narrower and (ii) irrespective of classifiers' quality, our bounds will always cover the desired effect, with a good classifier leading to shorter bounds. Practically, this means that investigators can potentially get shorter bounds by not only getting good data from a CRT, but also by choosing better classification algorithms from ML.

We conclude by reanalyzing a CRT studying the effect of face masks and hand sanitizers on transmission of 2008 inter-pandemic influenza in Hong Kong. We find that the effect of giving free face masks and hand sanitizers was heterogeneous in that the effect was more effective among individuals living in dense households. Moreover, the bound estimate of the reduction in infection rates among individuals who did not use face masks and hand sanitizers from their peers was [5.4%p, 17.3%p], indicating that the protective effect was present in the Hong Kong study.

This talk is based on joint work with Dr. Hyunseung Kang.

### IMS Lawrence D. Brown PhD Student Award Lecture: Rong Ma

Rong Ma is currently a postdoctoral scholar in the Statistics Department at Stanford University, advised by Professor David Donoho. Prior to that, he got his PhD in Biostatistics in 2021 from the University of Pennsylvania, jointly advised by Professors T. Tony Cai and Hongzhe Li. He received a BS in Statistics in 2015 from Nankai University, China, and an MS in Statistics in 2016 from the University of Wisconsin, Madison. His research interest lies in the understanding and underpinning of the statistical foundations of data science. Currently his research focuses on (i) statistical inference for large disordered data and high-dimensional models, (ii) improving theoretical cognitions of data visualization and dimension reduction algorithms, and (iii) their applications in interdisciplinary research such as microbiomics, integrative genomics, among many other fields.



Rong Ma was another of the three winners of the Lawrence D. Brown PhD Student Awards, and will be presenting this lecture in a special session at the 2022 IMS Annual Meeting in London, UK, June 27–30, 2022.

### Statistical Inference for High-Dimensional Generalized Linear Models with Binary Outcomes

Generalized linear models (GLMs) with binary outcomes are ubiquitous in modern data-driven scientific research, as binary outcome variables arise frequently in many applications such as genetics, metabolomics, finance, and econometrics, and play important roles in many observational studies. In this talk, I will present our recent work in which we develop a unified statistical inference framework for high-dimensional binary generalized linear models (GLMs) with general link functions.

Both unknown and known design distribution settings are considered. For the former case, we propose a two-step procedure for constructing confidence intervals (CIs) and performing statistical tests for the regression coefficients of a given high-dimensional binary GLM. A penalized maximum-likelihood estimator is implemented to estimate the high-dimensional regression vector and then a Link Specific Weighting (LSW) method is proposed to correct the bias of the penalized estimator. CIs and statistical tests are constructed by quantifying the uncertainty of the proposed LSW estimator. The asymptotic normality of the proposed LSW estimator

is established and the validity of the constructed CIs and statistical tests are justified. A key methodological advancement is the construction of the link-specific weights. With this novel weight construction, the proposed LSW method is shown to be effective for a general class of link functions, including both the canonical and non-canonical binary GLMs. Furthermore, the proposed LSW method is effective for the general unknown sub-Gaussian design with a regular population design covariance matrix. The minimax optimality of CIs for a single regression coefficient of the binary GLMs with general link functions is established, and our proposed CIs are shown to achieve the optimal expected length up to a logarithmic factor over the sparse regime. The analysis provides important insights on the adaptivity of the optimal CIs with respect to a collection of nested parameter spaces indexed by the sparsity of the coefficients. It is shown that the possible region of constructing adaptive CIs for the individual coefficients is the ultra-sparse regime. New lower bound techniques are developed, which can be of independent interest for other high-dimensional binary

GLM inference problems. Moreover, for both theoretical and practical interests, we study the optimal CIs and statistical tests in the case of known design distributions.

Simulation studies indicate several practical advantages of the LSW method over the existing ones. Specifically, our proposed method is flexible with respect to the underlying link function and efficient in terms of computational costs. The proposed CIs have more precise empirical coverage probabilities and shorter lengths. As for hypothesis testing, under the sparse setting, the proposed test is more powerful than the existing likelihood ratio tests. In addition, an analysis of a real single cell RNA-seq data set yields interesting biological insights that integrate well into the current literature on the cellular immune response mechanisms as characterized by single-cell transcriptomics. Our proposed method has been included in the R package SIHR, which is now available from CRAN.

This is joint work with Tony Cai and Zijian Guo, while I was a PhD candidate in biostatistics at the University of Pennsylvania.

### **Student Puzzle Corner 37**

Guest puzzler Stanislav Volkov, Centre for Mathematical Sciences at Lund University, sets a puzzle about a speeding random walk:

For n = 1, 2, ... let  $X_n = \pm n$  with equal probabilities and assume that  $X_n$ s are independent. Define a "speeding" random walk by  $S_0 = 0$  and  $S_n = X_1 + X_2 + ... + X_n$  (note that if  $X_n$  were ±1 then it would be the ordinary, simple, symmetric random walk). A possible path for this Deadline: March 15, 2022 random walk, starting from 0, would be 0, 1, 3, 0, 4, 9, 15, 8, ....

**The Question:** 

Is the random walk S<sub>n</sub> recurrent or transient (in the usual sense)?

Student members of IMS are invited to submit solutions to bulletin@imstat.org (with subject "Student Puzzle Corner").

The names of student members who submit correct solutions, and the answer, will be published in the issue following the deadline.

The Puzzle Editor is Anirban DasGupta. His decision is final.

### Solution to Puzzle 36

### A reminder of the puzzle:

(a) Suppose *X* ~ Bin(*n*, *p*), 0 < *p* < 1.

Show that the estimator  $\frac{X+1}{n+2}$  is the posterior mean of p with respect to a unique Beta prior on p.

(b) Show that  $\frac{X+1}{n+2}$  is the posterior mean of p with respect to a class of infinitely many different prior distributions on p. For the special case n = 2, exhibit two such priors different from a Beta prior.

(c) Let  $X_1, \dots, X_n$  be i.i.d.  $N(\mu, 1)$ ,  $-\infty < \mu < 1$ . Suppose  $\delta(X_1, \cdots, X_n)$  is a statistic. Prove that  $\delta(X_1, \dots, X_n)$  is either not a posterior mean of  $\mu$  with respect to any prior distribution on  $\mu$ , or it is so with respect to one, and only one, prior distribution on  $\mu$ .

#### Problem Corner Editor Anirban DasGupta writes on the previous puzzle:

For part (a), trivially,  $\frac{X+1}{n+2}$  is the posterior mean of p against the U[0, 1] prior, and this is the only Beta prior for which  $\frac{X+1}{n+2}$  is the posterior mean. Recall now that for a general prior distribution G, the posterior mean of p equals

$$\delta(x) = \frac{\int p^{x+1} (1-p)^{n-x} \, dG(p)}{\int p^x \, (1-p)^{n-x} \, dG(p)}$$

and hence depends only on the first n+1 moments of G. Hence, for any prior distribution G whose first three moments are equal to those of the U[0, 1] distribution produces the posterior mean  $\frac{X+1}{n+2}$  for p. Simple examples are finitely supported priors G, with support on four suitable points. This handles part (b).

