Volume 50 • Issue 1

IMS Bulletin

January/February 2021

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Read it online:* *imstat.org/news

IMS Lectures in 2021

As you will have noticed, 2020 has been an unusual year for conferences and speakers! Many events that were scheduled for 2020 will now be happening in 2021 (or even 2022), as you can see in the calendar at the back of the Bulletin, or on the IMS website at https://imstat.org/meetings-calendar/. As a result, several of the special invited IMS lectures are rescheduled to the coming year.

Firstly, at the **Seminar on Stochastic Processes** (**SSP**), held at Lehigh University in Bethlehem, PA, USA, from March 18–20, 2021, there will be two Medallion lectures, from Dmitri Ioffe and Alexei Borodin. See https://wordpress.lehigh.edu/ssp2021/ for more information.

Secondly, at the **Bernoulli–IMS 10th World Congress in Probability and Statistics**, rescheduled to July 19–23, 2021, in Seoul, South Korea, there will be the IMS lectures that would have been delivered in 2020. These are the Wald lectures from Martin Barlow, the Blackwell lecture from Gábor Lugosi, and five Medallion lectures: Gérard Ben Arous, Andrea Montanari, Elchanan Mossel, Laurent Saloff-Coste, and Daniela Witten. There are two IMS/BS lectures: the Doob lecture, from Nicolas Curien, and the Schramm lecture, by Omer Angel. There will also be the three 2020 Lawrence Brown PhD Student Award winners, giving their talks: Didong Li, Ashwin Pananjady, and Yuqi Gu. (In addition there are five Bernoulli Society named lectures: Persi Diaconis will give the Kolmogorov Lecture, Alison Etheridge the Bernoulli Lecture, Massimilliano Gubinelli the Lévy Lecture, Tony Cai the Laplace Lecture and Sara van der Geer the Tukey Lecture.) Details are forthcoming on the WC website: https://www.wc2020.org/ (same URL as in 2020).

Finally, the **Joint Statistical Meetings** (**JSM**), held August 7–12 in Seattle, WA, USA (https://ww2.amstat.org/meetings/jsm/2021/index.cfm), will be the venue for the remaining special invited lectures to be delivered in 2021. The 2021 Wald lecturer is Jennifer Chayes, and the 2021 Le Cam Lecturer is Jianqing Fan. The Medallion lectures will be given by Axel Munk, Robert Nowak, Philippe Rigollet, and Nancy Zhang. The three 2021 Lawrence Brown PhD Student Award winners, announced in the previous issue, are Xin Bing, Ilmun Kim and Yichen Zhang; they will give their papers at a special session. The IMS Presidential Address will be shared between the current President Regina Liu and her predecessor Susan Murphy.

There are two more 2021 Medallion lectures, though both are planned to be delivered in 2022. Hugo Duminil-Copin will give a lecture at the 2022 meeting on **Stochastic Processes and their Applications** (there is no SPA meeting in 2021), in Wuhan, China, June 27–July 1, 2022. Silvia Serfaty is due to give her Medallion lecture at the **2022 IMS Annual Meeting** in London, UK, June 27–30, 2022.

If you are confused by this, be thankful you are not a meeting organizer during a pandemic... and if you *are* organizing a meeting, thank you!

At the time of writing, all these meetings are planned to be in-person events, but obviously, things may change, so **please check the meeting websites** nearer the time!

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IMS Members' News

Emery Brown wins Swartz Prize for Theoretical and Computational Neuroscience

The Society for Neuroscience (SfN) has awarded its Swartz Prize for Theoretical and Computational Neuroscience to Emery N. Brown, Edward Hood Taplin Professor of Medical Engineering and Computational Neuroscience at MIT.

IMS Fellow Emery Brown, who is a member of The Picower Institute for Learning and Memory and the Institute for Medical Engineering and Science as well as the Warren M. Zapol Professor at Harvard Medical School, is a neuroscientist, a statistician and a practicing anesthesiologist at Massachusetts General Hospital. His research has produced principled and efficient new methods for decoding patterns of neural and brain network activity and has advanced neuroscientific understanding of how anesthetics affect the brain, which can improve patient care.

Photo: Joshua Sarinana

Emery Brown

"Dr. Brown's seminal scientific contributions to neural signal processing and the theory of anesthetic mechanisms, together with his service as an educator and a physician, make him highly deserving of the 2020 Swartz Prize," SfN President Barry Everitt said. "Dr. Brown has demonstrated an unusually broad knowledge of neuroscience, a deep understanding of theoretical and computational tools, and an uncanny ability to find explanatory simplicity lurking beneath complicated observational phenomena."

In its announcement, the world's largest neuroscience organization elaborated: "Brown's insights and approaches have been critical to the development of some of the first models estimating functional connectivity among a group of simultaneously recorded neurons," SfN's announcement stated. "He has contributed statistical methods to analyze recordings of circadian rhythms and signal processing methods to analyze neuronal spike trains, local field potentials and EEG recordings."

With regard to anesthesiology, the statement continued: "Brown has proposed that the altered arousal states produced by the principal classes of anesthetics can be characterized by analyzing the locations of their molecular targets, along with the anatomy and physiology of the circuits that connect these locations. Overall, his systems neuroscience paradigm, supported by mechanistic modeling and cutting-edge statistical evaluation of evidence, is transforming anesthesiology from an empirical, clinical practice into a principled neuroscience-based discipline."

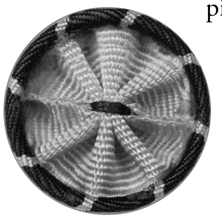
Brown said the recognition made him thankful for the chances his research, teaching and medical practice have given him to work with colleagues and students. "Receiving the Swartz Prize is a great honor," he said. "The Prize recognizes my group's work to characterize more accurately the properties of neural systems by developing and applying statistical methods and signal processing algorithms that capture their dynamical features. It further recognizes our efforts to uncover the neurophysiological mechanisms of how anesthetics work and to translate those insights into new practices for managing patients receiving anesthesia care. Finally, receipt of the Swartz Prize makes me eternally grateful for the outstanding colleagues, graduate students, post-docs, undergraduates, research assistants and staff, with whom I have had the good fortune to work."

The prize, which includes $30,000, was awarded during SfN's Awards Announcement Week in October.

More Members' News

American Association for the Advancement of Science elects new Fellows

Nearly 500 members of the American Association for the Advancement of Science have earned the lifetime distinction of AAAS Fellow. AAAS Fellows are elected each year by their peers serving on the Council of AAAS, the organization's member-run governing body.



The title recognizes important contributions to STEM disciplines, including pioneering research, leadership within a given field, teaching and mentoring, fostering collaborations, and advancing public understanding of science.

A virtual induction ceremony for the 489 newly elected Fellows will take place on Feb. 13, 2021, the Saturday following the AAAS Annual Meeting. The honorees will receive, by mail, official certificates and rosette pins [*pictured left*] in gold and blue, colors that symbolize science and engineering.

Fellows are elected in different subject sections. In the **Section on Information, Computing and Communication** there was one IMS member: Anuj Srivastava, Florida State University. Anuj was elected "For distinguished contributions to the field of statistical pattern recognition, particularly for development of differential geometric approaches to statistical shape analysis."

In the **Section on Statistics**, there were four IMS members/Fellows.

Sudipto Banerjee, University of California, Los Angeles: For innovative contributions to Bayesian methodology with focus on spatially indexed information, for high-impact applications, for educational and mentoring excellence, professional service and academic administration.

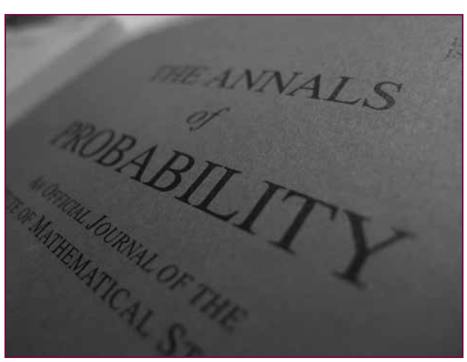
David L. Banks, Duke University: For leadership at the Statistical and Applied Mathematical Sciences Institute, research on risk analysis, and editorial service.

