



September 2018

CONTENTS

- 1 **President Xiao-Li Meng's Message**
- 2–3 **Members' news:** ASA Fellows; Don Rubin, Edo Airoldi; Mike West; Richard De Veaux, Mark Glickman, Alyson Wilson, Ofer Harel
- 2 **Nominate IMS lecturers**
- 4 **IMS Vilnius meeting photos**
- 8 **Hand writing:** Administrative Data
- 10 **Undergraduate Data Science report**
- 11 **Toronto grows Statistics Department**
- 12 **Recent papers:** *Annals of Probability*; *Annals of Applied Probability*;
- 13 **Update from Stochastic Systems**
- 14 **Alison Etheridge's Presidential Address 2018:** Reflections on probability, statistics and the IMS
- 18 **Meetings**
- 22 **Employment Opportunities**
- 24 **International Calendar of Meetings**
- 27 **Information for Advertisers**

**Read it online:
bulletin.imstat.org**



New President's Message

IMS: Younger, Broader, and Deeper

Xiao-Li Meng is the IMS President for 2018–19. He writes:

No vibrant society would want as its president someone who feels entitled to the honor, or treats it as an honorary title. I am therefore honored by your trust, and shall do my best to earn the honor. No society is entitled to vibrancy either, regardless of its past laurels, without ongoing and on-target efforts by its membership and leadership. For those inclined to consider this assertion merely a new president's scare tactic, my Chicago colleague Stephen Stigler's historical account, "Does the American Statistical Association Have a Future?" (*Amstat News*, August 2004, pp 2–3), would be a timely read.

"But why should I care about IMS's vibrancy?" some of you may ask. "Duh!" perhaps is the most expected answer from any IMS president, but let's elaborate on that "Duh." Don't worry, I am not here to preach about why you shouldn't ask what IMS can do for you (you should), but rather ask what you can do for IMS (you can). Nor am I here artfully to back out of any "read-my-lips" campaign promises. I didn't make, or rather need, any. IMS decided a long while ago, wisely, that a sure way to eliminate empty campaign promises was to eliminate the campaign. "Conditioning is the soul of statistics," as my Harvard colleague Joe Blitzstein emphasizes in all his teaching. The vote of confidence I received was conditioned on $N=1$, where N is the population size of candidates determined by the nomination committee (thanks a bunch!). My previous " $N=2$ " experiences (at ASA and ISBA) reminded me that this conditional confidence should give me little confidence that the majority of IMS members actually endorse the three priorities in my candidate statement, or even know what they are. Indeed, when I asked about what to write for the President Column, I got a clear message that I should not make the obnoxious assumption that the majority of members actually know who I am. This gives me a perfect excuse to invoke $n=1$, interweaving a few personal stories with the thinking behind the three priorities. As a (reputable) statistician, I am well aware of the danger of relying on $n=1$ (or any n). My hope is that these stories can help personalize messages that otherwise may be perceived to be mostly rhetorical.

I was trained, during 1978–1982, as a pure mathematician at Fudan University in Shanghai. Like thousands of youths then in China, I was attracted to mathematics not because I understood any of its applications, but because of an inspiring article on Jingrun Chen, a mathematician who, back in the early 1970s, had made the most significant contribution towards solving the Goldbach conjecture. By comparison, the statistical profession has relied almost exclusively on the applicability and impact of statistics to attract students, researchers and the public's attention. This has been working increasingly well as we enter more deeply into the digital age. For instance, the Statistical Sciences department at the University of Toronto now attracts more

Continues on page 6

Contact information

Managing Editor: T.N. Sriram
Assistant Editor: Tati Howell
Contributing Editors:
Anirban DasGupta, Yoram Gat, David Hand, Takis Konstantopoulos, Xiao-Li Meng, Regina Nuzzo, Dimitris Politis, Kavita Ramanan and Terry Speed

Contact the IMS Bulletin by email:

e bulletin@imstat.org
w <http://bulletin.imstat.org>
f <https://www.facebook.com/IMSTATI>

Contact the IMS regarding your dues, membership, subscriptions, orders or change of address:

✉ IMS Dues and Subscriptions Office
9650 Rockville Pike, Suite L3503A
Bethesda, MD 20814-3998
USA
t 877-557-4674 [toll-free in USA]
t +1 216 295 5661 [international]
f +1 301 634 7099
e staff@imstat.org

Contact the IMS regarding any other matter, including advertising, copyright permission, offprint orders, copyright transfer, societal matters, meetings, fellows nominations and content of publications:

✉ Executive Director, Elyse Gustafson
IMS Business Office
t 877-557-4674 [toll-free in USA]
t +1 216 295 2340 [international]
f +1 216 295 5661
e erg@imstat.org

Executive Committee

President: Alison Etheridge
president@imstat.org
President-Elect: Xiao-Li Meng
president-elect@imstat.org
Past President: Jon Wellner
president-past@imstat.org
Treasurer: Zhengjun Zhang
zjz@stat.wisc.edu
Program Secretary: Judith Rousseau
rousseau@ceremade.dauphine.fr
Executive Secretary: Edsel Peña
pena@stat.sc.edu

IMS Members' News

New ASA Fellows recognised at JSM 2018 ceremony

The American Statistical Association elected 60 new Fellows this year, among whom are 16 IMS members and/or Fellows: Dipankar Bandyopadhyay, Moulinath Banerjee, Aurore Delaigle, Peter David Hoff, Bing-Yi Jing, Christina Kendzioriski, James O. Ramsay, Aleksandra B. Slavkovic, Peter X. Song, Zhiqiang Tan, Boxin Tang, Huixia Judy Wang, Lan Wang, Yichao Wu, Fang Yao and Zhengjun Zhang. Congratulations to all of them!

Fox School, Temple University, appoints Don Rubin and Edo Airoldi

IMS Fellow Don Rubin, IMS member Edo Airoldi, and Vishesh Karwa, have all joined the Department of Statistical Science at Temple University's Fox School of Business.

Donald B. Rubin, professor of statistics at Yau Mathematics Center, Tsinghua University, and professor emeritus at Harvard University, has been appointed Murray Schusterman Senior Research Fellow in the Department of Statistical Science in Temple University's Fox School of Business. Don is a fellow/member/honorary member of the Woodrow Wilson Society, Guggenheim Memorial Foundation, Alexander von Humboldt Foundation, American Statistical Association, Institute of Mathematical Statistics, International Statistical Institute, American Association for the Advancement of Science, American Academy of Arts and Sciences, European Association of Methodology, the British Academy, and the US National Academy of Sciences. He has authored or co-authored about 450 publications (including 10 books), has four joint patents, and is one of the most highly cited authors in the world, with nearly 250,000 citations

Edoardo M. Airoldi will join the Department in fall 2018 as the Millard E. Gladfelter Professor of Statistics and Data Science. He will also serve as director of the Fox School's Data Science Center. Edo comes from Harvard University, where he served since 2009 as a full-time faculty member in the Department of Statistics. He founded the Harvard Laboratory for Applied Statistics and Data Science and served as director there until 2017. Additionally, he has held visiting positions at MIT, Yale University, and Microsoft Research, and served as a research associate at Princeton University. A distinguished researcher, Edo has authored more than 140 publications with over 12,000 citations. His work focuses on statistical theory and methods for designing and analyzing experiments on large networks and, more generally, on modeling and inferential issues that arise in analyses that leverage network data in some way.

Vishesh Karwa also joined the department as an assistant professor. He is also a Patrick J. McGovern Research Fellow at the Simons Institute, Berkeley.

Nominate an IMS lecturer

The IMS Committee on Special Lectures is accepting nominations for IMS Named and Medallion Lectures. The following lectures are available for nomination in 2018:

- The 2020 Blackwell Lecturer
- The 2021 Medallion Lecturers

The deadline is **October 1, 2018**.

Information on all lectures, including how to nominate, can be found here: <http://www.imstat.org/ims-special-lectures/>

IMS Members' News

Mike West to give second Akaike Memorial Lecture

In May of 2016, the Institute of Statistical Mathematics (ISM) and the Japan Statistical Society (JSS) jointly created the Akaike Memorial Lecture Award to celebrate the outstanding achievements of the late Dr. Hirotugu Akaike. Dr. Akaike greatly influenced a wide range of research by proposing the Akaike Information Criterion (AIC) and establishing a novel paradigm for statistical modeling, which was distinguished by its predictive point of view, and was totally distinct from traditional statistical theory. The Akaike Memorial Lecture Award aims to encourage the education of talented young researchers by recognizing researchers who have achieved outstanding accomplishments that contribute to the field of statistical sciences.

The recipient of the Second Akaike Memorial Lecture Award is Professor **Mike West** of Duke University, USA. Professor West's contributions to Bayesian statistics include seminal work in dynamic modeling, and the implementation of nonparametric models that paved the way to practical data analyses via the first realization of large-scale simulation-based methods. Professor West himself has also actively worked at the frontiers of various research fields to which Bayesian statistics can be applied and contributed to the creation of data-driven sciences. For example, he established a new approach for biomarker discovery using gene expression data, thus creating a novel trend in -omics biology based on data analysis.

The award ceremony and memorial lecture will be held during the plenary session of the Japanese Joint Statistical Meeting 2018, which will take place at the Korakuen Campus of Chuo University on September 10, 2018.

More information: http://www.ism.ac.jp/ura/press/ISM2018-05_e.html



Mike West

Richard De Veaux elected ASA Vice-President

Richard De Veaux, professor of statistics at Williams College, has been elected as the American Statistical Association's Vice-President. His term begins January 1, 2019. He will serve alongside Wendy Martinez, director of the Mathematical Statistics Research Center at the Bureau of Labor Statistics, who was elected the 115th president of the ASA. In addition, **Mark Glickman** of Harvard University was elected as the Council of Sections Governing Board Representative to the ASA Board, with **Alyson Wilson** as Vice Chair; and **Ofer Harel** of the University of Connecticut as chair-elect of the Council of Sections Governing Board.

IMS Vilnius meeting

The 12th International Vilnius Conference on Probability Theory and Mathematical Statistics and the 2018 IMS Annual Meeting took place July 2–6, 2018, in Vilnius, Lithuania. The Organizing Committee co-chairs, Remigijus Leipus and Erwin Bolthausen, together with the Program Committee co-chairs, Vygantas Paulauskas and Peter Bühlmann, said, "Over 430 participants from 45 countries gave their time and resources to attend and to contribute to the meeting. Hopefully you enjoyed both the scientific part and the social program and that you used the opportunity to extend your existing networks. We are sure that cooperation with most of you will continue in near future." You can see photos from the meeting on the following pages, and you'll find more photos at <https://goo.gl/JrsKLp>.

= access published papers online

IMS Journals and Publications

Annals of Statistics: Ed George and Tailen Hsing

<http://imstat.org/aos>

<http://projecteuclid.org/aos>

Annals of Applied Statistics: Tilmann Gneiting

<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: Bálint Tóth

<http://imstat.org/aop>

<http://projecteuclid.org/aop>

Statistical Science: Cun-Hui Zhang

<http://imstat.org/sts>

<http://projecteuclid.org/ss>

IMS Collections

<http://imstat.org/publications/imscollections.htm>

<http://projecteuclid.org/imsc>

IMS Monographs and IMS Textbooks: David Cox

<http://imstat.org/cup/>

IMS Co-sponsored Journals and Publications

Electronic Journal of Statistics: Domenico Marinucci

<http://imstat.org/ejs>

<http://projecteuclid.org/ejs>

Electronic Journal of Probability: Andreas Kyprianou

<http://ejp.ejpecp.org>

Electronic Communications in Probability:

Giambattista Giacomini

<http://ecp.ejpecp.org>

Current Index to Statistics: George Styan

<http://www.statindex.org>

log into members' area at imstat.org

Journal of Computational and Graphical Statistics:

Diane Cook

<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

<http://imstat.org/ps>

<http://www.i-journals.org/ps/>

IMS-Supported Journals

ALEA: Latin American Journal of Probability and Statistics: Victor Perez Abreu

<http://alea.impa.br/english>

Annales de l'Institut Henri Poincaré (B): Gregory

Miermont, Christophe Sabot <http://imstat.org/aihpb>

<http://projecteuclid.org/aihpb>

Bayesian Analysis: Bruno Sansó

<http://ba.stat.cmu.edu>

Bernoulli: Holger Dette

<http://www.bernoulli-society.org/>

<http://projecteuclid.org/bj>

Brazilian Journal of Probability and Statistics:

Francisco Louzada Neto <http://imstat.org/bjps>

<http://projecteuclid.org/bjps>

IMS-Affiliated Journals

Observational Studies: Dylan Small

<http://www.obsstudies.org>

Probability and Mathematical Statistics: K. Bogdan,

M. Musiel, J. Rosiński, W. Szczotka, & W.A. Woyczyński

<http://www.math.uni.wroc.pl/~pms>

Stochastic Systems: Shane Henderson

<http://www.i-journals.org/ssy/>

IMS Annual Meeting in photos



Wald lecturer Luc Devroye



Peter Bühlmann's Neyman lecture started with a random distribution of chocolate!