For part (c), first note that if we denote the marginal density of  $\overline{X}$  with respect to a given prior G on  $\mu$  as  $m(X) = m_G(X)$ , then the posterior mean admits the formula

$$\delta(\bar{x}) = \bar{x} + \frac{1}{n} \, \frac{m'(\bar{x})}{m(\bar{x})}.$$

Thus, if a given estimator  $\delta(\bar{x})$  is the posterior mean against two different priors G, H, then one gets that

$$\frac{m'_{G}(\bar{x})}{m_{G}(\bar{x})} = \frac{m'_{H}(\bar{x})}{m_{H}(\bar{x})},$$

which would give that for some positive constant c,  $m_H(\bar{x}) = c m_G(\bar{x})$ , and c must be equal to 1. Now, note that since  $m_G$ ,  $m_H$  are Gaussian convolution densities, if  $m_H = m_G$ , then G = H as measures. This handles part (c).

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### **OBITUARY: Constance van Eeden** 1927–2021

On September 21, 2021, mathematical statistics lost an emblematic figure, Constance van Eeden. Constance, an IMS (and ASA) Fellow since 1973, made an enormous contribution to statistical science as an educator and researcher, through a very active career that spanned more than half a century.

#### **Beginnings**

Constance was born in Delft, The Netherlands, on April 6, 1927, and the family spent the trying war years in Bergen op Zoom.

Constance received her BSc in 1949 from the University of Amsterdam and worked on her MSc and PhD while employed by the Mathematical Center (now CWI) in Amsterdam. She earned her PhD *cum laude* in 1958, as one of the four PhD students of the renowned mathematician David van Dantzig, on a topic that stemmed from consulting work supervised by Jan Hemelrijk.

In 1960, Hermann Rubin invited Constance to Michigan State University, where she met her husband, the gifted statistician Charles Kraft. After a short stay at the University of Minnesota, in 1965 van Eeden and Kraft were invited to join Université de Montréal faculty. The arrival of Kraft and van Eeden gave a big impetus to scientific statistics in Québec. Sadly, Charles passed away in 1985.

### The researcher

Constance's research career spanned over 50 years, the years after retirement being as active as those before. She contributed more than 70 peer-reviewed papers and two books, many of the papers being written with her principal collaborators, Charles Kraft and Jim Zidek.

Her earliest contribution, in the 1950s, reveals her great intellectual courage, mathematical skill, and originality. She was always well ahead of her time. Even in her PhD thesis she proposed a whole new subarea of statistical science, namely, inference for restricted parameter spaces. (Dan Brunk proposed the same thing independently at about the same time.) The importance of the field cannot be overestimated as statistical procedures that exploit parameter restrictions can achieve huge improvements in performance over those that do not. That work culminated in 2006 with her publication of a Springer monograph on estimation in restricted-parameter space.

In another direction, Constance produced pioneering work in nonparametric statistical inference that is quoted in the Hájek–Šidák classic book on rank tests. Jointly with Charles Kraft, she wrote other seminal papers in the field that were published in first-class journals, like the *Annals* of (*Mathematical*) Statistics and JASA. For many years, "Kraft and van Eeden" were household names in that discipline, and in 1968 they published a highly innovative book on that subject. Moreover, as many of her students worked in nonparametric statistics she is the founder of the Québec school of nonparametrics.

As for her contributions in other fields, we mention her long-term collaboration with Jim Zidek that stemmed initially from his work on group Bayesian theory. Their first paper showed how Wald's classical theory found new applications there, where the hyperparameters assumed the role formerly played by parameters and restrictions were thus inevitable. But good collaborations



Constance van Eeden, with her SSC Gold Medal in 1992. Photo courtesy of Peter Macdonald.

take on a life of their own and this one was no exception. It moved through such things as weighted likelihood estimation, and in a totally new direction, Bayesian subset selection.

All of her collaborators appreciated her extremely high standards, her keen sense of precision and originality, and her love of the discipline. Importantly, she would never rush into publishing: drafts of her papers had to sit in a drawer for a while.

#### The editor and educator

Constance's sharpness as a reviewer was proverbial. That sharpness combined with her high standards led to associate editorships in: the Annals of Statistics (1974–1977), the Canadian Journal of Statistics (1980–1994), the Annales des Sciences Mathématiques du Québec (1986–1998). Perhaps her most significant editorial contributions stemmed from her Editorship of the ISI's abstracting journal (1994–2004), rewarded in 1999 with the Henri Willem Methorst Medal.

Constance was also a great educator and an exemplary and quite unique advisor and mentor (14 PhD and 19 MSc), who instilled in her students her professionalism and sense of rigor. During her 75th birthday fest, in May 2002, there were numerous references to the generosity and patience of "Madame van Eeden". **Constance van Eeden, 1927–2021** Continued from previous page

#### **Retirement and honors**

Constance chose to retire in 1988 and became Professeur Émérite at Université de Montréal. Besides, 1989 marked the beginning of her long-term multifaceted involvement with UBC, as Honorary Professor of Statistics for more than 20 years.

Her extraordinary career was rewarded by numerous honours, the most salient one being an SSC Gold Medal (1990). In 2003, the IMS published a *Festschrift* volume in her honour. At the time of her passing, she was an honorary member of both the Canadian and the Dutch statistical societies, and an elected member of the ISI. Université de Montréal established, in 1998, the "Prix Constance van Eeden" to be awarded to the best BSc graduate in statistics.

#### A full life

Constance was always full of praise for the younger lot: junior faculty and students, her daughter Kari, her stepchildren. She viewed herself as a problem solver; her favorite pastimes were crossword puzzles and knitting. Her personality is epitomized by the village of her retirement: close to busy Amsterdam, Broek in Waterland lives at a slower pace, surrounded by green pastures.

Both Constance the person and Constance the icon will be greatly missed.

Written by Sorana Froda, UQAM, and Jim Zidek, UBC

### **OBITUARY: Kjell A. Doksum**

1940-2021

Kjell Doksum, IMS Fellow, died on November 20, 2021 at the age of 81. He was Professor Emeritus of Statistics at the University of California, Berkeley, and Senior Scientist in the Statistics Department at University of Wisconsin–Madison.

Kjell was born in Sandefjord, Norway, and grew up in Oslo. His parents were Filip Doksum and Elise Olsen, and he had two brothers. He was married to Joan Fujimura, a distinguished scholar in Sociology of Science, and had three daughters: Teresa, Kathryn, and Margrete.

Kjell's early and lifelong passion was soccer (or football). He grew up near Bislett Stadium and started playing in the streets of Oslo. Alas, his skills on the cobblestones did not translate to the pitch, and his hopes of becoming a professional player were dashed. Nevertheless, he remained an avid soccer fan and played recreational soccer well into his 60s. Generations of students, faculty, and visitors at Berkeley, Madison, and elsewhere will fondly recall the practices, games, and parties he organized. It was during one of the soccer parties that I asked him if I could work with him on my dissertation. Not being a man of many words, Kjell just said "Sure". He became not only my advisor, but lifelong mentor and close friend.

Another potential career that didn't work out was fishing. After high school, he moved to San Diego in 1959 to join his aunt and uncle. Many of his relatives were fishermen, so he tried it out for two weeks. After getting seasick from the huge waves during a storm, he decided that going to San Diego State College was a smarter and safer option. The fishing industry's loss was a huge gain for Statistics.

Kjell received his Master's degree in Statistics from San Diego State College in 1962, where he worked with Chuck Bell, one of the few African-American statisticians at the time. He then moved to



Kjell Doksum

University of California, Berkeley, where he completed his PhD in 1965 under the supervision of Erich Lehmann. After a year as a postdoc in Paris, he joined the Berkeley Statistics department where he spent most of his academic career. He took an early retirement in 2002 and moved to the University of Wisconsin, Madison, together with his wife Joan, who was recruited by the Department of Sociology. He retired from Wisconsin in 2010 and remained there as a Senior Scientist. He held visiting positions at the University of

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### **Kjell Doksum, 1940–2021** Continued from previous page

Paris, University of Oslo, the Norwegian Institute of Technology in Trondheim, Harvard University, Columbia University, Bank of Japan, Hitotsubashi University in Tokyo, and Stanford.