Qi Long, University of Pennsylvania: For distinguished contributions to analysis of incomplete data, causal inference and analysis of big data for advancing precision health.

Richard L. Smith, University of North Carolina at Chapel Hill: For distinguished contributions to statistics, particularly the statistical analysis of extreme events and environmental applications including climate change and air pollution.

Annals of Probability News

The three-year term of the *Annals of Probability* editor, Amir Dembo, ends December 31, 2020. The IMS Committee to Select Editors recommended the appointment of Alice Guionnet and Christophe Garban as co-editors of the journal, from January 1, 2021 to December 31, 2023. Alice Guionnet is a CNRS Research Director at the ENS Lyon, France. Her web page is http://perso.ens-lyon.fr/aguionne/. Christophe Garban is a Professor at Université Lyon. His web page is http://math.univ-lyon1.fr/~garban/. You can read the *Annals of Probability* online at https://projecteuclid.org/euclid.aop.



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IMS Journals and Publications

Annals of Statistics: Ming Yuan, Richard Samworth
https://imstat.org/aos
https://projecteuclid.org/euclid.aos

Annals of Applied Statistics: Karen Kafadar
https://imstat.org/aoas
https://projecteuclid.org/aoas

Annals of Probability: Amir Dembo
https://imstat.org/aop
https://projecteuclid.org/aop

Annals of Applied Probability: Francois Delarue, Peter Friz
https://imstat.org/aap
https://projecteuclid.org/aoap

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

IMS Collections
https://projecteuclid.org/imsc

IMS Monographs and *IMS Textbooks:* Nancy Reid
https://www.imstat.org/journals-and-publications/ims-monographs/

IMS Co-sponsored Journals and Publications

Electronic Journal of Statistics: Domenico Marinucci
https://imstat.org/ejs
https://projecteuclid.org/ejs

Electronic Journal of Probability: Andreas Kyprianou
https://projecteuclid.org/euclid.ejp

Electronic Communications in Probability: Giambattista Giacomin
https://projecteuclid.org/euclid.ecp

Journal of Computational and Graphical Statistics: Tyler McCormick https://www.amstat.org/ASA/Publications/Journals.aspx
log into members' area at imstat.org

Statistics Surveys: David Banks
https://imstat.org/ss
https://projecteuclid.org/euclid.ssu

Probability Surveys: Ben Hambly
https://imstat.org/ps
https://www.i-journals.org/ps/

IMS-Supported Journals

ALEA: Latin American Journal of Probability and Statistics: Roberto Imbuzeiro Oliveira
http://alea.impa.br/english

Annales de l'Institut Henri Poincaré (B): Grégory Miermont, Christophe Sabot
https://imstat.org/aihp
https://projecteuclid.org/aihp

Bayesian Analysis: Michele Guindani
https://projecteuclid.org/euclid.ba

Bernoulli: Mark Podolskij, Markus Reiß
https://www.bernoulli-society.org/
https://projecteuclid.org/bj

Brazilian Journal of Probability and Statistics: Enrico Colosimo
https://imstat.org/bjps
https://projecteuclid.org/bjps

IMS-Affiliated Journals

Observational Studies: Dylan Small
https://obsstudies.org/

Probability and Mathematical Statistics: K. Bogdan, M. Musiela, J. Rosiński, W. Szczotka, & W.A. Woyczyński
http://www.math.uni.wroc.pl/~pms/

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

Polls, Damned Polls, and Statistics

Jeffrey S. Rosenthal, University of Toronto, writes: In the recent U.S. presidential election, public opinion polls indicated that Joe Biden would defeat Donald Trump handily. His actual victory was much tighter than expected — a popular vote margin about half of the predicted 8–10%, and narrow victories in states he was supposed to carry easily. These errors, amplified by the delayed count of certain pro-Biden mail-in ballots, and intensified by many people's hatred of Trump, led to howls of protest that the polls had betrayed us and could never be trusted again.

Some of the complaints came from statisticians themselves. One colleague wondered what was possibly left to say about polls, now that their inaccuracies had been so exposed. Another leaned in conspiratorially and whispered, "I would like to talk to a pollster after a few drinks, to find out what *really* happened." They felt a sense of shame, and saw the unreliable polls as a harsh and public repudiation of the very concept of random sampling upon which so much of statistics is based.

Having published a successful general-interest book, *Struck by Lightning: The Curious World of Probabilities*, I am often asked about polls by news media and various organizations, so I have had to confront these issues head on. And I have come to think that we should regard high-profile polling errors not as a failure, but as an opportunity.

Consider a typical statistics exam question: An urn contains N balls of different colors. A sample of n balls is taken, of which exactly $n/2$ are red. Compute a 95% confidence interval for the fraction of red balls in the urn. Every statistician knows the answer to this question. The sample proportion is $\hat{p} = 0.5$, so if $1 \ll n \ll N$, then the interval has endpoints $\hat{p} \pm 1.96\sqrt{\hat{p}(1-\hat{p})/n} = 0.5 \pm 0.98/\sqrt{n}$. Indeed, that is how most polling companies compute their margin of error. Easy, right?

However, this answer requires the assumption, either implicit or explicit, that the sample was drawn uniformly at random. But suppose it wasn't. Suppose the question instead said: the sample was drawn using an unknown, arbitrary scheme. Then it is no longer easy. In fact, it is now completely impossible! Any statistics instructor assigning such a question would face an angry student revolt.

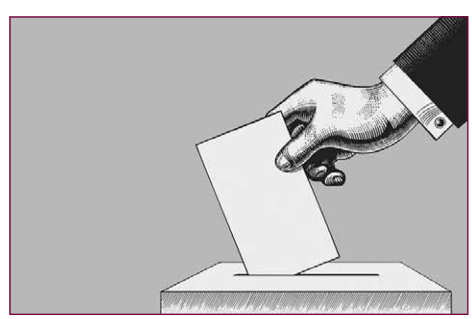
And yet, this second version is essentially what confronts pollsters. Sure, they phone people randomly, but most people do not answer (Pew Research reports that their response rates have declined to just 6%). If the non-respondents were missing *at random*, then they would be of little consequence (aside from requiring more phone call attempts), and the usual confidence intervals would still apply. But what if they're not?

In fact, response rates do appear to be increasingly correlated with voting preferences, for reasons that remain unclear. Perhaps Trump supporters were less inclined to reveal their preferences to "elite" pollsters, or were harder to reach due to work responsibilities, or were less likely to follow COVID-19 safety protocols which would make them be home and available? All we know is that somehow, Trump supporters were significantly underrepresented in pre-election polls, in both 2016 and 2020. And all of the efforts to re-weight the poll samples to match general population covariates such as race, age, gender, and education level, still failed to overcome these biases.

Despite these challenges, poll results haven't actually been that far off. They accurately predicted the 2018 U.S. midterm elections, and the 2008 and 2012 presidential elections. In 2016, they just slightly overestimated Hillary Clinton's popular vote margin as 4% instead of 2%, and failed only because they predicted narrow wins in several states which ended up as narrow losses. Even their 2020 forecasts correctly predicted the winner (Biden) and most of the states that he eventually won, albeit with excessive spreads. These outcomes, achieved under impossible circumstances, are worthy of statisticians' praise, not scorn.

Bias-correction efforts for polls raise many interesting statistical questions. Which population covariates are relevant, and how should samples be re-weighted to match them? How should past election results be incorporated into forecasting models to increase accuracy? Can other kinds of sampling, from online panels to social media scraping to intercepted web browsers, replace or supplement traditional random phone calls to produce better data? These questions should intrigue statisticians, not depress them.