Julius Damarackas



Yuval Peres (r) presented the Schramm lecture, with Erwin Bolthausen, Oded Schramm in the slide behind



Vilnius at nightfall



The band played on... at the IMS reception



The Carver Medal was presented to Byeong U. Park (left)



Presenting the new IMS Fellows (who could come to the meeting)



Medallion lecturer
Jean Bertoin (r) with Vladas Sidoravicius



Medallion lecturer
Svante Jansen (r) with Michal Karoński



Medallion lecturer
Thomas Mikosch (r) with Paul Embrechts



Medallion lecturer
Sonia Petrone (r) with Natesh Pillai



Medallion lecturer Richard Samworth



Medallion lecturer
Allan Sly (r) with Christina Goldschmidt



Alison Etheridge passes the President's gavel to Xiao-Li Meng with a smile



Life Sciences Centre



Even the mightiest of us
will die: a reminder inside
a baroque church



Ruth Williams delivered the Le Cam lecture
(Lucien Le Cam is on the slide behind her)



Anthony Davison (r) with Dan Cooley

Meanwhile
at JSM in
Vancouver,
there were
two more
Medallion
Lectures...



Ming Yuan

New President's Message continued

Continued from cover

than 3500 undergraduate students from all walks of (college) life to its statistical programs, apparently because of the greater job prospects; see the report on page 11. Even if only a small percentage of them end up being a card-carrying statistician or probabilist, the large denominator greatly drives up the numerator.

There is still more we can and should do, however. For instance, the pure-math community constantly attracts some of the world's most powerful minds, as well as public fascination, by emphasizing (wisely) not the job prospects of mathematicians, but the sheer intellectual challenges created by the community, from Fermat's last theorem to the twin prime conjecture. As I argued in XL-Files, <http://bulletin.imstat.org/2015/10/xl-files-more-joy-of-statistics-not-merely-job-of-statistics/>, job prospects can fluctuate greatly even for seemingly infallible fields (e.g., CS). Yet to solve world's most difficult problems, as they accumulate, requires an increasing supply of creative minds and deep thinkers. A nano-sample of such problems might include: formulating and guiding data utility and data privacy trade-off, building a general theory for cost-effective and information-preserving data preprocessing, establishing a rigorous evaluative framework for individualized treatments, analytical modeling of digital blockchain networks, coherent statistical learning with many and diverse low-resolution input, and deep understanding of deep learning. It would be a missed opportunity if we do not also emphasize their intellectual demandingness, including being harder to formulate than mathematical conjectures, when conveying their importance and impact. The joy of intellectual pursuit is catnip for brilliant minds, and IMS, being the world's leading scholarly society for mathematical statistics and probability, is a

natural home for such minds. Therefore, we should also compete for them to the fullest extent.

Young minds (of whatever biological age) are not only more curious, they are also more likely to make good use of the joy implicit in “aha” moments as fuel for the drive to overcome increasingly higher-level obstacles. In my own case, although I did well enough in middle school to forgo high school, I ran into a major learning block upon encountering the concept of open sets at college. I just couldn't comprehend the notion “open” without connecting it to a geometric object. It took a whole week for me to realize that it is fruitful to let the meaning of a property outgrow its original root. I still recall how joyful I was when I finally “got it!” My ability to engage in abstract thinking took off after that “aha” moment. I started to seek difficult abstract concepts instead of avoiding them, ultimately leading me to study abstract algebra for my senior thesis. IMS should cultivate interest from college students from around the world, and from all data science-oriented fields, who live for such moments of intellectual exhilaration. Relative to the pool of graduate students, undergraduates represent an even larger supply of extraordinary minds, with increasingly diverse backgrounds. Indeed, once when I was writing a recommendation letter for a PhD student, I had to replace “the best student” by “the best PhD student,” upon realizing that the most original thinker I ever worked with was an immigrant undergraduate student, whose senior

thesis is far deeper than my PhD thesis (and most of my publications).

When I started to take courses at Harvard in 1986, I encountered my second learning block. I was well advised, by a classmate from Fudan who had come to the

The joy of intellectual pursuit is catnip for brilliant minds, and IMS, being the world's leading scholarly society for mathematical statistics and probability, is a natural home for such minds.”

US a year earlier, to take some hard courses and some easy ones, in order to achieve a “grade-learning balance.” Unfortunately, he neglected to tell me which courses were easy and which ones were hard. Probability Theory was obviously hard, and Regression Analysis surely was on the easier side: how hard could it be to draw a reasonable line across a bunch of points? The reality opened my eyes and my mind. My homework answers on Probability Theory were used by the instructor to replace the TA's answers, thanks to years of training in getting the right answers in the most elegant and succinct ways (getting right answers would only earn partial credits then). For the regression homework, I knew how to start, but didn't know when to stop. The residual plots always had the shapes—especially when I stared at them long enough—that my textbook said I should avoid. I took log of Y , and of X , and of both of them, and sometimes log of log Y . Shapes changed, but never disappeared. The book told me to also try the square root transformation. So

I did. I also cleverly avoided taking a square root of the square root—there was something called the Box-Cox transformation. More shapes emerged, and some were more amusing than others. But the young course instructor was not amused, when I handed in about 100 pages of computer output. I was called to his office, and I was asked to explain what I had done. I was frustrated. If I had known what I was doing, would I have handed in all 100 pages?? Thankfully, my English was so poor then that soon the instructor had to let me go, saving both of us from going from regression to aggression.

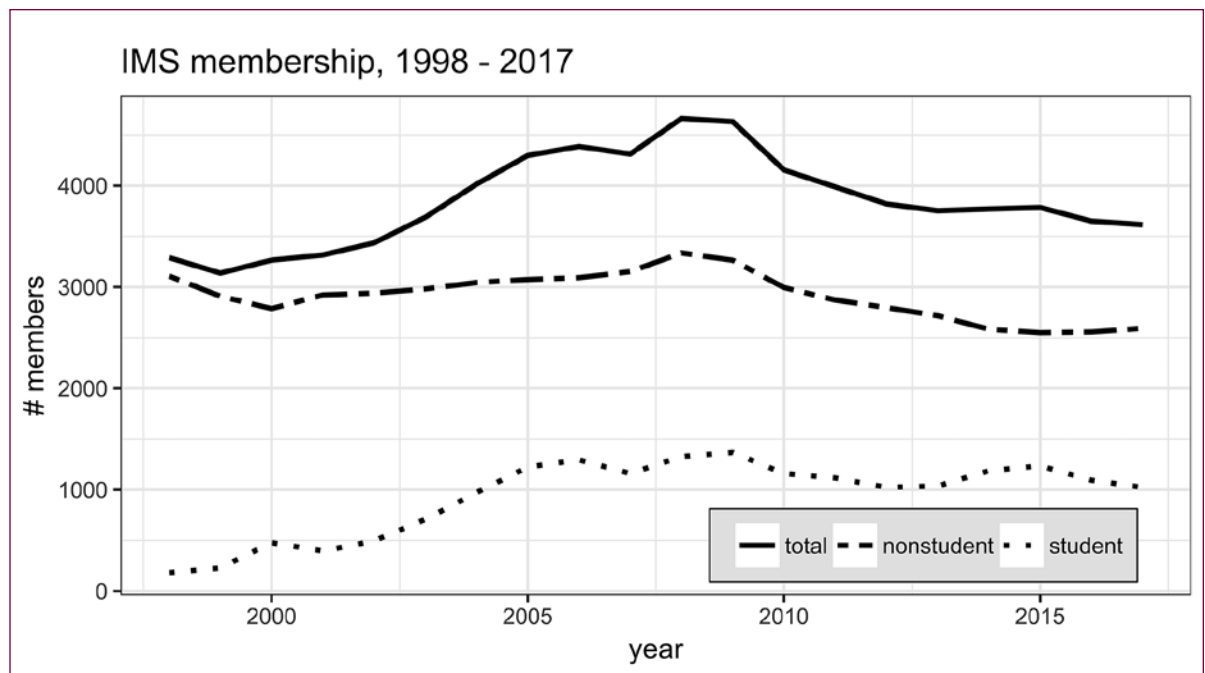
Recently, the same instructor—now a senior professor at a world class university—and I reminisced about those good old days with a few colleagues. He said that he didn't recall that encounter at all. Instead, he told everyone how once I cracked a mathematical problem for the course on the spot, a problem that he had struggled with for days. I, of course, was flattered, but didn't have the slightest memory of it. The conversation reminded me of how young minds are more likely to be impressed, not depressed or suppressed, by challenges. It is also a telling example of the effectiveness of having people with different training and experiences work together to solve challenging problems. Back then the ratio of my understanding and skills in probability to that in statistics was essentially infinite, and hence I was more useful for mathematical

and theoretical problems. By now, the ratio is essentially zero—I didn't intentionally decrease the numerator, but I have tried hard to grow the denominator. I now have a far better understanding of the residual plots (I hope!), and much deeper statistical insights with which to conduct principled corner-cuttings and formulate foundational research problems, such as those in "*A Trio of Inference Problems that Could Win You a Nobel Prize in Statistics (If You Help Fund It)*" (http://www.stat.harvard.edu/Faculty_Content/meng/COPSS_50.pdf). But to tackle these problems, I am in far more need of probabilistic and other analytical skills than the young instructor was in need of my mathematical skills more than three decades ago.

Generally speaking, foundational problems in data science require penetrating statistical and computational thinking, complex probabilistic modeling, and intricate mathematical derivations. As my predecessor, Professor Alison Etheridge, rightly and repeatedly stressed in her presidential address during the 2018 IMS

annual meeting (see page 14), there is an increasingly urgent need for statisticians and probabilists to work together as a team, within and beyond IMS, to tackle the most challenging problems in data science. She also stressed the importance of being as inclusive and supportive as possible, for example to female probabilists and statisticians. We need to work together, continuously and creatively, to ensure that IMS excels as a scholarly society for mathematical statistics and probability, establishing and sustaining a socially welcoming and intellectually supportive hub and professional network for young talents in statistics, probability, and more broadly data science. Our key aim is to facilitate collaboration and career development, especially for those who are in most need.

With these priorities in mind, I was very encouraged when NSF (the US National Science Foundation) contacted me during the JSM at Vancouver, inviting IMS to play more a leading role in conducting foundational research for data science, and in helping NSF to shape its priorities and strategies



New President's Message continued

Continued from page 7

for various data science initiatives, such as the HDR (Harnessing the Data Revolution) investment (https://www.nsf.gov/news/news_summ.jsp?cntn_id=244678&org=CI).

As a small but immediate step, I have requested the leadership of IMS Data Science Group to accelerate their efforts to organize a cross-disciplinary conference on Foundations of Data Science, and to increase their emphasis on attracting and accommodating young talents from probability, statistics, computer science, and beyond. I am also forming an IMS Task Force, consisting of probabilists and statisticians, with the charge to recommend strategies and activities aimed at building younger, broader, and deeper pipelines, in terms of demographical and intellectual spectrums. IMS is not immune to the phenomenon of declining membership; see, for example, the trends in the figure on the previous page, especially the non-student membership. Yet our vibrant future lies not only in increasing our numbers, but in enriching the scholarly community of

probabilists, statisticians, and, more broadly, data scientists. We aim to strengthen our existing foundations, as well as to break the ground within which new ones can be built.

To summarize, foundations cannot be simulated; they necessitate designing, digging, and excavating, and hence, powerful minds and muscles. If IMS is to play a more leading role in building the foundations of data science, probabilists and statisticians need to work more closely and more frequently. This aim should compel us to cultivate collaboration and communication early on in the careers of young talents, and to be as inclusive and supportive as possible in our pipeline-building effort. IMS will also serve data science, and itself, well by attracting many more extraordinary talents from all walks of life, who derive joy and develop perseverance from intellectual challenges themselves. The more broadly and deeply we can attract and engage such talents, the more effectively IMS can lead in building the foundations of data science. Our vitality depends upon exercising our

capacities to carry out the tasks right in front of us, while taking a long view of the intellectual challenges that are as yet far beyond us.

