Volume 49 • Issue 4

IMS Bulletin

June/July 2020

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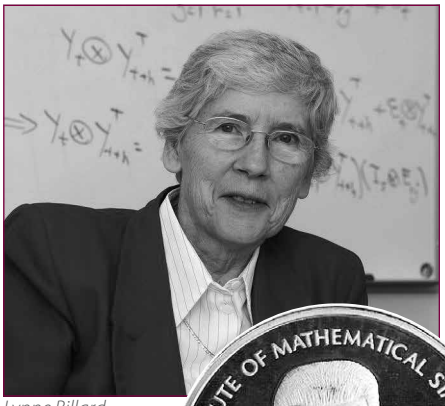
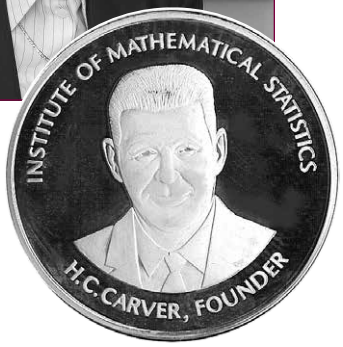
# Carver Award: Lynne Billard

We are pleased to announce that the IMS Carver Medal Committee has selected Lynne Billard to receive the 2020 Carver Award. Lynne was chosen for her outstanding service to IMS on a number of key committees, including publications, nominations, and fellows; for her extraordinary leadership as Program Secretary (1987–90), culminating in the forging of a partnership with the Bernoulli Society that includes co-hosting the biannual World Statistical Congress; and for her advocacy of the inclusion of women and young researchers on the scientific programs of IMS-sponsored meetings."

Lynne Billard is University Professor in the Department of Statistics at the University of Georgia, Athens, USA.



Lynne Billard




Lynne Billard was born in Toowoomba, Australia. She earned both her BSc (1966) and PhD (1969) from the University of New South Wales, Australia. She is probably best known for her ground-breaking research in the areas of HIV/AIDS and Symbolic Data Analysis. Her research interests include epidemic theory, stochastic processes, sequential analysis, time series analysis and symbolic data. She has written extensively in all these areas, publishing over 250 papers in leading international journals, plus eight books, and chapters in a number of acclaimed edited volumes.

Lynne has served as president of the American Statistical Association and the International Biometric Society, only the third person to have led both organizations. She also served as principal investigator for "Pathways to the Future," an annual NSF workshop which ran from 1988–2004 and focused on mentoring women who had recently received PhDs in Statistics, and were primarily entering academic positions.

Among her awards, in 2011, Lynne Billard received the tenth annual Janet L. Norwood Award for Outstanding Achievement by a Woman in the Statistical Sciences, and she was selected by COPSS to receive the 2013 F.N. David Award and the 2008 Elizabeth Scott Award. She is a Fellow of IMS and ASA, and an elected member of the ISI. From the ASA, she received the 1999 Samuel Wilks Award (for research) and the 2003 Founders Award (for service).

You can read more about Lynne's life and career, in conversation with Nitis Mukhopadhyay, in the 2017 *Statistical Science* article (Vol 32, No. 1, pp.138–164): see https://imstat.org/journals-and-publications/statistical-science/conversations/.

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## Executive Committee





# IMS Members' News

### New Members elected to National Academy of Sciences

The US National Academy of Sciences (NAS) has announced the election of 120 members and 26 international members, in recognition of their distinguished and continuing achievements in original research. Among them are three IMS Fellows: Gérard Ben Arous, professor of mathematics at the Courant Institute of Mathematical Sciences, New York University, New York City; Yoav Benjamini, The Nathan and Lily Silver Professor of Applied Statistics in the School of Mathematical Sciences at Tel Aviv University, Israel; and Ofer Zeitouni, professor of mathematics at the Weizmann Institute of Science, Rehovot, Israel. (Yoav Benjamini was elected as an international member.)

See the complete list at http://www.nasonline.org/news-and-multimedia/news/2020-nas-election.html

*Gérard Ben Arous*

*Yoav Benjamini*

*Ofer Zeitouni*

### …and to National Academy of Engineering

Meanwhile, the US National Academy of Engineering (NAE) also elected 87 new members and 18 international members. Among them is Sallie Ann Keller, division director for social and decision analytics and distinguished professor of biocomplexity and public health sciences at the University of Virginia, Charlottesville. Sallie was elected for development and application of engineering and statistical techniques in support of national security and industry. See the list at https://www.nae.edu/224584/National-Academy-of-Engineering-Elects-87-Members-and-18-International-Members

Johnny Shyrock

*Sallie Ann Keller*

### Dennis Lin named head of statistics department at Purdue University, and JSM Deming Lecturer

Purdue University's College of Science has named Dennis K.J. Lin to lead its department of statistics. Lin, who is currently a University Distinguished Professor of supply chain and statistics at Penn State University, will begin his new role at Purdue University in July.

Lin received his Bachelor of Science degree in mathematics from National Tsing-Hua University and his doctoral degree in statistics from the University of Wisconsin–Madison with a minor in computer science. His research interests are design of experiments, quality assurance, industrial statistics, statistical Inference and data science. An elected Fellow of the Institute for Mathematical Statistics, the American Society of Quality, Royal Statistical Society, International Statistical Institute and the American Statistical Association, he will be the **2020 Deming Lecturer** at the upcoming online JSM.

### Thomas M. Liggett 1944–2020

Tom Liggett passed away May 12, 2020 in Los Angeles. Tom was the editor of the *Annals of Probability* 1985–87, gave the Wald Lectures in 1996, and was elected to the National Academy in 2008. He is best known for his two books on interacting particle systems. An obituary will follow.

# More Members' News

## SIAM Fellows

The Society for Industrial and Applied Mathematics (SIAM) has elected the 2020 Class of SIAM Fellows. These distinguished members were nominated for their exemplary research as well as outstanding service to the community. Through their contributions, SIAM Fellows help advance the fields of applied mathematics and computational science. Among the new SIAM Fellows are Kavita Ramanan and Ruth J. Williams. Kavita Ramanan, Brown University, is being recognized for contributions to constrained and reflected processes and stochastic networks; and Ruth Williams, University of California San Diego, is being recognized for contributions to the study of stochastic processes and their applications.

See: https://sinews.siam.org/Details-Page/siam-announces-class-of-2020-fellows

## AAAS Fellows

In October 2019, the American Association for the Advancement of Science (AAAS) elected 443 of its members as AAAS Fellows. This designation reflects the Fellows' efforts to advance science and its applications to better serve society. The Fellows collectively span the AAAS's 24 different sections, and four IMS members and Fellows were honored as 2019 AAAS Fellows.

Thomas C.M. Lee (University of California, Davis) was elected to the Section on Engineering. Kavita Ramanan (Brown University, *see photo*) was elected to the Section on Mathematics. Kathryn Roeder (Carnegie Mellon University) and Jiming Jiang (University of California, Davis), were elected to the Section on Statistics.

*Steven Chu, AAAS President presents Kavita Ramanan (left) as a member of the 2019 class of AAAS Fellows. Photo courtesy of Sastry Pantula.*

## Sir Adrian Smith new President-Elect of the UK Royal Society

*Sir Adrian Smith*

Adrian Smith, Director and Chief Executive of the Turing Institute (the UK's institute for data science and AI), will take up the post of President of the Royal Society in November. Sir Adrian was elected a Fellow of the Royal Society in 2001, and of the IMS in 1984. He won the RSS Guy Medal in Bronze (1977), in Silver (1993) and in Gold (2016); and was Knighted in 2011. Read more at https://royalsociety.org/news/2020/05/sir-adrian-smith-prs-elect/

## Nominations are open for International Prize in Statistics

Who do you think deserves the next International Prize in Statistics? Nominations for the prize are open through **August 15, 2020**. Information about how to nominate someone is located at https://statprize.org/nominations.cfm. More information about the prize, and past winners, is at https://statprize.org/index.cfm.

= access published papers online

### 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/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

# **Recent papers:** supported and affiliated journals

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

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

**Volume 56, Number 2, May 2020**



## *Observational Studies*

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

**2020 papers to date**

# *Statistical Science:* What's New?

Sonia Petrone writes: It is an honor and an exciting challenge to be the new Editor of *Statistical Science*. I would like to thank the Past Editor Cun-Hui Zhang for his generous help in the transition, and for the great vitality he is leaving to the journal, including a forthcoming special issue on causal inference and a special section on network data.

I will continue in the tradition of *Statistical Science*, aiming at conveying a vision of the "full range of contemporary statistical thought at a moderate technical level accessible to our wide community". I will do my best to enhance the features that make *Statistical Science* so unique and appreciated.

Let me first express my intention to contribute to giving the deserved space to women in statistics. More to come about this, but certainly this is something I particularly care about, and that I hope the journal will address, in the appropriate ways.

Recognizing the huge value of review articles has been a founding principle of *Statistical Science*, and a reason for its success. I would like to renew the **call for good review articles**, along the lines well expressed in the Editorials of Robert E. Kass (1992) and George Casella (2002). If you are considering writing a review article, you may submit a detailed outline to the Editor or to any member of the Editorial Board for early feedback. Also, any reader is welcome to contact us with suggestions, for example, informing us of a lecture that may be the basis for an interesting review paper, or of topics that they would like to see reviewed and discussed in the journal.

I would like to particularly encourage **submissions of interdisciplinary articles**, or proposals for special sections or issues, that could offer different perspectives on a problem—for example, synthesizing probabilistic and statistical methodologies on a problem of interest, or statistical and machine learning approaches, or discussing why should statisticians care about a particular mathematical area.

In his Editorial in the first issue of *Statistical Science*, Morris DeGroot wrote, "The field of Statistics is in a state of rapid growth and expansion. As a result [statisticians are] more and more specialized. A central purpose of *Statistical Science* is to convey the richness, breadth and unity of the field." It couldn't have been said better, or more simply. Nowadays, we are still facing a trend towards specialization; but it's not only that. People are being attracted to new fields—machine learning and AI are obvious examples—that have a lot in common with statistics (and I feel are somehow "evolving back" towards statistics), and that, at the same time, bring different viewpoints and problems. To *"convey the richness, breadth, and unity,"* good interdisciplinary articles, or articles from a related field yet *written for statisticians*, would be stimulating and appreciated.