One statistics instructor recently enthused that the Trump/Biden polling errors were an actual, real-life example of sampling bias in action. I didn't particularly share the amazement, since sampling bias is all around us and easy to find. But I do agree with the sentiment. High-profile missed forecasts provide compelling ways to teach our students the importance of statistical assumptions, as well as new opportunities to investigate innovative ways to overcome their limitations. Inaccurate polls should fill statisticians not with shame, but with excitement.



IMSI: A new NSF-funded institute

Douglas Simpson was appointed as the Associate Director of the Institute for Mathematical and Statistical Innovation (IMSI) on August 1, 2020. He has been a faculty member of the Department of Statistics at the University of Illinois at Urbana-Champaign since 1985, serving as chair of the department from 2000–19. In addition, he served as director of the department's statistical consulting center 1995–2000. His research areas include applied and computational statistics, robust statistical methods, machine learning, and functional data methodology for quantitative image analysis. He was a recipient of an NSF Mathematical Sciences Postdoctoral Research Fellowship. He has served on NSF review panels and as a regular member of the NIH Biostatistical Methods and Research Design study group. He is a fellow of IMS, ASA, and the American Association for the Advancement of Science. Together with the IMSI's Director **Kevin Corlette** and scientific adviser **Panagiotis Souganidis**, he writes:

The Institute for Mathematical and Statistical Innovation (IMSI) is a new mathematical sciences research institute funded by the National Science Foundation (NSF). This institute is located at The University of Chicago and managed in partnership with Northwestern University, the University of Illinois at Chicago, and the University of Illinois at Urbana-Champaign. It is the newest member of the portfolio of institutes funded by the Division of Mathematical Sciences, joining the American Institute of Mathematics (AIM), School of Mathematics at the Institute for Advanced Study (IAS), Institute for Computational and Experimental Research in Mathematics (ICERM), Institute for Pure and Applied Mathematics (IPAM), Mathematical Sciences Research Institute (MSRI), and Statistical and Applied Mathematical Sciences Institute (SAMSI).

The mission of IMSI is to apply rigorous mathematics and statistics to urgent, complex scientific and societal problems and to spur transformational change in the mathematical sciences and mathematical sciences community.

A distinctive feature of the new institute is the organization of programs around longer-term scientific themes in key areas of application, with the application areas driving new mathematics and statistics. The aim is to enable sustained, ongoing advances in both the substantive area and mathematical sciences.

IMSI Boards

The statistics and probability communities are represented: among the Board of Trustees (https://www.imsi.institute/board-of-trustees/) is **T. Tony Cai** and **Patrick Wolfe**; the Scientific Advisory Committee (https://www.imsi.institute/scientific-advisory-committee/) includes **Alicia Carriquiry, René Carmona, Amir Dembo, Larry Hedges** and **Rebecca Willett**.

The IMS community is acutely aware that interactions with other disciplines have enriched and strengthened the core mathematical science disciplines. Furthermore, many are involved in application areas that pose novel challenges to the mathematical sciences. IMSI intends to accelerate progress on these problems by bringing together powerful teams of cross-disciplinary researchers for focused efforts to advance both the application and our field. Participation of IMS members in IMSI programs will be crucial to success in these endeavors.

The focus on applications is driven by an understanding that the mathematical sciences are woven inextricably into the fabric of the wider enterprise of research, science, and technology. If the mathematical sciences are to thrive, they must do so as part of that wider enterprise.

While mathematical tools and insights have always been crucial to research in other disciplines, their usefulness has been broadening and intensifying. The National Academies' report *The Mathematical Sciences in 2025* noted the mathematical sciences are becoming "an increasingly integral and essential component of a growing array of areas of investigation" and went on to argue that "the mathematical sciences have an exciting opportunity to solidify their role as a linchpin of twenty-first century research and technology" through a transformation into a discipline with "much broader reach and greater potential impact." IMSI aims to be a catalyst for this kind of transformation of the mathematical sciences.

An important dimension of the potential impact of the mathematical sciences is its capacity to bring insight to challenges that arise, often with urgency, for society.

Continues on **page 7**

IMSI continued

Examples include the problem of modeling the spread of COVID-19 and its interactions with social distancing policies, the economy, and various forms of infrastructure; the problem of modeling climate and the effects of climate change on the conditions that make life on earth possible; and the power of ideas and techniques from artificial intelligence and machine learning to transform human society, both for good and ill.

These are challenges in which the mathematical sciences can make a difference and which, in many cases, demand all hands on deck. Responding to these challenges is an essential part of realizing the full potential impact of the mathematical sciences. It is also crucial to the health and diversity of the mathematical sciences community: We are less likely to attract new talent to the field if the field remains on the sidelines in the face of urgent challenges.

Upcoming IMSI Workshops in 2021

Mathematical and Computational Materials Science (February 15–19): https://www.imsi.institute/materials-science/

Confronting Climate Change (March 1–5): https://www.imsi.institute/confronting-climate-change-2/

The Multifaceted Complexity of Machine Learning (April 12–16): https://www.imsi.institute/the-multifaceted-complexity-of-machine-learning/

Topological Data Analysis (April 26–30): https://www.imsi.institute/topological-data-analysis/

Verification, Validation, and Uncertainty Quantification Across Disciplines (May 10–14): https://www.imsi.institute/verification-validation-and-uncertainty-quantification-across-disciplines/

Decision Making in Health and Medical Care: Modeling and Optimization (May 17–21): https://www.imsi.institute/decision-making-health-medical/

Quantum Information for Mathematics, Economics, and Statistics (May 24–28): https://www.imsi.institute/quantum-information/

Eliciting Structure in Genomics Data (August 30 – September 3): https://www.imsi.institute/eliciting-structure-in-genomics-data/

This last point highlights another element of the mission: the transformation of the mathematical sciences community. *The Mathematical Sciences in 2025* report pointed to benefits that would accrue to the mathematical sciences if more of its practitioners had an understanding of the general landscape of the mathematical sciences beyond their areas of expertise; the ability to communicate and collaborate across disciplinary boundaries; a better understanding of the role of the mathematical sciences in other disciplines; and more experience with computation. IMSI aims to offer researchers opportunities to develop these qualities more fully and thereby catalyze the development of a new breed of interdisciplinary mathematical scientist through boot camps, internships, research programs of various lengths, and training in communication across disciplines.

The long-term scientific themes will evolve over time, but only on relatively long timescales of a decade or more. There are six initial themes for IMSI: **climate science; data and information; health and medical care; materials science; quantum computing and information; and uncertainty quantification.**

Scientific activity at IMSI will take a variety of forms, including the following:

- **Long programs**, typically three months in length, which bring a large interdisciplinary group of researchers together for a period of sustained focus on an area that seems ripe for progress
- **Workshops**, either standalone or attached to a long program, of up to a week in length
- **Interdisciplinary research clusters** in which small interdisciplinary teams collaborate on promising projects
- **Research collaboration workshops** in which teams of senior and junior researchers work on problems over several months, with the work brought to completion in a concluding workshop.

These activities are expected to fall within the scope of IMSI's scientific themes, except for possibly standalone workshops, which can be used to explore a wider range of territory.

This academic year is a ramp-up year for IMSI, and the research activity will primarily take the form of workshops. We expect to host (either virtually or in person) eight workshops [*see box, left*].

We plan to follow what we expect will be a more typical schedule in 2021–2022 with long programs: **Distributed Solutions to Complex Societal Problems** in the fall and **Decision Making and Uncertainty** in the spring. Applications for participation in these programs, as well as for associated tutorial programs in the summer of 2021, are open. See https://www.imsi.institute/programs/ for more details and how to apply.