Kjell made pioneering contributions to statistical theory and methodology, covering a wide range of areas: randomization methods, nonparametric and rank-based inference, survival and reliability analysis, semiparametric techniques, transformation models, probability measures, and Bayesian inference. In early collaboration with Chuck Bell, he developed a randomization procedure and showed that the resulting Gaussian randomized tests were asymptotically more powerful in non-normal situations than the classical ones. He returned to this topic later when he proposed a Monte Carlo approach for partial likelihood inference for semiparametric models. In the early 1970's, Kjell introduced the shift function as a nonparametric functional measure of difference between distribution functions and, in a series of subsequent papers, developed inference procedures. In fact, he was still working with a student on extending this approach to regression settings at the time of his death.

In one of his most cited papers, Kjell proposed the well-known "neutral-tothe-right" processes and developed their properties. These processes are very useful in nonparametric Bayesian inference. Kjell's joint work with Peter Bickel provided deep insights into statistical properties of procedures based on transformed data. In joint work with Steinar Bjerve and others, he introduced the concept of local correlation in nonparametric regression framework. He proposed, jointly with Hoyland, a new class of degradation models for reliability and life testing. He and his co-authors also made many important contributions to survival and censored data analysis. The Festschrift volume organized for his 65th birthday, Advances in Statistical Modeling



Kjell (right) celebrating his beloved football at the Olympics Soccer game between Norway and Brazil in 1996, with (left to right) his daughters Kathryn and Teresa, and his wife Joan.

*and Inference: Essays in Honor of Kjell A. Doksum* (2006), edited by V. Nair, covered contemporary results on all these research areas.

Many graduate students at Berkeley and elsewhere learned their statistics theory and methods from Kjell's book, co-authored with Peter Bickel, *Mathematical Statistics: Basic Concepts and Selected Topics, Volumes I and II*, CRC Press. I fondly remember the early edition (called the Red Book by students), all the more because of the many errors that we had to work through! It made our learning more robust.

Kjell supervised 24 PhD students as well as several undergraduates, and quite a few returned to pursue successful careers in their home countries. He served on the editorial boards of JASA, Scandinavian Journal of Statistics, Life Data Analysis, and Sankhya. He was Executive Secretary of IMS and played a key role in the founding of the IMS journal Statistical Science. He was recognized for his contributions by being elected a Fellow of ASA and IMS, an elected member of ISI, and a foreign member of the Royal Norwegian Society of Sciences and Letters.

Kjell was a kind, gentle, and soft-spoken person. He always had a sweet smile on his face, a great sense of humor, and time for everyone. He rarely talked about himself, except to Joan who used her ethnographic interviewing skills to get him to talk about his childhood and his views on all things political. Kjell was fierce advocate for social justice. He had developed an integrity and a moral strength that carried him through many adversities, beginning with his mother's early death and the Nazi occupation of Oslo during his early childhood.

Kjell leaves behind a loving family: wife Joan, daughters Teresa and Kathryn, grandchildren Matthew, Kevin, Emma, and Calvin, nephews and cousins in Norway, sister-in-law in Denmark, and Joan's mother, brothers, their families, and cousins in Hawaii who all adopted Kjell as one of their own. He is dearly missed by all of them as well as his many friends and former students.

Vijay Nair, Wells Fargo

### **New \$1 million Prize seeks nominations**

#### Rousseeuw Prize for Statistics: nomination deadline March 31, 2022

Statistics is a cornerstone of science, health, industry, economics, government and more, and benefits society as a whole. Nevertheless, research in statistics does not yet receive the same level of recognition as in related fields such as mathematics, physics, and computer science. The Rousseeuw Prize for Statistics is intended to help remedy this gap. It awards pioneering work in statistical methodology. The prize recognizes a statistical innovation, that is, an outstanding contribution or tool that has had significant impact and found wide application in statistical practice, with relevance to society. The Rousseeuw Prize, named after its sponsor, statistician Peter J. Rousseeuw, focuses on the innovation rather than on a single individual, thus allowing the recognition of several individuals who made important contributions to it, and promoting awareness of the important role and intellectual content of statistics and its profound impact on human endeavors.

The prize will be awarded in even years, starting in 2022. The award amount is one million US dollars per prize, to be split between awardees if there are several, which it is hoped will typically be the case. The first award ceremony will take place in November 2022 at the University of Leuven, Belgium.

For the purpose of the prize, statistics is defined as *"the science and technology of obtaining useful information from data, taking its variability into account."* 



There is no time window for the work, or age limit on awardees. The awardees must be living persons, not organizations. If one of the main contributors is no longer alive, the surviving author(s) of the joint work can still be awarded. The deceased contributor(s) will of course be named explicitly.

Nominations will propose a particular innovation as well as a list of important contributors. When making this list it is encouraged to consider gender diversity when applicable. Self-nomination is not permitted. The nominations, including letters of recommendation, are to be submitted on this website, see section nominations.

Ready to nominate? Find the form, and more about the award, at https://www.rousseeuwprize.org/nominations.

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### **2022 IMS Elections: Meet the candidates**

It's time to think about who you would like to represent you on the IMS Council, and vote in the IMS elections. This year, the nominee for President-Elect is Michael Kosorok. There are 10 candidates standing for the five available places on Council: Siva Athreya, Rina Foygel Barber, Gilles Blanchard, Alexandra Carpentier, Sayan Mukherjee, Sofia Charlotta Olhede, Debashis Paul, Judith Rousseau, Ryan Tibshirani, and Harrison H. Zhou. Read about them here or on the IMS website, at https://imstat.org/elections/candidates/. Voting closes May 13, 2022.

### **President-Elect Nominee**

<u>Michael Kosorok</u>

W.R. Kenan, Jr. Distinguished Professor of Biostatistics and Professor of Statistics and Operations Research, Department of Biostatistics and Department of Statistics and Operations Research, University of North Carolina at Chapel Hill



### https://mkosorok.web.unc.edu/

### **Education**

BM Music Composition, 1988, Brigham Young University, Provo, Utah, USA

MS Statistics, 1988, Brigham Young University, Provo Utah, USA MS Biostatistics, 1991, University of Washington, Seattle, USA PhD Biostatistics 1991, University of Washington, Seattle, USA MM Music Composition, 1999, University of Wisconsin–Madison, USA

### **Research Interests**

Biostatistics, Data Science, Empirical Processes, Machine Learning, Precision Medicine, Applications of Data Science to Biomedicine

Elections close May 13, 2022. Vote online at https://www.imstat.org/ portal/voting/8/step1

### **Previous Service to the Profession**

Associate Editor, *Annals of Statistics*, 2004–present IMS Program Co-Chair, WNAR/IMS Joint Meeting, 2002, Los Angeles IMS Program Co-Chair, ENAR/IMS Joint Meeting, 2006, New Orleans

IMS Program Co-Chair, JSM 2009, Washington DC

### **Brief Statement**

I feel honored to be nominated as President-Elect of the IMS, the premier professional society for statistics and probability. The IMS has a central role in the ongoing fundamental and interdisciplinary developments in science. I view this role broadly and to involve many facets, including data science, rigorous and reproducible research, interdisciplinarity, communication about science, and other aspects. My goals are to maintain the tremendous current strengths and initiatives of the IMS, as well as to grow relevant partnerships with greater inclusivity across the world and increased attention to professional development at all career stages, especially for young scientists.