These are some directions for the journal I had started working on. But there is something that has been weighing on my mind in these weeks, and I think we should be prepared to discuss it in *Statistical Science*. In these dramatic days, many of us are offering their work and expertise in projects and initiatives in the urgent struggle against COVID-19 [*see the articles on the next pages*]. But we are also reflecting on our role and impact, now and in the future, to help prevent this from happening again. I believe we have a lot to learn from this terrible crisis.

We are planning to host a discussion in *Statistical Science*, in a special issue, that will offer a thoughtful and constructive **reflection on the role of statistics in the COVID-19 crisis**, in its many aspects. Statistics and related fields drive the most advanced scientific studies towards a vaccine, as well as effective and shared data collection, and a proper and timely evaluation of risk and support to make decisions. To what extent are we having an impact in all this? What should be improved? Is this crisis changing our perspective on our research and work? Chiara Sabatti (Stanford University) is kindly available to help coordinate contributions, as a guest co-editor of a special issue. You are welcome to contact me (sonia.petrone@unibocconi.it)and Chiara (sabatti@stanford.edu) with your thoughts on this.

In the meantime, life goes on and it is full of interesting challenges and topics for discussion: I see a lot of exciting work on the horizon for *Statistical Science!*

# **Radu's Rides:** A Lesson in Humility

Radu Craiu writes: The ancient Greeks believed that a philosopher's most impactful work happens in the *agora:* debating endlessly, correcting misconceptions and solving problems for their peers. Among STEM-ers, statisticians and data scientists are the ones who align the most with this noble tradition by virtue of dealing with data, the most valuable currency of our times. This allows us to tackle some of the world's most pressing issues: exploration of the large (astronomical) and small (molecular) universes, health and socio-economic studies, making predictions for pretty much everything under the sun (or on it!). At least, this was the situation until a few months ago, when one of the biggest threats to humankind materialized as an invisible, yet incredibly vicious creature.

There is no doubt that a trip to the *agora* of our times would reveal that the questions haunting our fellow citizens concern the COVID-19 pandemic: how contagious it really is, what is the mortality rate across age groups and health conditions, what is the best strategy to safeguard the well-being of a society as a whole, and so on. Some of these questions clearly belong to the domain expertise of a statistician or biostatistician while others involve political, philosophical, economical, psychological, and sociological considerations which cannot be answered by merely inspecting the data. The last time the world felt a threat of this reach and severity was during World War II, and that was also a time of great impetus for developing statistical thinking and methods. A question that begs asking is, *will we rise to the challenge once again?*

The inquiry is relevant also because this particular crisis placed a large onus on statisticians, or if you prefer, data scientists, to sort out the mess. The world needs answers and there is a large consensus that many will likely come from data. Alas, there is a fly in the ointment: some of the data are unreliable and most of the data are dark (see David Hand's book, *Dark Data: Why what you don't know matters*). There is little in a statistician's arsenal to use when so much of the truth is hidden. Methods predicated on the idea that answering questions is just a matter of dipping our hands in a bucket of informative data are certainly not of use here—worse, they may mislead. In this case, the idea that tomorrow is a replica of any day more than one month, or even a week ago is certainly passé, and our missing data mechanisms cannot come close to what we are currently witnessing. This is a very large lesson in humility that we, as a professional organisation, should pay heed to. Much has been said these days about how the world would never be the way it was. Every century or so, humanity goes through yet another loss of innocence that triggers pledges of fervent devotion to changing the ways of the world. One can be skeptical about ultimate success, but one should never stop trying.

Predicting the world's future priorities is a dangerous game and should be played carefully. But for the sake of discussion, let's speculate where we're going from here:

**1.** It is becoming increasingly apparent in this deepening crisis that our record keeping is vastly unprepared for the pace and scale of the spread. In this digital world, it is almost ironic that we have a hard time figuring out who got in touch with whom. Is this the event that will force the world to trade privacy boundaries for more accuracy and speed in data collection, as we already see in some countries (see https://www.bbc.com/news/world-asia-51733145 )?

**2.** Will the sobering realization that health truly matters most push governments to channel massive funding towards disciplines directly related to fighting the next virus-induced global crisis that we all know is waiting in the wings? And if so, how will we mitigate the sacrifice of other disciplines and their potential to serve in other global challenges that we cannot foresee?

**3.** As I write this, prominent world leaders have sent mixed messages around the false dichotomy: save lives or livelihoods? To put it in more crass terms, should we sacrifice the economy by plunging into a deep recession, possibly a depression, or the lives of those who will perish if a stringent lockdown is not imposed? With questions like these we open serious ethical and moral dilemmas. The risk inherently implied by the two paths or their various variants, is not only vastly asymmetric but, given the uncertainty around us, essentially impossible to compute. The black swan of COVID-19 is spreading its wings and is darkening the future in ways we have not seen in more than 100 years. Will the researchers of tomorrow take more seriously the fact that many statistical or economic models cannot be disentangled from ethical, moral, or political questions?

**4.** When the world burns around you it is hard to work on anything else but a top-notch extinguisher. I wonder how many of us feel a certain detachment from their old passion projects and how many will take on work related to the challenges we are going through now. [*See the article on the following pages!*] This reaction may be blamed on the atavism deeply buried in all of us which is not necessarily wrong. But then how do we save ourselves from consuming only one kind of passion fruit, thus overlooking the fact that only a balanced diet can protect us in the future?

Traumatic periods in a person's life have long been responsible for changing trajectories due to their eye-opening qualities. Similarly, I know that the scientific community will start an introspection process that will take into consideration the fundamental litmus test that has emerged these days for our ideas and methods: *are **you** willing to bet **your** life on it?*

# IMS members' work on COVID-19

You may have seen our call-out to IMS members, in the e-Bulletin email, or on our Facebook or Twitter, asking if you have been working on COVID-19? Below, in alphabetical order, you can read about the members who wrote to share what their research has focused on. If you'd like a mention in the next issue, please contact ims@imstat.org (ideally, send a paragraph about your work, and a link to the paper, or location where interested readers can find out more). **Our next deadline is July 1.**

### Xiaohui Chen

Associate Professor of Statistics, University of Illinois at Urbana-Champaign

Xiaohui writes, "I recently published an article on government policy interventions on the COVID-19 transmission. This paper introduces a dynamic panel SIR model to investigate the impact of non-pharmaceutical interventions (NPIs) on the COVID-19 transmission dynamics with panel data from nine countries across the globe. By constructing scenarios with different combinations of NPIs, our empirical findings suggest that countries may avoid the lockdown policy with imposing school closure, mask wearing and centralized quarantine to reach similar outcomes on controlling COVID-19 infection. Our results also suggest that, as of April 4th, 2020, certain countries such as the U.S. and Singapore may require additional measures of NPIs in order to control disease transmissions more effectively, while other countries may cautiously consider to gradually lift some NPIs to mitigate the costs to the overall economy." See https://arxiv.org/abs/2004.04529 and https://cepr.org/sites/default/files/news/CovidEconomics7.pdf .

### Ezra Gayawan

Head of the Biostatistics and Spatial Statistics Research Group at the Federal University of Technology in Akure, Nigeria

Ezra says, "I have led some other colleagues to work on spatio-temporal dynamics of COVID-19 spread in Africa in the first 62 days of its arrival on the continent. We used a hurdle Poisson model within the framework on distributional regression to examine the frequencies and no occurrence of the virus in Africa. We also look at the relationship with available physicians and number of bed spaces in each country in the continent."

The preprint version of the article can be found at: https://www.medrxiv.org/content/10.1101/2020.04.21.20074435v1

### Nicholas P. Jewell

London School of Hygiene and Tropical Medicine and the University of California, Berkeley

Nick Jewell and Britta Jewell (of Imperial College London) wrote an article in the *New York Times,* "The Huge Cost of Waiting to Contain the Pandemic" on April 14, 2020. https://www.nytimes.com/2020/04/14/opinion/covid-social-distancing.html

### Xihong Lin

Professor of Statistics at Harvard University and of Biostatistics at Harvard SPH

In a March 20, 2020 YouTube presentation "Learning from 26,000 cases of COVID-19 in Wuhan" as part of the Broad Institute's Infectious Disease & Microbiome Program Meeting, Xihong Lin presents her recent research analyzing the lab-confirmed COVID-19 cases in Wuhan (up to February 18). The findings could provide timely information on strategy development on controlling the outbreak in US and other countries.

Video: https://www.youtube.com/watch?v=aQ9KIO1eXTA

### Bani K. Mallick

Department of Statistics, Texas A&M University

Bani and his co-authors have written a research paper on COVID-19: a complete statistical model-based approach to predict the COVID infection curve with uncertainties, and to predict the time of flattening of the curve. He says, "In this paper, we propose a Bayesian hierarchical model that integrates global data to estimate COVID-19 infection trajectories. Due to information borrowing across multiple countries, the proposed growth curve models provide a powerful predictive tool endowed with uncertainty quantification. They outperform the existing individual country-based models. Additionally, we use countrywide covariates to adjust infection trajectories. A joint variable selection technique has been integrated into the proposed modeling scheme, which aimed to identify the possible country-level risk factors for severe disease due to COVID-19."

