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IMS Bulletin

January/February 2020

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National Academy of Medicine

M. Elizabeth 'Betz' Halloran elected to US National Academy of Medicine

The United States National Academy of Medicine (NAM) announced the election of 90 regular members and 10 international members during its annual meeting in October. Election to the Academy is considered one of the highest honors in the fields of health and medicine and recognizes individuals who have demonstrated outstanding professional achievement and commitment to service. Among those newly elected was M. Elizabeth "Betz" Halloran. She is a professor of biostatistics at the University of Washington, and a full member of the Vaccine and Infectious Diseases Division at Fred Hutchinson Cancer Research Center in Seattle. "It's a real honor to be recognized by your peers," said Halloran. "It's just thrilling to have that kind of recognition."

Fred Hutchinson Cancer Research Center

Betz Halloran

Halloran was honored for her seminal contributions to the design and analysis of human trials of new vaccines and to the study of how infectious diseases spread through populations. (Her citation reads, *"For pioneering the development of statistical methods and modeling for evaluating vaccines in populations, and contributions to evaluating direct and indirect effects of vaccines and improving design and analysis of vaccine studies."*)

Since her graduate research in malaria, Halloran has worked on outbreaks of about a dozen different diseases. Her current work includes projects in influenza, Ebola and dengue fever, a globally important mosquito-borne illness.

"Betz Halloran's development of innovative epidemiological and statistical models for the spread of infectious diseases have had substantial impact in the anticipation and management of global infectious disease outbreaks," said her Fred Hutch colleague and NAM member Dr. Ross Prentice, who nominated her for the honor. "She has also been a major contributor to methodology for the design and analysis of vaccine studies, including key contributions to the evaluation of direct and indirect effects of vaccines.

"Dr. Halloran also fulfills a leading role in related multicenter research collaborations and training activities. Many of these contributions and developments have occurred during the past 15 years, while Betz has been here in Seattle," he said.

The mathematical and statistical methods that Halloran has developed have been widely adopted and built upon. They account for the many complex variables that affect the impact of a vaccine in a population, such as interpersonal contact and herd immunity.

Betz Halloran is a fellow of the American Statistical Association, the Royal Statistical Society, and the American Association for the Advancement of Science. She received the ASA's 2019 Nathan Mantel Lifetime Achievement Award.

See the full list of new NAM members at http://www.nasonline.org/news-and-multimedia/news/2019-nas-election.html

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Executive Committee

IMS Members' News

Speakers at the Seminar on Stochastic Processes 2020

The Seminar on Stochastic Processes (SSP) 2020 will be held on March 4–7, 2020, (Wednesday through Saturday) at Michigan State University (MSU), in East Lansing, MI, USA. As well as informal presentations by conference participants, there will be plenary talks by the following five invited speakers: Martin Barlow (Kai Lai Chung Lecturer), University of British Columbia, Vancouver, BC, Canada; Ioana Dumitriu, University of California, San Diego, CA, USA; Martina Hofmanová, Universität Bielefeld, Germany; Firas Rassoul-Agha, University of Utah, Salt Lake City, UT, USA; Samy Tindel, Purdue University, West Lafayette, IN, USA.

Martin Barlow is the Kai Lai Chung lecturer at SSP in March, and will also give the Wald Lectures at the World Congress in Seoul in August (see next page)

This SSP 2020 conference will feature the tenth annual Kai Lai Chung Lecture, honoring Kai Lai Chung's Mathematical career. Kai Lai Chung was one of the leading probabilists of the second half of the twentieth century and one of the founders of the Seminar on Stochastic Processes.

The main conference will be held on March 5–7, 2020. On March 4, there will be a special set of tutorial lectures and discussions targeted at early-career researchers. These research lectures will be given by René Carmona, Princeton University, Princeton, NJ, USA.

There will be financial support for participants to attend the SSP 2020 conference, from the US National Science Foundation, and from MSU's Department of Statistics and Probability. Deadline January 20, 2019, for full consideration of travel support requests.

Further information on funding and accommodations, and more details about the conference, including the online registration form, is available at: https://stt.natsci.msu.edu/events/ssp2020/

US Congress investigates reproducibility and replicability in science

IMS Fellow David Allison (University of Alabama, Birmingham) is a member of the committee that wrote a 2019 National Academies report on reproducibility and replicability in science. He appeared on November 13, 2019, before the US House Committee on Science, Space, and Technology to discuss recommendations and findings in the report. The report recommends ways that researchers, academic institutions, journals, and funders should help strengthen rigor and transparency in order to improve the reproducibility and replicability of scientific research. You can watch the Hearing: https://science.house.gov/hearings/strengthening-transparency-or-silencing-science-the-future-of-science-in-epa-rulemaking or read the written testimony: http://naswebcontent.nas.edu/OCGA/116Session1/testimonies/OCGA_196671?_ga=2.153293118.743976180.1575898025-1378498500.1575898025

David Allison

Journal News

New Editor for *Statistical Science*

The IMS Committee to Select Editors has chosen Sonia Petrone as Editor of *Statistical Science* from January 1, 2020–December 31, 2022. Sonia, who is a professor in the Department of Decision Sciences at Bocconi University in Milan, Italy, will take over from Cun-Hui Zhang, who has served three years as Editor.

Special IMS Lectures in 2020

Each year the IMS selects people to deliver named and Medallion lectures at our meetings.

In 2020, there will be **three Medallion lectures at JSM** in Philadelphia, USA (August 1–6, 2020), from Susan Holmes, Roger Koenker and Paul Rosenbaum.

Then, a couple of weeks later (August 17–21) and on the other side of the world (Seoul, South Korea), the remaining IMS special lectures will be given at the **Bernoulli–IMS 10th World Congress in Probability and Statistics**. There are two named lectures this year: the **Wald Lectures** will be given by Martin Barlow, and the **Blackwell Lecture** by Gábor Lugosi. There will be five **Medallion lectures**, from Gérard Ben Arous, Andrea Montanari, Elchanan Mossel, Laurent Saloff-Coste and Daniela Witten. The **IMS Presidential Address** will be given by Susan Murphy. There are also two IMS–BS named lectures: the **Doob lecture**, which will be given by Nicolas Curien, and the **Schramm lecture**, from Omer Angel.

(Also at the World Congress, there will be five Bernoulli Society named lectures. Persi Diaconis will give the Kolmogorov Lecture, Alison Etheridge the Bernoulli Lecture, Massimilliano Gubinelli the Lévy Lecture, Tony Cai the Laplace Lecture and Sara van der Geer the Tukey Lecture.)

As we announced in the previous issue, there will be three papers presented by the winners of the inaugural **Lawrence D. Brown PhD Student Awards**: Yuqi Gu, Didong Li and Ashwin Pananjady.

You can read previews of two of these on pages 8 and 9, and we'll bring you more in the coming issues.

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= access published papers online

IMS Journals and Publications

Annals of Statistics: Ming Yuan, Richard Samworth
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http://projecteuclid.org/aos

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

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

Annals of Applied Probability: Francois Delarue, Peter Friz
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Statistical Science: Sonia Petrone UPDATED
http://imstat.org/sts
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IMS Monographs and *IMS Textbooks:* Nancy Reid
https://www.imstat.org/journals-and-publications/ims-monographs/

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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
http://www.amstat.org/publications/jcgs
log into members' area at imstat.org

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

Probability Surveys: Ben Hambly
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http://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): Gregory Miermont, Christophe Sabot
http://imstat.org/aihp
http://projecteuclid.org/aihp

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

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

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

Obituary: Salem Khamis

1919–2005

We recently learned that IMS member Salem Khamis had passed away in 2005 and no obituary was published in the Bulletin. *This obituary is condensed (with permission) from Prasada Rao's version that appeared in UK's* The Independent on Sunday *newspaper, on 15 July 2005.*

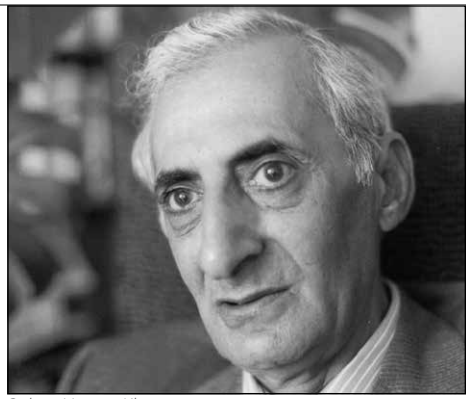


Photo: Thea Khamis

Salem Hanna Khamis

Salem Hanna Khamis was a mathematical statistician who became a senior functionary in the Food and Agricultural Organisation of the United Nations and an able administrator of newborn institutes for statistics in the under-developed world. His name is immortalized in the Geary–Khamis method of computing purchasing power parities (PPPs) of currencies, for conversion of national currency-denominated economic aggregates, like gross domestic product, into a common, comparable currency unit.