### **Council Nominees**

### This year there are 10 candidates, for five places on IMS Council.

### <u>Siva Athreya</u>

Professor, Department of Theoretical Statistics and Mathematics, Indian Statistical Institute



#### https://www.isibang.ac.in/~athreya/

### Education

- Bachelor of Science (Honours) Mathematics, (1991), St. Stephen's College, New Delhi, India
- Master of Statistics, (1993), Indian Statistical Institute, Kolkata, India
- PhD in Mathematics, (1998), University of Washington, Seattle, U.S.A.

### **Research Interests**

Stochastic Analysis (Stochastic Partial Differential Equations and Stochastic Differential Equations) Random walks among mobile traps Random Graphs Tree-valued Processes Computational Epidemiology

### **Previous Service to the Profession**

Organiser: Bernoulli–IMS One World Symposium 2020, August 24, 2020–August 28, 2020

Program Chair: The Bernoulli–IMS 10th World Congress in Probability and Statistics, July 13–July 19 2021 Editor-in-Chief: *Electronic Communications in Probability* 2021–23

### **Brief Statement**

It is a privilege to be a member of the IMS and a great honour to be nominated for the IMS Council. The IMS plays a very important role in bringing together probability and statistics researchers, supporting high-quality research, training and development. My interests in the IMS include maintaining the high quality of the journals supported by the IMS, dissemination of research results with minimal costs, helping early-career researchers, and supporting underrepresented research groups in the IMS community. I am very much committed to promoting diversity (geography, gender and science) in all activities of the IMS.

### <u>Rina Foygel Barber</u>

Louis Block Professor, Department of Statistics, University of Chicago

https://rinafb.github.io/

### **Education**

BS Mathematics, Brown University, 2005 MS Mathematics, University of Chicago, 2009 PhD Statistics, University of Chicago, 2012

### **Research Interests**

High-dimensional statistics Selective inference Distribution-free inference Medical imaging

### **Previous Service to the Profession**

Associate editor: Annals of Statistics (2017–present) Information and Inference (2017–2021) SIAM Journal on Mathematics of Data Science (2018–present) Awards committees: 2022 Bernoulli Prize for an Outstanding Survey Article in Probability or Statistics Other: Co-organizer of the International Seminar on Selective Inference (2020–present) Co-organizer of multiple workshops

### **Brief Statement**

This is a very exciting and dynamic time for the field of statistics, and the IMS is critical in providing opportunities for members of our field to grow as researchers and educators, for the development of interdisciplinary research between statistics and related fields, and for supporting students and new researchers in statistics, particularly during the challenges of the pandemic. I am very honored to be nominated for the IMS council and hope to have the opportunity to contribute to the IMS's mission of supporting our field and our community.

### <u>Gilles Blanchard</u>

Professor, Institute of Mathematics, University Paris-Saclay

https://www.imo.universite-paris-saclay. fr/~blanchard/

#### Education

PhD in mathematics/statistics, University Paris-Nord, 2001

### **Research Interests**

Statistical aspects of machine learning High-dimensional statistics Multiple testing

### **Previous Service to the Profession**

AE, Electronic Journal of Statistics (2007–2021) AE, Annales de l'Institut Henri Poincaré: Probability and Statistics (2009 - 2020)AE, Bernoulli (2016-) AE, Annals of Statistics (2012–2018, 2022–)

### **Brief Statement**

With the phenomenal growth and recognition of data science, I believe the role of the IMS as a lighthouse to our community is all the more important—as the maintainer of a proud intellectual tradition in the fields of probability and statistics, as well as in welcoming new opportunities with a discerning eye. Scientific excellence should always be its primary objective. Particularly important in my view is the support of early-career scientists while promoting equity of gender and origin. I also welcome self-reflection on our role and responsibility as a community in the context of global climate crisis.



### <u>Alexandra Carpentier</u>

Professor and chair for Mathematical Statistics and Machine learning, Institut for Mathematics, Department of Natural Sciences, University of Potsdam



https://www.math.uni-potsdam.de/professuren/mathematischestatistik/personen

### Education

M.Sc in Statistics and Economics, ENSAE Paris, 2009 M.Sc in Statistics, Probability theory and Finance, Université Paris 7, 2009 PhD in applied mathematics, Université Lille 1 and INRIA Lille Nord-Europe, 2012

### **Research Interests**

Minimax high and infinite dimensional statistics Sequential learning and bandit theory Adaptive inference

#### **Previous Service to the Profession**

AE for Bernoulli (2019-present) AE for Annals of Statistics (2020-present) AE for SIAM Journal for Uncertainty Quantification (2021-present) AE for ESAIM (2021-present) AC and PC for various conferences (NeurIPS, COLT, ICML, AISTATS, etc)

### **Brief Statement**

The IMS plays a central role for the mathematical statistics community, and it is an honor to be considered for membership on the IMS council. The following topics are mostly important to me: continuing to guarantee the scientific quality of IMS journals, promoting diversity, supporting early career researchers, and finding new ways to work and interact together as a community at an international level-in particular in relation to the mobility challenges posed by Covid and climate change

### **Council Nominees** continued

### <u>Sayan Mukherjee</u>

Professor, Statistical Science, Mathematics, Computer Science, Biostatistics & Bioinformatics, Duke University

### https://sayanmuk.github.io/

#### Education

MS 1996 Columbia PhD 2001 from MIT BSE 2002 Princeton

### **Research Interests**

Bayesian methodology
Computational and statistical methods for statistical genetics, quantitative genetics, cancer biology, molecular ecology, and morphology
Discrete Hodge theory
Dynamical systems
Geometry and topology for inference
Machine learning
Stochastic geometry and topology
Foundations of uncertainty quantification

### **Previous Service to the Profession**

Ten Lectures on Topological Data Analysis: NSF-CBMS Regional Conference Series in Probability and Statistics IMS Invited Program Chair for 2018 Joint Statistical Meetings Associate Editor roles: SIAM Journal on Mathematics of Data Science Foundations of Data Science Journal of Machine Learning Research Annals of Statistics Electronic Journal of Statistics Journal of Multivariate Analysis SIAM Journal on Applied Algebra and Geometry Annals of Applied Statistics BMC Medical Genomics IEEE Transactions on Computational Biology and Bioinformatics Conference and workshop service: Senior Program Committee: International Joint Conference on Artificial Intelligence

Program Committee: Intelligent Systems in Molecular Biology

IMS Invited Sessions Chair: Joint Statistics Meeting Session organizer for Geometry and Topology in Statistical Inference at ENAR Senior Program Committee: Neural Information Processing Systems Area chair: Artificial Intelligence and Statistics Organizer: IMA Workshop on "Bridging Statistics and Sheaves" Organizer: APS-INFORMS Session on "Statistical learning and dynamics" Organizer: SIAM-AG Session on "Topological Data Analysis" Organizer: JSM Session on "Geometric Data Analysis" Organizer: ICERM Semester Program on "Topology in Motion" Organizer: Stochastic Topology and Thermodynamic Limits at **ICERM** Principal lecturer: NSF-CBMS Regional Conference Series Organizer: Triangle Lectures in Combinatorics Organizer: 65th Birthday Conference for Robert Wolpert Organizer: Workshop on Sensing and Analysis of High-**Dimensional Data** AMS Short course: Joint Mathematics Meeting Organizer: SAMSI program on Low Dimensional Representations Program committee: International Conference on Machine Learning Program committee: Artificial Intelligence and Statistics Organizer: Biological Applications of Machine Learning, Senior program committee: International Conference on Machine Learning Local organizer: SAMSI program on Random Matrices Co-organizer: SAMSI program on Random Matrices and **Computer Models** Coordinator: SAMSI program on Random Graphs and Stochastic Computation Instructor: First School on Computational Cell Biology at University of Urbino Instructor: Machine Learning Summer School at Toyota Technical Institute Organizer: Workshop in bioinformatics at NeurIPS

