Volume 43 • Issue 6

IMS Bulletin

September 2014

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Martin Hairer: Fields Medalist

The Fields Medals are the most prestigious awards in the field of mathematics, awarded every four years by the International Mathematical Union. Among this year's four recipients is IMS member Martin Hairer (University of Warwick, UK), who delivered a Medallion lecture at the IMS annual meeting in Sydney in July.

Ofer Zeitouni explains some of the background to Martin's work:

Klaus Tschira Stiftung/Peter Badge

Martin Hairer (above) and the Fields Medal (left)

Martin Hairer of the University of Warwick is one of the four recipients of the 2014 Fields medal, awarded on August 13 during the International Congress of Mathematicians in Seoul. The citation reads: *Martin Hairer is awarded a Fields Medal for his outstanding contributions to the theory of stochastic partial differential equations, and in particular for the creation of a theory of regularity structures for such equations.*

For probabilists and statisticians, the solution of a stochastic ordinary differential equations involves Itô's theory; while extremely powerful and useful, Itô's method is crucially based on the martingale property of Brownian motion and does not generalize well to situations where the noise depends both on time and space. The latter is what happens in the case of stochastic partial differential equations; one often gets from physical considerations equations with terms that are not well defined, because they involve non-linear functions of distributions. Particularly well known examples are the Kardar-Parisi-Zhang (KPZ) equation and the so called Φ^3_4 equation of quantum field theory.

Hairer's theory of regularity structures allows one to give a sense to these equations. First, one mollifies the noise as to obtain a classical SPDE. The limit as the mollification is turned off, however, cannot be directly taken because of divergences. Hairer invented a method that expands the solutions in a basis (determined by the equation) and then renormalizes (a finite number of terms in the expansion) in order to give sense to the limit as the mollification is tuned off. As a result, one obtains the solution of the original SPDE as the limit of classical solutions of (modified) equation driven by mollified noise. The extra correction term is reminiscent of the Wong-Zakai correction term in the theory of SDEs, but the computation of the correction term requires the full power of Hairer's theory and is much more subtle.

In addition to this major achievement, Hairer made other spectacular contributions to the theory of SPDEs. In particular, together with Jonathan Mattingly of Duke University he introduced the notion of asymptotic strong Feller property and used it in a proof of ergodicity for two dimensional stochastic Navier-Stokes equations.

Congratulations, Martin, on this wonderful achievement.

You can read a longer profile of Martin Hairer in the Simons Foundation Quanta Magazine at www.simonsfoundation.org/quanta/20140812-in-mathematical-noise-one-who-heard-music/

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Executive Committee

IMS Members' News

Cognitive "Nobel" prize awarded to Michael Jordan


Michael Jordan

IMS Fellow Michael Jordan has been awarded the 2015 David E. Rumelhart Prize For Contributions to the Theoretical Foundations of Human Cognition, a prestigious $100,000 prize that is sometimes referred to as the "Nobel Prize of Cognitive Science" (http://rumelhartprize.org/). Michael has pioneered some of the most highly cited and most influential computational models of learning, inference and control in both biological and machine systems. He is Pehong Chen Distinguished Professor of Statistics, and of Electrical Engineering and Computer Science, at UC Berkeley. He holds a BS in Psychology from Louisiana State University, an MS in Mathematics and Statistics at Arizona State University, and a PhD in Cognitive Science at the University of California, San Diego, earned under the supervision of David Rumelhart. After completing his degree in 1985, and a two-year postdoc at the University of Massachusetts at Amherst, Michael was appointed assistant professor at MIT in 1988. In 1998, he joined Berkeley's Computer Science and Statistics Departments.

Michael has received many honors, including his election as a member of both the National Academy of Sciences and the National Academy of Engineering, as well as being named fellow of numerous professional organizations, including IMS and the Cognitive Science Society.

A more extensive profile of Michael's pioneering work is on the Rumelhart Prize website, at http://rumelhartprize.org/?page_id=505.

Susie Bayarri: 1956–2014

IMS Fellow M.J. Susie Bayarri passed away on August 19 in Valencia, Spain. Susie was a prominent Bayesian statistician, a former President of ISBA, and had just been made an ISBA Fellow (see page 3) before she died. She worked for most of her career at the University of Valencia, and held an adjunct professorship at Duke University's ISDS. She was an IMS, ISBA and ASA Fellow, and an elected member of the ISI; she won the Frank Wilcoxon Award and Jack Youden Prize. Christian Robert described her "rich and contagious laugh" in his blog, and posted the affectionate poem Kerrie Mengersen performed at the ISBA Cancun cabaret, which contains the toast, "To Susie, Queen of Bayes!"

A full obituary will appear in the next issue.