Meeting report: FODS-2020

David Madigan writes: The Association of Computing Machinery and the IMS have formed a joint venture to bring together researchers and practitioners to address foundational data science challenges in prediction, inference, fairness, ethics and the future of data science. Following the successful Interdisciplinary Summit on the Foundations of Data Science [https://www.acm.org/data-science-summit] that took place in San Francisco in 2019, we decided to launch an annual refereed conference series starting with the **2020 ACM–IMS Foundations of Data Science Conference** [https://fods.acm.org/]. The conference, co-chaired by Jeannette Wing from Columbia University and David Madigan from Northeastern University took place virtually on October 19th and 20th. The conference received 57 submissions and the 40-person program committee accepted 17 papers for plenary presentation and inclusion in the conference proceedings. The conference also featured two keynote speakers—Mihaela van der Schaar from the University of Cambridge and UCLA, and Oren Etzioni from the Allen AI Institute—and two tutorial presenters—David Blei from Columbia University and Michael Kearns from the University of Pennsylvania.

The conference proceedings are available in the ACM Digital Library: https://dl.acm.org/doi/proceedings/10.1145/3412815. In light of the pandemic, we are now planning for FODS-2022 and look forward to an annual conference thereafter.

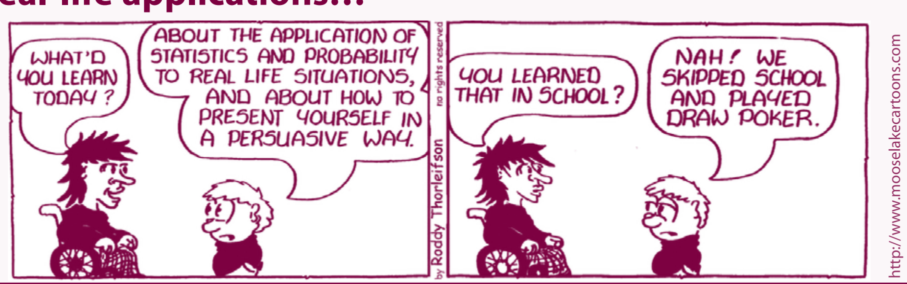
Nominations for IMS awards

Please consider nominating your outstanding colleagues and collaborators for these IMS awards. Candidates for **IMS Fellowship** shall have demonstrated distinction in research in statistics or probability, by publication of independent work of merit, and should be IMS members when nominated. The deadline for nominating is January 31, 2021. See https://www.imstat.org/honored-ims-fellows/nominations-for-ims-fellow/. Nominations are also invited for the **Carver Medal**, created by the IMS in honor of Harry C. Carver, for exceptional service specifically to the IMS. Nominate by February 1, 2021. Please visit https://www.imstat.org/ims-awards/harry-c-carver-medal/.

Early-career Travel Awards

The **IMS Hannan Graduate Student Travel Award** funds travel and registration to attend (and possibly present a paper/poster at) an IMS sponsored or co-sponsored meeting. This travel award is available to IMS members who are graduate (Masters/PhD) students studying some area of statistical science or probability. If you are a New Researcher (awarded your PhD in 2016–20) looking for travel funds, you should apply for the **IMS New Researcher Travel Award** to fund travel, and possibly other expenses, to present a paper or a poster at an IMS sponsored or co-sponsored meeting (not the IMS New Researcher's Conference, that's funded separately). See https://www.imstat.org/ims-awards/ for application details. The deadline for both is February 1, 2021.

Real-life applications…



Doeblin Prize

Nike Sun awarded 2020 Doeblin Prize

Nike Sun, associate professor of mathematics at the Massachusetts Institute of Technology, has been awarded the 2020 Wolfgang Doeblin Prize, awarded every other year by the Bernoulli Society. The prize is awarded to a single individual for outstanding research in the field of probability, and who is at the beginning of their mathematical career.

Nike's research interest is at the intersection of probability, statistical physics, and theory of computing. She completed BA (mathematics) and MA (statistics) degrees at Harvard in 2009, and an MASt in mathematics at Cambridge in 2010. She received her PhD in statistics from Stanford University in 2014 under the supervision of Amir Dembo. After the doctorate she held a Schramm fellowship at Microsoft New England and MIT Mathematics in 2014–2015 and a Simons postdoctoral fellowship at Berkeley in 2016, and joined the Berkeley Statistics Department as an Assistant Professor in 2016, and moved to MIT in 2018. She received (with Jian Ding) the 2017 Rollo Davidson Prize and an NSF CAREER award in 2019.

New COPSS–NISS webinar series

Inaugural COPSS–NISS Webinar on the Statistics of COVID-19 Vaccine Trials "standing-room only"

Glenn Johnson from NISS reports: How many people are interested in understanding and interpreting findings of the early results of COVID-19 vaccine efficacy trials? *Lots!* How many people can you get into a Zoom webinar? *More than you think!* Nearly 650 people logged into the Zoom webinar session that featured three distinguished individuals who are living in the thick of this research. This session featured **David Benkeser** (Assistant Professor, Department of Biostatistics and Bioinformatics, Rollins School of Public Health, Emory University) as speaker, **M. Elizabeth (Betz) Halloran** (Professor and Director of the Biostatistics, Bioinformatics, and Epidemiology Program, Vaccine and Infectious Diseases Division, Fred Hutchinson Cancer Research Center and Professor, Department of Biostatistics, University of Washington) as discussant, and **Natalie Dean** (Assistant Professor, Department of Biostatistics, University of Florida) as moderator.

The session was opened by **Xihong Lin** (Harvard University), chair of the organizing committee for this new twice-a-month webinar series that aims to share the latest research regarding new understandings and analyses of COVID-19 pandemic data as a means to promote data-driven research and decision-making to combat COVID-19. This new series of webinars is co-organized by the Committee of the Presidents of Statistical Societies (COPSS) and its five charter member societies (ASA, ENAR, IMS, SSC, and WNAR), as well as NISS.

Led by the remarks of David Benkeser, this session took a deep dive into the design and analysis of COVID-19 vaccine trials, with a focus on Phase 3 efficacy trials. David first walked through a quick overview of "Operation Warp Speed," the accelerated vaccine development program. Next, he focused on the current design protocols of the clinical trials taking place and the associated analysis of relative risk and relevant endpoints of these designs. This led to a discussion of the results reported by Pfizer, Moderna and other clinical trials. In wrapping up his remarks, David emphasized the importance of vaccine correlates as they relate to identifying possible surrogate endpoints for future vaccine trials and understanding how these correlates might reliably predict vaccine efficacy in new populations who have thus far been excluded from research, such as children and pregnant women.

David's presentation was followed by discussant Betz Halloran, both on this topic generally and regarding points made by the speaker. She emphasized the huge amount of thought and effort that statisticians are putting into harmonizing trials, the exciting work that is being done with regards to correlates of risk and protection across platforms, as well as mentioning the WHO's Solidarity Trial platform that would involve several vaccines in a protocols that would share a placebo group. Betz also stressed the importance of randomization and blinding and the issues that will likely arise, if the vaccines are highly effective, and involve these core principles of conducting trials. She also raised the challenges of estimating the effect of the vaccines on reducing infectiousness.

Perhaps the most interesting part of the session was the reaction, interpretations and perspectives provided by both panelists and moderator Natalie Dean, who fielded questions posed by the attendees at the session. Natalie certainly had her hands full! Even with the considerable about of time given to Q&A, it became clear that there was not nearly enough time to answer all of the thought-provoking questions that were posed. But remember, this was only the first of many webinar sessions to come that will follow up on these and additional topics related to statistics and COVID-19.

Presenter David Benkeser, moderator Natalie Dean, and discussant Betz Halloran

Want to learn more? Mark your calendar for **every first and third Thursday in the month**, from noon to 1 pm ET. (See https://www.niss.org/events for event details and to register for these sessions!)

You can find a recording of this session, along with a link to the slides that the speaker used, at https://www.niss.org/news/inaugural-copss-niss-webinar-statistics-covid-19-vaccine-trials-%E2%80%98standing-room-only%E2%80%99. The slides not only provide you with the key points that were offered but also include links to additional resources that should not be ignored!