The most celebrated illustration of a PPP is the "Big Mac Index", which compares the real value of different national currencies based on the differences in the prices of the Big Mac hamburger. However, for serious economic analyses in a globalized world economy, there is an acute need to determine accurate measures of PPPs of currencies based not on the price of a single consumer item but on the prices of a wide range of goods and services deemed of relevance in the expenditure patterns of the general public. This estimation of PPPs requires combining and aggregating prices from a large number of countries using sophisticated formulae based on both intuitive appeal and scientific rigour. It is in this context that the work of Salem Khamis made a lasting contribution to economic analyses on the world stage. Over the past three decades, PPPs of currencies have been calculated under the auspices of the International Comparison Project (ICP) of the United Nations using the Geary–Khamis method.

The method was first proposed by the Irish statistician R.C. Geary in 1952, and was developed by Khamis in a series of papers, notably "A New System of Index Numbers for National and International Purposes" published in the *Journal of the Royal Statistical Society* in 1972. It is now used extensively in the measurement of global inequality, living standards and the estimation of the human development index, by the World Bank, the OECD and the Food and Agriculture Organisation.

Although Khamis also made significant contributions to sampling theory and the tabulation of incomplete gamma functions, it is his work on index number theory and applications, and the development of the Geary–Khamis method, that has been indelibly imprinted on all the recent work on international comparisons of prices, real incomes, output and productivity.

Salem Khamis was born in a small village in the Nazareth district of Palestine in 1919. His early education took place in Jerusalem and at the American University of Beirut, from where he graduated with a BA in Mathematics and an MA in Physics. He travelled to England on a British Council Fellowship and took his doctoral degree in statistics at University College London. He also spent periods of time at Cambridge and Leeds and it was during this time that he met his lifelong partner, Mary Guy.

Khamis spent much of his working life as an international civil servant, from 1949 working for the United Nations in New York and from 1958 for the Food and Agriculture Organisation, a UN agency, first at the regional headquarters in Cairo and then at its international headquarters in Rome. Through his UN positions, Khamis played a dynamic role in setting up institutional structures in many developing countries to help gather, analyse and disseminate the essential statistics necessary for informed decision-making by politicians and the general public. For example, in Uganda, many generations of statisticians have been trained at the Institute of Statistics established at the Makerere University in 1969 and nurtured through its early years by Khamis.

Remarkably, Khamis managed to maintain an impressive academic profile through all these years of involvement in international statistical organisations notorious for endless meetings and frequent travel missions to member countries. He held appointments at the Syrian University, where he was Professor of Applied Mathematics in 1948–49, and at the American University of Beirut, where he was Professor of Mathematics, 1955–58. In 1955 he was elected a member of the International Statistical Institute, and served as its Vice-President, 1979–81.

Khamis maintained a strong bond with his motherland. He was a passionate and vigorous supporter of the establishment of a Palestinian homeland. He was endowed with brilliance and endless curiosity; fearlessness in his support for the just rights of his fellow human beings; and a passion for the less privileged and the poor.

Written by Prasada Rao, Emeritus Professor, University of Queensland, Australia

Salem Khamis's family created a charitable educational trust to provide scholarships to Palestinian students of mathematics and statistics, through the Friends of Birzeit University. Donations welcome: https://fobzu.org/scholarships/

Seeking old copies of the *IMS Bulletin*

The IMS would like to provide online access to all volumes of the *IMS Bulletin*. Currently, all issues since the beginning of 2002 are online, at https://imstat.org/ims-bulletin-archive/. However, prior to that we only have hard copies, which must be scanned. Since commercial scanning involves separating the pages, thus destroying the physical copy, we are keen to receive a donation of each old issue. So we were delighted to hear from Thea Khamis, daughter of the late Salem Khamis [whose obituary appears on the previous page] saying that she had found among his papers 44 issues of his copies of the *Bulletin*, from the very first issue [see below].

So, if you have copies that you would be willing to donate—IMS will cover the shipping costs—please get in touch with Elyse Gustafson, erg@imstat.org, to discuss what to do.

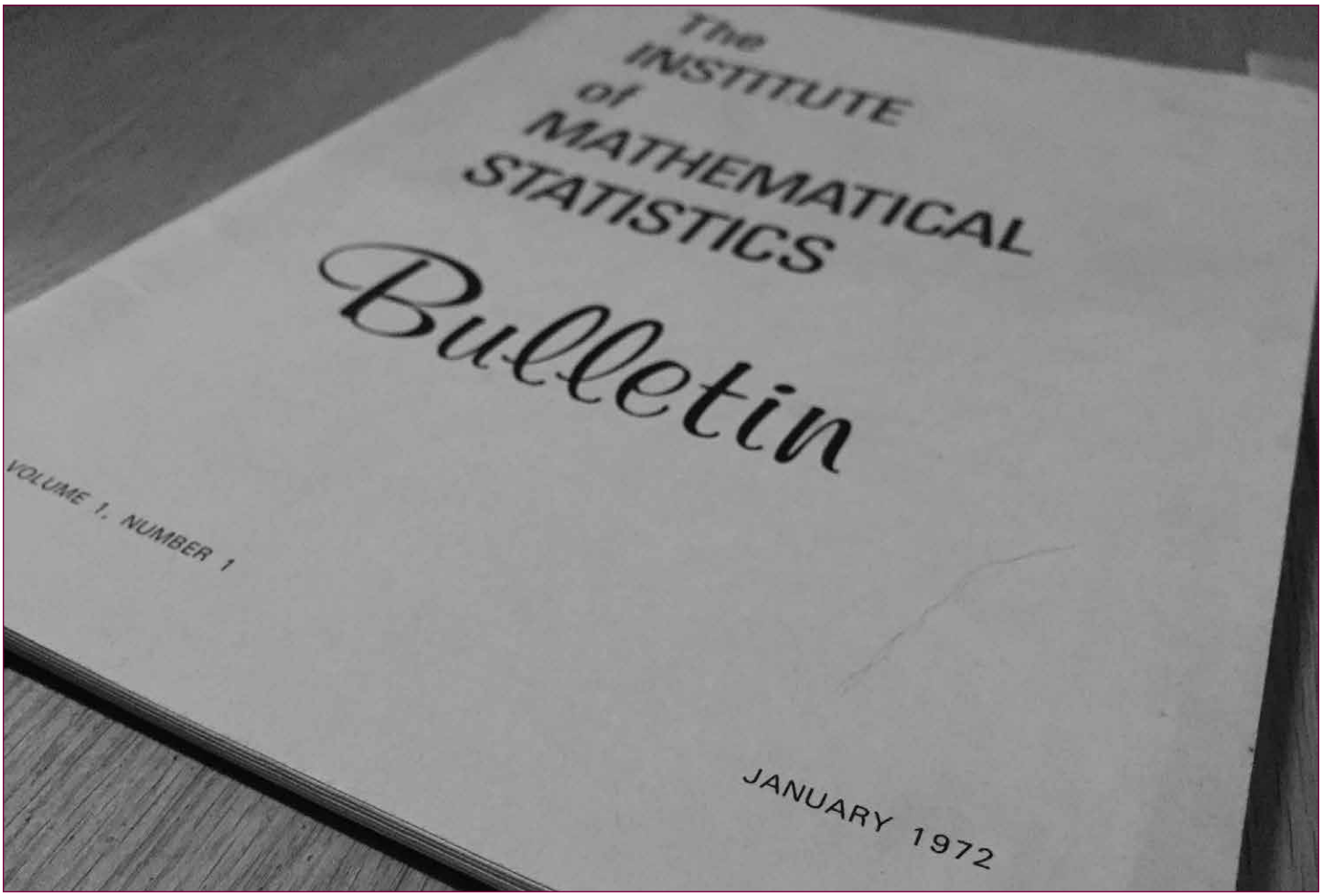
At the time of writing, we are looking for the following, in Volume(issue) numbering format: 2(3), 2(5), 3(1)–3(6), 6(3), 6(4), 7(1), 7(5), 8(3), 10(1)–10(4), 11(1), 11(2), and all the issues from 11(5) to 30(6).

Can you help?

The very first issue of the *IMS Bulletin*, in January 1972—pictured below—was introduced by its first editor, Leo Katz, who was also at that point also the IMS Executive Secretary:

"Following a considerable period of study and discussion, by the Executive Committee and the Council, concerning the feasibility and the advantages and disadvantages of separate publication of some of the less formal material which has been relegated to the back pages of the Annals [of Mathematical Statistics, *which was just about to split into the* Annals of Statistics *and the* Annals of Probability]*, the Council … voted to accept the creation of a new journal of news and notices and similar matters. It was decided that this new publication should contain abstracts of papers presented to the Institute of Mathematical Statistics, news and notices, announcements, general information concerning new members and new PhDs' lists of new publications, reports of officers, and similar material (which has occupied, in the past, about 150 pages or more of each volume of the* Annals*)."*

For the first year the *Bulletin* was issued five times, and between 1973 and 2004 it settled into six times per year.