Terry Speed receives 2014 Sacks Award

Terry Speed is this year's recipient of the 2014 NISS Jerome Sacks Award for Cross-Disciplinary Research. The citation commended him as "a pioneer in the development and application of statistical methods for the analysis of biomedical and genomic data. His work exemplifies the best of applied statistics in cross-disciplinary research and is notable for its creativity, rigor, and relevance."

Kafadar appointed to forensic panel

Karen Kafadar, who has just become professor and chair of the department of statistics at the University of Virginia, has been appointed to the US Forensic Science Standards Board (FSSB). The panel of experts will identify and foster development and adoption of standards and guidelines for the nation's forensic science community. Visit the National Institute for Standards of Technology website for more information.

IMS Election results

New ISBA Fellows elected

ISBA, the International Society for Bayesian Analysis, has elected 17 new Fellows, all of whom are IMS members and/or fellows. Congratulations to: M. J. (Susie) Bayarri [who has just passed away: see note on page 2], Alicia Carriquiry, Merlise Clyde, Dipak Dey, David Draper, Stephen E. Fienberg, Edward I. George, Michael Jordan, Joseph B. Kadane, Kerrie Mengersen, Eugenio Regazzini, Sylvia Richardson, Christian Robert, Judith Rousseau, Fabrizio Ruggeri, Marina Vannucci, and Robert Wolpert.

The fellows were presented at the International Society for Bayesian Analysis World Meeting, held in Cancún, Mexico, from 14–18 July, 2014.

The new ISBA Fellows, and some others, photographed at the ISBA World Meeting in Cancun in July.

ASA Fellows announced

The 2014 ASA Fellows were presented at JSM in Boston. Honorees are recognized for outstanding professional contributions to, and leadership in, the field of statistical science.

Nineteen of them are IMS members and/or Fellows. We congratulate: Brian Scott Caffo, Catherine A. Calder, Joseph E. Cavanaugh, Jie Chen, Jeng-Min Chiou, Bertrand S. Clarke, Holger Dette, Paul Embrechts, Yulia R. Gel, Mark E. Glickman, Scott H. Holan, Lurdes Yoshiko Tani Inoue, Karunarathna Bandara Kulasekera, Nicole A. Lazar, Bin Nan, Philip B. Stark, Joshua M. Tebbs, Hansheng Wang, and Tian Zheng.

"On behalf of the ASA's entire membership, I extend heartfelt congratulations to each of the 63 new ASA Fellows," said ASA President Nathaniel Schenker. "These distinguished members have established themselves among the best in the world of statistical science. Their many accomplishments are far-reaching and contribute greatly to the advancement of statistical theory, methodology and applications, as well as to the ASA." Read the citations in the release at http://www.amstat.org/newsroom/pressreleases/2014_ASAFellows.pdf

John Stufken appointed at Arizona State University

John Stufken has joined the School of Mathematical and Statistical Sciences (SoMSS) at Arizona State University (ASU) as the Charles Wexler Professor in Statistics. ASU aims to build a strong statistics unit over the coming years. Plans are underway to elevate this unit into a statistics department under the umbrella of SoMSS. This effort will continue this year with two additional searches, one for an open rank position and the other for a junior tenure track position. Additional searches are planned for subsequent years.

John Stufken

= access published papers online

IMS Journals and Publications

Annals of Statistics: Peter Hall and Runze Li
http://imstat.org/aos
http://projecteuclid.org/aos

Annals of Applied Statistics: Stephen Fienberg
http://imstat.org/aoas
http://projecteuclid.org/aoas

Annals of Probability: Krzysztof Burdzy
http://imstat.org/aop
http://projecteuclid.org/aop

Annals of Applied Probability: Timo Seppäläinen
http://imstat.org/aap
http://projecteuclid.org/aoap

Statistical Science: Peter Green
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: George Michailidis
http://imstat.org/ejs
http://projecteuclid.org/ejs

Electronic Journal of Probability: Michel Ledoux
http://ejp.ejpecp.org

Electronic Communications in Probability: Anton Bovier
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: Thomas Lee
http://www.amstat.org/publications/jcgs
log into members' area at imstat.org

Statistics Surveys: Donald Richards
http://imstat.org/ss
http://projecteuclid.org/ssu

Probability Surveys: Laurent Saloff-Coste
http://imstat.org/ps
http://www.i-journals.org/ps/

IMS-Supported Journals

Annales de l'Institut Henri Poincaré (B): Thierry Bodineau & Lorenzo Zambotti http://imstat.org/aihp
http://projecteuclid.org/aihp

Bayesian Analysis: Marina Vannucci
http://ba.stat.cmu.edu

Bernoulli: Eric Moulines
http://www.bernoulli-society.org/
http://projecteuclid.org/bj