About this Webinar Series

The COPSS–NISS COVID-19 Data Science webinar series is co-organized by the Committee of the Presidents of Statistical Societies (COPSS) and its five charter member societies (ASA, ENAR, IMS, SSC, and WNAR), as well as NISS. This bi-monthly (i.e. twice a month) webinar features the latest research that is positioned on the cusp of new understanding and analysis of COVID-19 pandemic data, and promotes data-driven research and decision making to combat COVID-19. Find out more about this series and view all the previous sessions on the Webinar Series page: https://www.niss.org/copss-niss-covid-19-data-science-webinar-series.

Opinion Polling: Its Secret Sauce is also its Spoilage Source

Photo: Harvard University

Xiao-Li Meng writes:

On November 6, 2020, I woke up to a flood (for a statistician) of tweets about my 2018 article, "Statistical Paradises and Paradoxes in Big Data (I): Law of Large Populations, Big Data Paradox, and the 2016 US Presidential Election" (https://statistics.fas.harvard.edu/files/statistics-2/files/statistical_paradises_and_paradoxes.pdf). A kind soul had offered it as an explanation to the question: "What's wrong with polls?", which led to the article going viral.

As much as I was flattered by the attention, I was disappointed that no one had asked "Why would anyone expect polls to be right in the first place?" A poll typically samples a few hundred or thousand people, but it aims to learn about a population many times larger. For predicting the US presidential election, conducting a poll of size n=5,000 to learn about the opinions of N=230 million (eligible) voters is the same as asking just about 2 people out of every 100,000 voters on average. Isn't it absurd to expect to learn anything reliably about so many from opinions of so few?

Indeed when Anders Kiær, the founder of Statistics Norway, proposed the idea to replace a national census by "representative samples" during the 1895 World Congress of the International Statistical Institute (ISI), the reactions "were violent and Kiær's proposals were refused almost unanimously!" as noted by former ISI President Jean-Louis Bodin (https://www.isi-web.org/news-featured/20200-celebrating-isi-s-135th-anniversary). It took nearly half a century for the idea to gain general acceptance.

The statistical theory for polling might be hard to digest for many, but the general idea of representative sampling is much more palatable. In a newspaper story about Gallup Poll going to Canada (*Ottawa Citizen*, Nov 27, 1941: https://news.google.com/newspapers?nid=2194&dat=19411127&id=I-0uAAAAIBAJ&sjid=VtsFAAAAIBAJ&pg=4887,5489739&hl=en), Gregory Clark wrote,

> *"When a cook wants to taste the soup to see how it is coming, he doesn't have to drink the whole boilerful. Nor does he take a spoonful off the top, then a bit from the middle, and some from the bottom. He stirs the whole cauldron thoroughly. Then stirs it some more. And then he tastes it. That is how the Gallup Poll works."*

The "secret sauce" for polling, therefore, is thorough stirring. Once a soup is stirred thoroughly, any part of it becomes *representative* of the entire soup. And *that* makes it possible to sample a spoonful or two to assess reliably the flavor and texture of the soup, regardless of the size of its container. Polling achieves this "thorough stirring" via random sampling, which creates, statistically speaking, a miniature that mimics the population.

But this secret sauce is also the source of spoilage. My 2018 article shows how to mathematically quantify the lack of thorough stirring, and demonstrates how a seemingly minor violation of thorough stirring can cause astonishingly large damage due to the "Law of Large Populations" (LLP: https://www.jbs.cam.ac.uk/insight/events/the-law-of-large-populations/). It also reveals that the polling error is the product of three indexes: data quality, data quantity, and problem difficulty.

To understand these terms intuitively, let's continue to enjoy soup. The flavoring of a soup containing only salt would be much easier to discern than a Chinese soup with five spices. *Problem difficulty* measures the complexity of the soup, regardless of how we stir it or the spoon size. *Data quantity* index captures the spoon size, relative to the size of the cooking container. This shift of emphasis from only the sample size n to the sample fraction $^n/_N$, which depends critically on the population size N, is the key to LLP.

The most critical index and also the hardest one to assess is the *data quality*, a measure of the lack of thorough stirring. Imagine some spice clumps did not dissolve completely in the cooking, and if they have more chance of getting caught by the cook's spoon, then what the cook tastes is likely to be spicier than the soup actually is. For polling, if people who prefer candidate B over A are more (or less) likely to provide their opinions, than the polling will

over- (or under-) predict the vote shares for B. This tendency can be measured by the Pearson correlation—let's denote it by r—between preferring B and responding (honestly) to the poll. The higher the value of $|r|$ (the magnitude of r), the larger the polling error. A positive r indicates overestimation, and a negative r underestimation.

The whole idea of stirring thoroughly or random sampling is to ensure r is negligible, or technically, to ensure it is on the order of the reciprocal of the square-root of N. Statistically, this is as small as it can be since we have to allow some sampling randomness. For example, for N=230 million, $|r|$ should be less than 1 out of 15,000. However, for the 2016 election polling, r was -0.005, or about 1 out of 200 in magnitude for predicting Trump's vote shares, as estimated in my article (based on polls carried out by YouGov). Whereas a half a percent correlation seems tiny, its impact is magnified greatly when multiplied by the square-root of N.

As an illustration of this impact, my article calculated how much statistical accuracy was reduced by $|r|$=0.005. Opinions from 2.3 million responses (about 1% of the eligible voting population in 2016) with $|r|$=0.005 has the same expected polling error as that resulting from 400 responses in a genuinely random sample. This is a 99.98% reduction of the actual sample sizes, an astonishing loss by any standard. A quality poll of size 400 still can deliver reliable predictions, but no (qualified) campaign manager would stop campaigning because a poll of size 400 predicts winning. But they may (and indeed some did) stop when the winning prediction is from 2.3 million responses, which amount to 2,300 polls and each with 1,000 responses.

What was generally overlooked in 2016, and unfortunately again in 2020 (but see this *Harvard Data Science Review* article https://hdsr.mitpress.mit.edu/pub/cnxbwum6/release/2), is the devastating impact of LLP. Statistical sampling errors tend to balance out when we increase the sample size, but systematic selection bias only solidifies when sample size increases. Worse, the selection bias is magnified by the population size: the larger the population, the larger the magnification. That is the essence of LLP.

When a particular bit of soup finds itself on the cook's spoon, it cannot say, "Well, I'm a bit too salty for the cook, so let me jump off this spoon!" But in an opinion poll, there is nothing to stop someone from opting out because of the fear of the (perceived) consequences of revealing a particular answer. Until our society knows how to remove such fear, or the pollsters can routinely and reliably adjust for such selective responses, we can all be wiser citizens of the digital age by always taking polling results with a healthy grain of salt.

Originally published by *Scientific American*, December 6, 2020: https://www.scientificamerican.com/article/the-secret-sauce-in-opinion-polling-can-also-be-a-source-of-spoilage/

The open access resource for leading and advanced content in data science, *Harvard Data Science Review* (HDSR) provides a crossroads at which fundamental data science research and education intersect directly with societally important applications from industry, government, NGOs, and more. HDSR publishes high-quality articles that help to define and shape data science as a rigorous field of study with global impact. Each issue informs, intrigues, and inspires readers with a wide breadth of content.