Preprint: https://www.medrxiv.org/content/10.1101/2020.04.23.20077065v1.full.pdf

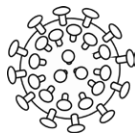
### David S. Matteson

Professor of Statistics and Data Science, Cornell University

David and his co-authors have written a paper, "Social Distancing Has Merely Stabilized COVID-19 in the US". David says, "There is a dramatic (albeit delayed) change in the COVID-19 infection data associated with social distancing, but not as dramatic as everyone had hoped for." Read the pre-print article at: https://www.medrxiv.org/content/10.1101/2020.04.27.20081836v1

*Continues on* **page 8**

# IMS members' work on COVID-19 continued



### Karl Pazdernik

Senior Data Scientist in Applied Statistics & Computational Modeling at Pacific Northwest National Laboratory, and Research Assistant Professor at North Carolina State University

Dr. Lauren Charles (PI) along with IMS member, Dr. Karl Pazdernik, and other data scientists and engineers at Pacific Northwest National Laboratory (A. Tuor, S. Dixon, A. Barker, D. Farber, E. Saxon, D. Stevens) continue to push the edge of research with their text analytics pipeline for Biofeeds, a tool used by the Department of Homeland Security to identify and track COVID-19. Biofeeds enables machine-assisted biological and chemical surveillance of any potential threat to humans, animals, or the environment. The tool automatically collects open source text data from more than 800,000 sources, published in over 90 languages around the globe. Powered by natural language processing, named entity recognition, machine learning, and human-in-the-loop training, Biofeeds is able to filter out irrelevant articles and provide a relevance ranking, machine-tags of location, disease, chemical, control measures, impacts, and red flags, identify active events, provide access to similar articles, and calculate an overall significance to the article. A NiFi processing pipeline contains a variety of natural language processing methods, including, but not limited to, time-weighted penalized logistic regression models, recursive regex, binary bag of words models, and recurrent neural network models. The analytic development continues as PNNL expands methods to utilizing transformer deep learning classifiers as well as expanding capabilities to identify anomalous new events and abnormal characteristics of ongoing events. See more about Biofeeds at https://www.nextgov.com/emerging-tech/2020/04/how-homeland-securitys-biosurveillance-arm-uses-tech-track-pandemic/164585/

### Śaunak Sen

Professor and Chief of Biostatistics, The University of Tennessee Health Science Center, Memphis

Śaunak says, "We have developed penalized regression models for incorporating longitudinal social distancing measure information into SEIR models. Our work was sparked by an request from the City of Memphis Fire Department emergency response group. They wanted a subcommittee to evaluate the fast-evolving situation and make recommendations to city and county decision-makers. The group we are working with includes a faculty member from my university (UTHSC), a faculty member from the University of Memphis, a freelance epidemiologist and an official from the Fire Department. None of us have prior experience working with infectious diseases and this work needed to be done on an extremely tight deadline. I am proud that we were able to put our collective experience in the service of our community." This Github repository (with code in Julia) has an outline of their work: https://github.com/senresearch/DiseaseOutbreak.jl

### Nozer D. Singpurwalla

Department of Statistics, The George Washington University

Nozer wrote a paper, "The Di-negentropy of Diagnostic and Detection Tests" that was published in 2018 in a publication of Kyoto University's Research Institute of Mathematical Sciences at http://hdl.handle.net/2433/242115. A revised and more complete work on this topic is currently in progress. He says, "Whereas the matter of testing large members of the population for COVID-19 has become one of predominant discussion, the question of test reliability has been appearing in the major national newspapers on an almost daily basis. Of concern are false negatives and their cascading consequences of poor preparation. There are reports that test inaccuracy of certain devices can be as high as 30%. The matter is certainly one of probability and statistics. Comparing the efficacy of two diagnostic tests when their ROC's (Receiver Operating Characteristic Curves) cross has been an open statistical problem for quite some time. Based on a previous effort supported by the US NSF on Threat Detection, a procedure based on the information theoretic notion of "di-negentropy" has been developed, and its effectiveness has been empirically demonstrated."

### Anuj Srivastava

Distinguished Research Professor, Florida State University

Anuj's paper, "Agent-Level Pandemic Simulation (ALPS) for Analyzing Effects of Lockdown Measures," models the spread of the pandemic using an agent-level model. The main goal of the ALPS simulation is analyze effects of preventive measures—imposition and lifting of lockdown norms—on the rates of infections, fatalities and recoveries.

https://arxiv.org/abs/2004.12250

### Harvey Stein

Head of Quantitative Risk Analytics at Bloomberg, and Adjunct Professor of Mathematics at Columbia University

Harvey has been working on estimating COVID-19 infection rates in New York City. He details this in his blog post on the subject: https://hjstein.blogspot.com/2020/04/covid-19-nyc-stats-not-what-they-seem.html. The code for the analysis (updated with the latest

data) is available in Harvey's fork of the NYC Coronavirus data Github repository: https://github.com/hjstein/coronavirus-data

**Stanislav Volkov**
Professor of Mathematical Statistics and Deputy Head of Division, Centre for Mathematical Sciences, Lund University
Stanislav (Stas) Volkov experimented with trying to find how to model the total death count as a result of COVID-19 in a few countries, without directly implementing SIR or SEIR model, but rather searching for and ad hoc model for how this total mortality develops with time. He says, "It seems to perform fairly well for a number of countries. It may be used to predict when the peak of the decease is over, and perhaps how much medical capacity one would need in the future."
You can view the paper at https://imstat.org/wp-content/uploads/2020/05/Volkov_COVID_paper.pdf

**Lily Wang**
Associate Professor in Statistics, Iowa State University
Lily and her co-authors have developed a novel spatiotemporal epidemic model (STEM, Wang, et al. 2020) for infection count and death count to study the spatial-temporal pattern in the spread of COVID-19 at the county level. The proposed methodology can be used to dissect the spatial structure and dynamics of spread, as well as to assess how this outbreak may unfold through time and space in the future. Based on our research findings, a dashboard (https://covid19.stat.iastate.edu/) was established on March 27, 2020, with multiple R shiny apps embedded to provide real-time 7-day forecast of COVID-19 infection count and death count at the county level with risk analysis, as well as a long-term projection in the next four months. Details in the paper at: http://arxiv.org/abs/2004.14103

**Qingyuan Zhao**
University Lecturer of Statistics at University of Cambridge
Qingyuan says, "I would like to share some work we have done on the selection bias of some early statistical analyses of COVID-19. We developed a generative model we call BETS for four key epidemiological events—Beginning of exposure, End of exposure, time of Transmission, and time of Symptom onset (BETS)—and derived explicit formulas to correct for the sample selection. We gave a detailed illustration of why some early and highly influential analyses of the COVID-19 pandemic were severely biased. All our analyses, regardless of which subsample and model were being used, point to an epidemic doubling time of 2 to 2.5 days during the early outbreak in Wuhan. A Bayesian nonparametric analysis further suggests that about 5% of the symptomatic cases may not develop symptoms within 14 days of infection and that men may be much more likely than women to develop symptoms within 2 days of infection." https://arxiv.org/abs/2004.07743

**Bin Yu**
University of California, Berkeley
Bin Yu and her team at Berkeley featured in an April 2, 2020 article in *Berkeley Engineering*, "Getting the right equipment to the right people": https://engineering.berkeley.edu/news/2020/04/getting-the-right-equipment-to-the-right-people/

# NOMINATE AN IMS SPECIAL LECTURER

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- **2022 Rietz Lecturer**
- **2023 Medallion Lecturers**

**Send your nomination by October 1, 2020. Information on all lectures is available at https://www.imstat.org/ims-special-lectures/**

# Obituary: Richard M. Dudley

## 1938–2020


Richard "Dick" Dudley

Richard Mansfield Dudley, MIT professor emeritus of mathematics, died on January 19 at the age of 81. Born on July 28, 1938, in Cleveland, Ohio, Dick Dudley completed a BA from Harvard University, summa cum laude, in 1959. He wrote a doctoral dissertation at Princeton University under two advisors, Gilbert A. Hunt and Edward Nelson, completing his PhD in mathematics in 1962. He served as an instructor at the University of California at Berkeley in 1962–63, and as an assistant professor from 1963–67, before moving to MIT, until his retirement in 2015.

Over the course of those 48 years, during which he published over 100 articles as well as numerous books and monographs, Dick Dudley worked on a broad range of topics in probability, statistics and mathematical analysis, including weak convergence of measures, Gaussian processes, probability in Banach spaces, empirical processes and uniform central limit theorems, Lorentz invariant Markov processes, Wiener functionals, random walks on groups, sequential convergence, singularity of measures in linear spaces, prediction theory, Bayesian statistics, hypothesis testing, Fréchet differentiability of nonlinear functionals in $p$-variation norms, and approximation theory. Dudley made fundamental breakthroughs in the theory of stochastic processes and the general theory of weak convergence, in particular, by developing a version of the theory of weak convergence of measures in non-separable metric spaces and by studying metrizability of weak convergence. Dudley's work, starting in the 1960s, had a profound impact on the fields of probability and mathematical statistics. His highly influential contributions to the theory of Gaussian processes and empirical processes have become a standard tool of modern research in several areas of contemporary statistics and in machine learning. In particular, Dudley's work in the late 1960s along with the work of Sudakov, Fernique and Strassen changed the paradigm in the study of Gaussian processes by highlighting the role of intrinsic metric structure associated with the process and by introducing "Dudley's entropy bound", the main tool in the study of boundedness and continuity of Gaussian processes. Ultimately, it led to the development by Talagrand of generic chaining bounds that provided a characterization of these properties of Gaussian processes.

Dudley's work also transformed the theory of empirical processes initiated by Vladimir Vapnik and Alexey Chervonenkis in the context of machine learning. Along the way Dick wrote 281 reviews for *Mathematical Reviews*, including reviews of two of the key papers by Vapnik and Chervonenkis which appeared in 1968 and 1971 (his Russian language skill gave Dick an edge). In a sequence of papers, starting with his landmark paper Central limit theorems for empirical processes (*Annals of Probability*, 1978) and continuing with his influential Saint-Flour lecture notes (1984) and later, his book *Uniform Central Limit Theorems* (Cambridge University Press, 1999 & 2014), Dudley refined and developed these ideas into a working body of theory and tools that remains today as the reference framework in mathematical statistics and statistical learning theory. In particular, he developed a mathematical framework for the study of central limit theorems (CLT) for general empirical processes and obtained the first sharp results on CLT in terms of bracketing entropies as well as CLT on Vapnik–Chervonenkis classes.

The wider communities of probability and statistics will remember his excellent taste for mathematically rich and important subjects, as well as his highest standard of rigor, and his careful precision and attention to history in the "Notes" sections of his several books.

Dudley gave a number of distinguished research talks. He was an invited speaker at the 1974 International Congress of Mathematicians in Vancouver, Canada. The published version of his talk includes a venture into verse, humorously and sympathetically lamenting the naming of Gaussian processes for C. F. Gauss rather than Abraham de Moivre.

He also presented invited lectures at meetings of the American Mathematical Society, the Institute of Mathematical Statistics, and the Bernoulli society. He was an invited lecturer at the Saint-Flour probability summer school in probability in 1982 and several of the Vilnius Conferences on Probability Theory and Mathematical Statistics. He was a regular participant and organizer of multiple conferences and meetings, including a series of meetings on Probability in Banach Spaces (which have morphed into a further series on High-Dimensional Probability). In 1976, Dudley visited the University of Aarhus. While there he produced a set of graduate lecture notes, Probabilities and Metrics. These became a part of his graduate text, *Real Analysis and Probability*, published by Wadsworth, Inc. in 1989. An early review of this work in the *London Mathematical Society Bulletin* (July 1990) found that it "could be compared to the appearance of

*Continues on* **page 10**

**Richard M. Dudley, 1938–2020**

*Continued from* **page 10**

Breiman's or Loève's classic probability texts." The text has since become a standard: in 2002 was reissued by Cambridge University Press and is still in print.