XL-Files: Time Travel and Dark Data

Contributing Editor Xiao-Li Meng writes:

As might have been anticipated (jinxed?) by my thesis title, "Towards complete results for some incomplete problems," self-pity for being incomplete has never left me. This is as true now as it was back when I accidentally reduced my almost complete thesis to merely its title, exactly 10 days before it was due. All 12 LaTeX files, one for each draft chapter, displayed zero bits on that almost fatal morning, after a 2 a.m. attempt at creating a backup copy reversed its direction. A painful lesson learned: data augmentation with sleepy or closed eyes should not be attempted. But God obviously had more lessons for me: a DVI file was left for me to build imputation. Imputation is never perfect, but I did graduate in time.

Since that time, imputation has become a source of self-help whenever my feeling of incompleteness fails to entertain itself, for reasons that are known or, otherwise, in need of rational imputation themselves. I imputed unobserved data, biased responses, latent variables, counterfactual fantasies, hidden agendas, implied ideologies, unspoken threats, suspicious motivations, and of course, the hardest of all, blinded wine labels. I imputed sometimes with deep satisfaction, and other times with deep regret. I even multiply imputed.

Never in my wildest imagination, however, had I contemplated the possibility that imputation could transform me into a time traveler — never, that is, until I encountered, a few years ago, an ingenious reporter who wrote about a comparative study on voting behaviors of politicians. The researchers couldn't make direct comparisons among all the politicians studied because very few voted on *all* the legislation: politicians obviously cannot participate in voting before they were elected, or after completing their terms. The researchers therefore built a model to impute what these impossible votes would have been had these politicians been in office at the time of voting. In effect, the reporter observed, the researchers were building a time machine, allowing the politicians to travel back and forth in time to cast their votes.

Regardless how skeptical we are (as we all should be) about the validity of such an imputation model, we should admire the reporter's creativity in coming up with a vivid analogy to arouse the public's curiosity about something rather technical, or at least to remind the reader that there is something here both remarkable and questionable. No statistician has ever used "time travel" to describe imputing counterfactuals, despite it being a rather effective and engaging analogy. Indeed, collectively, we statisticians have done a *regrettable* job in coming up with rhetorically attractive means of engaging those beyond the already converted. The italic emphasis here is to remind ourselves that "regret" is even a technical term for us!

And this is not the only R-word in our vocabulary. We also have "regression", "risk", "rejection", "residual error", etc.; and speaking of error, we have another rich collection: "type 1 error", "type 2 error", "standard error", "standard deviation", "absolute deviation", "variance", "bias", "mean squared error", and the most depressing of all, "total error"… I have to wonder how many other fields would knowingly adopt a term that may leave the impression of total wrongness?

> We should stop lamenting how other professions repackage our methods, and start doing it ourselves *properly*, to better engage the broader data science community and beyond.

Of course, I am as guilty as anyone, for I coined "uncongeniality" as a technical term (initially for describing a thorny issue for multiple imputation, now more broadly for pre-processing).

Science and statistics are serious businesses, and as such, we should resist any temptation of creating hype terms merely for their soundbite value. At the same time, we have to admit that no matter how much we complain about deep learning without deep understanding, the phrase "deep learning" is far more likely to attract our attention than, say, "multi-layer adaptive non-linear function compositions" or MLANFC.

We should stop lamenting how other professions repackage our methods, and start doing it ourselves *properly*, to better engage the broader data science community and beyond. This is not an easy task, because most of us are not trained to appreciate the important roles of branding and marketing in scholarly products and dissemination,

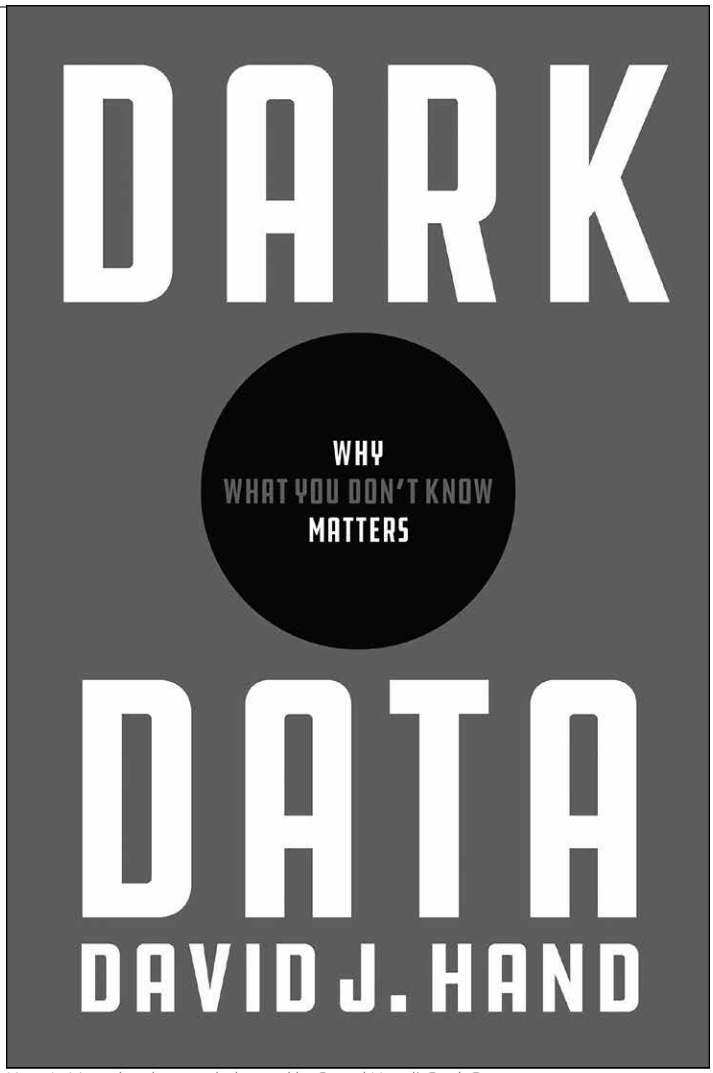
especially in an era of progressively shorter attention spans.

I am therefore particularly excited about my fellow columnist David Hand's (yet another) new book, *Dark Data*. Right away, without reading any text, you can tell that this is a book about data we cannot see but matter. Indeed, David was inspired by *dark matter*: "Since we can't see this extra mass, it has been called dark matter. And it can be significant (I almost said 'it can matter')." The first time I saw the title, my immediate reaction was to kick myself for being so incomplete – how could I have never thought about such a catchy and apt term, especially given my years of messing with missing data, non-responses, and latent variables, all forms of dark data???

I calmed my statistical ego down (sadly) by comforting myself with the thought that, "Well, this must be another CS term." I googled and found the term indeed has been used in the CS community, but it was used exchangeably with "dusty data." Hats off once more to my CS friends, for "dusty data" is another clever and vivid term, which describes data that are never processed or analyzed, effectively making their collection an expensive process for gathering dust.

However, "dark" and "dusty" are not exchangeable, semantically or visually. David's use of "dark data" is much more appropriate and comprehensive, despite his emphasis that his list of types of dark data is necessarily incomplete. David discusses 15 types of dark data, and why and in what ways they matter. He shows that they must be dealt with even if they are invisible (especially to untrained eyes). In David's taxonomy and notation, the various forms and conditions of dark data are as follows:

DD-Type 1: *Data We Know Are Missing*
DD-Type 2: *Data We Don't Know Are Missing*
DD-Type 3: *Choosing Just Some Cases*
DD-Type 4: *Self-Selection*
DD-Type 5: *Missing What Matters*
DD-Type 6: *Data Which Might Have Been*
DD-Type 7: *Changes with Time*
DD-Type 8: *Definitions of Data*
DD-Type 9: *Summaries of Data*
DD-Type 10: *Measurement Error and Uncertainty*
DD-Type 11: *Feedback and Gaming*
DD-Type 12: *Information Asymmetry*
DD-Type 13: *Intentionally Darkened Data*
DD-Type 14: *Fabricated and Synthetic Data*
DD-Type 15: *Extrapolating Beyond Your Data*



Xiao-Li Meng has been enlightened by David Hand's Dark Data

Because I initially thought that David's notion of "dark data" only covers the kind of missing observations or incomplete data to which statisticians commonly refer, I didn't fully appreciate some items on this list, for example, Type 11 or 12, on their own. I wouldn't be surprised if the list generates a similar feeling for you. But this is why you need to read the book, and be convinced by David's reasoning and his examples of cases in which unseen or unreported data play a critical and sometimes even a fatal role. You are likely to walk away with the feeling that the term *dark data* is indeed a very effective one to arouse both curiosity and suspicion, mixed with happiness that finally a great term was coined by a statistician—and sadness that the statistician is not you.

Oh, whereas I probably don't want to be re-labelled as a Dark Data Scientist, I'm enlightened by David's *dark data*, and believe my years of imputation practice can shed some light on the dark matter revealed in David's book.