Selected Recent Content

Perspectives

- *Coming to Our Census: How Social Statistics Underpin Our Democracy (And Republic)* by Teresa A. Sullivan (Michigan State University)
- *Should We Trust Algorithms?* by David Spiegelhalter (Winton Centre for Risk and Evidence Communication, UK)
- *10 Research Challenge Areas in Data Science* by Jeannette M. Wing (Columbia University)
- *How to Define and Execute your Data and AI Strategy* by Ulla Kruhse-Lehtonen and Dirk Hofman (DAIN Studios, Finland)
- *Tackling COVID-19 through Responsible AI Innovation: Five Steps in the Right Direction* by David Leslie (The Alan Turing Institute, UK)
- *Doing Data Science on the Shoulders of Giants: The Value of Open Source Software for the Data Science Community* by Katie Malone (Tempus Labs) and Rich Wolski (UC Santa Barbara)
- *Differential Privacy and Social Science: An Urgent Puzzle* by Daniel L. Oberski (Utrecht University) and Frauke Kreuter (University of Maryland)
- *A Conversation with L. Rafael Reif on College of Computing, COVID-19 and the Future Workforce* by L. Rafael Reif (MIT), Liberty VIttert (Washington University), and Xiao-Li Meng (Harvard University)
- *On the Convergence of Epidemiology, Biostatistics, and Data Science* by Neil D. Goldstein, Michael LeVasseur, and Leslie A. McClure (Drexel University)

Impact

- *Geo-mapping of COVID-19 Risk Correlates Across Districts and Parliamentary Constituencies in India* by S. V. Subramanian, Omar Karlsson, Weixing Zhang, and Rockli Kim
- *Lost or Found? Discovering Data Needed for Research* by Kathleen Gregory (Royal Netherlands Academy), Paul Groth (University of Amsterdam), Andrea Scharnhorst (Royal Netherlands Academy), and Sally Wyatt (Maastricht University)
- *The Importance of Being Causal* by Iavor Bojinov, Albert Chen, and Min Liu (LinkedIn)
- *SCAM: A Platform for Securely Measuring Cyber Risk* by Leo de Castro, Andrew W. Lo, Taylor Reynolds, Fransisca Susan, Vinod Vaikuntanathan, Daniel Weitzner, and Nicholas Zhang (MIT)

Education

- *Data Science for Everyone Starts in Kindergarten: Strategies and Initiatives from the American Statistical Association* by Wendy Martinez and Donna LaLonde (American Statistical Association)
- *Beyond Unicorns: Educating, Classifying, and Certifying Business Data Scientists* by Tom Davenport (Babson College)
- *The Role of Academia in Data Science Education* by Rafael A. Irizarry (Dana-Farber Cancer Institute)

Research

- *Deep Learning with Gaussian Differential Privacy* by Zhiqi Bu, Jinshuo Dong, Qi Long and Su Weijie (The University of Pennsylvania)
- *With Malice Toward None: Assessing Uncertainty via Equalized Coverage* by Yaniv Romano, Rina Foygel Barber, Chiara Sabatti, and Emmanuel Candes (Stanford University and University of Chicago)

Columns

- **Diving into Data**
  Stop Flaunting Those Curves! Time for Stats to Get Down and Dirty with the Public by Timandra Harkness (BBC Radio)
- **Minding the Future**
  High School Data Science Review: Why Data Science Education Should be Reformed by Angelina Chen (Princeton High School)
- **Mining the Past**
  Error, Uncertainty, and the Shifting Ground of Census Data by Dan Bouk (Colgate University)
- **Recreations in Randomness**
  Recipes for Success: Data Science in the Home Kitchen by Shuyang Li and Julian McAuley (UC San Diego)

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Harvard Data Science Initiative

The *Harvard Data Science Review* is an open access platform of the Harvard Data Science Initiative, and it is published by the MIT Press.

Student Puzzle Corner 32

Puzzle Editor Anirban DasGupta sets a problem on maximum likelihood estimation in a sports scenario. Between two badminton players A and B, player B has a probability $p_1 = p$ of returning a serve or a shot from A, and A has a probability $p_2 = cp$ of returning a serve or shot from B, where c is a fixed positive constant. We make the usual independence assumption among shots. If A fails to return a shot or a serve from B, the next serve is made by B, and vice versa. We also assume that the beginning serve in any play is always done successfully. Suppose A begins the first play by serving to B. In 5 consecutive plays, the total number of shots successfully returned by the players before the first failure were: 8, 7, 0, 5, 9.

a) Calculate the likelihood function.

b) Find the maximum likelihood estimate of p.

c) Take p_1 and p_2 to be general. A serves to B in the first play and B successfully returns the serve. But A fails to return this volley from B. The serve now turns over to B, and A is able to return the serve. But B fails to return the volley from A. And so it goes on, for a total of n plays — in other words, the number of shots successfully returned is always 1. What will happen to the MLEs of p_1 and p_2 in this scenario?

Deadline: February 1, 2021

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 31

Student Puzzle Editor Anirban DasGupta writes: Our respondent **Raimundo Julian Saona Urmeneta** (Institute of Science and Technology Austria) has done a lovely and complete job of solving the previous puzzle. Congratulations to Raimundo. We are publishing his answer [*right*] as an example of clarity and completeness.

The self-avoiding walk problem is incredibly diverse. Limited to the case of the square lattice as in this puzzle, it is obvious that $\log f(n)$ is subadditive, so it follows that $f(n)^{1/n}$ converges to some positive number μ. This is classic and appears to have been already noted in Hammersley and Morton's 1954 *JRSS(B)* article. In fact, a pointwise inequality holds that is of some use in numerically approximating μ; one has $f(n) \geq \mu^n$ pointwise in n. A reasonable rational approximation to the value of μ is 8⁄3.

A delightful reference that you will enjoy is Gordon Slade's survey article in the *Princeton Companion to Mathematics.*

Raimundo Saona's clear and complete answer is published below.

Imagine a particle conducting a walk on the traditional square lattice, starting at the origin (0, 0). That is, at any time during the walk, the particle goes one unit distance to either the east, or the west, or the north, or the south. An n-walk is a walk that has taken n steps. The walk is called self-avoiding if the particle does not visit any given state twice. Let $f(n)$ denote the number of n-walks that are self-avoiding.

(a) Compute $f(n)$ for $n = 2, 3$, and justify how you got these values.

For $n=2$, the only non self-avoiding paths are those that return to the origin, which are only 4. Then, $f(2) = 4^2 - 4 = 12$. For $n = 3$, the first two steps of the walk must be a self-avoiding path itself. Then, the third step has three possibilities. Therefore, $f(3) = 3f(2) = 36$.

(b) Compute $f(4)$ if you can, or place it within good lower and upper bounds.

Of all self-avoiding 3-walks, there are only 8 that can complete a square by adding a fourth step, leaving only 2 possibilities to complete a 4-walk. All other self-avoiding 3-walks have 3 possibilities for a fourth step. Therefore, $f(4) = 3(f(3) - 8) + 2(8) = 84 + 16 = 100$.

(c) Give non-trivial lower and upper bounds on $f(n)$ of the form ck^n for $c > 0$ and $k \in \mathbb{N}$.

$f(n) \leq 4 \cdot 3^{n-1} = \frac{4}{3} 3^n$, because there are 4 initial directions and each next step has at most 3 possibilities. $f(n) \geq 4 \cdot (2 \cdot 2^{n-1} - 1) = 4 \cdot 2^n - 4$, because there are 4 initial directions and then using either (i) the same initial direction, or (ii) a perpendicular direction, will result in a self-avoiding walk. This counting procedure repeats the four paths that uses one direction only, therefore we must correct the counting by subtracting 4.

These bounds mean that for all N natural numbers, there exists a constant $c_N > 0$ such that $f(n) \geq c_N \cdot 2^n$ and $\lim_{N\to\infty} c_N = 4$.

Recent papers: *Electronic Journal of Probability*

The *Electronic Journal of Probability* (*EJP*) publishes full-length research articles in probability theory. Short papers should be submitted first to its sister journal, *Electronic Communications in Probability* (*ECP*). *EJP* and *ECP* share the same editorial board, but with different Editors in Chief. *EJP* and *ECP* are open access official journals of IMS and the Bernoulli Society. *Donations to the IMS Open Access Fund help to keep the journal free:* https://www.imstat.org/shop/donation/. Read it at **https://projecteuclid.org/euclid.ejp**

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Recent papers: *Electronic Communications in Probability*

Electronic Communications in Probability (*ECP*) is also an open access IMS/Bernoulli Society official journal. Read the journal online at **https://projecteuclid.org/euclid.ecp**

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IMS meetings around the world

Joint Statistical Meetings: 2021–2026

IMS sponsored meeting

UPDATED

JSM 2021
August 7–12, 2021. Seattle, USA.
w https://ww2.amstat.org/meetings/jsm/2021/

The theme of the 2021 JSM is "**Statistics, Data, and the Stories They Tell.**" Registration and housing open May 3, 2021. The early registration deadline is May 31. Propose a topic-contributed session for JSM 2021! Topic-contributed sessions are a great way to bring speakers together to present about a shared topic, so if you have a great idea for a JSM session, see https://ww2.amstat.org/meetings/jsm/2021/submissions.cfm. There is only room for a limited number of these sessions, so note the deadline for proposals is **December 10**.