Thanks for indulging my long “Duh,” going from vibrancy to vitality. Increasingly, I find myself hoping that I am aging like Château Musar (I cannot afford Château Lafite, at least not those from Château Lafite). But there is no escape from the reality that in youth (which is both an inward and outward quality) lies vitality. I surmise that few of you would have the patience to hear yet another anecdote from my youth to illustrate this point. But in case you feel your time has been wasted reading my anecdotes, I'm happy to refund your time by reading your stories (president@ims.org), especially if they can inspire us to build, collectively, a more vibrant and vital IMS.

Until the next time (with stories from the older me), please stay young and vibrant!

Hand writing: Administrative Data



Contributing Editor David Hand, Imperial College London, examines some of the pitfalls of administrative data (information collected primarily for business or organizational, not research, purposes):

A great deal of statistical analysis is aimed at making inferences from a sample to a population. This might be with a view to predicting the value of some characteristics for previously unseen population members, for predicting future values in a series of observations, for understanding mechanisms and processes which generate the data, or for other reasons. Statistical theory, based on a sound understanding of probability developed over the past three hundred years, has given us very powerful tools for such inferences. Increasingly, however, we find ourselves faced with a rather different

data paradigm. Instead of sampled data, we now find ourselves presented with what is claimed to be *all* of the data.

For example, supermarkets do not record just some of the transactions made; details of all of them are entered in the database. Tax offices retain all of their records, not just a random sample. Schools do not test just some of their students, but all of them.

Data of this kind have been termed *administrative data* (Hand, 2018). They are data collected during the course of some administrative exercise, not primarily with a view to statistical analysis, but simply to run an operation—a supermarket, a tax system, or an education system in the examples above. But once the data have been collected, the extra cost of retaining them in a database is negligible. The data represent a sort of exhaust from the process, and can be immensely valuable for shedding light on the organisation and operation that is generating the data.

Continues on page 9

Continued from page 8

This potential has stimulated a burst of enthusiasm for the analysis of such data. In fact, it is often claimed that such data have significant advantages over traditional sampled data.

The first claimed advantage is the negligible cost of data acquisition compared with, say, conducting a survey, since the cost is already mainly borne through the administrative exercise which is driving the measurement. That is true, but effort—and hence cost—will be needed to quality assure and perhaps clean the data, as well as link them to other relevant material. Furthermore, the cost of collating a supermarket's transaction data might be negligible to that supermarket, but you try asking for the data and see if the cost is negligible to you.

Secondly, as we have already noted, for very good reasons we might expect *all* of the data to be there. It is true that all of a particular supermarket's transactions can be retained in its database. But there is more than one supermarket. Different supermarkets often tend to target slightly different population segments, so that their data sets differ in subtle ways. If your aim is to describe the past customers of the organisation for which you have data, that's fine, but if you hope to go beyond that then various imponderables arise.

Thirdly, one might justifiably expect the data to be of high quality, since otherwise the organisation is likely to go bust. A supermarket which incorrectly charges for its goods may not last long. It's true that there is no sampling variability in the data, but there will be all sorts of other issues. Product switching with new electronic self-checkouts provides an example. Here people have been seen to enter other vegetables as carrots, since carrots are

"An avocado in the hand is worth several carrots at the self-checkout," as the saying nearly goes... Switching more valuable products (like avocados) for less valuable ones (e.g., carrots) skews the administrative data collected by supermarkets.



typically the cheapest vegetables sold, far cheaper than items like avocados, for example. One supermarket even appeared to have sold more carrots than it had in stock.

There's also a more subtle (but arguably at least as important) aspect to data quality. This is that the data might not be ideal for answering your particular research question. After all, they were collected to run the organisation, not primarily for later analysis to shed light on the organisation. The definition a tax office uses for "employed" may not match the definition a social scientist would like to use.

Fourthly, and this is one of the keys of the "big data" revolution, at least in commerce and government the data will be as up-to-date as it is possible to be. Supermarket transactions enter the database essentially as soon as they are made. Contrast this with the delay of months which may arise if the data are collected by a survey. Once again, however, while the data might be instantly available to the supermarket, it is unlikely to be so readily available to external analysts.

Fifthly, administrative data tell us how people really are behaving, not how they say they behave. This suggests you cannot get any closer to social reality than with administrative data. Which is fine if that social reality is what you really want to study. Carrot misrepresentation may be social reality, but it is really a minor aspect requiring resolution as far as the macroeconomics of the supermarket are concerned.

Finally, it is claimed, administrative data necessarily provide more precise definitions than alternative sources: you know precisely the make of the vodka being sold. But the fact is that sometimes simplifications are necessary. Government trade statistics group different goods into larger classes, inevitably glossing over subtle distinctions. Credit card transactions do not record at the micro-level of the precise nature of the goods being bought.

There is no doubt that, in the face of globally declining survey response rates, new strategies for data collection have great attractions. In many ways, these alternative sources of data have properties complementary to more traditional sources. And that, of course, tells us the way forward. Combining, linking, and merging data from different kinds of sources is likely to yield more accurate and more insightful perspectives on the systems we are trying to understand.

Reference:

Hand, D.J. (2018) Statistical challenges of administrative and transaction data (with discussion). *Journal of the Royal Statistical Society, Series A*, **181**, 555–605.

Undergraduate Data Science: Opportunities and Options

Nicholas Horton (Amherst College) was a co-author of the recent National Academies consensus study report that is available for free download from <https://nas.edu/envisioningds>. He writes:

Recent years have seen the dramatic rise of data science, revolutionizing industry and science. The NSF-funded National Academies consensus report entitled *Undergraduate Data Science: Opportunities and Options* (NASEM, 2018) noted that “as more data and ways of analyzing them become available, more aspects of the economy, society, and daily life will become dependent on data.”

Much has been written on the growth of data science and the role of statistics plays within it (see for example Donoho, 2017). Historically, working in data science has required a graduate degree. However, many reports indicate a shortage of well-trained data scientists to fill new positions, with many opportunities now available to those with appropriate undergraduate training. Given the demands of the workforce, the committee, chaired by Laura Haas (University of Massachusetts/Amherst) and Al Hero (University of Michigan) was charged with setting forth a vision for undergraduate data science with a focus on applications of and careers in data science.

The second chapter of the report laid out key concepts that data science professionals need to know. Building on the work of De Veaux et al. (2017), the report proposes “data acumen” as a framework for the education of future data scientists. This requires “exposure to key concepts in data science, real-world data and programs that can reinforce the limitations of tools, and ethical considerations that permeate many applications”. The committee outlined ten (overlapping) areas fundamental to developing data acumen: *Mathematical foundations; Computational foundations; Statistical foundations; Data management and curation; Data description and visualization; Data modeling and assessment; Workflow and reproducibility; Communication and teamwork; Domain-specific consideration; and Ethical problem solving.*

Mathematics is essential to data science, but questions remain about what type and how much mathematics is needed for bachelors’ graduates. The committee identified key concepts that would be important for all students, including set theory and basic logic; multivariate thinking (via functions and graphical displays); basic probability theory and randomness; matrices and basic linear algebra; networks and graph theory; and optimization.

Statistics was also seen as foundational to data science. Key concepts identified by the committee include variability, uncertainty, sampling error, and inference; multivariate thinking; non-sampling error, design, experiments, biases, confounding, and causal inference; exploratory data analysis; statistical modeling and model

assessment; and simulations and experiments.

The third chapter of the report focused on how to develop courses (e.g., data science for all, introduction to data science) and programs (e.g., certificates, minors, and majors) that would provide flexible pathways to students. The fourth chapter reviewed challenges and barriers that need to be addressed in developing data science programs. The fifth chapter reiterated the key role that formative and summative assessment and faculty development plays in advancing data science.

What are the implications of the report and the growth of undergraduate data science for statisticians and the IMS? De Veaux et al (2017) noted that: “Students should understand the basic statistical concepts of data collection, data wrangling, data analysis, modeling, and inference. ... Successful graduates should be able to apply statistical knowledge and computational skills to formulate problems, plan data collection campaigns or identify and gather relevant existing data, and then analyze the data to provide insights.”

More work is needed to create courses and flexible pathways that can provide sufficient mathematical and statistical background without a long succession of prerequisite courses, while also ensuring that students have strength in algorithmic thinking, data technologies, and domain knowledge.

The report notes that data science is in a formative development stage with robust growth likely. Academic institutions are recommended to “embrace data science as a vital new field” and “provide and evolve a range of educational pathways to prepare students for an array of data science roles in the workplace” (NASEM, 2018).

More discussion is also needed about future preparation at the graduate level, to ensure that interested data science graduates at the bachelors’ level are able to matriculate and successfully complete doctoral programs in statistics.

At a time when many (most?) institutions are pioneering data science programs, it is important for mathematical statisticians to ensure that they are part of the process of attracting students with varied backgrounds and degrees of preparation and preparing them for success in a variety of careers.

References:

- De Veaux, R., et al. (2017). Curriculum guidelines for undergraduate programs in data science, *Annual Review of Statistics and its Applications*, 4:15-30. <https://www.annualreviews.org/doi/abs/10.1146/annurev-statistics-060116-053930>.
- Donoho, D. (2017). 50 Years of Data Science, *Journal of Computational and Graphical Statistics*, 26:4, 745–766. doi: 10.1080/10618600.2017.1384734.
- National Academies of Sciences, Engineering, and Medicine (2018). *Data Science for Undergraduates: Opportunities and Options*. Washington, DC: The National Academies Press. doi: 10.17226/25104.

Growing Pains and Gains in Statistics, the Toronto Way

Radu V. Craiu is Professor and Chair of the Department of Statistical Sciences at the University of Toronto. He writes:

These are interesting times for statistical science departments throughout the world. The demand for a statistician's expertise is at an all-time high across a multitude of sectors: tech, finance, health and, not least, government and academia. This gives us the power to grow and prosper as long as we can adapt quickly enough to a rapidly changing environment that may seem challenging to the more traditional aspects of our culture.

But I bring good news from Toronto! Just like our city has had to manage enormous growth over the last decade, so has our department had to navigate the tumultuous waters of growth and change that carry potential hazards but also great promises. So how did the University of Toronto's department of statistical sciences manage to accelerate from (at most) two job searches a year to over 30 in the last five years, and build a large network of joint interests with other departments, including the usual suspects e.g., Computer Science and Public Health, but also Astronomy and Astrophysics, Information sciences, Psychology and Sociology, to name just a few? Read on.

The story begins about eight years ago when the world learned from Google leader Hal Varian that statisticians will be the sexiest professionals at the vortex of tech revolutions engulfing the world. Subsequently, the world learned that Data Science is much more than a semi-pleonastic association of terms. From Tukey's wishful thinking—nicely summarized in David Donoho's 2015 ("50 Years of Data Science", *JCGS* 2017) seminal piece that went viral before it even hit the printing presses—to Silicon Valley's high demand for scientists able to swim in a sea of data,

emerged a vague, yet seductive idea about the kind of training that is suitable for the modern world. It turns out that *ideal* is a multifarious scientist capable of handling superhuman computing tasks and juggling sound statistical methods while building authoritative subject-matter knowledge that can impact scientific discovery.

Incoming students at the University of Toronto have heard the call loud and clear which is why our specialist, major and minor programs have exploded in size. Since 2012, our undergraduate programs have *yearly* increased by 25–40 percent, leading to the current cohort of over 3,500 statistics major, minor and specialist students. Yes! You have read those numbers correctly, and if it gives you pause as a neutral observer, imagine how *we* felt.

The pressure on our department has been enormous. Instead of panicking, the former chair of our department, James Stafford, has coordinated an ambitious plan to develop professional Master of Science programs, make numerous joint hires with other data-rich programs in the University and develop a strong undergraduate teaching culture with new course initiatives that have quickly turned us into a showcase for the Faculty of Arts and Sciences. A quick visit to our webpage (www.utstat.toronto.edu) will reveal the extent of these successful initiatives and the unparalleled (to my knowledge) growth of our department. We have currently over 30 research- and

teaching-stream faculty in the department, working in statistics and its intersections with computer science (machine learning, visualization, neural nets, etc.) and other disciplines, such as sociology, genetics, neuroscience, public health and more. These departments have a genuine need to make sense of their data, usually big piles of them. In turn, working with other departments opens new horizons for our faculty, introducing them to interesting problems and allowing our department to grow in directions that would have remained unexplored otherwise. The mantra "follow the data" has never been more fitting than now.

Of course, these innovations could have led to many outcomes, somewhat less scintillating. As we take a retro- and prospective look at our evolution, we realize that at the core of our story lie a penchant for data-driven vision augmentation as well as many wonderful students, faculty and staff, who have bootstrapped this department into becoming an important center for Data Science research and education.