And I am sure you can too, unless, of course, you prefer to be a dusty (dark?) statistician…

Previews of Special IMS Lectures

IMS Lawrence D. Brown PhD Student Award: Ashwin Pananjady

Ashwin Pananjady

Ashwin Pananjady is a final year PhD student in the Department of Electrical Engineering and Computer Sciences at the University of California, Berkeley, advised by Martin Wainwright and Thomas Courtade. His research interests are broadly in statistics, optimization and information theory. Specific topics of interest include ranking and permutation estimation, high-dimensional and non-parametric statistics, high-dimensional probability, and reinforcement learning. His honors include the Governor's Gold Medal from the Indian Institute of Technology Madras in 2014, and an Outstanding Graduate Student Instructor award from UC Berkeley in 2018.

Ashwin will give this talk at the Bernoulli–IMS World Congress in Seoul in August.

Statistics meets computation in non-parametric, permutation-based models

In a variety of applications including ranking from pairwise comparisons, crowd labeling, and assortment optimization, matrix data is represented using transformations of a small number of free parameters. For instance, consider modeling the $n \times n$ matrix of pairwise comparison probabilities between n chess players: entry (i, j) of the matrix contains the probability with which player i wins a game against player j. The ELO rating system employed in chess roughly* posits that this probability is given by the Gaussian CDF evaluated at the difference between the ELO ratings of player i and player j. In effect, it posits that the entries of the comparison matrix are completely determined by scalar parameters assigned to each of the n players, i.e., their ELO ratings.

Such a parametric model is simple, interpretable, and amenable to computationally efficient maximum likelihood estimation of the comparison matrix from win/loss data. On the other hand, for many modern applications of ranking from pairwise comparisons where we are interested in modeling human preferences, parametric models suffer from significant mis-specification. Consequently, the classical sociology literature [1] proposed a class of non-parametric, "stochastic transitivity" models for better representing such data, which replaced parametric ratings with shape constraints and permutations.

This gave rise to the class of bivariate isotonic matrices with unknown permutations: matrices in which the rows and columns can be suitably permuted such that the entries of the resulting matrix increase along each row as well as along each column. The comparison probability matrix generated by the ELO rating system clearly takes this form, but the non-parametric, "permutation-based" model class is significantly larger and therefore more robust to mis-specification than parametric models. In addition, and perhaps surprisingly, the minimax rate of matrix estimation over the class of permutation-based models is essentially the same as that over the smaller parametric class; this rate is achieved by the maximum likelihood estimator. Thus, these permutation based models occupy a nice "sweet-spot" on the bias–variance tradeoff.

However, the maximum likelihood estimator over the class of permutation-based models is intractable to compute, and existing computationally efficient estimators produce sub-optimal rates. Consequently, a "statistical–computational" gap was conjectured in a series of papers on this topic.

In this talk, I will introduce an efficient algorithm that uniformly outperforms existing, tractable procedures. It obtains minimax-optimal estimation rates in a certain regime of the problem, and in other regimes, it narrows the statistical–computational gap [2]. Time permitting, I will also touch upon how these estimators can be modified in the presence of structured missing data [3].

* The actual system is slightly more complicated, and accounts for drawn games.

References

[1] P. C. Fishburn. Binary choice probabilities: on the varieties of stochastic transitivity. *Journal of Mathematical Psychology*, 10(4): 327–352, 1973.

[2] C. Mao, A. Pananjady, and M.J. Wainwright. Towards optimal estimation of bivariate isotonic matrices with unknown permutations. *Annals of Statistics*, to appear, 2019+.

[3] A. Pananjady, C. Mao, V. Muthukumar, M.J. Wainwright, and T.A. Courtade. Worst-case versus average-case design for estimation from partial pairwise comparisons. *Annals of Statistics*, to appear, 2019+.

IMS Lawrence D. Brown PhD Student Award: Didong Li


Didong Li

Didong Li is a fifth-year graduate student in the Department of Mathematics at Duke University, supervised by David B. Dunson and Sayan Mukherjee. His research focuses on bridging between statistics and differential geometry to develop fundamentally new algorithms, statistical methods and theory. In particular, he is interested in manifold learning, nonparametric Bayes and information geometry. His PhD thesis focuses on learning and exploiting low dimensional geometric structures hidden in high dimensional data. Li earned a Bachelor's degree in 2012 and a Master's degree in 2015, both in Mathematics, from Beijing Institute of Technology, under the supervision of Huafei Sun. He will give this talk at the Bernoulli–IMS World Congress in Seoul in August.

Efficient Manifold Approximation with Spherelets

Data lying in a high-dimensional ambient space are commonly thought to have a much lower intrinsic dimension. In particular, the data may be concentrated near a lower-dimensional manifold. If one does not pay much attention to the hidden geometry in the data but instead deal with the ambient high-dimensional Euclidean spaces, both statistical and computation efficiency have been proven to be extremely low. In contrast, an accurate approximation of the unknown manifold will benefit a variety of aspects including dimension reduction, feature selection, density estimation, classification, clustering, data denoising, data visualization and so on. Most of the literature for data analysis relies on linear or locally linear methods. However, when the manifold has essential curvature, these linear methods suffer from low accuracy and efficiency. There is also an immense literature focused on non-linear methods like Variational Auto Encoders and Gaussian Process Latent Variable Model, to improve the approximation performance. However, these methods are complex black boxes lacking identifiability and interpretability, trading one problem (bad performance) for another (high complexity). As a result, new non-linear tools need to be developed without introducing too much extra complexity.

In this talk, I will focus on exploiting the geometry in the data through curvature of the unknown manifold to improve the performance when the manifold has essential curvature, while keeping the simple and clean close forms as in linear methods. In particular, we propose a simple and general alternative of locally linear manifold learning method, which instead uses pieces of spheres, or spherelets, to locally approximate the unknown manifold. We also develop spherical principal components analysis (SPCA) as a non-linear alternative of PCA, to find the best sphere fitting the data. SPCA provides simple tools that can be implemented efficiently for big and complex data and enables learning about geometric structure in the data, without introducing much more complexity than linear methods. Time permitting, I will also introduce a curved kernel called Fisher–Gaussian kernel which outperforms multivariate Gaussians in many cases, with a Bayesian nonparametric methodology for inference. I will also present some applications of spherelets, including classification, geodesic distance estimation and clustering.

References:

[1] D. Li, M. Mukhopadhyay, D.B. Dunson, Efficient manifold and subspace approximations with spherelets, arXiv:1706.08263, 2018.

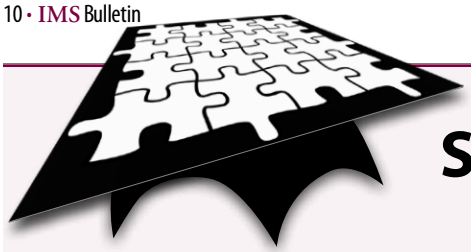
[2] M. Mukhopadhyay, D. Li, D.B. Dunson, Estimating densities with nonlinear support using Fisher–Gaussian kernels, arXiv:1907.05918, 2019.

[3] D. Li, D.B. Dunson, Classification via local manifold approximation, arXiv:1903.00985, 2019.

[4] D. Li, D.B. Dunson, Geodesic distance estimation with spherelets, arXiv:1907.00296, 2019.

Nominations invited for 2020 Parzen Prize

To promote the dissemination of statistical innovation, the Emanuel and Carol Parzen Prize for Statistical Innovation is awarded in even-numbered years to a North American statistician whose outstanding research contributions include innovations that have had impact on practice and whose PhD degree is at least 25 years old. The Parzen Prize is awarded by the Department of Statistics at Texas A&M University, selected by the members of the Parzen Prize Committee. The prize consists of an honorarium of $1,000 and travel to College Station, Texas, to present a lecture at the Prize Ceremony. Nominations for the 2020 Parzen Prize should include a letter describing the nominee's outstanding contributions to high impact innovative research in statistics, a current curriculum vita, and two supporting letters. Nominations should be submitted by February 29, 2020 to Thomas Wehrly, the Chair of the 2020 Parzen Prize Committee, via e-mail to twehrly@stat.tamu.edu or to: *Professor Thomas Wehrly, Department of Statistics, Texas A&M University, TAMU 3143, College Station Texas 77843-3143.* For more information on the Parzen Prize, please visit https://www.stat.tamu.edu/about/awards-and-prizes/parzenprize/



Student Puzzle Corner 27

We pose a classic problem, variously known as the taxicab problem or the German tank problem (named after its historical application, by Allied forces in World War II, to the estimation of the monthly rate of German tank production from very few data).

We have a finite population $\mathcal{X}$ with labels $\{\theta+1, \theta+2, \cdots, \theta+N\}$, where $\theta \geq 0$, $N \geq 1$, and both θ, N are regarded as unknown parameters. A random sample $X_1, \cdots, X_n$ is taken without replacement from $\mathcal{X}$, and suppose $X_{(1)}, X_{(n)}$ denote the minimum and the maximum of the sample labels. Let $W_n = X_{(n)} - X_{(1)}$ denote the sample range. The problem of this issue is as follows:

a) Find in closed form an unbiased estimate $T(W_n)$ of N

b) Find an unbiased estimate of the variance of $T(W_n)$

c) Is the unbiased estimate $T(W_n)$ in part (a) the UMVUE of N among all possible unbiased estimates $U(X_1, \cdots, X_n)$ of N?