Brazilian Journal of Probability and Statistics: Nancy Lopes Garcia http://imstat.org/bjps
http://projecteuclid.org/bjps

Stochastic Systems: Peter W Glynn
http://www.i-journals.org/ssy/

IMS-Affiliated Journals

ALEA: Latin American Journal of Probability and Statistics: Servet Martinez
http://alea.impa.br/english

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

IMS Annual Meeting, Sydney, Australia

Terry Speed was one of the Australian Statistical Conference keynote speakers

The new IMS Fellows were presented. Those who were able to be at the meeting (l–r): Richard Samworth, Richard Lockhart, Bin Yu (the then IMS President), Zhen-Qing Chen (Committee on Fellows), Martin Wainwright, Rami Atar, Harrison Zhou

IMS Editors and Associate Editors having a lunchtime discussion meeting

Walk Lecturer Thomas G. Kurtz with Ruth Williams; the slide in the background shows a photo of Abraham Wald

Coffee break discussions (photo courtesy of Marie-Louise Rankin, SSAI)

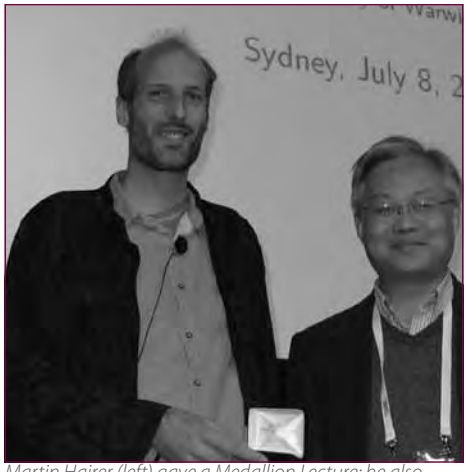
Local organizer Geoff Lee introduced the program

Peter Donnelly delivered the Neyman Lecture

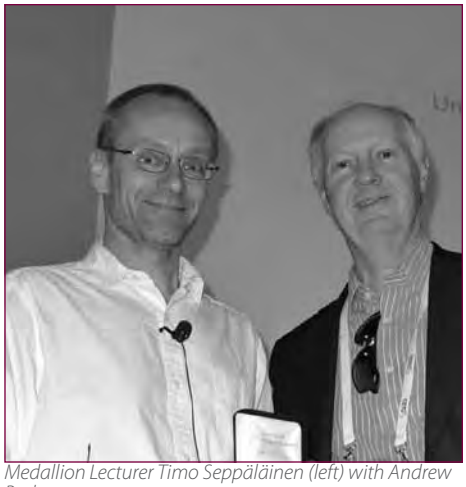
The second Schramm Lecture, in honor of Oded Schramm, was delivered by Terry Lyons

This building probably needs no introduction…

Medallion Lecturer Nina Gantert receives her award from Zhen-Qing Chen (right)



Martin Hairer (left) gave a Medallion Lecture; he also received his medallion from Zhen-Qing Chen


Medallion Lecturer Timo Seppäläinen (left) with Andrew Barbour

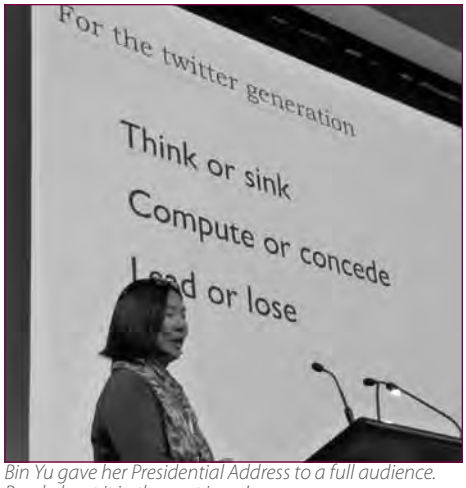
Matthew Stephens' medallion was presented by Sue Wilson


Harrison Zhou holds his Medallion


A classic Sydney view: the Opera House with the Harbour Bridge behind


The setting for the conference was Australian Technology Park, a former locomotive workshop. This is a locomotive crane on permanent display at the park.


IMS Presidents past, present and future. L–r: Bin Yu, Erwin Bolthausen, Richard Davis



Bin Yu gave her Presidential Address to a full audience. Read about it in the next issue!

IMS student members win Data Mining Cup

Iowa State student team wins international data mining competition

A team of Iowa State University graduate students topped 98 other universities from 28 countries to capture first place in the 15th annual Data Mining Cup. Prudsys AG, a leading European data mining company, sponsors the intelligent-data analysis competition for universities. According to Prudsys, the competition is meant to be a "bridge between university and industry to identify the best up-and-coming data miners."