Speaking of very good people, I would like to encourage your undergraduate trainees to apply to our graduate program, while we invite applications from your PhD students and postdocs for our eight open positions.

Tell us what's happening
in **YOUR** department!

Thriyambakam Krishnan: 1937–2018

Anirban DasGupta, Purdue University, writes: Thriyambakam Krishnan, former Dean of Academic Studies and Professor at the Indian Statistical Institute, passed away in Chennai, India on July 4; he was 81. Jointly with G.J. McLachlan he authored the masterly and popular Wiley text on the EM algorithm and its applications. Dr. Krishnan, a PhD student of C.R. Rao, specialized in experimental design, classification, and unsupervised clustering during the early years. He served as consulting statistician to Systat and to Mu-Sigma in India. At the time of his death, he was still teaching courses in probability and statistics at the Chennai Mathematical Institute.

Recent papers : two IMS journals

Annals of Probability

The *Annals of Probability* publishes research papers in modern probability theory, its relations to other areas of mathematics, and its applications in the physical and biological sciences. Emphasis is on importance, interest, and originality—formal novelty and correctness are not sufficient for publication. The Annals also publishes authoritative review papers and surveys of areas in vigorous development.

Access papers at <https://projecteuclid.org/info/euclid.aop>

Volume 46, No 4, July 2018

Limit theorems for Markov walks conditioned to stay positive under a spectral gap assumption	ION GRAMA, RONAN LAUVERGNAT, AND ÉMILE LE PAGE; 1807 - 1877
The fourth moment theorem on the Poisson space	CHRISTIAN DÖBLER AND GIOVANNI PECCATI; 1878 - 1916
Anchored expansion, speed and the Poisson–Voronoi tessellation in symmetric spaces	ITAI BENJAMINI, ELLIOT PAQUETTE, AND JOSHUA PFEFFER; 1917 - 1956
Optimal bilinear control of nonlinear stochastic Schrödinger equations driven by linear multiplicative noise	VIOREL BARBU, MICHAEL RÖCKNER, AND DENG ZHANG; 1957 - 1999
Random partitions of the plane via Poissonian coloring and a self-similar process of coalescing planar partitions	DAVID ALDOUS; 2000 - 2037
Scaling limit of two-component interacting Brownian motions	INSUK SEO; 2038 - 2063
Large excursions and conditioned laws for recursive sequences generated by random matrices	JEFFREY F. COLLAMORE AND SEBASTIAN MENTEMEIER; 2064 - 2120
Phase transition for the Once-reinforced random walk on \mathbb{Z}^d -like trees	DANIEL KIOUS AND VLADAS SIDORAVICIUS; 2121 - 2133
The Brownian limit of separable permutations	FRÉDÉRIQUE BASSINO, MATHILDE BOUVEL, VALENTIN FÉRAY, LUCAS GERIN, AND ADELIN PIERROT; 2134 - 2189
Critical density of activated random walks on transitive graphs	ALEXANDRE STAUFFER AND LORENZO TAGGI; 2190 - 2220
Indistinguishability of the components of random spanning forests	ÁDÁM TIMÁR; 2221 - 2242
Weak symmetric integrals with respect to the fractional Brownian motion	GIULIA BINOTTO, IVAN NOURDIN, AND DAVID NUALART; 2243 - 2267
On the spectral radius of a random matrix: An upper bound without fourth moment	CHARLES BORDENAVE, PIETRO CAPUTO, DJALIL CHAFAÏ, AND KONSTANTIN TIKHOMIROV; 2268 - 2286
Stochastic Airy semigroup through tridiagonal matrices	VADIM GORIN AND MYKHAYLO SHKOLNIKOV; 2287 - 2344
On the mixing time of Kac’s walk and other high-dimensional Gibbs samplers with constraints	NATESH S. PILLAI AND AARON SMITH; 2345 - 2399
Errata to “Distance covariance in metric spaces”	RUSSELL LYONS; 2400 - 2405

Annals of Applied Probability

The *Annals of Applied Probability* aims to publish research of the highest quality reflecting the varied facets of contemporary Applied Probability. Primary emphasis is placed on importance and originality.

Access papers at <http://projecteuclid.org/euclid.aop>

Volume 28, No 4, August 2018

Mixing times of random walks on dynamic configuration models	LUCA AVENA, HAKAN GÜLDAŞ, REMCO VAN DER HOFSTAD, AND FRANK DEN HOLLANDER; 1977 - 2002
Consistency of modularity clustering on random geometric graphs	ERIK DAVIS AND SUNDER SETHURAMAN; 2003 - 2062
Critical parameter of random loop model on trees	JAKOB E. BJÖRNBERG AND DANIEL UELTSCHI; 2063 - 2082
Order statistics of vectors with dependent coordinates, and the Karhunen–Loève basis	ALEXANDER E. LITVAK AND KONSTANTIN TIKHOMIROV; 2083 - 2104
Beating the omega clock: An optimal stopping problem with random time-horizon under spectrally negative Lévy models	NEOFYTOS RODOSTHENOUS AND HONGZHONG ZHANG; 2105 - 2140
Mutations on a random binary tree with measured boundary	JEAN-JIL DUCHAMPS AND AMAURY LAMBERT; 2141 - 2187
N -player games and mean-field games with absorption	LUCIANO CAMPI AND MARKUS FISCHER; 2188 - 2242
Hypoelliptic stochastic FitzHugh–Nagumo neuronal model: Mixing, up-crossing and estimation of the spike rate	JOSÉ R. LEÓN AND ADELIN SAMSON; 2243 - 2274
Exceptional times of the critical dynamical Erdős–Rényi graph	MATTHEW I. ROBERTS AND BATI ŞENGÜL; 2275 - 2308
Which ergodic averages have finite asymptotic variance?	GEORGE DELIGIANNIDIS AND ANTHONY LEE; 2309 - 2334
A stochastic Stefan-type problem under first-order boundary conditions	MARVIN S. MÜLLER; 2335 - 2369

Continues on page 13

Annals of Applied Probability continued**Vol 28, No 4, August 2018**Continued from **page 12**

Stochastic approximation of quasi-stationary distributions on compact spaces and applications.	MICHEL BENAÏM, BERTRAND CLOEZ, AND FABÏEN PANLOUP; 2370 - 2416
Glivenko–Cantelli theory, Ornstein–Weiss quasi-tilings, and uniform ergodic theorems for distribution-valued fields over amenable groups.	CHRISTOPH SCHUMACHER, FABÏAN SCHWARZENBERGER, AND IVAN VESELIĆ; 2417 - 2450
Polynomial jump-diffusions on the unit simplex	CHRISTA CUCHIERO, MARTIN LARSSON, AND SARA SVALUTO-FERRO; 2451 - 2500
Rapid mixing of geodesic walks on manifolds with positive curvature	OREN MANGOUBI AND AARON SMITH; 2501 - 2543
Convergence and qualitative properties of modified explicit schemes for BSDEs with polynomial growth	ARNAUD LIONNET, GONCALO DOS REIS, AND LUKASZ SZPRUCH; 2544 - 2591
Uniform control of local times of spectrally positive stable processes	NOAH FORMAN, SOUMIK PAL, DOUGLAS RIZZOLO, AND MATTHIAS WINKEL; 2592 - 2634

Stochastic Systems: An Update



Shane Henderson (Cornell University) is Editor-in-Chief of *Stochastic Systems*, an IMS-affiliated journal. He writes:

After more than six years being published through a cooperative agreement between the IMS and the Institute for Operations Research and the Management Sciences

(INFORMS) Applied Probability Society (APS), *Stochastic Systems* has become an INFORMS journal. The mission of the journal remains the same: *Stochastic Systems* is the flagship journal of the APS. It seeks to publish high-quality papers that substantively contribute to the modeling, analysis, and control of stochastic systems. A paper's contribution may lie in the formulation of new mathematical models, in the development of new mathematical or computational methods, in the innovative application of existing methods, or in the opening of new application domains. *Stochastic Systems* is **open access** and there are **no submission fees or page charges**.

Relative to other applied probability outlets, *Stochastic Systems* focuses exclusively on operations research content. Relevant work includes, for example, queueing, and papers that explore the ties between applied probability and statistics, optimization, or game theory. (These are just a few examples.) We are also interested in papers in a range of application areas, including, but not limited to, service operations, healthcare, logistics and transportation, communications networks (including the Internet), computer systems, finance and risk management, manufacturing operations and supply chains, market and mechanism design, revenue management and pricing, the sharing economy, social networks, and cloud computing.

The editorial board provides direct evidence of our breadth of interests, and if you don't see someone in an area that covers your paper, then why not contact me (sgh9@cornell.edu)? I'll provide you with a quick decision about relevance of your paper to the journal.

Why should you publish your work in *Stochastic Systems*?

1. All papers published in *Stochastic Systems* are **open access**. There are **no submission fees or page charges**. Published papers are available at <http://pubsonline.informs.org/journal/stsy> where you can also find author guidelines and much more.
2. *Stochastic Systems* aims to return reviews to authors within three months of submission, and to publish articles online within two months of acceptance. I am proactive in striving to keep to this timetable. Issues appear quarterly.
3. The editorial board of *Stochastic Systems* includes several IMS members. Indeed, one of our goals in publishing the journal is to strengthen the ties between the IMS and the APS.
4. *Stochastic Systems* is publishing, and will continue to publish, work of the highest quality. This quality is in evidence in its editorial board, which includes five Fellows of INFORMS (Jim Dai, Paul Glasserman, Peter Glynn, John Tsitsiklis, Ruth Williams), three Fellows of the IMS (Dai, Glynn, Williams), three Fellows of the IEEE (Bruce Hajek, R. Srikant and Tsitsiklis), and four members of the National Academy of Engineering (Glynn, Hajek, Frank Kelly, Tsitsiklis)! See the journal website for the full editorial board.

I'm looking forward to receiving your submission. Submit your work at <http://mc.manuscriptcentral.com/ssy/>

Reflections on probability, statistics and the IMS

Alison Etheridge gave this Presidential Address at the IMS annual meeting in Vilnius in July.



So, how was I going to write a Presidential address? The best way to start seemed to be to see what my predecessors had said, and so I took to the internet. There I found a series of articulate and thoughtful pieces, each addressing issues of importance to our profession, with, understandably, a particular recent emphasis on data science. I was

left more than a little intimidated. I toyed with trying to convince the authors that plagiarism was the highest form of flattery, but decided that this was not an appropriate solution, and so, instead, what follows is a somewhat more personal reflection on statistics, probability and, of course, the IMS.

Nonetheless, I shall draw upon the 2015 address of Erwin Bolthausen. Erwin opened with a question:

If one opens any scientific work about a topic where statistics plays a role, there are usually probabilistic concepts behind.

How does it then come that probability theory and statistics, in research, have become more and more separated? The answer is to some extent evident:

- *Probability theory has nowadays many relations with other mathematical fields, and also with applied fields outside statistics.*
- *For modern statistics, probability is just one crucial basis, but there are many more, often also non-mathematical ones. For instance, one has to decide which probabilistic models lead to computational feasible procedures, and still mirror the reality close enough. This cannot be answered by probability theory.*

He then goes on to remark on the lack of statistical training amongst probabilists, at least in Europe, and to say that:

I think that in the modern development of probability, the relations with pure mathematics and with mathematical physics have become stronger than those with statistics.

I would perhaps put a slightly different *spin* (a pun for those who have read Erwin's excellent summary of some of the most spectacular developments of modern probability theory) on the situation. And, of course, given my own research interests, I have to mention the tremendous impact that biology has had on all of the mathematical (including statistical) sciences.

It is true that both statistics and probability have grown at an unprecedented rate in recent years—we are told that this is the golden age of statistics; equally, we see probabilistic approaches

underpinning huge swathes of modern mathematics. And, conversely, statistics and probability are calling upon a broader and broader range of techniques from the rest of the mathematical sciences—for example, one needs a far greater understanding of abstract algebra than mine to really come to grips with rough paths (or more generally, Martin Hairer's regularity structures). In turn, the father of rough paths, Terry Lyons, now spends a large part of his time at the Alan Turing Institute in London (the UK's National Institute for Data Science and Artificial Intelligence), developing applications of rough paths to data science.

The importance of statistical and probabilistic techniques across science has never been more widely recognised. I thought that I'd share a quote, which I learned from Sebastian Schreiber, from the Department of Ecology at UC Davis. It is from the English poet and dramatist John Gay (1685–1732):

Lest men suspect your tale untrue, Keep probability in view.