IMS sponsored meetings: JSM dates for 2022–2026

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

IMS Annual Meeting @ JSM 2023
August 5–10, 2023
Toronto, Canada

JSM 2024
August 3–8, 2024
Portland, Oregon, USA

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

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

Seminar on Stochastic Processes (SSP) 2021
March 17–20, 2021
Lehigh University, Bethlehem, PA, USA
w https://wordpress.lehigh.edu/ssp2021/

At SSP2021, apart from informal presentations by conference participants, there will be plenary talks by **Alexei Borodin, Jennifer Chayes, Tadahisa Funaki, Dmitry Ioffe, Sarah Penington, and Makiko Sasada** (Alexei and Dmitry are IMS Medallion lecturers). The main conference will be held on March 18–20, 2021; on March 17, there will be a special set of **tutorial lectures by Greg Lawler** and **discussions targeted at early-career researchers**.

Travel funding: We expect this conference will be supported with funds to allow reimbursement of travel expenses. Graduate students, early-career researchers, women, and members of under-represented groups are especially encouraged to register and apply for funds. Applications will be accepted soon on the conference website, and should be received by **end of January**, 2021 for first consideration.

SSP 2021 is currently planned to be held in-person, with suitable COVID-19 precautions, to the extent possible given the evolving public health situation. Remote conference participation options will be implemented as appropriate.

Further information on funding, accommodations, conference participation modalities, and other details, including the online registration form, will be available soon on the website.

2022 IMS Annual Meeting
June 27–30, 2022, London, UK
w TBA

Mark your calendars for the 2022 IMS Annual Meeting. Held in London immediately before COLT, with extra workshop planned [*see announcement below*]. 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 announcement above*] will be immediately followed by the first IMS–COLT joint workshop, a one-day meeting in a hybrid format (on-site in central London, and online), linking the IMS and COLT communities of researchers. (COLT is the annual Conference on Learning Theory, and will take place in 2022 immediately after this IMS–COLT workshop day.) Committee: Benjamin Guedj (chair), Peter Grünwald, Susan Murphy.

At a glance:
forthcoming IMS Annual Meeting and JSM dates

2021

IMS Annual Meeting @ JSM: Seattle, **August 7–12, 2021**

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**

More IMS meetings around the world

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

AWAITING NEW DATES:

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

WNAR/IMS/KISS/JR Annual Meeting
http://www.wnar.org/

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

REARRANGED:

Frontier Probability Days
May 16–18, 2021, Las Vegas, Nevada
w http://lechen.faculty.unlv.edu/FPD20/
Registration open until March 16, 2021.

Mathematical Statistics and Learning
June 1–4, 2021, Barcelona, Spain.
w https://www.msl2020.org/

Statistics in the Big Data Era
June 2–4, 2021, UC Berkeley, CA, USA
w https://simons.berkeley.edu/workshops/statistics-big-data-era

Bernoulli–IMS World Congress 2020
July 19–23, 2021, Seoul, South Korea
w https://www.wc2020.org/

IMS Asia Pacific Rim Meeting 2022
January 4–7, 2022, Melbourne, Australia
w http://ims-aprm2021.com/

One World ABC Seminar: Ongoing and online

w https://warwick.ac.uk/fac/sci/statistics/news/upcoming-seminars/abcworldseminar

Inspired by the "One World Probability Seminar", in April 2020 we decided to run the One World Approximate Bayesian Computation (ABC) Seminar, a fortnightly series of seminars that will 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. So if you are interested in the ABC world seminar and would like to hear from us fortnightly about the announced speaker, title and abstract and, most importantly, be able to join the talk, please register at the website above.

The organizers are welcoming proposals for future talks. This webinar is part of the larger One World seminar initiative, which gathers seminars in applied mathematics and data sciences. [*See below for One World Probability Seminar*]

One World Probability Seminar (OWPS): Ongoing and online

w https://www.owprobability.org/

The short-term goal of the One World Probability Seminar is to provide access to a seminar for as many researchers as possible. For the indefinite future, the seminar is intended to foster ideas among our truly global research community and to help reduce our impact on climate change. Initially, the seminar will have an experimental character. We will need to understand how to work with online tools and learn how to deal with the vulnerabilities and bottlenecks of online traffic. Please join us in the long journey ahead!

ENAR

IMS sponsored meeting
March 14–17, 2021: Baltimore, MD, USA
w www.enar.org/meetings/spring2021/

Online registration coming soon! We have delayed opening registration for the ENAR 2021 Spring Meeting, because ENAR's highest priority is the health of our members and meeting attendees. We are monitoring the pandemic closely and will make final decisions on the format and registration closer to 2021.

2022 ENAR meeting:
March 27–30, 2022. Houston, TX, USA

ABC in Svalbard

April 12–13, 2021, Svalbard, Norway
w https://sites.google.com/view/abcinsvalbard/home

Registration is open, and limited to 100 participants so book soon! ABC in Svalbard aims to attract researchers at the forefront of research on approximate Bayesian computing methods, and promote original research in that field among various disciplines.

As the meeting is limited in size and located in a remote area of the world, **mirror meetings will take place in Brisbane, Coventry and Paris**, towards gathering participants unable or unwilling to travel to Longyearbyen. They will include live talks by local speakers, live interaction with the happy few in Longyearbyen (time zone permitting), and further discussions of the remote talks. Any volunteer interested in setting up another mirror meeting should contact one of the organizers.

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

Employment Opportunities around the world

Hong Kong
Hong Kong Baptist University
Professor / Associate Professor / Assistant Professor
https://jobs.imstat.org/job//55236268

Hong Kong
The Hong Kong University of Science and Technology, Department of Information Systems, Business Statistics and Operations Management
Non-tenure track teaching position in Statistics Group
https://jobs.imstat.org/job//55281901

Italy: Milan
Bocconi University, Department of Decision Sciences
Assistant Professor in Statistics
https://jobs.imstat.org/job//55157210

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https://jobs.imstat.org/job//55292365

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University of Warwick
Assistant Professor
https://jobs.imstat.org/job//55292360

United Kingdom: Coventry
University of Warwick
Associate Professor
https://jobs.imstat.org/job//55292353

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University of California, Irvine
Department of Epidemiology and Biostatistics
https://jobs.imstat.org/job//54933472

United States: Los Angeles, CA
University of Southern California
Professor of Data Sciences and Operations - Statistics (Open Rank, Tenure-Track)
https://jobs.imstat.org/job//55149655

United States: Santa Cruz, CA
University of California Santa Cruz
Statistics: Assistant Professor-Statistical Data Science (Open until filled. Apply by 1/18/21)
https://jobs.imstat.org/job//55265282

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Stanford University, Department of Statistics
Stein Fellow in Statistics or Probability
https://jobs.imstat.org/job//51005468

United States: Chicago, IL
University of Chicago
Instructional Professor (open rank) in Data Science
https://jobs.imstat.org/job//55292335

United States: Wichita, KS
Wichita State University
Assistant Professor of Statistics
https://jobs.imstat.org/job//55191643

United States: Boston, MA
Boston University Questrom School of Business
Assistant Professor of Finance (FinTech)
https://jobs.imstat.org/job//55149526

United States: Cambridge, MA
Harvard University Department of Statistics
Assistant Professor of Statistics
https://jobs.imstat.org/job//55236407