Dudley was always highly regarded as a graduate mentor throughout his career. He advised 33 PhD candidates (32 at MIT), yielding some 105 academic descendants.

Dudley served the IMS as associate editor (1972–78) and then editor (1979–81) of the *Annals of Probability*. During this period he continued writing reviews for *Mathematical Reviews*, completing 30 reviews while serving as Editor of *AOP*. Dudley was a member of the editorial board of the Wadsworth & Brooks/Cole *Advanced Series in Statistics/Probability* from 1982–92.

Among his honors, Dudley was an Alfred P. Sloan Research fellow from 1966–68 and a Guggenheim Foundation Fellow in 1991. He was selected to serve on the honorary Advisory Board of Stochastic Processes and their Applications from 1987-2001. In 1993, Dudley was elected a fellow of the ASA, "for world-recognized contributions to probability theory with far-reaching consequences for statistics, for founding the modern theory of empirical processes, and for dedication to many successful PhD students." He was also elected fellow of IMS, the American Association for the Advancement of Science, and the American Mathematical Society and was an elected member of the ISI.

Dick was an enthusiastic hiker in the Appalachian mountains and contributed as the editor of the *Appalachian Mountain Club White Mountain Guide* in 1979.

He also loved classical music and, in the last years of his life, he contributed to Wikipedia articles about several composers, including Amy Beach, Dvorák, Mozart, and Clara Schumann.

Dudley is survived by his wife, Elizabeth (Liza) Martin; his sisters, Edith D. Sylla and Alice D. Carmel; brother-in-law Richard E. Sylla; and nieces Anne Sylla, Margaret S. Padua, and Genevieve Carmel. Memorial contributions may be made in Dudley's name to the Environmental Defense Fund or to Partners in Health.

*Adapted by Jon Wellner and Vladimir Koltchinskii from an obituary posted by the MIT Mathematics Department and from the Preface and "A Biographical Sketch of Richard M. Dudley" published in* Selected Works of R. M. Dudley, *Springer, 2010.*

# Obituary: S.S. Shrikhande, 1917–2020

Shartchandra Shankar Shrikhande, IMS Fellow and well known combinatorial mathematician, passed away on April 21 at his residence in India. He was 102.

S.S. Shrikhande was born in Sagar, India, on October 19, 1917. Having won scholarships, he was able to complete his BSc Honours at the Government College of Science (now known as the Institute of Science) in Nagpur with a first rank and a gold medal. He went on to receive his doctoral degree on Construction of Partially Balanced Designs from the University of North Carolina in 1950, under the supervision of Raj Chandra Bose. Prior to that, he was a Research Fellow at the Indian Statistical Institute. Professor Shrikhande, R.C. Bose and E. T. Parker jointly disproved Euler's 1782 conjecture that mutually orthogonal Latin squares cannot exist for orders of the form $4n+2$ for any n. This was proved by Euler himself for $n=0$ and by Gaston Tarry in 1901 for $n=1$. The first analytical counterexample was found by Bose and Shrikhande in early 1959 for $n=5$. Later the same year, Bose, Shrikhande and Parker proved the general result that in fact such orthogonal squares exist for all orders $4n+2$ except $n=0,1$. The trio were dubbed "Euler's Spoilers"—as reported in the front-page *New York Times* article on April 26, 1959.

Dr. Shrikhande also gave a remarkable construction of a special strongly regular Cayley graph with each pair of vertices having exactly the same number of neighbors and each vertex having exactly the same degree. This graph, now known as the Shrikhande graph has found many applications in design of experiments.

Professor Shrikhande was the founding Head of the mathematics department at Bombay University and the founding Director of the Center for Advanced Study, Bombay. Professor Shrikhande is survived by his sons Mohan (Professor of mathematics at the Central Michigan University) and Anil and daughter Asha; his wife Shakuntala passed away in 1987.

*Written by B.V. Rao and Anirban DasGupta*

# Obituary: Mark H.A. Davis

## 1945–2020


Mark Davis

Occasionally, a mathematician passes on who is much more than the sum of his work, considerable as that might be. A person, perhaps, whom people felt the better for having known. A person who always had a smile, a glint in the eye, a beguiling charm, a ready happiness to have seen you again. Such a person might have been named Mark H.A. Davis.

I had a theory about the British. They have so few surnames that they need several middle names to uniquely identify themselves. Mark H.A. Davis seemed to be a case in point. I once asked him if the H.A. served a purpose, perhaps as a unique identifier? He told me his full name was Mark Herbert Ainsworth Davis, and it was his mother's doing, and he explained her choices of Herbert and Ainsworth. He cleverly avoided answering my question.

Mark H.A. Davis did much more than heal the souls of those he knew. He was also an eminent mathematician, a builder of theories, of journals, of programs, and a catalyst for young researchers.

Born on April 25, 1945, Mark graduated from Cambridge in 1966. His PhD was from UC Berkeley in 1971, working with Pravin Paraiya in Electrical Engineering, on dynamic programming in a non-Markovian context, developing a version of what is now known as an optional Doob–Meyer decomposition theorem. Trained at Cambridge, he was more of a mathematician than an electrical engineer, and he worked in stochastic control theory and filtering theory, emphasizing martingale techniques, leveraging the subject from Tyrone Duncan's course at Berkeley in 1969–70. He became editor of the journal *Stochastics* in 1978—for 17 years. During his tenure the journal was at the cutting edge of the boundary between electrical engineering, filtering theory, and stochastic analysis. It was a desirable place to publish.

Control theory was rapidly dying as a research subject, because the major problems of controlling the drift of a diffusion had been solved, using Girsanov's theorem. Thanks to the pioneering work of Black, Scholes and Merton, a few young researchers—among them N. El Karoui, I. Karatzas, S. Shreve, and Mark Davis himself—discovered that in Mathematical Finance one needed to control the diffusive term, and not the drift, requiring new ideas and new techniques. Math Finance gave a new lease on life to control theorists.

Even though the work of Black, Scholes and Merton appeared in the early 1970s, the subject did not really take off until the seminal works of J.M. Harrison, D. Kreps, and Stan Pliska in the 1980s, tying the subject to martingale representation. That was an interest of Davis, and he did some important work in that domain, and quite naturally moved into Math Finance.

An important meeting took place at Cornell University in 1989, at which Mark Davis, Bob Jarrow, and Stan Pliska decided a journal was needed for the new discipline of Mathematical Finance. With Jarrow representing Finance, Pliska representing Math Finance, and Davis representing Math, they created *Mathematical Finance*, the first, and still the premier, journal on the subject. Mark was always proud to have been one of its three founding editors.

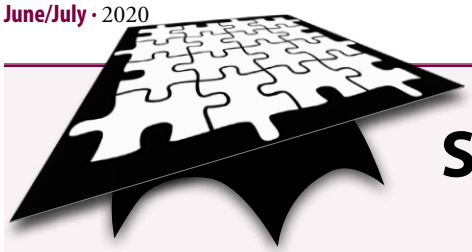
In 1995, Mark forsook the academy and took a position in industry: Director and Head of Research & Product Development for Mitsubishi Finance (later renamed Tokyo–Mitsubishi International). His team worked on risk analysis and pricing models. Some felt it was a loss for such a talented man as Mark to do such a thing—but he surprised the skeptics by returning to the academic fold, to Imperial College, in 2000. He returned with a profound understanding of both finance and math finance (two different subjects) and he started a masters' program in Math Finance at Imperial, training the future quants of the City of London. He also resumed active research, and fostered communication and the dissemination of knowledge in Oslo, Vienna and the United States.

Mark received his fair share of honors. He was elected to be a Fellow of IMS, the Institute of Actuaries (Honorary), and the Royal Statistical Society. Impressively, he was awarded the Naylor Prize by the London Mathematical Society in 2002.

Mark's research spanned multiple areas. Most notably he worked in utility maximization with transaction costs, portfolio credit risk contagion modelling, risk sensitive control and management, and robust pricing and hedging. He also tackled the complicated world of credit contagion, a subject of great relevance in society today, especially after the events of 2008.

Mark passed away in a hospice in London, due to cancer, on March 18, 2020, at the age of 74. For those of us lucky enough to have known Mark, we will remember him most for his smile, his kindness, his generosity of spirit, and his ability to turn any event, no matter how frustrating, into one of little consequence. His perspective, wisdom and delightful presence will forever be missed.

*Philip Protter, Columbia University*



# Student Puzzle Corner 29

**After our last puzzle with probabilities on hyperspheres [*see solution below*], it is now time to turn our thoughts again to something in statistics. This time it's a problem on epidemiology. Anirban DasGupta deliberately leaves this problem incompletely formulated. A correct solution involves identification of all the parameters, then formulate and answer the question in terms of the model parameters. Be careful: the values of your parameters may be known!**

In a certain state in a country, each of $m$ families has $k$ members. We assume $m$ and $k$ to be given to us. Suppose a total of $X$ residents of the state are found to have contracted an infectious viral disease; we assume $X$ to be observable. Suppose these $X$ infected residents come from a total of $Y$ different families. Thus, Y denotes the number of families in the state affected by this virus; data on $Y$, unfortunately, is not available.

(a) Find a closed form expression for $E(Y)$.

(b) Hence, or otherwise, provide a statistical estimate for $Y$.

(c) *This is more complex*: write an expression for the probability mass function of $Y$.

**Deadline: July 1, 2020**

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's decision is final.

## Solution to Puzzle 28

Contributing Editor Anirban DasGupta writes on the previous problem, which was about probabilities on hyperspheres:

**Congratulations to Andrew Thomas**, who is a PhD student in the Department of Statistics at Purdue University. Andrew sent a very detailed, rigorous and well written solution.