I confess that including this here is a little gratuitous, but I rather like it. (I'm also trying to match Erwin's earliest citation. I'm failing of course: Erwin referenced *Ars Conjectandi*, published in 1713, but this quote is from "*The painter who pleased everybody and nobody*", Fable XVIII in Gay's first book of fables, published in 1727.) Here's the whole of the first verse:

Lest men suspect your tale untrue, Keep probability in view.

The traveller leaping o'er those bounds, The credit of his book confounds.

Who with his tongue hath armies routed, Makes even his real courage doubted:

But flattery never seems absurd; The flattered always take your word:

Impossibilities seem just; They take the strongest praise on trust.

It seems to me that, despite when he lived, Gay had the makings of a statistician as well as a politician. And perhaps there is a lesson for data science there. Gay tells us that if we make unrealistic claims, people won't even believe in the results and applications that we really do have. Certainly a very large part of the UK Industrial Strategy seems to be founded upon the claim that data science (and perhaps more especially AI and Machine Learning) is the solution to all our economic and social woes; but if we are really to rely upon data science as an underpinning technology in our daily lives, so that those lives very literally depend upon it, then it must maintain its scientific integrity: "Keep probability in view".

My point is that I don't think that it is a problem that each and every one of us is part of a huge intellectual landscape, of which we

only *really* understand some very small part. In fact, we have been in this boat for a long time. Science is a massive continuum; gone are the days of renaissance (usually) man, mastering all of natural philosophy (and probably writing a few poems on the side). There is simply too much of it. As long as we can communicate with one another, we can combine our expertise, often to stunning effect.

When I was a young Research Fellow in Oxford, in the College where the great mathematician G.H. Hardy had been a Professor, other Fellows were a little too fond of reminding me that Hardy had believed that mathematicians did all their great work before the age of forty.

Young men should prove theorems, old men should write books.

I found this rather depressing—but a distinguished Professor, already considerably beyond his best-before date if we were to believe Hardy, explained to me that yes, mathematical scientists are supposed to be at the height of their computational powers when young, but there is also a “knowledge” distribution—as we grow older we know more and more (I confess that I am no longer convinced that this increases indefinitely); our power as scientists is a convolution of these distributions. In fact, these days many of us work in teams; we can combine the breathtaking speed and skill of our students with the knowledge and experience of scientists with complementary expertise. Some of our colleagues, especially at the more applied end of the field, are involved in huge collaborations. They are just one part of a complex picture—but a vital part.

We also have to be open to the idea that work of no immediate obvious practical benefit may still be of lasting importance. Hardy, of course, believed that mathematics would never be of any practical use and indeed he took pride in this:

No discovery of mine has made, or is likely to make, directly or indirectly, for good or ill, the least difference to the amenity of the world.

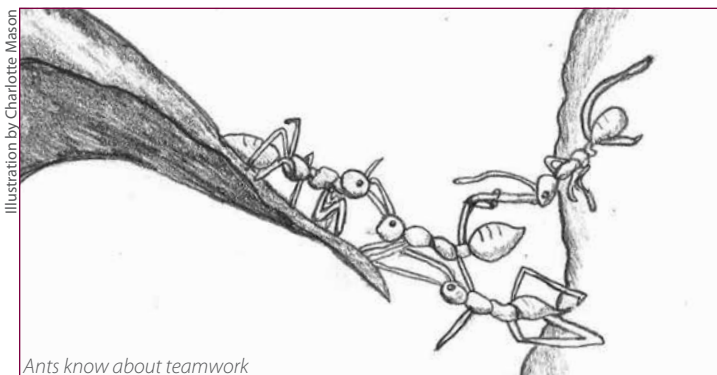
He was wrong, of course; his work has been of tremendous practical importance. But he also knew about teams (not just through his cricket team, “the Mathematics”). He collaborated widely and, especially impressive for the time, internationally. His network included

Pólya, Cramér, Wiener. I wonder how he would have felt to learn that probably more people know his name through the Hardy–Weinberg equilibrium than through his profound contributions to analysis and number theory.

Teamwork requires a team. That in turn requires the networks that Hardy so successfully cultivated. And I claim that here the IMS has two important roles to play. The first, most obvious, is to facilitate and cultivate those networks (at least within statistical science). This is the purpose of **IMS groups**. They have suffered varied fates, but what is clear is that the responsibility for running a group cannot rest on a single person’s shoulders indefinitely—without some sort of scaffold, the whole thing lasts for as long as the energy of its founder. So when Sofia Olhede and Patrick Wolfe offered to take over the **Data Science Group** last year, we agreed that we would put in place a minimal governance structure, borrowed to some extent from that of the highly successful **New Researchers Group**. If, as I hope, the group flourishes, then their terms of reference can provide a loose template for others.

Crucially, the Data Science Group has an executive committee that not only reflects the geographic diversity of the IMS, but also the immense range of interests overlapping data science, including high-dimensional statistics, biostatistics, algebraic statistics, Bayesian methods, big observational data, probabilistic methods, and post-secondary education in data science. We really want this to succeed, and I’d like to thank Sofia and Patrick for everything that they have done so far—anyone who has put together a scientific program committee will know just how hard it is to achieve subject, geographic, and gender diversity, but with their executive committee they have managed just that. It has taken a while for us to get this far, but the Data Science Group has an email address [datascience@imstat.org] and a website [http://groups.imstat.org/datascience/], and a session set up at the JSM in Vancouver; and much more is planned for next year.

Groups are only one way in which the IMS can help. The pressure on less established (and possibly also more established) researchers is to publish large numbers of papers, which in turn incentivizes a very narrow and specialized view. This can lead to a very distorted view of the world. Another distinguished Oxford mathematician had a very nice allegory of this. Imagine you are in a dark room. You turn on a lamp at your desk and the objects that are illuminated suddenly seem large and important. If I move the light and shine it somewhere else, other objects take on more importance. When someone turns on the overhead light, I see that everything is equally important (and that what I was looking for was not under my light at all). Although most of us will always be rather specialized, we need to be able to stand back and take a broader view.



Ants know about teamwork

Presidential Address continued

Of course, the annual **IMS New Researchers Conference** is a great contribution here—people from very different backgrounds meet and exchange scientific ideas, as well as tips on how to navigate the treacherous waters of academia, in a relaxed environment. But this only reaches a relatively small number of people. Another extremely important contribution is through our scientific programmes and, in particular, the special lectures. The **IMS Medallion and named lectures** (some in collaboration with the Bernoulli society) provide an opportunity to showcase, at an accessible level, some of the most exciting research from across our discipline. More thanks are certainly in order here, both to the New Researchers Group, for inviting me along to their meeting again this year, and to the Committee on Special Lectures, who have once again put together a phenomenal slate of lectures.

I want to say a little more about governance. I have spent much of my academic life in Oxford. If anyone wants to learn about the ways in which an Oxbridge [i.e. Oxford or Cambridge] College is governed, they should take a look at *Microcosmographia academica*, written by Francis Cornford, the husband of Charles Darwin's daughter Frances. It is a satire on university politics which came out in 1908, but in places it still rings very true. Cornford is very good at drawing out the reasons for doing nothing. I particularly like the Principle of Unripe Time: the argument is that although a particular action should be taken, now is not quite the right moment to take it. He goes on to say,

Time, by the way, is like the medlar [a fruit]; it has the trick of going rotten before it is ripe.

The extraordinarily long institutional memories in Oxbridge Colleges, combined with the application of Cornford's principles of academic government, can make it extremely difficult to elicit change. The IMS has almost the opposite problem. For us, institutional memory is rather short. We (rightly) have three year terms of office on essentially all our committees, and because we are spread across the globe, new

The medlar, a once-common fruit that becomes edible once it has "bled" or rotted, as the middle fruits show, below.

Photo by Takkk (<https://commons.wikimedia.org/w/index.php?curid=12683754>)



members of committees don't routinely run into old-timers and gossip at the water cooler.

Here, I want to point to a specific issue. We have just announced the election of a list of twenty fantastic new Fellows. Every single one of them is an outstanding scientist and deserves their election. However, there are only two women among them. This is not the fault of the Committee on Fellows, who performed their charge admirably; only two women were in fact nominated. This prompted us to take a look at nominations over a longer period and we see a cyclical trend. It seems to be that numbers fall, action is taken (probably by an individual), numbers increase, things look fine, everyone relaxes, numbers fall.

I have never thought of myself as a diversity champion, and don't find it to be a particularly comfortable role. Indeed, I find the issues to be extremely difficult. But in 1867 the British philosopher and political theorist John Stuart Mill delivered an inaugural address at the University of St Andrews in which he said,

Let not any one pacify his conscience by the delusion that he can do no harm if he takes no part, and forms no opinion.

He goes on to say something similar to a dictum often (incorrectly it seems) attributed to the British statesman Edmund Burke around 1800:

All that is required for the triumph of evil is that good men do nothing.

Evil is a strong word. Even Cornford only regarded women as the *second* most dangerous threat to the young academic; young men in a hurry (those data scientists not paying heed to the statistical underpinnings, perhaps?) came in at number one—but it is certainly wrong that more women are not being nominated. Burke did say something relevant:

No man, who is not inflamed by vain-glory into enthusiasm, can flatter himself that his single, unsupported, desultory, unsystematic endeavours are of power to defeat [evil].

So I am certainly, rather belatedly, willing to step forward and do my bit. But I can't do it alone and I have been trying to get some structures in place to help us to break the cycle. Council has agreed guidelines on unconscious bias and conflicts of interest for all our committees, and to the creation of a diversity committee. But we all need to be much more proactive, especially in seeking nominations.

I hope that an allegory of my own will prove appropriate. There is a very famous bridge in Cambridge, England, often called "the mathematical bridge." It was designed not, as many believe, by Newton, but by William Etheridge (a distant relative) in 1748, and built by James Essex in 1749. The design is based on that of the wooden structures used at the time as supports upon which to build stone bridges.



The Mathematical Bridge, in Cambridge, UK, joins the two sides of Queens' College. There is a popular myth that Isaac Newton designed the bridge. He didn't: Newton died in 1727; the bridge was built (actually by a distant relative of Alison's, William Etheridge) in 1749, and there is no record of Newton being involved at any stage, either before or after his death.

Etheridge himself was a carpenter who worked on the building of the first bridge to cross the River Thames at Westminster in London. He is credited with inventing an underwater saw to cut through the piles that ran down into the riverbed, so that once the stone bridge was complete, the wooden supporting structure could be lowered into the water and floated away. Maybe one day we'll be able to allow the diversity bridge to float down the river...

Diversity means much more than gender. Diversity is ethnicity, geography, discipline, Our strength as a society comes from that diversity. It is not without its challenges, but equally there is no doubting the rewards. It is also not just about diversity among the Fellows and across our scientific programme; we need diversity across our membership—the broadening of the membership is lagging behind the broadening of our journals. Part of the issue in Europe is the division between mathematics and statistics in our degree structures and training. Erwin pointed to the lack of statistical training among European probabilists and I think this leads to a lack of proper appreciation and respect. I'm sure that when I was a graduate student I would have taken much less pride in my own intellectual "family tree" than I do now: I was supervised by David Edwards, who led the functional analysis group in Oxford. He was supervised by David Kendall, who was supervised by Maurice Bartlett, and continuing backwards we have John Wishart, Karl Pearson and Sir Francis Galton. Not a bad line-up. In fact, I only discovered this fairly recently and realised that, far from being rebellious and striking out on my own when I left Oxford and functional analysis behind, in this company I was merely reverting to type. I have heard some question the relevance of the IMS to probabilists (although I notice that those asking routinely publish in our journals). I am still far from being a statistician—most of my work is either concerned with

infinite-dimensional stochastic processes or population genetics (or more likely both) and I am still acutely aware of my lamentable lack of knowledge of statistics—but that doesn't reduce the relevance of the IMS to me. In fact, I had a quick scan of the papers I've written in the last couple of years and realised that I had used results of at least six past-Presidents, in the last two years, not to mention the person who talked me into accepting the role of President, and several of our new Fellows. And, yes, I try to publish in our journals, because they are simply the best.

I'd like to reiterate to non-members that by joining the IMS, one is in a position to help shape the scientific programme, the future of our journals, and the contribution to the profession of this great society.

Fortunately, I didn't set out with grand aims when I accepted the gavel from Jon just under a year ago. I hope that some of the things that have been initiated will reach fruition over the next year. Of course, Presidents don't do the real work, all they do is set up an *ad hoc* committee and issue them with a charge, and I would like to say a huge thank you to all those colleagues who responded so generously to my requests for input, especially the very large number who I have only ever 'e-met', and so have never been able to thank in person.