Teams had six weeks to develop a solution for a data mining problem about optimal return prognosis. This year, teams had to use an unidentified online store's historical purchase data to create a model for new orders that predicts the probability of a purchase being returned.

"The motivation for this contest data is that some online retailers offering free return shipping have almost half of their orders returned," said Iowa State's team leader and statistics Ph.D. candidate Cory Lanker. "We could advance our ideas to create an application that helps online retailers reduce returned shipments and increase profit margins," he said.

Between April 2 and May 14, teams worked at their respective universities to develop their probability predictions. "Teams submitted return probabilities for approximately 50,000 purchases made in one month using data from approximately 481,000 orders from the previous 12 months," Lanker said. "They used 12 variables that characterize the customer information—such as age, location and purchase history—and information about ordered items—such as size, color, price, etc." Lanker said that the basis of Iowa State's technical solution was "to fully characterize customer behavior, which we did using advanced statistical learning concepts on the provided history of purchases. Once we successfully characterized customer behavior, we could then best predict whether a new purchase would be returned."

"This was specifically a student contest," said Steve Vardeman, University Professor of statistics and industrial engineering. "The team had no direct faculty input on the problem. They organized and executed their solution entirely on their own."

A jury scored all 57 submitted solutions (not all teams submitted a solution), and invited the top ten teams to Berlin to present their solution methods at the Prudsys User Days conference. Each team gave a ten-minute presentation.

Iowa State team members and their departments are Guillermo Basulto-Elias (statistics), Fan Cao (statistics), Xiaoyue Cheng (statistics), Marius Dragomiroiu (computer science), Jessica Hicks (bioinformatics and computational biology), Cory Lanker (statistics), Ian Mouzon (statistics), Lanfeng Pan (statistics) and Xin Yin (bioinformatics and computational biology/statistics).

Photo: Prudsys AG

[l-r]: IMS members Guillermo Basulto-Elias and Xin Yin, together with Iowa State's team leader Cory Lanker, proudly hold their first prize in the international Data Mining Cup, beating 124 other teams that came from 99 universities in 28 countries. See http://www.data-mining-cup.de/en/dmc-competition/winner/

Basulto-Elias, Yin and Lanker went to Berlin for the presentation and announcement. Final team rankings were announced beginning with tenth place.

"Before long, fifth place was announced and it wasn't us, so I knew we did better this year," Lanker said. "When it was down to two teams, [Prudsys organizer] Jens Scholz said, 'The United States lost in the World Cup last night,' and I thought, 'Well, this is us, we finished second,' but then he added, 'But a United States team has won the 2014 Data Mining Cup!'"

Lanker says the shock has not worn off yet. He attributes the team's success to multiple weekly team meetings that were well attended at the end of the semester, demonstrating the "dedication we all had to our team's success."

"As a leader, I stressed sticking to a schedule so we didn't run out of time, and involving everyone in discussions about making the many important statistical decisions," Lanker said. "The level of teamwork was extraordinary ... with many large contributions from all members."

Data science: how is it different to statistics?

Contributing Editor Hadley Wickham is Chief Scientist at RStudio and Adjunct Professor of Statistics at Rice University. He is interested in building better tools for data science. His work includes R packages for data analysis (ggplot2, plyr, reshape2); packages that make R less frustrating (lubridate for dates, stringr for strings, httr for accessing web APIs); and that make it easier to do good software development in R (roxygen2, testthat, devtools, lineprof, staticdocs). He is also a writer, educator, and frequent contributor to conferences promoting more accessible and more effective data analysis. He writes:

Hadley Wickham

Recently, there has been much hand-wringing about the role of statistics in data science. In this and future columns, I'll discuss both the threat and opportunity of data science. I believe that statistics is a crucial part of data science, but at the same time, most statistics departments are at grave risk of becoming irrelevant. Statistics is flourishing; by-and-large academic statistics continues to focus on problems that are not relevant to most data analyses. In this first column, I'll discuss why I think data science isn't just statistics, and highlight important parts of data science that are typically considered to be out of bounds for statistics research.

I think there are three main steps in a data science project: you *collect* data (and questions), *analyse* it (using visualization and models), then *communicate* the results. It's rare to walk this process in one direction: often your analysis will reveal that you need new or different data, or when presenting results you'll discover a flaw in your model.

Statistics has a lot to say about collecting data: survey sampling and design of experiments are well established fields backed by decades of research. Statisticians, however, have little to say about collecting and refining questions. Good questions are crucial for good analysis, but there is little research in statistics about how to solicit and polish good questions, and it's a skill rarely taught in core PhD curricula.