ICML Senior Area Chair AIStats Area Chair

### **Brief Statement**

The research purview of the IMS is very broad from probabilists to mathematical statistician to applied statisticians to machine learners. I am unique in that I am part of all of these communities. In



addition, I feel statistics is currently going through a critical period as data science, machine learning and statistics adjacent fields are getting greater attention and in the view of some taking resources that have traditionally gone to statistics. I think it is vital in this time that we consider statistics as broadly as possible and integrate data science, machine learning, as well as other new fields into statistics. In addition, I strongly feel the link between probability and statistics has been great for both disciplines and we need to work to keep this link strong and bring in links to theoretical computer science and machine learning. In short, I strongly support interdisciplinary efforts of the IMS. In my view the most useful thing the IMS can do is support and help develop junior members and I am committed to better understanding what their needs are and how we can support them. The issue of diversity and equity is also of great importance for the IMS and having language, actionable items, as well as clarity on this topic is vital but not trivial.

### <u>Sofia Charlotta Olhede</u>

Chair of Statistical Data Science, Institute of Mathematics, Ecole Polytechnique Fédérale de Lausanne (EPFL)

https://people.epfl.ch/sofia.olhede

#### Education

MSci in Mathematics Imperial College London 2000 PhD in Mathematics Imperial College London 2003

### **Research Interests**

Analysis of networks Analysis of point processes Random fields & Time Series Applications in ecology, geoscience, neuroscience and oceanography

### **Previous Service to the Profession**

- Member of SFI Ireland Centre for Data Analytics Scientific Advisory Board since 2019
- Commissioner on 2019 Law Society of England and Wales Public Policy Technology and Law Commission - Algorithms in the Justice System. Commissioner with Law Society Vice President Christina Blacklaws and Professor Sylvie Delacroix

- Member of the UK Office of National Statistics Data Science Campus Advisory Board since July 2018
- UK Royal Society and British Academy Data Governance Working Group July 2016–June 2017
- UK Royal Society Machine Learning Working Group Nov. 2015-May 2017

Science Committee Chair for the establishment of the Alan Turing Institute, the UK National Data Science Institute 2015–2016

Member of IMS Committee to select editors, 2013–2014

- Associate Editor for the IEEE Trans. Signal Proc October 2009-October 2013
- Associate Editor for the J. Royal Statistical Society Series B August 2007–August 2011

Member of the Research Section of the UK Royal Statistical Society July 2005- Dec. 2009

### **Brief Statement**

I am delighted to be nominated as a member of IMS council. IMS brings together probabilists and statisticians, thus convening a unique set of expertise. I have considerable experience of collaborating with other disciplines, both personally, and in terms of larger data science efforts. It would be my pleasure to leverage this intra- and inter-disciplinary experience to foster cross-fertilization of scientific ideas in data science within the context of IMS, and to work to support the next generation of researchers in probability and statistics.

More candidates overleaf...





### **Council Nominees** continued

### <u>Debashis Paul</u>

Professor, Department of Statistics, University of California, Davis



https://statistics.ucdavis.edu/people/ debashis-paul

### Education

B.Stat., Statistics, Indian Statistical Institute, 1997M.Stat., Statistics, Indian Statistical Institute, 1999M.A., Statistics, University of California Santa Barbara, 2000PhD, Statistics, Stanford University, 2005

### **Research Interests**

High-dimensional statistics Random matrix theory Random dynamical systems Neuroimaging Spatial statistics

### **Previous Service to the Profession**

Associate Editor of *The Annals of Statistics* (2013–2021), *Bernoulli* (2016–2018), *Electronic Journal of Statistics* (2016–), *Journal of Statistical Planning and Inference* (2012–), *Sankhya Series A* (2012–), *Statistica Sinica* (2009–2014). Guest editor of special issue of *Computational Statistics and Data Analysis* (2020–2021) Member: Committee on IMS New Researchers' Conference

(2011-2013)

Member: Program/organizing committee member of 8+ symposia and workshops (including two BIRS workshops and one MATRIX workshop)

### **Brief Statement**

It is a great honor for me to be nominated for election to the IMS Council. IMS has played an exemplary role in providing high-quality outlets for dissemination of statistical and mathematical research and creating open and equitable platforms for scholastic activities. I aim to be able to contribute to this great endeavor, by focusing especially on the following aspects: supporting under-represented communities and young researchers in building professional careers, improving participation of students and scholars from developing countries in IMS sponsored events, and increasing access to quality statistical education among a wider group of students.

### Judith Rousseau

Professor of Statistics, Department of Statistics, University of Oxford



http://www.stats.ox.ac.uk/~rousseau/

### Education

Graduated from University of Paris Diderot and from ENSAE, 1994 PHD from University of Paris 6 , 1997 Habilitation à Diriger des recherche : 2003 from Université Paris Descartes

### **Research Interests**

Bayesian Statistics High dimensional Statistics Bayesian nonparametrics Asymptotics Computational Statistics and approximate Bayesian computation Statistical machine learning Networks Latent variable models

### **Previous Service to the Profession**

Co-editor of Bayesian Analysis

- Associate editor of: EJS, AIHP
- Former associate editor of : *Annals of Statistics, Bernoulli, JASA, ANZJS*

Board member of the SNF (Swiss National Foundation) [2018– 2020]

Member of a number of committees for the International Society of Bayesian Analysis, including Chair of the prize committee, chair of the De Groot committee, chair of the Savage committee

Organization of a few conferences (Bayesian Nonparametrics 2017, ISBA World Meeting 2018); member of a number of scientific committees for conferences and chair of the EMS meeting (2022), chair of the SFDS meeting (2016)

### **Brief Statement**

International societies are key to the development and dissemination of science and IMS in particular is central to the community of statistics, probability and data science in general. I very much enjoyed my experience as IMS program secretary which allowed me to learn and understand how the IMS works, its challenges together with its importance. With the rapid expansion of data science in the society, we, as statisticians, are facing very exciting times with entirely new types of problems and greater interactions with other disciplines be them applied mathematics or various domains of science. In this landscape IMS has a key role to play and I would love to help again in the continuation of the support IMS provides to the community.

### <u>Ryan Tibshirani</u>

Professor, Department of Statistics and Machine Learning Department, Carnegie Mellon University

https://www.stat.cmu.edu/people/faculty/ ryan-tibshirani

#### Education

BS in Mathematics, 2007, Stanford University PhD in Statistics, 2011, Stanford University

### **Research Interests**

High-dimensional statistics Nonparametric estimation Distribution-free inference Continuous optimization Numerical analysis Epidemic tracking and forecasting

#### **Previous Service to the Profession**

- Associate Editor for the Journal of Machine Learning Research (2018–present), Annals of Statistics (2016–2020), Journal of American Statistical Society (JASA) (2019–2020), Biometrika (2013–2016), Statistical Analysis and Data Mining (2013–2016), and for NeurIPS, ICML, AISTATS (2014–2020)
- Editorial Board for the *Springer Series in the Data Sciences* (2018– present)
- Scientific Advisory Board for the Institute for Pure and Applied Mathematics (IPAM) (2019–present)
- Steering Committee for Association for Computing Machinery-Institute of Mathematical Statistics (ACM–IMS) Conference on Foundations of Data Science (2019–2020)
- Associate Chair for Joint Statistical Meetings (JSM) (2018)

### **Brief Statement**

I am honored to be nominated for the council position. The IMS occupies a central place in our field. If elected, I would focus on finding ways that the IMS can (1) help encourage and improve reproducibility in the publication process, and bridge the gap between the publication models in (and value systems embodied by) statistics and machine learning; and (2) help young statisticians to make an impact (and be properly recognized and rewarded) in ways that are not traditionally rewarded academically.