Deadline: January 29, 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 26

Contributing Editor Anirban DasGupta writes on the previous problem, which was about phase transitions:

If the common probability that each observer tells the truth on any given instance is p, and if there are m such observers, and if there are n options (colors) to choose from, then by using Bayes' theorem, the probability that the true color is the universally stated one (purple), given that all m observers said so, is

$$\frac{p^m \frac{1}{n}}{p^m \frac{1}{n} + (n-1)(1-p)^m \frac{1}{n(n-1)^m}} = \frac{1}{1 + \frac{(\frac{1}{p}-1)^m}{(n-1)^{m-1}}}.$$

If $m = n = 20$, this equals $1/n = 0.05$ if $p = 1/n = 0.05$, and it equals 0.00049 if $p = 0.04$ (just slightly smaller than $p = 1/n$).

If $1/p = n - \alpha \log n$, and $m = \gamma n$, then the expression reduces to

$$\frac{1}{1 + (n-1-\alpha \log n)(1 - \frac{\alpha \log n}{n-1})^{\gamma n - 1}} = \frac{1}{1 + (n-1)n^{-\alpha\gamma}(1+o(1))},$$

which converges to 0, ½ and 1, according as $\alpha\gamma$ is less than 1, equal to 1, or greater than 1.

Nominations for IMS awards

Please consider nominating your outstanding colleagues and collaborators for these IMS awards. Candidates for **IMS Fellowship** shall have demonstrated distinction in research in statistics or probability, by publication of independent work of merit, and should be IMS members when nominated. The deadline for nominating is January 31, 2020. See https://www.imstat.org/honored-ims-fellows/nominations-for-ims-fellow/. Nominations are also invited for the **Carver Medal**, created by the IMS in honor of Harry C. Carver, for exceptional service specifically to the IMS. Nominate by February 1, 2020. Please visit https://www.imstat.org/ims-awards/harry-c-carver-medal/.

Early-career Travel Awards

The **IMS Hannan Graduate Student Travel Award** funds travel and registration to attend (and possibly present a paper/poster at) an IMS sponsored or co-sponsored meeting. This travel award is available to IMS members who are graduate students (seeking a Masters or PhD degree) studying some area of statistical science or probability. If you are a New Researcher (awarded your PhD in 2014–19) looking for travel funds, you should apply for the **IMS New Researcher Travel Award** to fund travel, and possibly other expenses, to present a paper or a poster at an IMS sponsored or co-sponsored meeting (not the IMS New Researcher's Conference, that's funded separately). See https://www.imstat.org/ims-awards/ for more information about how to apply. The deadline for both is February 1, 2020.

Recent papers: *Electronic Journal of Probability*

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

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Supercritical causal maps: geodesics and simple random walk. . . . . THOMAS BUDZINSKI; PAPER 86, 43 PP.
An invariance principle for one-dimensional random walks among dynamical random conductances . . . . . MAREK BISKUP; PAPER 87, 29 PP.
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Disagreement percolation for the hard-sphere model . . . . . HOFER-TEMMEL CHRISTOPH; PAPER 91, 22 PP.
Alternative constructions of a harmonic function for a random walk in a cone . . . . . DENIS DENISOV AND VITALI WACHTEL; PAPER 92, 26 PP.
Large deviations for geodesic random walks. . . . . RIK VERSENDAAL; PAPER 93, 39 PP.
The genealogy of Galton-Watson trees . . . . . SAMUEL G.G. JOHNSTON; PAPER 94, 35 PP.
Integration by parts formula for killed processes: a point of view from approximation theory . . . . . NOUFEL FRIKHA, ARTURO KOHATSU-HIGA, AND LIBO LI; PAPER 95, 44 PP.
Gaussian fluctuations of the determinant of Wigner matrices. . . . . PAUL BOURGADE AND KRISHNAN MODY; PAPER 96, 28 PP.
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Recent papers:
Electronic Communications in Probability

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The bullet problem with discrete speeds . . . . . .BRITTANY DYGERT, CHRISTOPH KINZEL, MATTHEW JUNGE, ANNIE RAYMOND, ERIK SLIVKEN, AND JENNIFER ZHU; PAPER 27, 11 PP.
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IMS meetings around the world

Joint Statistical Meetings: 2019–2023

IMS sponsored meeting

JSM 2020

August 1–6, 2020. Philadelphia, PA, USA.

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

JSM (the Joint Statistical Meetings) is the largest gathering of statisticians and data scientists held in North America. It is also one of the broadest, with topics ranging from statistical applications to methodology and theory to the expanding boundaries of statistics, such as analytics and data science. JSM also offers a unique opportunity for statisticians in academia, industry, and government to exchange ideas and explore opportunities for collaboration.

IMS sponsored meetings: JSM dates for 2020–2024

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

IMS sponsored meeting

Bernoulli/IMS 10th World Congress in Probability and Statistics

August 17–21, 2020

Seoul, South Korea

w http://www.wc2020.org

Program chair: Siva Athreya; Local chair: Hee-Seok Oh.

The 10th World Congress in Probability and Statistics (WC2020), jointly organized by the Bernoulli Society and IMS, will be hosted by Seoul National University. We are expecting to attract more than 900 experts from over 40 countries.

This upcoming World Congress will take a comprehensive look at the latest developments in statistics and probability as well as the current trends emerging from all associated fields. A special lecture series will document a variety of modern research topics with in-depth uses and applications of these disciplines as they relate to science, industrial innovation, and society as a whole.

As the largest city in South Korea, dynamic Seoul is a bewitching mix of ancient and modern structures, packaged in a surprisingly compact metropolis that has earned it the designation of a UNESCO City of Design. The nation's capital has a cutting-edge cityscape of glass, steel and futuristic skyscrapers, which tower over traditional wooden houses with tiled roofs and mazes of cobbled alleys in village-like districts.

IMS sponsored meeting NEW

WNAR/IMS/JR 2020 Meeting

June 14–17, 2020. Anchorage, Alaska.

w http://www.wnar.org/page-18098

The 2020 WNAR/IMS/JR (Japanese Region) meeting will be held in Anchorage, Alaska from Sunday, June 14 through Wednesday, June 17, 2020. The conference will be held at Hilton Anchorage in downtown Anchorage. Join us during the season of the midnight sun in Alaska's largest city, nestled between the Chugach Mountains and Cook Inlet. Anchorage is a place rich in culture, history, natural wonders, and wildlife. Explore more about Anchorage and the surrounding sites. More conference details will be provided as they become available.

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**

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

NEW

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

JSM: Portland, OR, **August 3–8, 2024**

IMS co-sponsored meeting

NEW

Seminar on Stochastic Processes 2020
March 4–7, 2020
Michigan State University, Lansing, MI, USA

w https://stt.natsci.msu.edu/events/ssp2020/

The Seminar on Stochastic Processes (SSP) 2020 will be held on March 4–7, 2020, (Wednesday through Saturday) at Michigan State University (MSU), in East Lansing, MI, USA. As well as informal presentations by conference participants, there will be plenary talks by the following five invited speakers:

Martin Barlow (Kai Lai Chung Lecturer), University of British Columbia, Vancouver;
Ioana Dumitriu, University of California, San Diego, CA, USA;
Martina Hofmanová, Universität Bielefeld, Germany;
Firas Rassoul-Agha, University of Utah, Salt Lake City, UT, USA;
Samy Tindel, Purdue University, West Lafayette, IN, USA.

This SSP 2020 conference will feature the tenth annual Kai Lai Chung Lecture, honoring Kai Lai Chung's Mathematical career. Kai Lai Chung was one of the leading probabilists of the second half of the twentieth century and one of the founders of the Seminar on Stochastic Processes.

The main conference will be held on March 5–7, 2020. On March 4, there will be a special set of tutorial lectures and discussions targeted at early-career researchers. These research lectures will be given by René Carmona, Princeton University, Princeton, NJ, USA.

There will be **financial support** for participants to attend the SSP 2020 conference, from the US National Science Foundation, and from MSU's Department of Statistics and Probability. Deadline January 20, 2019, for full consideration of travel support requests.

Further information on funding and accommodations, and more details about the conference, including the online registration form, is available at the conference website: https://stt.natsci.msu.edu/events/ssp2020/

IMS co-sponsored meeting

NEW

Mathematical Statistics and Learning
June 2–5, 2020. Barcelona, Spain.

w https://www.msl2020.org

The meeting aims to bring together leading experts from diverse areas of mathematical statistics and machine learning who are interested in the mathematical foundations of our fields. The common theme of the meeting is modelling and statistical analysis of data from large complex systems, which leads to high-dimensional and structured problems. There will be four special morning lectures: Francis Bach (INRIA), Liza Levina (Michigan), Luc Devroye (McGill), and Judith Rousseau (Oxford).