Here is my solution. Suppressing the dimension $n$, let us denote the distance between $P,Q$ to be $X$. Clearly, $0 \le X \le 2$, because $P,Q$ are points on the unit hypersphere (in $n$ dimensions). The density of $X$ can be written down as

$$f(x) = \frac{\Gamma(n/2)}{2^{n-3}\sqrt{\pi}\,\Gamma((n-1)/2)} x^{n-2}(4-x^2)^{\frac{n-3}{2}}, 0 \le x \le 2 \cdot$$

Fortunately, one can integrate in closed form and get

$$c_1 = E(X) = \frac{2^{n-1}[\Gamma(n/2)]^2}{\sqrt{\pi}\,\Gamma(n-1/2)}.$$

As $n$ increases progressively, a plot of the density $f(x)$ would start to look like a spike around some point; let us see if we can work out exactly what is the value of this point of spike.

$$E(X) = c_1 = \frac{2^{n-1}[\Gamma(n/2)]^2}{\sqrt{\pi}\,\Gamma(n-1/2)}.$$

Hence, by using Stirling's approximation:

$$\Gamma(z) = e^{-z} z^{z-1/2}\sqrt{2\pi}(1+o(1)),\ z \to \infty,$$

$\lim_{n\to\infty} E(X) = \sqrt{2}$. A higher order expansion can be derived too, by using Stirling's series for $\Gamma(z)$. The limiting value of $\sqrt{2}$ for $E(X)$ is saying that in very high dimensions, two random points would act like points close to extremes on two mutually orthogonal radii on the surface of the hypersphere. For the special case of $n = 3$, the formula gives $E(X) = \frac{4}{3}$.

Next, again using the expression for the density, we get that the $2m$-th moment of $X$ in four dimensions is

$$c_{2m,4} = \frac{4^{m+1}\Gamma(m+3/2)}{\sqrt{\pi}\,\Gamma(m+3)},$$

which, on using the Gamma duplication formula, simplifies to

$$c_{2m,4} = C_{m+1},$$

the $(m+1)$th Catalan number. This is a very interesting coincidence!

If we instead compute the expected geodesic distance between $P$ and $Q$ in three dimensions, we will get an expected value larger than $\frac{4}{3}$. You can find the expected geodesic distance exactly by a trigonometric integration (the final answer will involve $\pi$).

You may find it interesting to generate two random points on the three-dimensional unit sphere (using, for example, normalized standard normals) and simulate the average geodesic distance. See if you can guess the exact value of the expected geodesic distance!

# Congratulations to the 2020 IMS Fellows!

## Louigi Addario-Berry

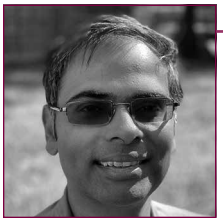
McGill University

*For fundamental contributions to probability, in particular to the topics of branching structures and random graphs, and for his devoted service to the mathematical sciences and promotion of diversity within them.*

## Aguemon Yves Atchade

Boston University

*For fundamental contributions to the theory and methods supporting computation in adaptive Markov chain Monte Carlo and in high-dimensional statistics.*



## Shankar Bhamidi

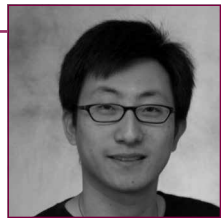
University of North Carolina at Chapel Hill

*For his many outstanding contributions to a wide variety of topics in network modeling and its applications.*

## Guang Cheng

Purdue University

*For outstanding work in methodology and theory of statistics, especially in high dimensional data, semiparametric estimation and inference, big data, and machine learning.*



Blais Jean Marc HEC Paris

## Nicolas Chopin

ENSAE & IPP, Paris

*For his major methodological contributions to Bayesian computational statistics, including INLA, SMC², and sequential quasi-Monte Carlo, editorial services to the profession and dedicated tutoring of PhD students.*

## Merlise Clyde

Duke University

*For her fundamental methodological contributions in the areas of model uncertainty, Bayesian variable selection, Bayesian model averaging, and effects of priors, as well as for exceptional service to the community.*

Jay LaPrete

## Peter F. Craigmile

The Ohio State University

*For outstanding contributions to the study of time series models, long memory processes, and spatio-temporal processes; for influential cross-disciplinary contributions to climate change and psychology; and for dedicated services to the IMS and to the profession.*

## Radu V. Craiu

University of Toronto

*For fundamental contributions to the methodology and theory of MCMC, the statistical applications of copulas, statistical genetics and false discovery rates; for his editorial service; for mentorship of students; and for leadership in the unprecedented expansion of his department's research complement.*

## Charmaine Dean

University of Waterloo

*For her scientifically important contributions to the analysis of count data, disease mapping, spatio-temporal data and more; for her outstanding leadership to the statistical profession, her record of mentorship and for her enormous work in keeping statistics visible at the center of science.*

## Francesca Dominici

Harvard University

*For her contributions in Bayesian methods, and causal inference, for her study of the impact of air pollution and other climate change related exposure to human health, and for her leadership and service to our profession.*

Harvard University

## Yingying Fan

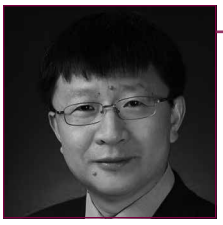
University of Southern California

*For seminal contributions to high-dimensional inference, variable selection, classification, networks, and nonparametric methodology, particularly in the field of financial econometrics, and for conscientious professional service.*

## Alice Guionnet

CNRS-ENS, Lyon

*For her contributions to the theory of random matrices and its link with free probability and large deviations.*



## Jianhua Guo

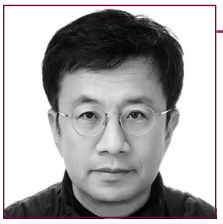
Northeast Normal University

*For his significant contributions to graphical models, causal inference, statistical genetics, and machine learning, and for his strong leadership in statistics education and development in China.*

## Jan Hannig

University of North Carolina at Chapel Hill

*For broad and original contributions to probability and mathematical statistics, most particularly innovative development of the theory of generalized fiducial inference, the application of this theory to a wide range of important application areas, and the development of computational techniques for its implementation.*



## Jae-kwang Kim

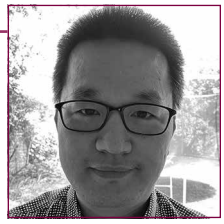
Iowa State University

*For fundamental contributions to the theory and methods of survey sampling and missing data analysis.*

## Chenlei Leng

University of Warwick

*For fundamental contributions to the theory and practice of high-dimensional statistics, statistical machine learning, model selection, and network data analysis.*



## Andrea Montanari

Stanford University

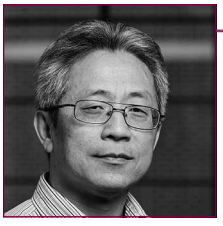
*For outstanding development of new asymptotic analysis techniques and their applications in modern high-dimensional statistics, data analysis and machine learning required for today's enormous and very complex data sets.*

## Johanna G. Nešlehová

McGill University

*For fundamental contributions to multivariate statistics, in particular stochastic dependence modeling and extreme-value theory; for promoting the sound application of statistics in risk management; for her editorial work; and for her service to the statistical profession.*

Astrid Eckert



## Wei Pan

University of Minnesota

*For his important contributions to survival analysis, correlated data analysis, statistical learning, bioinformatics, and applications to biology and medicine, and for his dedicated services to the profession.*

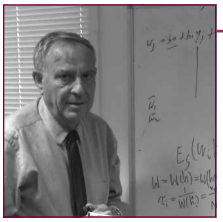
## Marianna Pensky

University of Central Florida

*For fundamental contributions to several areas of statistics including reliability, wavelet estimation, statistical inverse problems and high-dimensional statistics.*

*Continues on* **page 16**

# The 2020 IMS Fellows continued



## Danny Pfeffermann

Hebrew University of Jerusalem, Israel, and University of Southampton, UK

*For fundamental methodological contributions to inference from complex surveys, small area estimation, seasonal adjustment and trend estimation, observational studies and NMAR nonresponse; and for his extended and distinguished record of leadership in the statistical profession.*

## Jerry Reiter

Duke University

*For significant research contributions to survey methodology, data confidentiality, and statistical imputation.*

## Galit Shmueli

National Tsing Hua University

*For extraordinary contributions to statistical methods for biosurveillance, online commerce, and information quality, and for outstanding dissemination of statistical ideas through journal and textbook publications.*

## Lily Wang

Iowa State University

*For contributions to spatial, survey, image and functional analysis using nonparametric and semiparametric methods, especially to partially linear models, confidence envelopes and bivariate smoothing.*

## Ying Wei

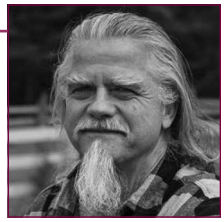
Columbia University

*For contributions to the development, dissemination, and application of mathematical statistics.*

## Carey E. Priebe

Johns Hopkins University

*For his substantive and influential contributions to developments of statistical methods for analyzing data using finite mixture models; for his fundamental contributions to analysis, algorithm, and theory of network data with significant impact in practice; and for his exemplary mentorship to young people in the profession.*



## Fabrizio Ruggeri

CNR-IMATI, Italy

*For innovations in theory and methods of stochastic modelling, Bayesian statistics, and decision analysis; for statistical applications in areas including reliability and industrial statistics; and for dedicated and distinguished leadership in the international professional statistics communities.*

## Van H. Vu

Yale University

*For his ground-breaking contributions in random matrix theory, as well as concentration of random polynomials and matching in random hypergraphs.*

## Marten H. Wegkamp

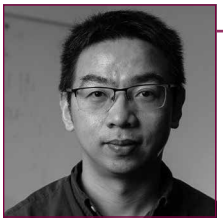
Cornell University

*For fundamental contributions to empirical process theory, copula modeling, and statistical learning theory, and for outstanding service to the profession.*

## Robert E. Weiss

University of California, Los Angeles

*For several outstanding and fundamental contributions to the theory and methods related to Bayesian statistics and inference, longitudinal modeling and their numerous applications to medical sciences and public health.*



## *Yichao Wu*

University of Illinois at Chicago

*For innovative contributions to nonparametric statistics, functional data analysis, and high dimensional statistical learning, and for conscientious professional service.*

## *Daniel Yekutieli*

Tel Aviv University

*For fundamental theoretical and methodological contributions in multiple testing and confidence intervals; for defining the difference between simultaneous inference and selective inference; and for groundbreaking work on testing in hierarchical families.*

## *Grace Y. Yi*

University of Western Ontario

*For research excellence in developing theory and methods for the analysis of survival data and longitudinal data in statistical and biostatistical applications, and for world-leading contributions to the analysis of missing and mismeasured data.*

## *Li-Xin Zhang*

Zhejiang University

*For important contributions to difficult problems in probability and statistical inference; and for excellence in mentoring and services.*

## *Xiao-Hua Zhou*

Peking University

*For influential contributions to the field of diagnostic medicine; for significant contributions to causal inference methods in clinical trials; for significant work in the analysis of health care cost data; and for mentorship and editorial service.*

# New podcast on healthcare statistics

Looking to stay up to date on developments in health care technology around the world? The American Statistical Association is sponsoring **The Pod of Asclepius**, a new podcast where data scientists, statisticians, engineers, and regulatory experts discuss the technical challenges in their healthcare domain. We have over 20 episodes published and available on YouTube, Podbean, iTunes, Stitcher, Podchaser, Tune In Radio, and Google Play.