### <u>Harrison H. Zhou</u>

Professor of Statistics and Data Science, Department of Statistics and Data Science, Yale University

http://www.stat.yale.edu/~hz68/

### Education

PhD in Mathematics, 2004, Cornell University

#### **Research Interests**

Analysis of iterative algorithms Bayesian nonparametrics Network analysis Large covariance matrices estimation Asymptotic decision theory

#### **Previous Service to the Profession**

2020, IMS Program Chair for Invited Talks at JSM 2010–2018, Associate Editor, *Annals of Statistics* 2013–2021, Associate Editor, *Bernoulli* 2017–2019, Associate Editor, *Statistical Science* 2015–2018, IMS Committee to select Editors (chair) 2010–2012, IMS Committee to select Editors

### **Brief Statement**

It is a great honor to be nominated for election to the IMS Council. In the past nine years I have served as the department chair at Yale to help with its transition from a statistics department to a department of statistics and data science. My experience during the transition might be valuable for the IMS community to further embrace and integrate with data science.



### **Recent papers: two co-sponsored journals**

### **Electronic Journal of Statistics**

The *Electronic Journal of Statistics (EJS)* publishes research articles and short notes on theoretical, computational and applied statistics. The journal is open access. Articles are refereed and are held to the same standard as articles in other IMS journals. Articles become publicly available shortly after they are accepted. This journal is a free access official journal of the IMS and the Bernoulli Society. The Co-Editors are Grace Y. Yi and Gang Li.

Author or publication fees are not required. Voluntary fees or donations to the Open Access Fund are accepted (see https://www. imstat.org/shop/donation/). Expenses not covered by voluntary payments are paid for by the co-sponsoring societies as a service to the community.

Access papers at https://projecteuclid.org/journals/electronic-journal-of-statistics

### Statistics Surveys

*Statistics Surveys* publishes survey articles in theoretical, computational, and applied statistics. The style of articles may range from reviews of recent research to graduate textbook exposition. Articles may be broad or narrow in scope. The essential requirements are a well specified topic and target audience, together with clear exposition. This journal is a free access official journal, sponsored by the American Statistical Association, the Bernoulli Society, the Institute of Mathematical Statistics, and the Statistical Society of Canada. The Coordinating Editor is Wendy L. Martinez, and the Editor for IMS is Marloes Maathuis. The other editors are Sara van de Geer (Bernoulli), Ranjan Maitra (ASA), and Richard A Lockhart (SSC).

Author or publication fees are not required. Voluntary fees or donations to the Open Access Fund are accepted (see https://www. imstat.org/shop/donation/). Expenses not covered by voluntary payments are paid for by the co-sponsoring societies as a service to the community.

Access papers at https://projecteuclid.org/journals/statistics-surveys

### IMS meetings around the world

JOINT IMS-COLT WORKSHOP: JULY 1, 2022, LONDON w https://bguedj.github.io/colt-ims-2022.github.io/

For the first time, the IMS Annual Meeting and COLT are co-located in London in 2022, with the IMS Annual Meeting happening on June 27–30 and COLT on July 2–5. We are organising a joint one-day workshop between the two conferences, on July 1, to offer a chance to the COLT and IMS audiences to mingle, and engage on

topics related to statistics and learning theory.

### All registered attendees to the IMS Annual Meeting or to COLT are automatically registered for this joint workshop. Join us in London!

The speakers are Emmanuel Candès, Nati Srebro and Vladimir Vovk for tutorials and talks, on the topics of conformal prediction and mathematics of deep learning. The workshop will close with a social event to give IMS and COLT participants a chance to mingle.

Organizers: Benjamin Guedj, Inria (France) and UCL (UK), Peter Grünwald, CWI and Leiden University (Netherlands), Ciara Pike-Burke, Imperial College London (UK), and Susan Murphy, Harvard (USA).

This event is supported by IMS and COLT.



### IMS meetings around the world

### Joint Statistical Meetings: 2021-2026

### 2022 Joint Statistical Meetings August 6–11, 2022. Washington DC

w https://ww2.amstat.org/meetings/jsm/2022/

Topic-Contributed Proposal Submission: November 11 – December 9, 2021. Contributed Abstract Submission: December 1, 2021 – February 1, 2022



IMS Annual Meeting	JSM 2024	IA
@ JSM 2023	August 3–8, 2024	@
August 5–10, 2023	Portland, Oregon,	A
Toronto, Canada	USA	N

IMS Annual Meeting @ JSM 2025 August 2–7, 2025 Nashville, TN, USA

JSM 2026 August 1–6, 2026 Boston, MA, USA

### 2022 IMS International Conference on Statistics and Data Science (ICSDS) December 13–16, 2022, Florence, Italy

w https://sites.google.com/view/icsds2022

The first IMS International Conference on Statistics and Data Science (ICSDS) is to be held in Florence, Italy, from December 13–16, 2022. The objective of ICSDS is to bring together researchers in statistics and data science from academia, industry and government in a stimulating setting to exchange ideas on the developments in modern statistics, machine learning, and broadly defined theory, methods and applications in data science. The conference will consist of plenary sessions, and about 50 invited, contributed and poster sessions. **Young researchers are particularly encouraged to participate**, with a portion of the invited sessions designated for them.

### BNP13: the 13th Conference on Bayesian Nonparametrics October 24–28, 2022 in Puerto Varas, Chile

### w https://midas.mat.uc.cl/bnp13/

This meeting aims to gather in Chile leading experts in this already consolidated and rapidly expanding field for a full week of plenary, invited, contributed and poster talks, reflecting the many and varied aspects of the theoretical, methodological, and applied work in the discipline. We also expect to attract many young researchers to the event, especially those residing in South America and in Chile. The event features three keynote lectures (free topic), invited and contributed sessions, spanning all the wide spectrum of theory, methodology and applications of Bayesian methods from the nonparametric viewpoint: asymptotics, advanced computation, robustness, inference in high-dimensional settings, deep learning, machine learning, uncertainty quantification, clustering and applications.

### 2022 IMS Annual Meeting June 27–30, 2022. London, UK

**w** www.imsannualmeeting-london2022.com The 2022 IMS Annual Meeting will be held in London immediately before COLT, with extra one-day workshop planned [*see announcement, right*] between the two meetings. Registration for the IMS–COLT workshop is included in your fee. Program and Local Chair: Qiwei Yao.

### 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 left*] 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.) If you're registered for the IMS Annual Meeting, this meeting is included.