IMS sponsored meeting

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

The Bernoulli–IMS World Congress in Probability and Statistics is held every four years. Details to follow, but for now, please save the date!

IMS co-sponsored meeting

Statistics in the Big Data Era
May 27–29, 2020
Berkeley, CA, USA

w https://simons.berkeley.edu/workshops/statistics-big-data-era

This conference, now co-sponsored by the IMS, is focused on the changing role and nature of the discipline of statistics in the time of a data deluge in many applications, and increasing success of artificial intelligence at performing many data analysis tasks. The conference aims to bring together experts in statistical methodology and theory for complex and big data with researchers focused on a range of applications, from genomics to social networks, and to provide opportunities for new researchers to learn about both emerging methods and applications. The conference will also be an occasion to celebrate Professor **Peter Bickel's 80th birthday**. Peter has spent his long and distinguished career at the Department of Statistics at UC Berkeley, throughout which he remained committed to developing theory and methods that shed light on relevant applications, a goal more relevant than ever in the age of big data. He is an IMS fellow and has also served the IMS in a number of capacities, including as President.

Peter Bickel (left) with Peter Bühlmann in 2014, when Peter Bickel received a Doctor honoris causa from ETH Zurich. Photo courtesy of ETH Zürich / Giulia Marthaler

IMS sponsored meeting

ENAR dates, 2020–2022
March 22–25, 2020: in Nashville, TN
w www.enar.org/meetings/future.cfm

The 2020 ENAR/IMS meeting will be in Nashville (and the following year in Baltimore, and then Houston in 2022). Featuring a *Fostering Diversity in Biostatistics* workshop, connecting underrepresented minority students interested in biostatistics with professional biostatisticians in academia, government and industry.

IMS sponsored meetings

ENAR/IMS 2021	ENAR/IMS 2022
March 14–17, 2021	March 27–30, 2022
Baltimore, MD	Houston, TX

IMS co-sponsored meeting

Third International Conference on Mathematics and Statistics
February 6–9, 2020
American University of Sharjah, UAE
w https://www.aus.edu/conferences/the-third-international-conference-on-mathematics-and-statistics

The conference offers a forum for researchers and scientists working in pure mathematics, applied mathematics, mathematical education and statistics to come together, discuss new research developments and network with one another. AUS-ICMS was initiated by the Department of Mathematics and Statistics at the American University of Sharjah (AUS), a high caliber young university in the Arabian Gulf region. AUS-ICMS incarnates the spirit of research fostered by AUS. Previously held in 2010 and 2015, over 250 researchers from many different countries participated in the conferences. High quality theoretical and applied work was presented at the conference through keynote lectures, special and contributed sessions.

IMS co-sponsored meeting

Frontier Probability Days
May 8–10, 2020. Las Vegas, Nevada, USA
w http://lechen.faculty.unlv.edu/FPD20/

Frontier Probability Days 2020 (FPD'20) is a regional workshop, taking place at the University of Nevada, Las Vegas. Its purpose is to bring together mathematicians, both regionally and globally, who have an interest in probability and its applications. FPD aims to complement other regional conferences in Probability that are held annually elsewhere in the US.

If you would like to participate and/or speak at the conference, please fill out a registration form on or before **April 19, 2020**. Registration is required but is free. To be considered for **financial support**, fill out a registration form by March 22: see the website for information.

IMS sponsored meeting

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

CALL FOR INVITED SESSION PROPOSALS: The Scientific Program Committee will consider proposals for Invited Paper sessions. If you are interested in submitting a proposal, please do so online by February 10, 2020 at http://ims-aprm2021.com/submissions. Each Invited Paper session will consist of four speakers and one chair, with each speaker having 25 minutes. The proposals will be evaluated by the Scientific Program Committee on a competitive basis. The proposers will be notified of the session selection before the end of March 2020.

The sixth meeting of the Institute of Mathematical Statistics Asia Pacific Rim Meeting (IMS-APRM) will provide an excellent worldwide forum for scientific communications and collaborations for researchers in Asia and the Pacific Rim, and promote collaborations between researchers in this area and other parts of the world.

The 8th Workshop on Biostatistics and Bioinformatics
May 8–10, 2020. Atlanta, GA, USA
w https://math.gsu.edu/yichuan/2020Workshop/

Biostatistics and Bioinformatics have been playing very important roles in scientific research fields in recent years. The workshop will provide the opportunity for faculty and graduate students to meet the top researchers, identify important directions for future research, facilitate research collaborations. The keynote speaker is **Nilanjan Chatterjee**, Bloomberg Distinguished Professor of Biostatistics and Medicine at the Johns Hopkins University Bloomberg School of Public Health and Johns Hopkins School of Medicine. There will be invited talks by distinguished researchers, and a poster session by young researchers and graduate students. Partial travel awards available.

IMS co-sponsored meeting

Bayes Comp 2020
January 7–11, 2020
University of Florida, Gainesville, FL
w http://users.stat.ufl.edu/~jhobert/BayesComp2020/Conf_Website/

Bayes Comp is a biennial conference sponsored by the ISBA section of the same name. The conference and the section both aim to promote original research into computational methods for inference and decision making and to encourage the use of frontier computational tools among practitioners, the development of adapted software, languages, platforms, and dedicated machines, and to translate and disseminate methods developed in other disciplines among statisticians.

Bayes Comp is the current incarnation of the popular MCMSki series of conferences, and Bayes Comp 2020 is the second edition of this new conference series. The first edition was Bayes Comp 2018, which was held in Barcelona in March of 2018.

Other meetings and events around the world

International Workshop on Statistical Methods and Artificial Intelligence

NEW

April 6–9, 2020
Warsaw, Poland

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

The International Workshop on Statistical Methods and Artificial Intelligence (IWSMAI) will be held April 6–9, 2020, in Warsaw, Poland. The aim of IWSMAI is to bring together researchers, professors and students from around the world to present their latest ideas and research results within the scope of IWSMAI 2020.

Artificial intelligence (AI) is mainly data-driven. It uses statistical methods through human-machine relationships during generation of data, production of algorithm, and prediction of results. The International Workshop on Statistical Methods and Artificial Intelligence will be an annual meeting of researchers in artificial intelligence, statistical methods, machine learning, and related areas. This workshop will include (but will not be limited to) the following topics: 1. Artificial Intelligence 2. Statistical methods 3. Data Analysis and Data mining 4. Computational Statistic 5. Supervised and unsupervised learning 6. Statistical methodology 7. Bioinformatics 8. Medical statistics 9. Deep Learning 10. Data Collection and Applications 11. Data Science and Blockchain Technology 12. Data Science and Artificial Intelligence 13. Data Science and Blockchain Technology 14. Mathematical Statistics 15. Sampling Techniques and Applications 16. Statistical Software (R, SAS, Python)

Conference on Applied Statistics in Agriculture and Natural Resources

NEW

April 26–28, 2020. Gainesville, USA

w https://conference.ifas.ufl.edu/applied-stats/

The Conference on Applied Statistics in Agriculture and Natural Resources brings together statisticians from academia, industry and government to discuss ideas and advancements in the application of statistics to solving agricultural research problems. This is a three-day conference consisting of a workshop, keynote speaker and a series of contributed papers and poster presentations.

This conference is unique in its interdisciplinary nature and also exposes students and developing scholars to new statistical research directly relevant to agriculture. We emphasize the application of statistics in solving real-life problems while highlighting agriculture and recognizing the joint effort of the statistician and the agricultural researcher. The relaxed atmosphere of this conference allows for participants to submit abstracts made jointly by the statistician and the researcher. Presentation of data sets and analyses which motivated the work shares equal importance with development of the statistical theory. Papers on either new or innovative applications of existing statistical methodologies are appropriate for presentation at this conference.

The workshop leader and keynote speaker is Dr Fang Chen, Director of Advanced Statistical Methods at SAS Institute Inc.

NIMBioS/SCMB Investigative Workshop: Quantitative Education in Life Science Graduate Programs

NEW

March 16–18, 2020
Knoxville, TN, USA

w http://www.nimbios.org/workshops/WS_quantedu

This workshop brings together a diverse group of researchers and educators working at the interface of various areas of the life sciences and quantitative science (e.g. mathematics, statistics, computing, data science). There has been very little open discussion about educational aspects of graduate life science quantitative training, such as what topics to prioritize across the vast array of potential quantitative methods, how formal courses might be effectively mixed with online learning, seminars and lab group activities and the effectiveness of bootcamps and tutorials. While many meetings, conferences and projects have focused on undergraduate education at this interface between the life sciences and quantitative methods, there has been nothing similar for graduate education. The intent is for the workshop to gather thought leaders on graduate life science education and its relation to quantitative training to determine commonalities of approaches across institutions and consider what evidence is available on the effectiveness of these approaches. The expectation is that this would provide potential guidance based on experiences at diverse institutions and in biological sub-disciplines about what has been tried, how effective the results have been, and what still needs to be examined. We expect that attendees will share experiences and any evaluation data regarding the programs they have been involved with. We intend for the workshop to gather advice from those with extensive experience in educating not only the few students specializing in quantitative biology, but also with the broad range of life science graduate students. Applications are welcome from those at any career stage, including recent PhDs.