Once the data has been collected, it needs to be tidied (or normalized) into a form that's amenable for analysis. Organising data into the right 'shape' is essential for fluent data analysis: if it's in the wrong shape you'll spend the majority of your time fighting your tools, not questioning the data. I've worked on this problem for quite some time (culminating in the tidy data framework, http://vita.had.co.nz/papers/tidy-data.html) but I'm aware of little similar work by statisticians.

Any real data analysis involves data manipulation (sometimes called wrangling or munging), visualization and modelling. Visualization and modelling are complementary. Visualizations surprise you, and can help refine vague questions. However, visualizations rely on human interpretation, so the ability to scale is fundamentally constrained. Models scale much better, and it's usually possible to throw more computing at the problem. But models are constrained by their assumptions: fundamentally a model cannot surprise you. In any real analysis you may use both visualizations and models. But the vast majority of statistics research is on modelling, much less is on visualization, and less still on how to iterate between modelling and visualization to get to a good place.

The end product of an analysis is not a model: it is rhetoric. An analysis is meaningless unless it convinces someone to take action. In business, this typically means convincing senior management who have little statistical expertise. In science, it typically means convincing reviewers. Communication is not a mainstream thread of statistics research (if you attend the JSM, it's easy to come to the conclusion that some academic statisticians couldn't care less about the communication of results). Communication is a part of some PhD programs, but it tends to focus on professional communication (to other statisticians), not communicating with people who have substantive expertise in other domains.

In business, analyses are often not done just once, but need to be performed again and again as new data come in. These data products need to be robust in both the statistical sense (i.e. to changes in the underlying distributions/assumptions) and in the software engineering sense (i.e. to changes in the underlying technological infrastructure). This is a ripe field for research.

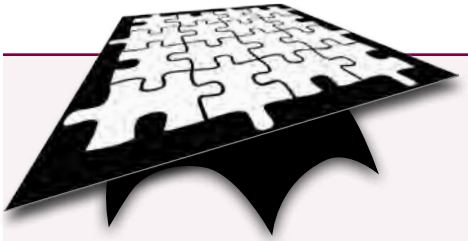
Statistics is a part of data science, not the whole thing. Statistics research focuses on data collection and modelling, and there is little work on developing good questions, thinking about the *shape* of data, communicating results or building data products.

There are people in statistics doing great work in all these areas, but it's not mainstream statistics. If you're interested in these areas, it's harder to get tenure, harder to get grants, and most of the 'top' statistics journals are unavailable to you.

Attempting to claim that data science is 'just' statistics makes statisticians look out of touch, and belittles the many other contributions outside of statistics.

What do you think? Let me know your thoughts at hadley@rstudio.com, or @hadleywickham.

Editor's note: The opinions expressed are exclusively of the columnist and do not necessarily reflect opinions of the IMS or editorial opinions of the IMS Bulletin.



Student Puzzle Corner 5

The *Student Puzzle Corner* contains one or two problems in statistics or probability. Sometimes, solving the problems may require a literature search.

Current student members of the IMS are invited to submit solutions electronically (to **bulletin@imstat.org with subject "Student Puzzle Corner"**). The deadline is **September 15, 2014**.

The names and affiliations of (up to) the first 10 student members to submit correct solutions, and the answer to the problem, will be published in the next issue of the *Bulletin*.

The Editor's decision is final.

We will try to approach a difficult statistics problem in this issue. It does not necessarily involve any difficult mathematics; but the problem is inherently unstable.

It has been surmised, and even seriously investigated, whether neolithic man was in possession of a so-called *quantum*. A quantum is simply a positive number q such that a certain set of similar measurements follow the mathematical formula $x = qn$ for some positive integer n. In words, all your measurements are multiples of a fixed basic unit, called the quantum. Alexander Thom and David Kendall have done profound and highly original studies of whether the diameters of neolithic monuments in Scotland, Wales, and England follow a quantum pattern. The evidence is seductive and interesting, but it is difficult to formulate the problem and draw conclusions— particularly because 4,000 years have passed since the stones were originally put there. If indeed neolithic man had a quantum, it may be reasonable to ask whether the quantum had a significance, and how it was passed from generation to generation and from one area to another… but these questions are outside the domain of mathematics.

"Paulnabrone": Kglavin/wikipedia

Neolithic monuments, such as this portal tomb in Ireland, and stone circles, may have been constructed using a "Megalithic Yard" or quantum measure.