Contributed Abstract Submission: December I, 2021 – February I, 2022 STATISTICS: A FOUNDATION FOR INNOVATION

# *Meeting and ISM dates*

At a glance:

forthcoming

IMS Annual

### 2022

**IMS Annual Meeting:** 

London, UK, **June** 27–30, 2022

JSM: Washington DC, August 6–11, 2022

### 2023

### IMS Annual Meeting

@ JSM: Toronto,August 5–10,2023

### 2024

IMS Annual Meeting/ 11th World Congress: Bochum, Germany, August 12–16, 2024

JSM: Portland, OR, August 3–8, 2024

### 2025

IMS Annual Meeting @ JSM: Nashville, TN, USA, August 2–7, 2025

### 2026

**IMS Annual Meeting:** TBD

JSM: Boston, MA, August 1–6, 2026

### More IMS meetings around the world

### Asia-Pacific Seminar in Probability and Statistics: Ongoing and online w https://sites.google.com/view/apsps/home

The Asia-Pacific Seminar in Probability and Statistics (APSPS) is a monthly online seminar, broadcast on a mid-month Wednesday via Zoom. The seminar series was created as a permanent forum for good research in the field. Topics include: probabilistic models for natural phenomena, stochastic processes and statistical inference, statistical problems in high-dimensional spaces, asymptotic methods, statistical theory of diversity. The organizers-Sanjay Chaudhuri (NUS, Singapore), Mark Holmes (University of Melbourne, currently at UBC, Vancouver), Estate Khmaladze (VUW, Wellington; Chair), Krishanu Maulik (ISI, Kolkata), Spiro Penev (UNSW, Sydney), Masanobu Taniguchi (Waseda University, Tokyo), Lijiang Yang (Tsinghua University, Beijing), and Nakahiro Yoshida (University of Tokyo) - seek an emphasis on novelty, beauty, and clarity. Presentations are intended to be accessible to good postgraduate students in probability and mathematical statistics.

If you are interested in receiving email announcements about the next speakers, send an email to any of the Board members listed above.

### Statistics in the Big Data Era June 1–3, 2022 UC Berkeley, CA, USA

w https://simons.berkeley.edu/workshops/statistics-big-data-era This conference is focused on the changing role and nature of the discipline of statistics in the time of a data deluge in many applications, and increasing success of artificial intelligence at performing many data analysis tasks. The conference aims to bring together experts in statistical methodology and theory for complex and big data with researchers focused on a range of applications, from genomics to social networks, and to provide opportunities for new researchers to learn about both emerging methods and applications. The conference will also be an occasion to celebrate Professor Peter Bickel's 80th birthday.

#### 2024 IMS annual meeting

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

#### **Stochastic Networks**

#### June 20-24, 2022. Cornell Univ., Ithaca, NY

w https://sites.northwestern.edu/snc2022/ Stochastic networks is a multifaceted area of research concerned with the modeling, stability, control, performance, approximation, and design of stochastic networks. It gives rise to challenging and subtle mathematical problems, whose solution often requires a combination of ideas and techniques from several branches of mathematics, including probability theory, stochastic processes, analysis, optimization, algorithms, combinatorics, and graph theory. Research in this area is strongly motivated by applications in diverse domains, ranging from telecommunications and manufacturing to service operations, biological and social networks, revenue management, and health care. The conference series, initiated in 1987 and held biennially, is a major forum for researchers to learn of the latest developments and new research directions in stochastic networks.

#### 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



2022 ENAR/IMS Spring Meeting March 27–30, 2022. Houston, TX, USA w https://enar.org/meetings/spring2022/

2023 ENAR/IMS Spring Meeting March 22–25, 2023. Nashville, TN, USA w https://enar.org/meetings/future.cfm

### Seminar on Stochastic Processes (SSP) 2022 March 17–19, 2022 Lehigh University, Bethlehem, PA, USA

w https://wordpress.lehigh.edu/ssp2022/ 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.



### Other meetings around the world



### 64th ISI World Statistics Congress July 16–20, 2023 Ottawa, Canada

w https://www.isi2023.org/

The 64th ISI World Statistics Congress is due to be held 16–20 July, 2023, in the magnificent Shaw Centre in Ottawa, Canada. The Shaw Centre is in the heart of Ottawa, near the Rideau Canal; an inviting place to take a stroll or hike, or relax on one of the many terraces on the Canal's banks.

The Chair of the Scientific Programme Committee (SPC), Mark Podolskij, invites the statistical community to prepare proposals for the Invited Paper Sessions (IPS) programme. Details will be announced in March on the website above.





The Institute of Mathematical Statistics presents

# IMS TEXTBOOKS



Hardback \$105.00 Paperback \$39.99 eBook \$32.00

IMS members receive a 40% discount: email ims@imstat.org to request your code

### Two-Dimensional Random Walk: From Path Counting to Random Interlacements

Serguei Popov, Universidade do Porto

The main subject of this introductory book is simple random walk on the integer lattice, with special attention to the two-dimensional case. This fascinating mathematical object is the point of departure for an intuitive and richly illustrated tour of related topics at the active edge of research. It starts with three different proofs of the recurrence of the two-dimensional walk, via direct combinatorial arguments, electrical networks, and Lyapunov functions. After reviewing some relevant potential-theoretic tools, the reader is guided toward the relatively new topic of random interlacements, which can be viewed as a 'canonical soup' of nearest-neighbor loops through infinity — again, with emphasis on two dimensions. On the way, readers will visit conditioned simple random walks — the 'noodles' in the soup — and also discover how Poisson processes of infinite objects are constructed, and review the recently introduced method of soft local times. Each chapter ends with many exercises, making it suitable for courses and independent study.

"An excellent and inspiring introduction to simple random walk and random interlacements, in transient and recurrent cases. With its careful and original selection of topics, the reader will soon grasp the general picture and main ideas though to quite advanced material. Each chapter has a great selection of exercises with hints and solutions. This book is primarily designed for self-study, but it can also be used for a graduate course on Markov chains or Poisson processes." Francis Comets, Université de Paris

# www.imstat.org/cup

Cambridge University Press, with the Institute of Mathematical Statistics, established the IMS Monographs and IMS Textbooks series of high-quality books. The series editors are Nancy Reid (Coordinating Editor), Ramon van Handel (Probability), Arnaud Doucet (Algorithms) and John Aston (Statistics).

### **Employment Opportunities**

#### Belgium: Leuven

### University of Leuven (KU Leuven)

Professor in risk management, financial mathematics, financial statistics or mathematical statistics https://jobs.imstat.org/job//61254880

### Canada: Vancouver, BC

University of British Columbia Assistant Professor of Teaching - MDS STAT (Tenure-Track) https://jobs.imstat.org/job//61042734

#### **China: Shenzhen**

**The Chinese University of Hong Kong, Shenzhen** Faculty Openings in Statistics https://jobs.imstat.org/job//61400990

#### **New Zealand: Wellington**

Victoria University of Wellington Lecturer in Applied Mathematics https://jobs.imstat.org/job//60920247

#### Singapore

National University of Singapore, Yong Loo Lin School of Medicine Postdoctoral Research Fellow https://jobs.imstat.org/job//61321794

#### Taiwan: Taipei

National Taiwan University,Institute of Statistics and Data Science Faculty Positions https://jobs.imstat.org/job//58875216

#### The Netherlands: Leiden

**Leiden University, The Faculty of Science and the Mathematical** Institute Assistant Professors in Statistics (Tenure Track) https://jobs.imstat.org/job//60948748

#### **UK: Liverpool**

**University of Liverpool** Lecturer In Stochastics Grade 7/8 https://jobs.imstat.org/job//61313360

### USA: La Jolla, CA

University of California San Diego Assistant Professor - Statistical Foundations of Data Science (HDSI) https://jobs.imstat.org/job//60516469

### USA: La Jolla, CA

University of California San Diego Assistant Professor - Environmental Data Science (HDSI/SIO Joint Hire) https://jobs.imstat.org/job//60516460

### **ISI Seeks New Director**

The International Statistical Institute (ISI) is seeking a new Director, to replace the current Director who will retire on 1 July 2022. The new Director should help develop a vision for the profession of statistics and the role the ISI can play in supporting it.