Looking for a good place to start? Check out the following episode links:

**Risks and Opportunities of AI in Clinical Drug Development** with David Madigan and Demissie Alemayehu: https://www.youtube.com/watch?v=PrnKOLGYM2U

**Kidney Injury - Biomarkers for Prediction and Prognosis** with Allison Meisner: https://www.youtube.com/watch?v=87h8d1fhLaE

**NHS Digital Health Initiatives** with Emma Hughes: https://www.youtube.com/watch?v=-Ol87o_CLqk

**Data Platforms to Monitor Animal Health** with Shane Burns: https://www.youtube.com/watch?v=8uPu-vHahdc

**Bayesian Approaches in Medical Devices, Part 1**, **Part 2**, **Part 3** with Martin Ho and Greg Maislin: https://www.youtube.com/watch?v=bzso7ou4lAA

You can catch up on all episodes on our YouTube playlists for **Season 0** (https://www.youtube.com/watch?v=jjmPhEs8yQ8&list=PL39DE7gPXqsffssSVFixw-3ohGrjfDAPG) and **Season 1** (https://www.youtube.com/watch?v=kQsnOumGP6o&list=PL39DE7gPXqsdNm-F0eDhz0TOystmYIeLt).

**The easiest way to catch new episodes is to subscribe via our channels.**

**Email List**: https://www.podofasclepius.com/mail-list

**YouTube**: https://www.youtube.com/channel/UCkEz2tDR5K6AjlKw-JrV57w

**Podbean**: https://podofasclepius.podbean.com

You can see our full schedule on the website:

www.podofasclepius.com

# IMS meetings around the world

## Joint Statistical Meetings: 2020–2025

IMS sponsored meeting

**JSM 2020**

**August 1–6, 2020. ONLINE ONLY.**

ONLINE

**w** http://ww2.amstat.org/meetings/jsm/2020/


JSM 2020 is not canceled, it's going virtual! Information about how to access the wide variety of sessions and networking options will be communicated as soon as it is available. If you have been accepted onto the program, we hope you will still choose to participate. The organizers will be in touch with details about how to do that within the coming weeks. The ASA staff and JSM program committee will be working hard to transition the JSM to a virtual event and appreciate your patience. Any questions in the meantime, please feel free to email meetings@amstat.org.

IMS sponsored meetings: JSM dates for 2021–2025

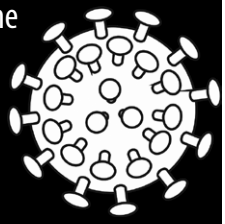
| | | | | |
|---|---|---|---|---|
| **IMS Annual Meeting @ JSM 2021** | **2022 Joint Statistical Meetings** | **IMS Annual Meeting @ JSM 2023** | **JSM 2024** | **IMS Annual Meeting @ JSM 2025** |
| **August 7–12, 2021, Seattle, WA** | **August 6–11, 2022 Washington DC** | **August 5–10, 2023 Toronto, ON, Canada** | **August 3–8, 2024 Portland, Oregon** | **August 2–7, 2025 Nashville, TN, USA** |

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

Following the last-minute cancellation of ABC in Grenoble, and the likely cancellation of several workshops and conferences in the near future, including the ABC sessions at ISBA 2020, members of the scientific committee and other ABC researchers decided to launch an online seminar or webinar, around the theme of approximate Bayesian (ABC) methods. This initiative is called One World ABC seminar and is currently held **biweekly at 11:30 UK time (12:30 CET)**. This seminar is destined to aggregate people interested in ABC (approximate Bayesian computation) methods. Participation is free and unlimited but requires registration for access to the Blackboard Collaborate link, which allows for interactions from the participants. 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 next page for One World Probability Seminar*]

**COVID-19: CHECK FIRST**

As the situation is rapidly changing, please check for updates on the websites of any meetings you are planning to attend in the coming months. The information here may be out of date by the time you read this! Let us know any updates: email **bulletin@imstat.org**.



The MSRI summer graduate school in **Discrete Probability, Physics and Algorithms** (https://www.msri.org/summer_schools/925) will be ONLINE June 29–July 10, 2020.

**ABC in Svalbard April 12–13, 2021, Svalbard, Norway**

https://sites.google.com/view/abcinsvalbard/home

ABC in Svalbard is the next edition of a successful workshop series around ABC methods. It aims at attracting researchers at the forefront of research on approximate Bayesian computing methods and promoting original research in that field among various disciplines.

**FODS2020 ACM–IMS Foundations of Data Science Conference October 18–20, 2020, Online:** https://fods.acm.org

## *At a glance:* *forthcoming IMS Annual Meeting and JSM dates*

### *2020*

**JSM:** Philadelphia, **August 1–6, 2020**

**IMS Annual Meeting/ 10th World Congress:** Seoul, South Korea, August 17–21, 2020

POSTPONED

### *2021*

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

### *2022*

**IMS Annual Meeting:** TBC

**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**

# One World Probability Seminar (OWPS)

## The World of Probability becomes One…

Leif Döring and Andreas Kyprianou write:

The year 2020 will be remembered as a year of big changes in many aspects caused by the COVID-19 virus and its consequences. Research, as a truly global activity, has also been affected severely. Conferences, schools, research visits and seminar programs have been canceled or postponed [*see the list of canceled/postponed IMS meetings overleaf*]. However, the global lockdown provides the perfect laboratory environment to road test a number of ideas that some within our community, have been thinking of for quite some time. As such, the One World Probability project was born (www.owprobability.org). The project follows three major targets: **to foster research communication** during the COVID-19 lockdown; **to create long-term regular access to high-level research**, irrespective of local resources; and **to stimulate a change in mindset** with regard to how much travel is necessary for research.

On 26th March, just a few days after ideas were finalized, the first session of the One World Probability Seminar (OWPS) took place with 450 participants spanning the globe from San Diego to Beijing. While a perfect time slot does not exist (Chinese participants sat down at 21:00–23:00 hrs, whereas Californians rose for a 06:00 hrs start) this truly global activity created a lot of excitement among its participants. The One World Probability Seminar has continued to broadcast **two seminars per week on Thursdays** and its seminar programme has already been extended well into the summer. For the time being, the seminar uses the electronic platform Zoom to stream talks. In contrast to some other platforms, Zoom is extremely stable, especially for large audiences. Moreover, it is **free for participants**, as long as a central license is purchased by the host. As an additional convenience over a regular seminar, discussions around questions that occur during the talk can take place in a chat window between participants. Discussions after the talks happen in so-called breakout rooms. Operating Zoom requires some care in order to avoid so-called "Zoom bombing" (incursions of random disruptive individuals). Since the first lectures were broadcast, the One World Probability Seminar has experienced a process of evolution at breakneck speed. A number of different formats for the two back-to-back seminars held every week have been experimented with.

From the project's potential as a permanent feature in the probability research landscape, it is clear that it must be run by the entire community. Weekly chairing is performed by volunteers. Both IMS and the Bernoulli Society became co-sponsors of the project and a board was created [*see below*]. The board's role is to help move the vision forward and ensure that the project's full potential is met. This means offering opportunities across career stage, gender, geographical location and time zone, as well addressing as other factors that are emerging en route. The long-term aim is that the board will refresh in a similar spirit to the way journal boards do. A first step to expand the project beyond weekly seminar talks is the **One World Probability School** organised by Hendrik Weber and Andris Gerasimovics in July 2020.

The benefits of worldwide online research activities have become increasingly clear among the many that are currently active. The ability to live-stream contemporary research talks to any device has led to the realization that a greater sense of diversity, inclusion and international connectivity can be had, without the need to travel and incur major financial or $CO_2$ expenditure. Whilst this is particularly pertinent during the 2020 global lockdown, this equally applies to the post-virus world that awaits us. Within days of the first OWPS broadcast, a number of other "One World" seminars in different fields of mathematics have popped up. Starting with the One World PDE Seminar, no less than fourteen other One World-branded seminars in mathematics have emerged and have remained broadcasting since. Aptly named "Other Worlds", the full list can be found on the One World Probability webpage. The sheer number of seminars and workshops that have been moved online in Mathematics alone is phenomenal. This has stimulated the creation of a webpage, https://mathseminars.org/info, which provides a rolling list of the huge numbers of daily seminars.

Online activities will never be able to replace the valuable moments of intellectual exchange and creation of opportunity that we experience in during face-to-face exchange. Nonetheless, the moment is upon us to experiment with new regimes of interaction, especially given that environmental issues pose an even greater threat than the current crisis.

The journey has just begun.

### One World Probability board members

**Siva Athreya (Bangalore), Louigi Addario-Berry (Montreal), Chris Burdzy (Seattle), Itaj Benjamini (Weizmann), Nathanael Berestycki (Vienna), Ivan Corwin (New York), Alison Etheridge (Oxford), Christina Goldschmidt (Oxford), Alice Guionnet (Lyon), Zenghu Li (Beijing), Milton Jara (Rio de Janeiro), Jean-Christophe Mourrat (New York). Leif Döring (Mannheim) and Andreas Kyprianou (Bath) are co-chairs.**

# More IMS meetings around the world

**These IMS sponsored or co-sponsored meetings are known to be either postponed or canceled at the time of printing. Please check for updates on the meeting websites. And if you spot something we're missing, please let us know!**

First-Passage Percolation and Related Models (https://www.icts.res.in/program/FPP2020) is canceled.

The IMS New Researchers Conference (http://groups.imstat.org/newresearchers/conferences/nrc.html) will not take place July 29–August 1, 2020; we'll update you as plans develop.