Other meetings and events around the world

2nd IMA Conference on the Mathematics of Robotics
September 9–11, 2020
Manchester, 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).

Big Data Meets Survey Science (BigSurv20)
November 4–6, 2020. Utrecht, The Netherlands
w https://www.bigsurv20.org/

Following a very successful conference in Barcelona, Spain, in 2018, BigSurv returns in Utrecht, Netherlands in 2020! This conference is a meeting place for computer and data scientists with an interest in social science and data collection and for social scientists, survey methodologists, and statisticians with an interest in computer and data science. The goal of the conference is to improve the production of statistics on topics with a broader relevance and impact for society. The conference will combine different perspectives stemming from computer science and social sciences: *From expertly designed data carefully measuring human behaviors, attitudes, and opinions to organic, electronic data capturing massive quantities of observations about our everyday lives in real-time. - From generating summary statistics describing entire populations to leveraging fine-grained data informing the context of each observation. - From the sampling of individuals within populations to considering the implications of "N=all." - From applying the Total Survey Error paradigm to new forms of data and adopting a total statistical uncertainty framework that will be needed to encompass the new quality issues associated with Big Data. - From doing intensive fieldwork by traveling around the country, to leveraging the power of Big data harvesting online.*

We would particularly like to **encourage contributions focusing on combining traditional survey data with new data sources**, such as registers, social media, apps, and other forms of digital data. Expect exciting keynote speakers, short courses on cutting edge topics in data science and survey methodology, a data challenge and a series of spectacular sessions.

Employment Opportunities around the world

Canada: Vancouver, BC

University of British Columbia
Instructor (Tenure-Track)
https://jobs.imstat.org/job//51664936

Canada: Toronto, ON

University of Toronto, Department of Statistical Sciences
Associate Professor or Professor - Regional Director of the Canadian Statistical Sciences Institute
https://jobs.imstat.org/job//51642289

Hong Kong: Kowloon

Hong Kong University of Science and Technology
Department of Information Systems, Business Statistics and Operations Management
Non-tenure track teaching position in Statistics
https://jobs.imstat.org/job//51357143

Hong Kong: Shatin

The Chinese University of Hong Kong
Professor / Associate Professor / Assistant Professor
https://jobs.imstat.org/job//51506898

Netherlands: Amsterdam

University of Amsterdam, Faculty of Science, Korteweg-de Vries Institute for Mathematics
Two Tenure track positions in Mathematical Statistics as Assistant/Associate professor
https://jobs.imstat.org/job//51632984

Netherlands: Tilburg

Tilburg University
Assistant or Associate Professor
https://jobs.imstat.org/job//51596815

Singapore:

Department of Statistics and Applied Probability, National University of Singapore
Faculty
https://jobs.imstat.org/job//51462934

Employment Opportunities around the world

Switzerland: Lausanne,
Ecole Polytechnique Fédérale de Lausanne
Postdoctoral
https://jobs.imstat.org/job//52027331

Switzerland: Lausanne,
Ecole Polytechnique Fédérale de Lausanne
PhD
https://jobs.imstat.org/job//52027160

Taiwan: Taipei City
Institute of Statistical Science, Academia Sinica
Tenure-Track Faculty Positions
https://jobs.imstat.org/job//49747539

United Kingdom: Coventry
University of Warwick
Professor
https://jobs.imstat.org/job//51674265

United Kingdom: Glasgow
The University of Glasgow, School of Mathematics & Statistics
Lecturer/Senior Lecturer/Reader (Statistics)
https://jobs.imstat.org/job//51829796

United Kingdom: Warwickshire
University of Warwick
Assistant/Associate Professor
https://jobs.imstat.org/job//51807848

United States: Berkeley, CA
University of California Berkeley
Teaching Professor Positions
Department of Mathematics
https://jobs.imstat.org/job//51867467

United States: Los Angeles, CA
UCLA, Department of Statistics
UCLA Statistics Open-Ranked Faculty Search
https://jobs.imstat.org/job//51476614

United States: Riverside, CA
Department of Statistics, University of California, Riverside, USA
A Tenure-Track Assistant Teaching Professor
https://jobs.imstat.org/job//51125221

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

United States: New Haven, CT
Yale University, Department of Statistics & Data Science
Assistant/Associate/Full Professor
https://jobs.imstat.org/job//51710350

United States: Newark, DE
The University of Delaware
Tenure Track Faculty Positions in Data Science, Assistant/Associate Professor
https://jobs.imstat.org/job//51562874

United States: Newark, DE
The University of Delaware
Chairperson, Department of Applied Economics and Statistics
https://jobs.imstat.org/job//52028981

United States: Boca Raton, FL
Florida Atlantic University
Assistant Professor, Mathematical Sciences
https://jobs.imstat.org/job//51770544

United States: Chicago, IL
University of Illinois at Chicago
Assistant Professor/Associate Professor/ Full Professor in Statistics - Tenure-Track/ Tenured
https://jobs.imstat.org/job//51348789

United States: Chicago, IL
The University of Chicago
Kruskal Instructor
https://jobs.imstat.org/job//51560701

United States: Lawrence, KS
Dept of Mathematics, University of Kansas
Visiting Assistant Professor
https://jobs.imstat.org/job//51744869

United States: Cambridge, MA
Massachusetts Institute of Technology (MIT)
Dual Appointment Faculty Positions
https://jobs.imstat.org/job//51493611

United States: Baltimore, MD
University of Maryland Baltimore County
Tenure Track Assistant Professor Position in Statistics
https://jobs.imstat.org/job//52088906

United States: Rockville, MD
National Institutes of Health National Cancer Institute
Tenure-Track/Tenure-Eligible Investigator
https://jobs.imstat.org/job//52051760

United States: Ann Arbor, MI
University of Michigan Statistics
RTG Postdoctoral associate
https://jobs.imstat.org/job//37685748

United States: Minneapolis, MN
University of Minnesota, School of Statistics
Tenure Track Assistant Professor
https://jobs.imstat.org/job//50499570

United States: Chapel Hill, NC
University of North Carolina at Chapel Hill
Teaching Assistant Professor
https://jobs.imstat.org/job//52028432

United States: Ithaca, NY
Cornell University
Tenured/Tenure-Track Faculty Position(s)
https://jobs.imstat.org/job//51348721

Employment Opportunities around the world

United States: Ithaca, NY

Cornell University,
Statistics and Data Science
Faculty Position - Assistant/Associate/ Visiting Professor
https://jobs.imstat.org/job//51449566

United States: Cleveland, OH

Case Western Reserve University
Assistant Professor
https://jobs.imstat.org/job//51452182

United States: Philadelphia, PA

Temple University, Fox School of Business
Non-Tenure Track and Adjunct Faculty Positions in Statistical Science, Data Science, and Business Analytics
[*See boxed ad on this page*]
https://jobs.imstat.org/job//51924976

United States: Philadelphia, PA

Temple University, Fox School of Business
Tenure Track and Tenured Positions in Statistical Science
[*See boxed ad on next page*]
https://jobs.imstat.org/job//51924925

United States: Providence, RI

Brown University Data Science Initiative
Assistant Professor
https://jobs.imstat.org/job//51384691

United States: Columbia, SC

University of South Carolina,
Department of Epidemiology and Biostatistics
Associate Professor of Biostatistics
https://jobs.imstat.org/job//51347907

United States: Richardson, TX

University of Texas at Dallas
Assistant Professor Positions Mathematical Sciences
https://jobs.imstat.org/job//51493573

United States: Philadelphia, PA

Non-Tenure Track and Adjunct Faculty Positions in Statistical Science, Data Science, and Business Analytics
Temple University, Fox School of Business, Philadelphia, Pennsylvania

The Department of Statistical Science of Temple University, housed in the Fox School of Business invites applications for non-tenure research track, non-tenure teaching track, and adjunct faculty positions to begin in July 2020 or later. Candidates must hold a Ph.D. degree or foreign equivalent in statistics, data analytics or related field by September 1, 2020 (for the research track) or a master's degree (for the teaching track/part-time adjunct), and must have a strong background in statistics, data analytics, or a closely related field. Teaching responsibilities include introductory as well as advanced level statistics courses, visualization, and data mining.

Temple University has evolved into an international powerhouse in higher education and a top-tier research institution with roughly 40,000 undergraduate, graduate and professional students. As the largest university in one of the nation's most iconic cities, Temple educates diverse future leaders from across Philadelphia, the country and the world who share a common drive to learn, prepare for their careers and make a real impact. For additional information about Temple University please visit our website at www.temple.edu.

The Fox School of Business, with more than 9,000 students and more than 220 full-time faculty members, is accredited by AACSB International and one of the largest and most comprehensive business schools in the nation, offering Bachelors, MBA, Specialized Masters, Executive MBA, Executive DBA, and Ph.D. with programs at campuses in the Philadelphia region and worldwide.