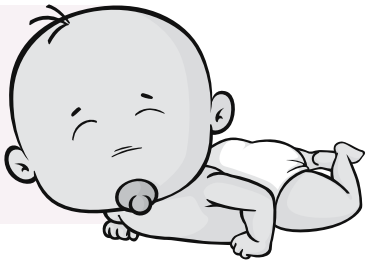
So, in this issue's problem, we have taken a subset of a famous science dataset and converted the original numbers n_i, all positive integers, by following the formula $x_i = qn_i + \epsilon_i$, $i = 1, 2, \ldots, n = 50$. The ϵ_i are random errors with zero mean. We do not tell you what quantum q we used, and we do not tell you what is the exact distribution of the random errors. The question asked is: can you estimate the quantum q? The answer must describe a rational attack and method of solution, not merely a one-sentence numerical guess. As we said, it is not going to be easy to come within a close shot of the true quantum!

The dataset is:
1.00, 7.21, 13.92, 17.81, 22.00, 24.88, 27.08, 32.74, 37.36, 39.36, 45.66, 47.32, 53.6, 55.02, 61.46, 63.05, 69.3, 77.24, 80.5, 79.68, 89.83, 96.48, 101.99, 103.81, 110.34, 111.61, 117.16, 118.99, 127.25, 130.34, 140.05, 145.19, 150.36, 158.03, 160.25, 168.21, 170.07, 176.59, 178.87, 181.74, 186.49, 192.79, 195.08, 202.4, 205.06, 212.46, 215.95, 224.28, 229.9, 238.9.

A word of caution: note that the data values have been reported to two digits after the decimal. So you can get a spurious perfect fit by using a small quantum, e.g., $q = .01$!

Solution to last problem on **page 9**

Last issue's Student Puzzle:
Suppose couples in a certain country have a Poisson number of children with mean λ. Little Dennis is a son of the Mitchells. For what values of λ would you bet that Dennis has an equal number of brothers and sisters? Assume that childbirths are independent and that each birth results in a boy or a girl with probability ½ each.



Last issue's correct answer

Anirban DasGupta, *IMS Bulletin* Editor, explains:

Colman Humphrey (*pictured left*) of the Wharton School at the University of Pennsylvania gave a sensible formulation of the last issue's problem and sent a rigorous and correct solution for his formulation. We encourage more of our student members to send solutions!

Here is a slightly different formulation. Let N denote the number of children a random couple in this country has, and let B, G denote their number of boy and girl children; thus, $B + G = N \sim \mathcal{P}(\lambda)$, $\lambda > 0$. Suppose that each conception results in one boy with probability p or one girl with probability q, $p + q = 1$, $0 < p < 1$. Under the usual assumptions, one has $B \sim \mathcal{P}(\lambda p)$, $G \sim \mathcal{P}(\lambda q)$, and B, G are independent Poissons. Basically, if events arrive according to a Poisson process and then fall into one of k mutually exclusive counters, then the counts of each counter are also Poisson processes with the obvious rates, and these k Poisson processes are independent.

In our problem, the Mitchells do have at least one boy, namely Dennis; we know that $B \geq 1$. Dennis has $B-1$ brothers and G sisters. We want to know when is $P(B - 1 = G \,|\, B \geq 1) \geq ½$?

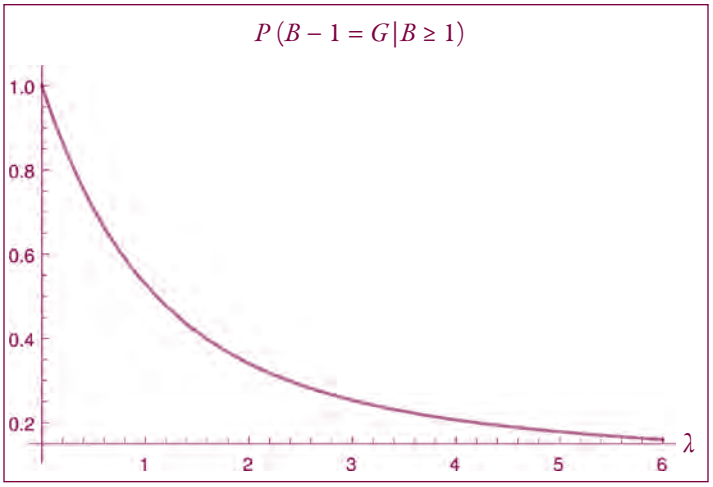
Now, after a few lines of algebra,

$$P(B - 1 = G \,|\, B \geq 1) = \frac{\sum_{j=1}^{\infty} P(B=j,\, G=j-1)}{P(B \geq 1)}$$

$$= \frac{\frac{e^{-\lambda}}{\lambda q} \sum_{j=1}^{\infty} \frac{(\lambda^2 pq)^j}{j!(j+1)!}}{1 - e^{-\lambda p}}$$