As I come to the end of my term as President, I still have an immense sense of pride in the IMS. And so I'll end by plagiarising my own piece in the *Bulletin* a year ago: The IMS is a badge of academic quality; we publish outstanding journals and our Committee on Special Lectures have once again excelled themselves in their contribution to the scientific programme. But most of all, the IMS is a community of scholars that supports and nourishes talent from right across the spectrum of our discipline. Long may it thrive!

IMS meetings around the world

Joint Statistical Meetings: 2018–2023

IMS sponsored meeting

IMS Annual Meeting @ JSM 2019

July 27–August 1, 2018. Denver, CO, USA.

[w](http://ww2.amstat.org/meetings/jsm/2019/) <http://ww2.amstat.org/meetings/jsm/2019/>

We hope you'll join us in Denver for the 2019 IMS Annual Meeting, in conjunction with the Joint Statistical Meetings. With more than 6,500 attendees (including over 1,000 students) from 52 countries, and over 600 sessions, it's a busy few days! The theme this year is "Statistics: Making an Impact."



IMS sponsored meetings: JSM dates for 2020–2024

JSM 2020	IMS Annual Meeting	2022 Joint Statistical
August 1–6, 2020	@ JSM 2021	Meetings
Philadelphia, PA	August 7–12, 2021,	August 6–11, 2022
	Seattle, WA	Washington DC

IMS Annual Meeting	JSM 2024
@ JSM 2023	August 3–8, 2024
August 5–10, 2023	Portland, Oregon
Toronto, ON, Canada	

NEW

IMS co-sponsored meeting

NEW

The Tenth International Conference on Matrix-Analytic Methods in Stochastic Models

February 13–15, 2019

The University of Tasmania, Hobart, Australia

[w](http://www.maths.utas.edu.au/People/oreilly/mam/mam10.html) <http://www.maths.utas.edu.au/People/oreilly/mam/mam10.html>

IMS Representative on Program Committees: Mark Squillante
Matrix-Analytic Methods in Stochastic Models (MAM) conferences aim to bring together researchers working on the theoretical, algorithmic and methodological aspects of matrix-analytic methods in stochastic models and the applications of such mathematical research across a broad spectrum of fields, which includes computer science and engineering, telephony and communication networks, electrical and industrial engineering, operations research, management science, financial and risk analysis, bio-statistics, and evolution.

Keynote speakers: Søren Asmussen, Jevgenijs Ivanovs, Giang Nguyen, Zbigniew Palmowski and Phil Pollett.

Short Abstract submission deadline is September 15, 2018: see submission instructions at <http://www.maths.utas.edu.au/People/oreilly/mam/register.html>

IMS Sponsored meeting

Bernoulli/IMS 10th World Congress in Probability and Statistics

August 17–21, 2020. Seoul, South Korea

[w](#) TBC

Program chair is Siva Athreya and the Local chair is Hee-Seok Oh.

IMS co-sponsored meeting

NEW

20th INFORMS Applied Probability Society Conference

July 3–5, 2019

Brisbane, Australia

[w](http://informs-aps.smp.uq.edu.au/) <http://informs-aps.smp.uq.edu.au/>

The plenary speakers for the conference are: Charles Bordenave, Université de Toulouse, France (IMS Medallion Lecturer); Ton Dieker, Columbia University; Nelly Litvak, University of Twente and Eindhoven University of Technology, Netherlands; and Sidney Resnick, Cornell University (Marcel Neuts Lecturer).

A number of related events are being held before and after this conference: *Queues, Modelling, and Markov Chains: A Workshop Honouring Prof. Peter Taylor*, June 28–30 at Mount Tamborine, Queensland. *Applied² Probability*, July 2 at The University of Queensland, Brisbane. *12th International Conference on Monte Carlo Methods and Applications (MCM2019)*, July 8–13 in Sydney, Australia.

At a glance:

forthcoming
IMS Annual
Meeting and
JSM dates

2019

IMS Annual Meeting

@ JSM: Denver,
July 27–August 1,
2019

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,
August 6–11,
2022

2023

IMS Annual Meeting

@ JSM: Toronto,
August 5–10,
2023

IMS co-sponsored meeting**Michigan State Symposium on Mathematical Statistics and Applications: From time series and stochastic, to semi- and nonparametrics, and to high-dimensional models****September 14–16, 2018****Henry Center for Executive Development, Michigan State University****w** <https://stt.msu.edu/MSUStatSymposium2018/>**e** MSUStatSymposium2018@stt.msu.edu

The 2018 Michigan State Symposium is a conference designed around the scientific legacy of Prof. Hira L. Koul, who was a member of MSU's department of statistics and probability for decades. The scientific areas which will be represented at the conference will include: Semi- and non-parametric foundations of data science; Asymptotic theory of efficient and adaptive estimation; Inference for high-dimensional data; Inference for long-memory and other stochastic processes; Nonlinear Time Series analysis with applications to econometrics and finance; Robust multivariate methods; Survival analysis and its applications; and Sequential estimation and design.

Plenary invited speakers include: Richard Davis, Philip Ernst, Jianqing Fan, Joseph Gardiner, Tailen Hsing, Richard Johnson, S.N. Lahiri, Regina Liu, Ursula Mueller, Lianfen Qian, Annie Qu, Anton Schick, Donatas Surgailis.

All inquiries to: MSUStatSymposium2018@stt.msu.edu.

IMS co-sponsored meeting**2019 Seminar on Stochastic Processes****March 13–16, 2019****University of Utah, Salt Lake City, USA****w** <http://www.math.utah.edu/SSP-2019/>

The Seminar on Stochastic Processes 2019 (SSP2019), will be held from March 13–16, 2019, at the University of Utah in Salt Lake City.

It will feature the Kai-Lai Chung lecture from Jean Bertoin (Universität Zürich), and invited speakers: Dan Crisan (Imperial College London); Kay Kirkpatrick (University of Illinois at Urbana-Champaign); Sunder Sethuraman (University of Arizona); and Amandine Véber (École Polytechnique).

On Wednesday, March 13th, there will be two 90-minute tutorials by Marek Biskup (University of California, Los Angeles). More information on the content of the tutorials will be posted in early 2019.

There are no registration fees, but all participants, including invited speakers, are asked to register (the registration form is on the meeting website now).

IMS co-sponsored meeting**41st Conference on Stochastic Processes and their Applications (SPA) July 8–12, 2019. Evanston, IL, USA****w** <http://sites.math.northwestern.edu/SPA2019/>

The 41st Stochastic Processes and their Applications conference will take place July 8–12, 2019, in Evanston, USA. It will feature the following invited lectures. Plenary Speakers: Cécile Ané (University of Wisconsin-Madison); Béatrice de Tilière (University Paris-Est Créteil); James R. Lee (University of Washington); Dmitry Panchenko (University of Toronto); Yanxia Ren (Peking University); Allan Sly (Princeton University); Caroline Uhler (MIT). IMS Medallion Lectures: Krzysztof Burdzy (University of Washington) and Etienne Pardoux (Aix-Marseille Université) Lévy Lecture: Massimiliano Gubinelli (Universität Bonn) Doob Lecture: Jeremy Quastel (University of Toronto) Schramm Lecture: Stanislav Smirnov (Université de Genève/St Petersburg State University).

IMS co-sponsored meeting**ICIAM 2019: the 9th International Congress on Industrial and Applied Mathematics****July 15–19, 2019****Valencia, Spain****w** <https://iciam2019.org/index.php>

The 9th International Congress on Industrial and Applied Mathematics (ICIAM 2019) will be held in Valencia, Spain, from July 15–19, 2019. IMS is a member of ICIAM

The call for organizing mini-symposia at the ICIAM 2019 congress is now open. Please visit the webpage <https://iciam2019.org/index.php/information-for-delegates/submissions-calls/2-uncategorised/130-minisymposia> for details and online submissions.

**IMS sponsored meetings****ENAR dates, 2019–2020****March 24–27, 2019: in Philadelphia, PA****March 22–25, 2020: in Nashville, TN****w** <http://www.enar.org/meetings/future.cfm>

The 2019 ENAR/IMS meeting will be in Philadelphia, and the following year in Nashville.

IMS co-sponsored meeting**The 7th International Workshop in Sequential Methodologies****June 18–21, 2019
Binghamton, USA**

<https://sites.google.com/view/iwsm2019>

Other meetings and events around the world

Cincinnati Symposium: Probability Theory and Applications

November 9–11, 2018. Cincinnati, USA

[w](http://homepages.uc.edu/~buckinrt/cinciprob2018/) <http://homepages.uc.edu/~buckinrt/cinciprob2018/>

The 2018 symposium focuses on the latest advances in stochastic processes and random matrices. The plenary speakers are Jinho Baik, Davar Khoshnevisan, Florence Merlevede, Jim Pitman, Jan Rosinski, and Balint Virag. Travel support is available for junior researchers and poster session participants (see the website for application details).

NIMBioS Tutorial

Applications of Spatial Data: Ecological Niche Modeling

December 3–5, 2018. Knoxville, USA

[w](http://www.nimbios.org/tutorials/TT_SpatialData2) http://www.nimbios.org/tutorials/TT_SpatialData2

The distribution of a species may be influenced by an array of factors, the combination of which results in the ecological niche. However, defining these conditions is difficult, due to the complexity of natural systems. One approach uses spatial data GIS software. The objectives of this tutorial are to teach participants the concepts of ecological niche modeling, introduce them to select analytical techniques, and present how to interpret and apply spatial analyses. This tutorial is intended for advanced graduate students, postdocs, and faculty. Some basic knowledge of GIS software and ecology is preferred. Little to no programming will be involved, with ecological niche modeling and spatial analysis conducted using existing applications (MaxEnt) and packages in QGIS and R.

Statistical methods in Finance 2018

December 17–20, 2018. Chennai, India

[w](http://statfin.cmi.ac.in/2018/) <http://statfin.cmi.ac.in/2018/>

The fourth conference and workshop on Statistical Methods in Finance aims to expose the participants to new and active areas of research and to engage researchers into working groups. The conference is jointly organized by ISI Chennai and CMI. PhD students, post-doctoral researchers and faculty in mathematics, statistics, business, economics and physics are eligible to apply. Participants from the industry are encouraged to apply with a paper to be considered for presentation in the contributed paper sessions.

Statistics Winter Workshop 2019

January 18–19, 2019. Gainesville, FL, United States

[w](https://informatics.institute.ufl.edu/event/statistics-annual-winter-workshop-2019-recent-advances-in-causal-inference-and-mediation-analysis-and-their-applications/) <https://informatics.institute.ufl.edu/event/statistics-annual-winter-workshop-2019-recent-advances-in-causal-inference-and-mediation-analysis-and-their-applications/>

3rd Bangkok Workshop: Discrete Geometry, Dynamics and Statistics

January 21–25, 2019. Bangkok, Thailand

[w](http://www.thaihep.phys.sc.chula.ac.th/BKK2019DSCR/) <http://www.thaihep.phys.sc.chula.ac.th/BKK2019DSCR/>

The workshop will focus on mathematical physics of discrete systems, and in particular its applications to random geometries. Real-life motivations for such studies range from attempts to quantize gravity to problems in condensed matter physics to mathematical modelling of cooperative phenomena in macroscopic communities.

Hawassa Stat & Math Conference 2019

February 11–15, 2019. Hawassa, Ethiopia

[w](http://www.hu.edu.et/mathstatconf/) <http://www.hu.edu.et/mathstatconf/>

Contributed talks and posters are welcomed. Invited speakers include: Sylvia Richardson, Laura Palagi, Peter Diggle. About half of the programme is dedicated to statistics, the rest to OR and applied mathematics. Hawassa city, located in the African Rift Valley on the shores of Lake Hawassa, offers a unique atmosphere: it exposes the strengths, opportunities, charms and challenges of Africa, in a safe setting under the gentle Ethiopian sun. There are multiple grants for African participants (see the website).

5th Conference on Contemporary Issues in Data Science (CiDaS)

March 6–8, 2019. Zanjan, Iran

[w](https://cidas.iasbs.ac.ir/) <https://cidas.iasbs.ac.ir/>

This three-day conference will provide a real workshop (not “listen-shop”) to scientists and scholars to share ideas, initiate future collaborations and brainstorm challenges as well as industries to catch emerging solutions from science to their real data science problems. The format of the conference includes a tutorials day on March 6, and plenary talks, special invited talks, and contributed poster sessions on March 7 and 8.