APPLICATION PROCEDURE: To ensure full consideration, candidates should send application materials by January 31, 2020. Later applications will be accepted until the position is filled. Include (a) cover letter, (b) full curriculum vitae (c) brief statement of current and future research interests (d) evidence of excellence in teaching (i.e. evaluations) and/or a statement addressing teaching philosophy and experience (e) names and contact information of three to six references.

Submit materials electronically to the Chair of the Faculty Search Committee at stat.recruiting@temple.edu.

For more information, please visit www.fox.temple.edu/cms_academics/dept/statistics/recruiting

Temple University is an equal employment opportunity and affirmative action employer committed to student, faculty and staff diversity, equity, and inclusion. Women and minorities are strongly encouraged to apply. Additional information is available from the university, college and department websites at http://www.fox.temple.edu.
Temple University's Annual Security and Fire Safety Report contains statistics, policies, and procedures related to campus safety and can be found at: https://safety.temple.edu/reports-logs/annual-security-report. *You may request a copy of the report by calling Temple University's Campus Safety Services at 215-204-7900.*

United States: Philadelphia, PA

Tenure Track and Tenured Positions in Statistical Science
Temple University, Fox School of Business, Philadelphia, Pennsylvania

The Department of Statistical Science seeks tenured/tenure track scholars at all ranks to contribute to the environment of collaborative and multi-disciplinary research of the Fox School of Business at Temple University. Qualified candidates must hold a Ph.D. or foreign equivalent in Statistics or a related field before September 1, 2020,and have the potential for excellence in scholarship, teaching, and doctoral student supervision including the demonstrated ability to conduct high-quality research and publish in top-tier journals. Researchers in all areas of Statistics are encouraged to apply by January 31, 2020. Later applications will be accepted until the position is filled.

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APPLICATION PROCEDURE: To ensure full consideration, candidates should send application materials by December 15, 2019. Later applications will be accepted until the position is filled. Include the following: (a)cover letter, (b) full curriculum vitae, (c) brief statement of current and future research interests, (d) evidence of excellence in teaching (i.e. evaluations) and/or a statement addressing teaching philosophy and experience, (e) names and contact information of three to six references. Submit materials electronically to the Chair of the Faculty Search Committee at stat.recruiting@temple.edu.

For more information, please visit www.fox.temple.edu/cms_academics/dept/statistics/recruiting

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Temple University's Annual Security and Fire Safety Report contains statistics, policies, and procedures related to campus safety and can be found at: https://safety.temple.edu/reports-logs/annual-security-report. *You may request a copy of the report by calling Temple University's Campus Safety Services at 215-204-7900.*

United States: Arlington, VA

Biocomplexity Institute and Initiative
Research Faculty Positions in Statistical Sciences (SDAD) - Biocomplexity
https://jobs.imstat.org/job//52182623

United States: Fairfax, VA

George Mason University
Faculty
https://jobs.imstat.org/job//51452325

United States: Seattle, WA

Fred Hutch
Assistant/Associate Faculty Position - Biostatistics
https://jobs.imstat.org/job//51665083

United States: Seattle, WA

University of Washington
Assistant Professor, Biostatistician, Rehabilitation Medicine
https://jobs.imstat.org/job//51869236

United States: Madison, WI

University of Wisconsin, Madison, Department of Statistics
Assistant Professor of Statistics
Https://jobs.imstat.org/job//51737575

United States: Madison, WI

University of Wisconsin, Madison
Assistant Professor, Associate Professor, or Professor in Statistics
https://jobs.imstat.org/job//51915810

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

January 2020

January 2–11: Washington DC, USA. **Institute for Data Science and Big Data** w https://www.american.edu/spa/data-science/data-science-institute.cfm

January 6–8: San Diego, CA, USA. **International Conference on Health Policy Statistics (ICHPS)** w http://ww2.amstat.org/meetings/ices/2020/index.cfm

January 6–10: Bangkok, Thailand. **4th Bangkok Workshop on Discrete Geometry, Dynamics and Statistics** w http://thaihep.phys.sc.chula.ac.th/BKK2020DSCR/

ims January 7–11: University of Florida, Gainesville, USA. **Bayes Comp 2020** w http://users.stat.ufl.edu/~jhobert/BayesComp2020/Conf_Website/

February 2020

ims February 6–9: American University of Sharjah, UAE. **Third International Conference on Mathematics and Statistics** w https://www.aus.edu/conferences/the-third-international-conference-on-mathematics-and-statistics

February 17–18: Paris, France. **Robotics and Artificial Intelligence** w https://robotics.pulsusconference.com/

February 20–22: Sacramento, CA, USA. **Conference on Statistical Practice 2020** w https://ww2.amstat.org/meetings/csp/2020/

March 2020

NEW ims March 4–7: Lansing, MI, USA. **Seminar on Stochastic Processes 2020** w https://stt.natsci.msu.edu/events/ssp2020/

NEW March 16–18: Knoxville, TN, USA. **NIMBioS/SCMB Investigative Workshop on Quantitative Education in Life Science Graduate Programs** w http://www.nimbios.org/workshops/WS_quantedu

ims March 22–25: Nashville, TN, USA. **ENAR Spring Meeting** w http://www.enar.org/meetings/future.cfm

March 26: London, UK. **6th IMA Conference on Mathematics in Defence and Security** w https://ima.org.uk/12970/6th-ima-conference-on-mathematics-in-defence-and-security/

April 2020

April 6–9: Warsaw, Poland. **Statistical Methods and Artificial Intelligence** w https://sites.google.com/view/iwsmai

April 15–17: Geneva, Switzerland. **Workshop on Statistical Data Editing** w https://reg.unog.ch/event/31130/

April 26–28: Gainesville, FL, USA. **Conference on Applied Statistics in Agriculture and Natural Resources** w https://conference.ifas.ufl.edu/applied-stats/

May 2020

ims May 8–10: Las Vegas, NV, USA. Frontier Probability Days w http://lechen.faculty.unlv.edu/FPD20/

ims May 8–10: Atlanta, GA, USA. 8th Workshop on Biostatistics and Bioinformatics w https://math.gsu.edu/yichuan/2020Workshop/

NEW [Now IMS co-sponsored] May 27–29: Berkeley, CA, USA. **Statistics in the Big Data Era** w https://simons.berkeley.edu/workshops/statistics-big-data-era

May 31–June 3: Carleton University, Ottawa, ON, Canada. **2020 SSC Annual Meeting** w https://ssc.ca/en/meetings/2020-annual-meeting-ottawa

June 2020

June 1–26: Vancouver, BC, Canada. **2020 PIMS-CRM Probability Summer School** w http://www.math.ubc.ca/Links/ssprob20/

NEW June 2–5: Barcelona, Spain. **Mathematical Statistics and Learning** w https://www.msl2020.org

June 2–5: Barcelona, Spain. **6th Stochastic Modeling Techniques and Data Analysis International Conference (SMTDA2020). Also featuring Demographics 2020 Workshop** w www.smtda.net

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

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

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

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

June 15–19: Paphos, Cyprus. **International Symposium on Nonparametric Statistics 2020** **w** http://cyprusconferences.org/isnps2020/

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

ims June 21–24 [tentative]: Anchorage, Alaska, USA. **2020 WNAR/IMS/JR (Japanese Region) meeting** **w** http://wnar.org/page-18098

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

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

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

July 2020

July 5–11: Portoroz, Slovenia. **8th European Congress of Mathematics.** **w** http://www.8ecm.si/

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

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

August 2020

ims August 1–6: Philadelphia, PA, USA. **JSM 2020** **w** http://www.amstat.org/ASA/Meetings/Joint-Statistical-Meetings.aspx

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

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

September 2020

NEW 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/

October 2020

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

November 2020

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

December 2020

December 15–17: Manipal, Karnataka, 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

Continues on **page 26**

International Calendar *continued*

July 2021

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

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

March 2022

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

June 2022

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

July 2022

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

July 10–15: Riga, Latvia. **XXXI International Biometric Conference (IBC 2022)** **w** https://www.biometricsociety.org/meetings-events/ibcs/

August 2022

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

August 2023

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

August 2024

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

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

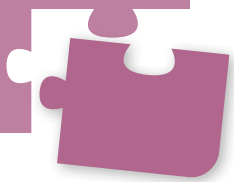
August 2025

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

August 2026

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

Are we missing something? If you know of any statistics or probability meetings which aren't listed here, please let us know. You can email the details to Elyse Gustafson at 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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Journals

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

Individual Memberships

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IMS Bulletin

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

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3: April/May	**March 15**	April 1	April 15
4: June/July	**May 1**	May 15	June 1
5: August	**July 1**	July 15	August 1
6: September	**August 1**	August 15	September 1
7: Oct/Nov	**September 15**	October 1	October 15
8: December	**November 1**	November 15	December 1

the next issue is

March 2020

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February 1, then
March 15

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