7th Bayes, Fiducial and Frequentist Statistics Conference (BFF7) (http://www.fields.utoronto.ca/activities/20-21/BFF7) is moved to October 26–28, 2020. Note new website address.

The 8th Workshop on Biostatistics and Bioinformatics (https://math.gsu.edu/yichuan/2020Workshop/) has been postponed to Fall 2020. New date coming soon.

Frontier Probability Days (http://lechen.faculty.unlv.edu/FPD20/) is now May 16–18, 2021. Registration open until March 16, 2021.

Mathematical Statistics and Learning (https://www.msl2020.org/) is moved to June 1–4, 2021.

Statistics in the Big Data Era (https://simons.berkeley.edu/workshops/statistics-big-data-era) will now take place June 2–4, 2021, at the University of California, Berkeley.

The 2020 WNAR/IMS/KISS/JR Annual Meeting (http://www.wnar.org/event-3603109) is postponed from June 14–17, 2020, to next year in Anchorage, Alaska; dates to be confirmed.

The Bernoulli–IMS World Congress 2020 (https://www.wc2020.org/) in Seoul, South Korea, is postponed to 2021. Details to follow.

There won't be a physical IMS Annual Meeting this year. The next IMS Annual Meeting will take place at JSM 2021, August 7–12, 2021, in Seattle, WA, USA.

**Bernoulli–IMS 11th World Congress in Probability and Statistics**
***(including the 2024 IMS Annual Meeting)***
**August 12–16, 2024: Ruhr-University Bochum, Germany**
**w** TBC
Details to follow, but for now, please save the date!

*These meetings are not IMS-sponsored or co-sponsored, but they are also rearranged: Check for updates.*

The **Bocconi Summer School** (https://www.unibocconi.eu/wps/wcm/connect/Bocconi/SitoPubblico_EN/Navigation+Tree/Home/Programs/PhD/PhD+in+Statistics/Summer+School+in+Advanced+Statistics+and+Probability/) will be rescheduled in 2021.

**Conference on Applied Statistics in Agriculture and Natural Resources** (https://conference.ifas.ufl.edu/applied-stats/) is moved to April 25–27, 2021, in Gainesville, FL, USA.

The **International Biometric Conference,** IBC2020 (https://www.ibc2020.org/home) will not take place in July 2020.

MIMAR, the **11th IMA International Conference on Modelling in Industrial Maintenance and Reliability** (https://ima.org.uk/12183/11th-ima-international-conference-on-modelling-in-industrial-maintenance-and-reliability-mimar/) is postponed to 2021, dates to be announced.

**LinStat 2020, the International Conference on Trends and Perspectives in Linear Statistical Inference** (https://linstat2020.science.upjs.sk/), is postponed until June 28–July 2, 2021.

The **Australian Statistical Society and New Zealand Statistical Association Conference, ANZSC 2020** (https://anzsc2020.com.au) is moved to July 5–9, 2021.

The **7th Workshop on Stochastic Methods in Game Theory** (https://sites.google.com/view/erice-smgt2020/the-workshop) will now be held in Erice, Italy, from May 12–18, 2022.

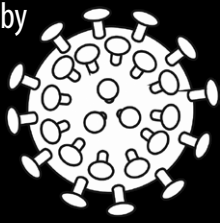
**IMS Asia Pacific Rim Meeting 2021**
**January 5–8, 2021: Melbourne, Australia**
**w** http://ims-aprm2021.com/

IMS sponsored meeting
**ENAR dates, 2021–2022**
**March 14–17, 2021: Baltimore, MD, USA**
**March 27–30, 2022. Houston, TX, USA**
**w** www.enar.org/meetings/future.cfm

# Other meetings and events around the world

## COVID-19: CHECK FIRST

As the situation with the coronavirus is rapidly changing, please check for updates on the websites of any meetings you are planning to attend in the coming months. The information here may be out of date by the time you read this! Let us know any updates: email **bulletin@imstat.org**.



**Sixth International Conference on Establishment Statistics (ICES VI)**
**June 14–17, 2021. New Orleans, USA**
https://ww2.amstat.org/meetings/ices/2020
ICES VI, the Sixth International Conference on Establishment Statistics, will now be held in New Orleans, June 14–17, 2021. Information regarding the postponed conference—including dates and deadlines—will be provided in the coming months. In the meantime, should you have any questions, please send an email to ices@amstat.org.

**2nd IMA Conference on Mathematics of Robotics**
**September 8–10, 2021(postponed from September 2020)**
**Manchester Metropolitan University, UK**
**w** https://ima.org.uk/11468/ima-conference-on-mathematics-of-robotics/
The IMA Conference on the Mathematics of Robotics aims to bring together researchers working on all areas of robotics which have a significant mathematical content. The idea is to highlight the mathematical depth and sophistication of techniques applicable to Robotics and to foster cooperation between researchers working in different areas of Robotics. This Conference has been organised in cooperation with the Society for Industrial and Applied Mathematics (SIAM).

Areas of interest include, but are not limited to:

**Topology**. Kinematics. Algebraic topology of configuration spaces of robot mechanisms. Topological aspects of path planning and sensor networks. Differential topology and singularity theory of robot mechanism and moduli spaces.

**Algebraic Geometry**. Varieties generated by linkages and constraints. Geometry of stiffness and inertia matrices. Rigid-body motions. Computational approaches to algebraic geometry.

**Dynamical Systems and Control**. Dynamics of robots and mechanisms. Simulation of multi-body systems, e.g. swarm robots. Geometric control of robots. Optimal control and other optimization problems.

**Combinatorial and Stochastic Methods**. Rigidity of structures. Path planning algorithms. Modular robots.

**Statistics**. Stochastic control. Localization. Navigation with uncertainty. Statistical learning theory.

**Cognitive Robotics**. Mathematical aspects of Artificial Intelligence, Developmental Robotics and other Neuroscience based approaches.

**Call for Papers:** Original technical contributions are currently being accepted in the form of full papers of at most 8 pages. Papers should be submitted by 26 March 2021 via https://my.ima.org.uk/. All contributions will be peer reviewed and acceptance will be based on the results of the review process. All submissions are subject to rigorous review before an acceptance decision is made.

**Induction Course for New Lecturers in the Mathematical Sciences 2020** NEW
**September 16–17, 2020. Cambridge, UK.**
https://tinyurl.com/IMANEWLECTURERS2020
The Induction Course for New Lecturers in the Mathematical Sciences has been designed by the mathematics community so that it is ideally suited for anyone who is new to or has limited experience teaching mathematics or statistics within UK higher education. It will be delivered by individuals with significant experience of teaching in the mathematical sciences and will focus upon the specific details and issues that arise in mathematics and statistics teaching and learning within higher education including topics such as: lecturing; supporting student learning; making teaching interactive; assessment, examinations and feedback; linking teaching and research; using technology to enhance teaching and learning; using examples and mathematical problem solving. Additionally, there will be significant opportunities for delegates to discuss their own ideas, challenges and experiences with the session facilitators so that individual queries can be answered. In the past, attendance has been recognised as contributing towards some introductory institutional programmes in learning and teaching for new staff, and for the 2020 Induction Course accreditation will be provided through the Institute of Mathematics and its Applications relative to the UK Professional Standards Framework for Teaching and Supporting Learning in Higher Education.

# Other meetings and events around the world

**Columbia University SHARP Training Program, various dates (see below), now online.**
*These meetings, below, will no longer take place in person, but will instead be a live-stream, remote training that takes place over live, online video. They are not a self-paced, pre-recorded online training. Check the meeting websites for pre-requisites and requirements. Capacity is limited. Paid registration is required to attend.*

**Machine Learning**
**June 8–9, 2020. Online.**
https://mailman.columbia.edu/Machine-Learning
*Machine Learning: Analyzing Biomedical and Health Data*
This two-day intensive boot camp of seminars combined with hands-on R sessions provides an overview of concepts, techniques, and data analysis methods with applications in biomedical research.
Investigators at all career stages are welcome to attend, and we particularly encourage trainees and early-stage investigators to participate.
For more details and to subscribe for updates; email us at Columbia.MachineLearning@gmail.com.

**Mendelian Randomization**
**August 3–4, 2020. Online.**
https://mailman.columbia.edu/MendelianRandomization
*Mendelian Randomization Boot Camp: A Practical Guide to Study Design and Implementation*
This two-day intensive combination of seminars and hands-on analytical sessions provides an overview of the concepts, techniques, packages, data sources, and data analysis methods needed to conduct Mendelian Randomization studies.
For more details and to subscribe for updates, email us at Columbia.SPH.MR@gmail.com.

**Quantitative Genomics**
**June 11–12, 2020. Online.**
https://mailman.columbia.edu/Genomics
*Quantitative Genomics Training: Methods and tools for whole-genome and transcriptome analyses*
This is a two-day intensive training of seminars and hands-on analytical sessions to provide an overview of concepts, methods, and tools for whole-genome and transcriptome analyses in human health studies.
Investigators at all career stages are welcome to attend, and we particularly encourage trainees and early-stage investigators to participate.
For more details and to subscribe for updates; email us at Columbia.Genomics@gmail.com.

**Causal Mediation Analysis**
**August 12–14, 2020. Online.**
https://mailman.columbia.edu/Causal-Mediation
*Causal Mediation Analysis Training: Methods and Applications Using Health Data*
The Causal Mediation Analysis Training is a three-day intensive boot camp of seminars and hands-on analytical sessions to provide an overview of concepts and data analysis methods used to investigate mediating mechanisms.
For more details and to subscribe for updates, email us at Columbia.CMA@gmail.com

**P.I. Crash Course**
**June 25–26, 2020. Online.**
https://mailman.columbia.edu/PI-Crash-Course
*New Principal Investigator (PI) Crash Course: Skills for Future or New Lab Leaders*
This two-day intensive boot camp of seminars, discussions, and hands-on activity sessions provides exposure to fundamental leadership and management skills and tools needed for success in your lab.
Senior post-doctoral students and associate research scientists about to start their independent position search are particularly welcome to attend, and we strongly encourage new and recent PIs to participate as it is never too late to get an overview of the survival skills that you will need throughout your career.
For more details and to subscribe for updates; email us at Columbia.SPH.PI@gmail.com.