$$= \frac{\lambda p e^{-\lambda} \sum_{j=0}^{\infty} \frac{(\lambda\sqrt{pq})^{2j}}{j!(j+1)!}}{1 - e^{-\lambda p}}$$

$$= \sqrt{\frac{p}{q}}\, \frac{e^{-\lambda} I_1(\lambda\sqrt{4pq})}{1 - e^{-\lambda p}},$$



where $I_1(z)$ is the modified Bessel function of the first kind of index one. For the general index ν, $-\infty < \nu < \infty$, the modified Bessel function $I_\nu(z)$ may be defined by the infinite series

$$I_\nu(z) = \left(\frac{z}{2}\right)^\nu \sum_{j=0}^{\infty} \frac{\left(\frac{z^2}{4}\right)^j}{j!\Gamma(j+\nu+1)}.$$

For the special case $p = ½$, we have the reduction

$$P(B - 1 = G \,|\, B \geq 1) = \frac{e^{-\lambda} I_1(\lambda)}{1 - e^{-\lambda/2}}.$$

This is .5 or more for $\lambda \leq 1.10626 \approx 1.11$.

So, the answer to the narrow question of the problem of the previous issue is that we should bet that Dennis has an equal number of brothers and sisters if we know that λ is smaller than about 1.11.

TOPOS: *Applied topologists do it with persistence*

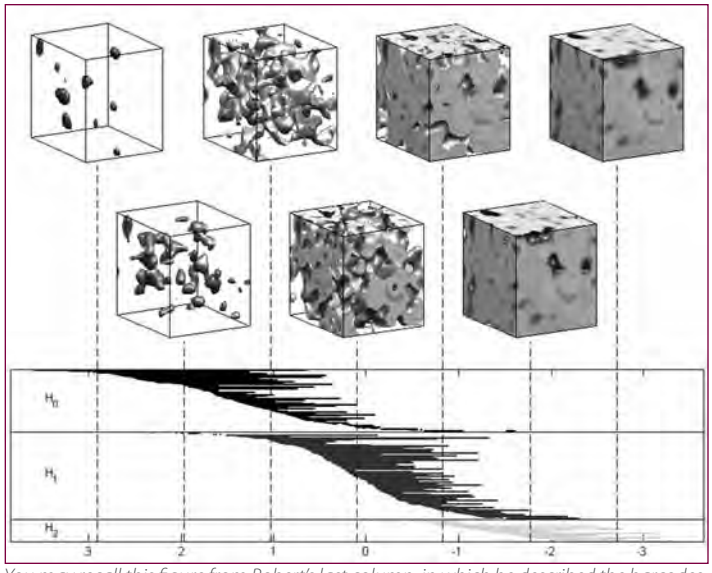
Robert Adler continues his series of articles on Topology, Probability and Statistics:

In my previous column (in the March 2014 issue) I introduced TOPOS as an acronym for *Topology, Probability and Statistics*, and promised three more columns to convince you that this combination is, today, producing elegant mathematics, powerful statistical tools, and challenges galore. This month I want to concentrate on the *T* of TOPOS. In particular, to address the question of why applied topologists do it with persistence, why that makes them different from theoretical topologists, and exactly what "it" is.

"It" is the study of shape, and this is what topologists do for a living and, for many of them, for a life. Their basic objects of study are simplicial complexes, manifolds and stratified manifolds. Manifolds are generalizations of two-dimensional surfaces like spheres and tori that we all know about. But, in the same way that we 'see' two-dimensional surfaces as objects 'living' (technically, 'embedded in') three-dimensional Euclidean space, k-dimensional manifolds are objects which are typically embedded in spaces of dimension at least $k+1$. By the time one moves to stratified manifolds, almost any reasonable shape that you might think about falls into the ballpark of topology.

Topologists like to call three- and four-dimensional manifolds (embedded in at least four- and five-dimensional spaces) low dimensional; even in these cases there are so many results that are contrary to the intuition that comes from living in a three-dimensional world—not to mention open problems—that it is clear that we need special tools for understanding high-dimensional structures and data sets. (The latter, of course, is what this column is doing in an IMS publication!)

Since intuition does not work, mathematics has developed two closely intertwined areas of topology—differential and algebraic—to replace it. Today I want to concentrate on algebraic concepts, and to describe them with a simple example, visualizing a real valued function on a three-dimensional set. For something concrete, think of heat levels in a metal bar, activity levels within the brain, or pollution levels at various heights above a city (and, if you can't wait for more about applications, jump ahead to the next page). To 'really see' what such a function looks like, we need four dimensions (three for the parameter space, and one for the function values) and that is one more than it is easy to find. One way out of this would be to threshold the function at various levels, and look at the 'excursion' or 'super-level' sets of the parameter space, the regions over which the function takes values higher than the threshold. You can see how this works in the top part of the figure below, in which the function is defined over a cube, and, moving in a up-down zigzag fashion from left to right, you see the excursion sets over lower and lower thresholds.