The new Director must be able to quickly get on top of the complexity of the role and the unique challenges the ISI faces as an international society. The Director is responsible for all strategic, tactical and operational activities of the ISI and the Permanent Office and reports to the Executive Committee. Great challenge for an ambitious Director who can drive the future of ISI in close cooperation with a truly international board and motivated team.

Further details are in the Position Specification: https://www.isi-web.org/files/docs/news/2022-position-specification-international-statistical-institute-director.pdf.

All inquiries and expressions of interest should be sent to Mr. Hans Oort at Stanton Chase, h.oort@stantonchase.com. Application deadline: 15 March 2022.



### **Employment Opportunities** continued

### USA: La Jolla, CA

### University of California San Diego

Assistant Professor (Ladder-rank): Broad Area search in Data Science (HDSI) https://jobs.imstat.org/job//61394031

### **USA: Palo Alto, CA**

**Delfi Diagnostics** Staff Statistician, Assay Development https://jobs.imstat.org/job//61105628

### USA: Santa Barbara, CA

**Westmont College** Full-time, One-Year Position in Mathematics, Fall 2022 https://jobs.imstat.org/job//61409881

### USA: Stamford, CT

University of Connecticut Assistant Research Professor (Faculty Fellows), Data Science https://jobs.imstat.org/job//60551139

### **USA: Athens, GA**

**Department of Statistics** Two Lecturer Positions in Statistics https://jobs.imstat.org/job//61207508

### USA: Champaign, IL

**Department of Statistics, University of Illinois at Urbana-Champaign** Instructor, Lecturer, Teaching Track Professors and Clinical Track Professors https://jobs.imstat.org/job//61196274

### USA: Chicago, IL

**Data Science Institute** Instructional Professor (open rank) and Senior Instructional Professor (open rank) https://jobs.imstat.org/job//61321577

#### **USA: Bloomington, IN**

### IU School of Public Health

Chair of the Department of Kinesiology https://jobs.imstat.org/job//61396763

#### USA: Baton Rouge, LA

### Louisiana State University Department Head/Chair of Experimental Statistics - Tenured https://jobs.imstat.org/job//61550041

### USA: Beltsville, MD

IMS, Inc. Statistician/Programmer https://jobs.imstat.org/job//61296122

### USA: St. Louis, MO

**WUSTL, Department of Mathematics and Statistics** Chauvenet Postdoctoral Lecturer https://jobs.imstat.org/job//61064811

### USA: Chapel Hill, NC

**University of North Carolina at Chapel Hill** Teaching Assistant Professor, Statistics and Data Science https://jobs.imstat.org/job//61289957

### **USA: Corvallis, OR**

**Oregon State University Department of Statistics** Tenure-track Assistant Professor of Statistics https://jobs.imstat.org/job//60968275

### USA: Middletown, PA

**Pennsylvania State University** Assistant Professor of Mathematics https://jobs.imstat.org/job//91172549

### USA: Pittsburgh, PA

**Department of Statistics & Data Science, Carnegie Mellon University** Open Rank Position in Carnegie Mellon Statistics & Data Science in the Delphi Research Group https://jobs.imstat.org/job//60920722

#### USA: Forth Worth, TX

**Tarrant County College District** Research Analyst https://jobs.imstat.org/job//60768320

### **International Calendar of Statistical Events**

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

**Statistics w** https://sites.google.com/view/apsps/home

Webinar series w https://www.niss.org/copss-niss-covid-19-datascience-webinar-series

**WONLINE** One World ABC Seminar w https://warwick.ac.uk/fac/sci/statistics/news/upcomingseminars/abcworldseminar

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

**ONLINE** One World YoungStatS Webinar series w https://youngstats.github.io/categories/webinars/

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

### March 2022

*Lims* March 17–19: Bethlehem, PA, USA. Seminar on Stochastic Processes (SSP) w https://wordpress.lehigh.edu/ssp2022/

March 21–May 27: Chicago, IL, USA. Decision Making and Uncertainty w https://www.imsi.institute/activities/decisionmaking-and-uncertainty/

March 27–30: Houston, TX, USA. ENAR Spring Meeting w https://enar.org/meetings/spring2022/

### April 2022

April 25-29: Nicosia, Cyprus. BNP Networking Event w TBC

### May 2022

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

May 17-29: Istanbul. CODIT 2022 w https://codit2022.com/

### June 2022

June 1–3: Berkeley, USA. Statistics in the Big Data Era w https://simons.berkeley.edu/workshops/statistics-big-data-era

June 13–17: Charlottesville, VA, USA. Ethical Challenges of AI in Biomedicine w http://innovation.lab.virginia.edu/

June 14–18: Paphos, Cyprus. International Symposium on Nonparametric Statistics, ISNPS w http://cyprusconferences.org/isnps2022/

**Wey:** June 20–23: Budapest, Hungary. Rényi 100: celebrating 100 years since Rényi's birth w https://conferences.renyi.hu/ renyi100

June 20–23: Timisoara, Romania. 23rd Conference of the Romanian Society of Probability and Statistics w https://spsr.ase.ro/conferinta-nationala-spsr/

June 25–July 1: Montreal, Canada. ISBA World Meeting 2022 w https://isbawebmaster.github.io/ISBA2022

**ims** June 27–30: London, UK. **IMS Annual Meeting w** www.imsannualmeeting-london2022.com

*Iims* June 27–July 1: Wuhan, China. Stochastic Processes and their Applications w http://spa2022.whu.edu.cn

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

### **July 2022**

**July 1:** London, UK. **IMS–COLT one-day workshop** (between IMS meeting and COLT meeting) **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. 33rd European Meeting of Statisticians w https://ems2022.org/

### International Calendar continued

### August 2022

August 2–13: Campinas, Brazil. São Paulo School of advanced science on singular stochastic partial differential equations and their applications w https://www.ime.unicamp.br/spas2022//

Winns August 6–11: Washington DC, USA. JSM 2022 w https://ww2.amstat.org/meetings/jsm/2022/

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

### September 2022

September 7–10: UC Santa Cruz, CA, USA. O'Bayes 2022 w https://obayes.soe.ucsc.edu/

September 12–15: Aberdeen, UK. RSS International Conference w https://rss.org.uk/training-events/conference2022/

### October 2022

**Lims** October 24–28: Puerto Varas, Chile. **BNP13: Bayesian** Nonparametrics w https://midas.mat.uc.cl/bnp13/

### December 2022

**Conference on Statistics and Data Science (ICSDS)** w https://sites.google.com/view/icsds2022

December 18–20: Hong Kong. ICSA International Conference w https://www.icsa.org/12th-icsa-international-conferencedecember-18-20-2022/

### January 2023

*Lims* January dates TBC (postponed from January 2022): Melbourne, Australia. IMS Asia Pacific Rim Meeting (IMS-APRM2021) w http://ims-aprm2021.com/

### July 2023

July 15–20: Ottawa, Canada. ISI World Statistics Congress w https://www.isi2023.org/



### August 2023

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

### July 2024

Dates TBC: Venice, Italy. ISBA World Meeting 2024 w https://bayesian.org/2024-world-meeting/

### August 2024

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

Congress in Probability and Statistics w TBC

### August 2025

**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

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

### Membership and Subscription Information: 2022

#### 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

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