United States: Rockville, MD
Information Management Services, Inc.
Statistician/Programmer
https://jobs.imstat.org/job//55274445

United States: Rolla, MO
Missouri University of Science and Technology
Fred and June Kummer Endowed Department Chair of Mathematics and Statistics
https://jobs.imstat.org/job//55244433

United States: Saint Louis, MO

Washington University in Saint Louis

Postdoctoral Lecturer in Statistics

https://jobs.imstat.org/job//55229612

United States: Ithaca, NY

Cornell University, Department of Statistics and Data Science

Assistant/Associate/Visiting Professor

https://jobs.imstat.org/job//55083713

United States: New York, NY

Simons Foundation

Flatiron Research Fellow in Scientific Computing, CCM

https://jobs.imstat.org/job//54848450

United States: New York, NY

Simons Foundation

Flatiron Research Fellow, Machine Learning and Computational Statistics, CCM

https://jobs.imstat.org/job//54848441

United States: New York, NY

New York University Stern School of Business, Department of Technology, Operations, and Statistics

Assistant Professor of Technology, Operations, and Statistics - Statistics

https://jobs.imstat.org/job//55123735

United States: Memphis, TN

University of Memphis

Assistant Professor-Data Science

https://jobs.imstat.org/job//55191561

United States: Seattle, WA

University of Washington, Department of Statistics

Acting Assistant Professor in Statistics

https://jobs.imstat.org/job//55292276

United States: Madison, WI

University of Wisconsin–Madison

Professor - Asst, Assoc, full

https://jobs.imstat.org/job//55190957

United States: Ithaca, NY

Columbia University
Department of Statistics
Lecturer in Discipline, position starting Fall 2021

The Department of Statistics invites applications for multiple positions at the rank of Lecturer in Discipline to begin July 1, 2021. These are full-time appointments with multi-year renewal contingent on successful review. These positions will contribute to the departmental educational mission at the undergraduate and masters levels.

Lecturers in Discipline are officers in the University who meet a programmatic need for instruction in specialized fields. The selected candidates will be expected to teach three courses per semester. A Ph.D. in Statistics or related field and a commitment to high-quality teaching at both the undergraduate and MA levels in Statistics and/or Probability are required. Experience with online education is desirable but not required. Candidates will be expected to participate in the full gamut of statistics education including curriculum improvement, modifying and developing courses, and exploring new strategies for the teaching of statistics.

The department currently consists of 35 faculty members and 60 PhD students. The department has been expanding rapidly and, like the university itself, is an extraordinarily vibrant academic community. We are especially interested in candidates who, through their research, teaching and/or service, will contribute to the diversity and excellence of the academic community. Women and minorities are especially encouraged to apply. For further information about the department and our activities, centers, research areas, and curricular programs, please go to our web page at http://www.stat.columbia.edu.

All applications must be submitted through Columbia's online Recruitment of Academic Personnel System (RAPS) and must include the following materials: cover letter, curriculum vitae, statement of teaching philosophy, research statement, evidence of teaching effectiveness (teaching evaluations), a sample course syllabus and the names of three references. Applicants also should arrange for three letters of recommendation to be uploaded on their behalf.

For more information and to apply, please go to: http://pa334.peopleadmin.com/postings/6606

Inquiries may be made to Dood Kalicharan at dk@stat.columbia.edu

Review of applications begins on February 1, 2021 and will continue until the position is filled.

Columbia University is an Equal Opportunity/Affirmative Action employer.

International Calendar of Statistical Events

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

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

Online and Ongoing

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

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

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

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

January 2021

January 4–5: Tokyo, Japan [can also attend virtually – hybrid format]. **3rd International Conference on Computational Mathematics and Applied Physics (ICCMAP 2021)** **w** http://www.iccmap.iisrc.org

POSTPONED ~~January 5–8~~ [NOW January 4–7, 2022]: Melbourne, Australia. **IMS Asia Pacific Rim Meeting (IMS-APRM2021)** **w** http://ims-aprm2021.com/

March 2021

March 14–17: [*Currently in-person, may move to online, please check*] Baltimore, MD, USA. **ENAR Spring Meeting**
w https://www.enar.org/meetings/spring2021/

March 17–20: Bethlehem, PA, USA. **Seminar on Stochastic Processes (SSP)** **w** https://wordpress.lehigh.edu/ssp2021/

April 2021

April 12–13: Svalbard, Norway [also mirror meetings in Brisbane, Coventry, Paris]. **ABC in Svalbard**
w https://sites.google.com/view/abcinsvalbard/home

April 22–23: Birmingham, UK. **3rd IMA and OR Society Conference on Mathematics of Operational Research**
w https://ima.org.uk/14347/14347/

April 25–27: Gainesville, FL, USA. **Conference on Applied Statistics in Agriculture and Natural Resources**
w https://conference.ifas.ufl.edu/applied-stats/

May 2021

May 16–18: Las Vegas, USA. **Frontier Probability Days**
w http://lechen.faculty.unlv.edu/FPD20/

NEW May 20–23: Chicago, USA. **IISA 2021 Summer Conference**
w https://www.intindstat.org/summerConference2021/

June 2021

June (dates TBA): Anchorage, Alaska, USA. **WNAR/IMS/JR Meeting** **w** https://www.wnar.org/page-18098

Have you spotted a meeting that's missing or listed incorrectly? *Please tell us!*

Email bulletin@imstat.org.

June 1–4: Barcelona, Spain. **Mathematical Statistics and Learning** **w** https://www.msl2020.org

June 2–4: Berkeley, CA, USA. **Statistics in the Big Data Era** **w** https://simons.berkeley.edu/workshops/statistics-big-data-era

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

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

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

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

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

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

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

July 2021

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

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

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

July 19–23 (postponed from 2020): Seoul, South Korea. **Bernoulli–IMS World Congress** **w** https://www.wc2020.org/

Meeting organizers: to get a FREE LISTING in this calendar, please submit the details (as early as possible) at https://www.imstat.org/ims-meeting-form/ Or you can email the details to Elyse Gustafson at erg@imstat.org We'll list them here in the Bulletin, and on the IMS website too, at imstat.org/meetings-calendar/

August 2021

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

August 7–12: Seattle, WA, USA. **IMS Annual Meeting at JSM 2021** **w** http://www.amstat.org/ASA/Meetings/Joint-Statistical-Meetings.aspx

September 2021

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

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

January 2022

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

March 2022

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

Continues on **page 26**

International Calendar *continued*

May 2022

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

June 2022

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

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

July 2022

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

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

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

August 2022

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

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

July 2023

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

August 2023

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

August 2024

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

August 12–16: Bochum, Germany. **Bernoulli/IMS World 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

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

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

Membership and Subscription Information

Journals

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

Individual Memberships

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

Individual and General Subscriptions

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

IMS Bulletin

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

The *IMS Bulletin* (ISSN 1544-1881) is published eight times per year, in January/February, March, April/May, June/July, August, September, October/November and December, by the Institute of Mathematical Statistics, 9760 Smith Rd, Waite Hill, Ohio 44094, USA. Periodicals postage paid at Cleveland, Ohio, and at additional mailing offices. Postmaster: Send address changes to 9760 Smith Rd, Waite Hill, Ohio 44094, USA or dues.subs@imstat.org. Printed by The Sheridan Press, 450 Fame Avenue, Hanover, PA 17331, USA.

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

Advertising meetings, workshops and conferences

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

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

the next issue is
March 2021

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DEADLINES for submissions
February 1, then
March 15

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Volume 50 · Issue 1

The *purpose* of the *Institute* is to foster the *development* and *dissemination* of the *theory* and *applications* of *statistics* and *probability*

IMS: Organized September 12, 1935

…64 (print)
…7 (online)

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Ann. Appl. Probab. Dec 2020
https://projecteuclid.org/euclid.aoap

Articles

Vol. 30, No. 6—December 2020