CiDaS 2019 focuses on main topics such as big data analysis, machine learning, semantic data science and applied data science. All accepted full papers will be published by Springer in *Lecture Notes on Data Engineering and Communications Technologies*, and all accepted short papers in CiDaS 2019 will be published in the Springer’s *SN Applied Sciences*. More details can be found on the website.

2nd IMA and OR Society Mathematics of Operational Research

April 25–26, 2019. Birmingham, UK

[w https://ima.org.uk/9649/2nd-ima-and-or-society-conference-on-mathematics-of-operational-research/](https://ima.org.uk/9649/2nd-ima-and-or-society-conference-on-mathematics-of-operational-research/)

The conference will aim to draw together the considerable community of researchers and practitioners who develop new mathematics of relevance to and which underpin applications in Operational Research (OR). It will take a comprehensive view, will showcase activity from across OR, and will welcome both contributions which have a clear application focus as well as those which are theoretically driven.

DYNSTOCH 2019

June 12–14, 2019. Delft, The Netherlands

[w http://web.math.ku.dk/~michael/dynstoch/](http://web.math.ku.dk/~michael/dynstoch/)

In many fields complex dynamical stochastic models are needed to describe processes that develop in time and/or space in a random way, usually with temporal or spatial interactions that are important for a proper understanding of the phenomenon under study and for making predictions about the system.

The principal aim of the DYNSTOCH network is to make a major contribution to the statistical theory and methodology for stochastic processes by taking advantage of the tools of modern probability theory including stochastic calculus and by using highly computer-intensive methods. This is partly done by modelling and statistical data analysis in a number of subject areas including neuro science, physiology, biology, turbulence (wind energy) and finance.

Third International Congress on Actuarial Science and Quantitative Finance

June 19–22, 2019. Manizales, Colombia

[w http://icasqf.org/](http://icasqf.org/)

Invited speakers include Torben Andersen, Søren Asmussen, Pauline Barrieu, Jean-Philippe Bouchaud, Peter Carr, Kees Oosterlee, Mogens Steffensen, Greg Taylor, Nizar Touzi, Frank Riedel, Ruodu Wang, Thaleia Zariphopoulou.

Short Course Instructors include Arthur Charpentier, Edward (Jed) Frees, Julien Guyon Bloomberg, Mathieu Rosenbaum, Viktor Todorov, and Emil Valdez.

8th FIPS Workshop

September 10–11, 2018. London, UK

[w https://wwwf.imperial.ac.uk/~ajacque/FIPS2018/](https://wwwf.imperial.ac.uk/~ajacque/FIPS2018/)

The eighth workshop of the FIPS (Finance, Insurance, Probability and Statistics) activity group brings together academics from statistics and applied mathematics and practitioners from finance and insurance.

Fourth Workshop on Higher-Order Asymptotics and Post-Selection Inference (WHOA-PSI)

August 17–19, 2019. St. Louis, USA

[w https://www.math.wustl.edu/~kuffner/WHOA-PSI-4.html](https://www.math.wustl.edu/~kuffner/WHOA-PSI-4.html)

The Fourth WHOA-PSI will focus on emerging frontiers in post-selection inference, with particular emphasis on issues of accuracy, power and validity. More than 30 invited talks, and also PhD student posters, will present recent advances in high-dimensional, selective, simultaneous, and Bayesian inference. Special attention is given to analytic and bootstrap-based refinements. New methodologies for model selection or change-point analysis may also be discussed, as well as relevant applications in need of post-selection inference procedures.

The 3rd International Conference on Statistical Distributions and Applications (ICOSDA 2019)

October 10–12, 2019. Grand Rapids, USA

[w http://people.cst.cmich.edu/lee1c/icosda2019/](http://people.cst.cmich.edu/lee1c/icosda2019/)

This international conference is being organized to provide a platform for researchers and practitioners to share and discuss recent advancements on statistical distributions and their applications, and to provide opportunities for collaborative work. The scopes of ICOSDA 2019 include, but not limited to statistical distributions and their applications; statistical modeling; high dimensional data analysis; Bayesian statistics and statistical distributions in the era of big data.

6th International Conference on Establishment Statistics (ICES-VI)

**June 15–18, 2020
New Orleans, LA, USA**

[w http://ww2.amstat.org/meetings/ices/2020/](http://ww2.amstat.org/meetings/ices/2020/)

Participants are invited to the 2020 ICES to discuss emerging issues and improved techniques related to business, farm, and institution data. Topics will include statistical techniques, technologies, and survey methods and feature data from sources such as censuses, sample surveys, and administrative records.

Participation is open to all who are interested in establishment surveys. Whether you're excited by estimation strategies, frame development, questionnaire design, data collection, dissemination, or data visualization, you will find something to like at ICES-VI! Opportunities to participate in the ICES-VI program will open in 2019.

Employment Opportunities around the world

Australia: Melbourne, Victoria

University of Melbourne

Lecturer/Senior Lecturer in Statistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42636310

Canada: Vancouver, BC

University of British Columbia

Assistant Professor Tenure-Track in Statistics (15616)

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42904895

Canada: Toronto, ON

University of Toronto, Department of Statistical Sciences

Assistant Professor, Astrostatistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=43115421

Taiwan: Taipei

Institute of Statistical Science, Academia Sinica

Tenure-Track Research Positions

[See advertisement details below]

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42905013

United Kingdom: Coventry

University of Warwick

Professor and Head of Department

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=43091891

United States: Fullerton, CA

California State University, Fullerton

Statistics, Tenure Track Faculty

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42344212

United States: Irvine, CA

Hyundai Capital America

Stats II, Prdctve Mdlng

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42386794

United States: San Diego, CA

Celgene

Statistics Roles at Celgene

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42635339

Taiwan: Taipei

Institute of Statistical Science

Academia Sinica

Tenure-Track Research Positions

Applications are invited for tenure-track appointments as Full/Associate/Assistant Research Fellows in the Institute of Statistical Science, Academia Sinica (ISSAS), to commence on August 1, 2019 or as soon as possible thereafter. Applicants should possess a Ph.D. degree in Statistics, Data Science or related areas, and should submit: (1) a cover letter, (2) an up-to-date curriculum vita, (3) a detailed publication list, (4) a research proposal, (5) three letters of recommendation, and (6) representative publications and/or technical reports. Additional supporting materials such as transcripts for new Ph.D. degree recipients may also be included.

Electronic submissions are encouraged. Applications should be submitted to

Dr. Frederick Kin Hing Phoa

Chair of the Search Committee

Institute of Statistical Science, Academia Sinica

128 Sec. 2 Academia Road, Taipei 11529, Taiwan, R.O.C.

Fax: +886-2-27831523

E-mail: recruit@stat.sinica.edu.tw

Application materials should be received by **December 15, 2018** for consideration, but early submissions are encouraged.

United States: Fort Collins, CO**Colorado State University, Department of Statistics**

Associate or Full Professor Faculty Position

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42810435**United States: Champaign, IL****University of Illinois at Urbana-Champaign, Department of Statistics**

Lecturer, Teaching, Clinical or Visiting Assistant, Associate and Full Professors

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42685040**United States: Boston, MA****Boston University, Questrom School of Business**

Assistant Professor in Digital Analytics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42388904**United States: Boston, MA****Boston University, Questrom School of Business**

Assistant Professor in Marketing

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42668735**United States: Lowell, MA****University of Massachusetts Lowell**

Assistant Professor of Mathematics - Statistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42423481**United States: Williamstown, MA****Williams College**

Assistant Professor of Statistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=41716026**United States: Minneapolis, MN****School of Statistics, University of Minnesota–Twin Cities**

Tenure-Track Assistant Professor

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42927508**United States: Saint Louis, MO****Washington University in St. Louis**

Professor

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42926824**United States: Durham, NC****Fuqua School of Business, Duke University**

Tenure Track Faculty Position in Decision Sciences

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=43179332**United States: Durham, NC****Duke University, Statistical Science**

Open Rank Professor of the Practice

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42550856**United States: Berkeley Heights, NJ****Celgene**

Statistics Roles at Celgene

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42635339**United States: Las Cruces, NM****New Mexico State University**

Assistant Professor in Applied Statistics Tenure Track

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=42981945**United States: Kingston, RI****University of Rhode Island**

Multicultural Postdoctoral Fellow (Statistics)

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=43133986**United States: Columbia, SC****University of South Carolina, Department of Statistics**

Assistant or Associate Professor

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=43134237**United States: Columbia, SC****University of South Carolina, Department of Statistics**

Assistant or Associate Professor


http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=43177622


International Calendar of Statistical Events



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

September 2018


September 3–6: Cardiff, UK. Royal Statistical Society International Conference  www.rss.org.uk/conference2018



September 8–10: St Louis, Missouri, USA. Third Workshop on Higher-Order Asymptotics and Post-Selection Inference (WHOA-PSI)  <http://www.math.wustl.edu/~kuffner/WHOA-PSI-3.html>


September 9–11: Oslo, Norway. ADVICE2018: First International Conference on Statistical Advice  <http://www.advice2018.bio/>


 September 10–11: London, UK. 8th FIPS Workshop  <https://wwwf.imperial.ac.uk/~ajacque/FIPS2018/>


September 10–13: Leiden, The Netherlands. Workshop on Statistical Inference for Stochastic Process Models in Weather and Climate Science  <http://www.lorentzcenter.nl/lc/web/2018/1012/info.php3?wsid=1012&venue=Snellius>


September 14–15: Derby, UK. 2nd IMA Conference on Theoretical and Computational Discrete Mathematics  <https://ima.org.uk/7775/2nd-ima-conference-theoretical-computational-discrete-mathematics/>

 September 14–16: Michigan State University, USA. Michigan State Symposium on Mathematical Statistics and Applications: *From time series and stochastics, to semi-and nonparametrics, and to high-dimensional models*  <https://stt.msu.edu/MSUStatSymposium2018/>


September 22: Amherst, USA. STATFEST 2018  <https://nhorton.people.amherst.edu/statfest/>


September 23–26: Ribno (Bled), Slovenia. Applied Statistics 2018 (AS2018)  <http://conferences.nib.si/AS2018/>


September 24–28: São Pedro, Brazil. Brazilian Symposium on Probability and Statistics  <http://www.sinape2018.com.br/>


September 26: Basel, Switzerland. IDEAS Dissemination Workshop  <http://www.ideas-itn.eu/dissemination-workshop/>

October 2018


October 1–4: Turin, Italy. IEEE International Conference on Data Science and Advanced Analytics (DSAA)  <https://dsaa2018.isi.it/home>



October 3–7: Bodrum, Turkey. 11th International Statistics Days Conference  <http://igs2018.mu.edu.tr/>

October 18–20: Cincinnati, OH, USA. 2018 Women in Statistics and Data Science Conference  <https://ww2.amstat.org/meetings/wds/2018/>


October 25–27: Barcelona, Spain. Big Data Meets Survey Science  <https://www.bigsurv18.org/>



November 2018


November 1–2: Boston, MA, USA. Biobanks: Study Design and Data Analysis  <https://www.hsph.harvard.edu/2018-pqg-conference/>


 November 9–11: Cincinnati, USA. Cincinnati Symposium: Probability Theory and Applications  <http://homepages.uc.edu/~buckinrt/cinciprob2018/>



December 2018

December 10–11: London, UK. 3rd IMA Conference: Mathematical Challenges of Big Data  <https://ima.org.uk/9104/3rd-ima-conference-on-the-mathematical-challenges-of-big-data/>

 December 3–5: Knoxville, USA. NIMBioS Tutorial: Applications of Spatial Data: Ecological Niche Modeling  http://www.nimbios.org/tutorials/TT_SpatialData2

December 13–15: Hsinchu, Taiwan. Joint Conference for Experimental Design and Production Engineering 2018  <http://www3.stat.sinica.edu.tw/jcedpe2018/>

December 17–19: Houston, TX, USA. 4th International Conference on Big Data and Information Analytics  <https://sph.uth.edu/divisions/biostatistics/bigdia/>

 December 17–20: Chennai, India. Statistical methods in Finance 2018  <http://statfin.cmi.ac.in/2018/>

December 17–20: Jerusalem, Israel. **Jerusalem Joint Statistical Event 2018** **w** <https://www.emr2018.com/>

December 27–30: Kolkata, India. Tenth International Triennial Calcutta Symposium on Probability and Statistics **w** <http://www.calcuttastatisticalassociation.org/sympBrochure.php>

January 2019


NEW January 18–19: Gainesville, FL, USA. **Statistics Winter Workshop 2019** **w** <https://informatics.institute.ufl.edu/event/statistics-annual-winter-workshop-2019-recent-advances-in-causal-inference-and-mediation-analysis-and-their-applications/>