# Employment Opportunities around the world

### China: Beijing

**Academy of Mathematics and Systems Science, Chinese Academy of Sciences**

Chair Professor Position in Statistics

https://jobs.imstat.org/job//53542035

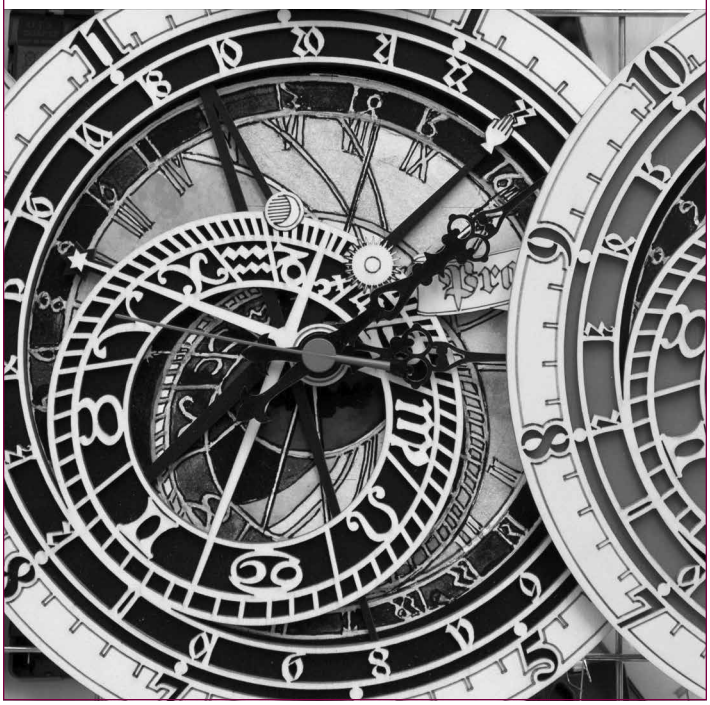
### China: Guangzhou

**The Hong Kong University of Science and Technology (Guangzhou Campus)**

Founding Faculty in the Information Hub (Data Science and Analytics, DSA)

https://jobs.imstat.org/job//53522098





### United Kingdom: Glasgow

**The University of Glasgow**

Lecturer / Senior Lecturer / Reader in Statistics & Data Analytics

https://jobs.imstat.org/job//53895584

### United States: Auburn, AL

**Auburn University**

Postdoctoral Fellow

https://jobs.imstat.org/job//53786211

### United States: San Diego, CA

**Institute For Defense Analyses (IDA)**

2021 SCAMP Research Program

https://jobs.imstat.org/job//53749251

### United States: Stamford, CT

**University of Connecticut**

Assistant Professor In-Residence

https://jobs.imstat.org/job//53708121

### United States: Storrs, CT

**University of Connecticut**

Visiting Assistant Professor

https://jobs.imstat.org/job//53460394

### United States: Bloomington, IN

**Indiana University School of Public Health–Bloomington**

Department of Health & Wellness Design: Chair and Full Professor

https://jobs.imstat.org/job//53786062

### United States: College Station, TX

**Texas A&M University**

Program Coordinator I

https://jobs.imstat.org/job//53975544

# International Calendar of Statistical Events

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

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

## June 2020

ONLINE June 1–26: Online. **2020 PIMS-CRM Probability Summer School** has become the **2020 Online Open Probability School** (OOPS) **w** https://www.math.ubc.ca/Links/OOPS

POSTPONED June 2–3: The Netherlands. **Dimensionality Reduction and Inference in High-Dimensional Time Series w** http://sbe.maastrichtuniversity.nl/hdts2020/

POSTPONED June 2–5: Barcelona, Spain. **Mathematical Statistics and Learning (postponed to June 2021) w** https://www.msl2020.org

ONLINE June 2–5: *NOW ONLINE ONLY*. **6th Stochastic Modeling Techniques and Data Analysis International Conference** (SMTDA2020). **w** www.smtda.net

ONLINE June 3–6: Pittsburgh, PA, USA. **Symposium on Data Science and Statistics w** https://ww2.amstat.org/meetings/sdss/2020/

POSTPONED June 14–17: Anchorage, Alaska, USA. **WNAR/IMS/JR Meeting w** https://www.wnar.org/page-18098

POSTPONED June 15–18: New Orleans, LA, USA. **Sixth International Conference on Establishment Statistics** (ICES-VI) **w** http://ww2.amstat.org/meetings/ices/2020/

POSTPONED June 15–18: Thessaloniki, Greece. **IWAP 2020 (10th International Workshop on Applied Probability) w** http://iwap2020.web.auth.gr

POSTPONED June 15–19: Paphos, Cyprus. **International Symposium on Nonparametric Statistics 2020 (now June 14–18, 2021) w** http://cyprusconferences.org/isnps2020/

POSTPONED June 17–19: Paris Orsay, France. **Mixtures, Hidden Markov Models and Clustering w** https://www.math.u-psud.fr/~mhc2020/

ONLINE June 22–26: Sydney, Australia. **International Statistical Ecology Conference** (ISEC2020) **w** http://www.isec2020.org/

POSTPONED June 24–26: Birmingham, UK. **7th IMA Conference on Numerical Linear Algebra and Optimization w** https://ima.org.uk/

POSTPONED June 24–27: Brno, Czech Republic. **Fifth International Workshop on Functional and Operatorial Statistics** (IWFOS 2020) **w** https://iwfos2020.sci.muni.cz/

POSTPONED June 28–July 3: Kunming, China. **ISBA 2020: World Meeting of the International Society for Bayesian Analysis** now **June 28-July 2, 2021 w** https://bayesian.org/isba2020-home/

June 29–July 3: [*no information yet on website, please check*] Luxembourg. **SanDAL Summer School in Mathematical Statistics w** https://sandalschool.uni.lu

POSTPONED June 29–July 3: Nový Smokovec, Slovakia. **LinStat 2020** now June 28–July 2, 2021 **w** https://linstat2020.science.upjs.sk/

ONLINE June 29–July 10: Montreal, Canada. **SMS: Discrete Probability, Physics and Algorithms w** http://www.msri.org/summer_schools/925

## July 2020

POSTPONED July 1–8: Erice, Italy. **7th Workshop on Stochastic Methods in Game Theory now 12–18 May 2022 w** https://sites.google.com/view/erice-smgt2020/the-workshop

POSTPONED July 5–8: Rio de Janeiro, Brazil. **40th International Symposium on Forecasting w** https://isf.forecasters.org/

POSTPONED July 5–11: Portoroz, Slovenia. **8th European Congress of Mathematics now 20-26 June 2021 w** http://www.8ecm.si/

POSTPONED July 6–10: Gold Coast, QLD, Australia. **2020 Australian and New Zealand Statistical Conference now 5-9 July 2021 w** https://anzsc2020.com.au

POSTPONED July 6–10: Seoul, South Korea. **30th International Biometric Conference** (IBC2020) **w** https://www.biometricsociety.org/2018/07/ibc-2020-seoul-preview/

POSTPONED July 6–17: Lake Como, Italy. **Reproducibility in Data Science: Statistical Methods and Applications** w http://bocconi2020.lakecomoschool.org

POSTPONED July 14–16: Nottingham, UK. **11th IMA International Conference on Modelling in Industrial Maintenance and Reliability (MIMAR)** w https://tinyurl.com/IMAMIMAR

CANCELED July 27–August 14: Bangalore, India. **First-Passage Percolation and Related Models** w https://www.icts.res.in/program/fpp2020

## August 2020

ONLINE IMS August 1–6: Philadelphia, PA, USA. **JSM 2020** w https://ww2.amstat.org/meetings/jsm/2020/index.cfm

POSTPONED IMS August 17–21: Seoul, Korea. **Bernoulli/IMS World Congress in Probability and Statistics** w http://www.wc2020.org

August 19–21: Prague, Czech Republic. **2nd International Conference on Statistics: Theory and Applications (ICSTA'20)** w https://icsta.net/

August 23–27: Krakow, Poland. **41st Annual Conference of the ISCB** w www.iscb2020.info

## September 2020

September 9–11: Manchester, UK. **2nd IMA Conference on the Mathematics of Robotics** w https://ima.org.uk/11468/ima-conference-on-mathematics-of-robotics/

POSTPONED September 20–23: Ribno (Bled), Slovenia. **Applied Statistics 2020 (AS2020) now September 19-22, 2021** w http://conferences.nib.si/AS2020

September 23–25: Rockville, USA. 2020 **ASA Biopharmaceutical Section Regulatory-Industry Statistics Workshop (Biopharm 2020)** w https://ww2.amstat.org/meetings/biop/2020/

## October 2020

October 1–3: Pittsburgh, PA, USA. **Women in Statistics and Data Science Conference** w https://ww2.amstat.org/meetings/wsds/2020/

ONLINE IMS October 18–20: Seattle, WA, USA. **ACM–IMS Foundations of Data Science Conference** w https://fods.acm.org

NEW IMS October 26–28: Toronto, Canada. **7th Bayes, Fiducial and Frequentist Statistics Conference, BFF7** w https://www.fields.utoronto.ca/activities/20-21/BFF7

## November 2020

November 4–6: Utrecht, The Netherlands. **Big Data Meets Survey Science (BigSurv20)** w https://www.bigsurv20.org/

## December 2020

December 7–11: Atlantic City, USA. **76th Annual Deming Conference on Applied Statistics** w https://demingconference.org

December 15–17: Manipal, India. **28th International Workshop on Matrices and Statistics (IWMS 2020)** w https://carams.in/events/international-workshop-on-matrices-and-statistics/

## January 2021

IMS January 5–8: Melbourne, Australia. **IMS Asia Pacific Rim Meeting (IMS-APRM2021)** w http://ims-aprm2021.com/

## March 2021

IMS March 14–17: Baltimore, MD, USA. **ENAR Spring Meeting** w http://www.enar.org/meetings/future.cfm

## April 2021

NEW IMS April 12–13: Svalbard, Norway. **ABC in Svalbard** w https://sites.google.com/view/abcinsvalbard/home

## June 2021

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

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

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

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

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

Continues on **page 26**

# International Calendar *continued*

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

## July 2021

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

July 11–15: The Hague, The Netherlands. **63rd ISI World Statistics Congress 2021** **w** http://www.isi2021.org/

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

## August 2021

ims 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

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

## March 2022

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

## May 2022

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

## July 2022

ims July/August [exact dates TBC]: London, UK. **IMS Annual Meeting** **w** TBC

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

## August 2022

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

## August 2023

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

## August 2024

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

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

## August 2025

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

**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 erg@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/**

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