January 21–23: Lunteren, The Netherlands. 18th Winter School on Mathematical Finance **w** <https://staff.fnwi.uva.nl/p.j.c.spreij/winterschool/winterschool.html>

NEW January 21–25: Bangkok, Thailand. **3rd Bangkok Workshop on Discrete Geometry, Dynamics and Statistics** **w** <http://www.thaihep.phys.sc.chula.ac.th/BKK2019DSCR/>

February 2019

NEW February 11–15: Hawassa, Ethiopia. **Hawassa Stat & Math Conference 2019** **w** <http://www.hu.edu.et/mathstatconf/>

NEW  February 13–15: Hobart, Tasmania, Australia. **Matrix-Analytic Methods for Stochastic Models (MAM10)** **w** <http://www.maths.utas.edu.au/People/oreilly/mam/mam10.html>

February 14–16: New Orleans, USA. Conference on Statistical Practice **w** <https://ww2.amstat.org/meetings/csp/2019/>

March 2019

NEW March 6–8: Zanjan, Iran. **5th Conference on Contemporary Issues in Data Science (CiDaS)** **w** <https://cidas.iasbs.ac.ir/>

 March 13–16: Salt Lake City, USA. **2019 Seminar on Stochastic Processes** **w** <http://www.math.utah.edu/SSP-2019/>

 March 24–27: Philadelphia, PA, USA. **ENAR Spring Meeting** **w** <http://www.enar.org/meetings/future.cfm>

April 2019

NEW April 25–26: Birmingham, UK. **2nd IMA and OR Society Mathematics of Operational Research** **w** <https://ima.org.uk/9649/2nd-ima-and-or-society-conference-on-mathematics-of-operational-research/>

May 2019

NEW May 29–June 1: Bellevue, Washington DC, USA. **Symposium on Data Science and Statistics** **w** <http://ww2.amstat.org/meetings/sdss/2019/>

June 2019

NEW June 12–14: Delft, The Netherlands. **DYNSTOCH 2019** **w** <http://web.math.ku.dk/~michael/dynstoch/>


 June 18–21: Binghamton, USA. **7th International Workshop on Sequential Methodologies (IWSM)** **w** <http://sites.google.com/view/iwsm2019>

NEW June 19–22: Manizales, Colombia. **3rd International Congress on Actuarial Science and Quantitative Finance** **w** <http://icasqf.org/>

June 24–28: Oxford, UK. **12th International Conference on Bayesian Nonparametrics** **w** <http://www.stats.ox.ac.uk/bnp12/>

July 2019

July 1–9: Zagreb, Croatia. **11th International Conference on Extreme Value Analysis** **w** <http://web.math.hr/eva2019>

NEW  July 13–15: Brisbane, Australia. **20th INFORMS Applied Probability Conference** **w** <http://informs-aps.smp.uq.edu.au/>

 July 8–12: Evanston, IL, USA. **41st Conference on Stochastic Processes and their Applications (SPA)** **w** <http://sites.math.northwestern.edu/SPA2019/>

July 14–18: Leuven, Belgium. **40th Conference of the International Society for Clinical Biostatistics** **w** <http://www.icsb.info>


 July 15–19: Valencia, Spain. **ICIAM 2019** **w** <https://iciam2019.org/index.php>

July 22–26: Palermo, Italy. **European Meeting of Statisticians 2019** **w** <http://www.ems2019.palermo.it>

 July 27–August 1: Denver, CO, USA. **IMS Annual Meeting at JSM 2019** **w** <http://www.amstat.org/ASA/Meetings/Joint-Statistical-Meetings.aspx>


International Calendar *continued*

August 2019

 August 17–19: St. Louis, USA. 4th Workshop on Higher-Order Asymptotics and Post-Selection Inference (WHOA-PSI) **w** <https://www.math.wustl.edu/~kuffner/WHOA-PSI-4.html>

August 18–23: Kuala Lumpur, Malaysia. ISI2019: 62nd International Statistical Institute World Statistics Congress 2019 **w** <http://www.isi2019.org/>


October 2019

 October 10–12: Grand Rapids, USA. 3rd International Conference on Statistical Distributions and Applications (ICOSDA 2019) **w** <http://people.cst.cmich.edu/lee1c/icosda2019/>

March 2020

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


June 2020


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

July 2020


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

August 2020

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

 August 17–21: Seoul, Korea. Bernoulli/IMS World Congress on Probability and Statistics **w** TBC

March 2021

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

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>

August 2022


 July/August: Location TBC. IMS Annual Meeting **w** TBC

 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>

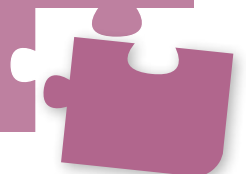
August 2024

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

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/



Membership and Subscription Information

Journals

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

Individual Memberships

Each individual member receives the *IMS Bulletin* (print and/or electronic) and may elect to receive one or more of the five scientific journals. Members pay annual dues of \$105. An additional \$89 is added to the dues of members for each scientific journal selected (\$53 for *Stat Sci*). **Reduced membership dues** are available to full-time students, new graduates, permanent residents of countries designated by the IMS Council, and retired members.

Individual and General Subscriptions

Subscriptions are available on a calendar-year basis. **Individual subscriptions** are for the personal use of the subscriber and must be in the name of, paid directly by, and mailed to an individual. Individual subscriptions for 2018 are available to *The Annals of Applied Probability* (\$204), *The Annals of Applied Statistics* (\$204), *The Annals of Probability* (\$204), *The Annals of Statistics* (\$204), *Statistical Science* (\$168), and *IMS Bulletin* (\$115). **General subscriptions** are for libraries, institutions, and any multiple-readership use. Institutional subscriptions for 2018 are available to *The Annals of Applied Probability*, *The Annals of Applied Statistics*, *The Annals of Probability*, and *The Annals of Statistics* (each title \$505 online only / \$559 print+online), *Statistical Science* (\$288/\$317), and *IMS Bulletin* (\$132 print). Airmail rates for delivery outside North America are \$149 per title.

IMS Bulletin

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

The *IMS Bulletin* (ISSN 1544-1881) is published eight times per year in January/February, March, April/May, June/July, August, September, October/November and December, by the Institute of Mathematical Statistics, 3163 Somerset Dr, Cleveland, Ohio 44122, USA. Periodicals postage paid at Cleveland, Ohio, and at additional mailing offices. Postmaster: Send address changes to Institute of Mathematical Statistics, 9650 Rockville Pike, Suite L3503A, Bethesda, MD 20814-3998.

Copyright © 2018 by the Institute of Mathematical Statistics. Printed by The Sheridan Press, 450 Fame Avenue, Hanover, PA 17331, USA.

Information for Advertisers

General information: The *IMS Bulletin* and webpages are the official news organs of the Institute of Mathematical Statistics. The *IMS Bulletin*, established in 1972, is published 8 times per year. Print circulation is around 4,000 paper copies, and it is also free online in PDF format at <http://bulletin.imstat.org>, posted online about two weeks before mailout (average downloads over 8,000). Subscription to the *IMS Bulletin* costs \$115. To subscribe, call 877-557-4674 (US toll-free) or +1 216 295 2340 (international), or email staff@imstat.org. The IMS website, <http://imstat.org>, established in 1996, receives over 30,000 visits per month. Public access is free.

Advertising job vacancies

A single 60-day online job posting costs just \$295.00. We will also include the basic information about your job ad (position title, location, company name, job function and a link to the full ad) in the *IMS Bulletin* at no extra charge. See <http://jobs.imstat.org>

Advertising meetings, workshops and conferences

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

Rates and requirements for display advertising

Display advertising allows for placement of camera-ready ads for journals, books, software, etc. A camera-ready ad should be sent as a grayscale PDF/EPS with all fonts embedded. Email your advert to Audrey Weiss, IMS Advertising Coordinator admin@imstat.org or see <http://bulletin.imstat.org/advertise>

	Dimensions: width x height	Rate
1/3 page	4.9" wide x 4" high (125 x 102 mm)	\$270
1/2 page	7.5" wide x 4" high (190 x 102 mm)	\$335
2/3 page	4.9" wide x 8" high (125 x 203 mm)	\$390
Full page (to edge, including 1/8" bleed)	8.75" wide x 11.25" high (222 mm x 286 mm)	\$445
Full page (within usual <i>Bulletin</i> margins)	7.5" wide x 9.42" high (190 mm x 239 mm)	\$445

Deadlines and Mail Dates for *IMS Bulletin*

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

the
next
issue is
**October/
November
2018**

Read IMS Bulletin
articles online at
<http://bulletin.imstat.org>



DEADLINES
for
submissions
September 15,
then **November 1**

Please see inside
the back cover for
subscription details
and information for
advertisers, including
all our **deadlines and**
requirements

Journal
alerts

For alerts and special
information on all the
IMS journals, sign up
at the IMS Groups site
<http://lists.imstat.org>



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

IMS: Organized September 12, 1935

THE ANNALS
of
STATISTICS

AN OFFICIAL JOURNAL OF THE
INSTITUTE OF MATHEMATICAL STATISTICS

Articles

- Variable selection with Hamming loss CRISTINA BUTUCEA, MOHAMED NDAOUD,
NATALIA A. STEPANOVA AND ALEXANDRE B. TSYBAKOV 1837
- Randomization-based causal inference from split-plot designs ANQI ZHAO, PENG DING,
RAHUL MUKERJEE AND TIRTHANKAR DASGUPTA 1876
- A new perspective on robust M -estimation: Finite sample theory and applications to
dependence-adjusted multiple testing
WEN-XIN ZHOU, KOUSHIKI BOSE, JIANQING FAN AND HAN LIU 1904
- Robust covariance and scatter matrix estimation under Huber's contamination model
MENGJIE CHEN, CHAO GAO AND ZHAO REN 1932
- Empirical best prediction under a nested error model with log transformation
ISABEL MOLINA AND NIRIAN MARTÍN 1961
- Backward nested descriptors asymptotics with inference on stem cell differentiation
STEPHAN F. HUCKEMANN AND BENJAMIN ELTZNER 1994
- Change-point detection in multinomial data with a large number of categories
GUANGHUI WANG, CHANGLIANG ZOU AND GUOSHENG YIN 2020
- Local asymptotic normality property for fractional Gaussian noise under high-frequency
observations ALEXANDRE BROUSTE AND MASAOKI FUKASAWA 2045
- Global testing against sparse alternatives under Ising models
RAJARSHI MUKHERJEE, SUMIT MUKHERJEE AND MING YUAN 2062
- Principal component analysis for second-order stationary vector time series
JINYUAN CHANG, BIN GUO AND QIWEI YAO 2094
- Estimation of a monotone density in s -sample biased sampling models
KWUN CHUEN GARY CHAN, HOK KAN LING, TONY SIT AND
SHEUNG CHI PHILLIP YAM 2125
- Community detection in degree-corrected block models . . . CHAO GAO, ZONGMING MA,
ANDERSON Y. ZHANG AND HARRISON H. ZHOU 2153
- CLT for largest eigenvalues and unit root testing for high-dimensional nonstationary time
series BO ZHANG, GUANGMING PAN AND JITI GAO 2186
- Smooth backfitting for errors-in-variables additive models
KYUNGHEE HAN AND BYEONG U. PARK 2216
- Unifying Markov properties for graphical models
STEFFEN LAURITZEN AND KAYVAN SADEGHI 2251
- Adaptation in log-concave density estimation
ARLENE K. H. KIM, ADITYANAND GUNTUBOYINA AND RICHARD J. SAMWORTH 2279
- Weak convergence of a pseudo maximum likelihood estimator for the extremal index
BETINA BERGHAUS AND AXEL BÜCHER 2307
- Semiparametric efficiency bounds for high-dimensional models
JANA JANKOVÁ AND SARA VAN DE GEER 2336
- Limit theorems for eigenvectors of the normalized Laplacian for random graphs
MINH TANG AND CAREY E. PRIEBE 2360
- Optimality and sub-optimality of PCA I: Spiked random matrix models
AMELIA PERRY, ALEXANDER S. WEIN, AFONSO S. BANDEIRA AND
ANKUR MOITRA 2416
- On the exponentially weighted aggregate with the Laplace prior
ARNAK S. DALALYAN, EDWIN GRAPPIN AND QUENTIN PARIS 2452
- Goodness-of-fit testing of error distribution in linear measurement error models
HIRA L. KOUL, WEIXING SONG AND XIAOQING ZHU 2479

1064 (print)
1064 (online)
Ann. Statist. Oct 2018
<http://projecteuclid.org/euclid.aos>