You may recall this figure from Robert's last column, in which he described the barcodes at the bottom as highly effective Exploratory/Topological Data Analysis descriptors of the three-dimensional structures at the top.

These sets tell you a lot about the function. For example, it is definitely multi-modal, since each of the little regions in the leftmost cubes corresponds to an excursion that must have at least one local maximum somewhere in the middle of it.

Lowering the threshold and moving to the right, the structure of the excursion sets becomes more complicated, and, instead of their being composed of a number of isolated regions, there are fewer regions joined in complicated fashions. In fact, 'holes' start to form, of the kind you could poke your finger through if this were a real three-dimensional object rather than a flat representation of one. Moving to the extreme right, almost everything is in the excursion set, and so it now looks like the cube itself, although we can be reasonably certain that there are some small, internal 'voids' that must look much like the regions in the left-most cube.

You may not have realized it, but we have just been doing some rather fancy algebraic topology. By talking about isolated regions, holes and voids, we have been talking about the three building blocks that make up all (nice) three-dimensional objects, and we have been following how these change under a filtration. The problem is that,

when we move to k-dimensional objects, there are k such building blocks, and nobody really knows what they look like. (In fact, since we can only see in three dimensions, 'look like' is probably not even a well-defined term here.)

To get around this, topologists replace these building blocks with algebraic objects, typically groups, and start using terms like k^{th} *homology* and *homotopy* to replace holes and voids. It seems almost unbelievable to the novice—including me, even after working with topologists for over half of the last decade—that studying groups and relationships between them could ever be a useful tool for understanding shape. However, not only does this work quite well, but it is the only real tool that Mathematics has for this study, even after more than a century of concentrated effort!

A column like this is hardly the place to define and explain homology theory, but, somewhat amazingly, it is easy to explain something that is intrinsically more complicated, and that is persistent homology. Look again at the cubes in the diagram on the previous page, recall the description above about how things change as we go from left to right, and how regions, holes and voids appear and disappear. Think of this as the 'birth' and 'death' of the different phenomena, where we morbidly refer to the merger of two as the death of one of them.

The diagram below the cubes encapsulates what I have just written. Each line in the top collection (moving from left to right) illustrates the birth, life, and death of a region, via its starting point, interior, and end point, respectively. The next set of lines do this for the holes, and the lowest set does the same for voids. These lines are typically called bars, and the entire collection a barcode.

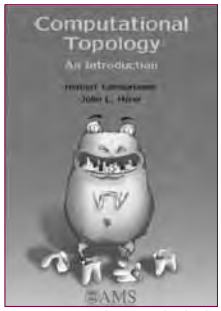
Think now of doing this not in our current three-dimensional situation, but in a 1,000-dimensional one. Neither you nor I know what the fourth or 999^{th} topological building blocks look like, but even without this there are numerical algorithms that would allow us to repeat what we just did in three dimensions, and follow the life and death of each one of these structures in a barcode which would now have 1,000, rather than three, regions. In the language of topology, we would be following the persistence of the generators (one per bar) of 1,000 homology groups. You don't have to understand homology to realize that there is useful information on shape in barcodes.

Life gets even better. Those of you who deal with 1,000 dimensional data know that, typically, the data live on a submanifolds of much lower, and usually single-digit, dimension. That is what techniques of dimension reduction and manifold learning rely on. An interesting, but not surprising, result in algebraic topology is that even if an object has nominal dimension 1,000, if it is really only, for example, three-dimensional, then all the homologies of degree greater than 3 will be empty. In terms of barcodes, there will only be three sets of bars, and the remaining 997 regions will be empty.

So now you can see why *applied* topologists do it with persistence! Persistent homology, visualized, for example, via barcodes, tells you a lot not only about the dimension of the object you are looking at, but also about its inner structure.

Why don't theoretical (I refuse to use the honorific 'pure' here) topologists do it with persistence? Because, at the turn of the millennium, persistence was invented by applied topologists with a view to applying what they knew to solve real world problems, and ... and I will leave you to finish this sentence.

The above example, of analyzing the structure of functions over high dimensional sets has many applications. For example, if the function happened to be a density estimator, then identifying excursion sets would be a way to go about cluster analysis. As opposed to non-topological methods of cluster analysis, this method would tell you not only the number of clusters, but also something about how they sit in relation to one another. Many other applications, including manifold learning, can be found in the references in my previous column. (On persistence itself, especially its computational aspects, see the books by Edelsbrunner and Harer, 2010, or Afra Zomorodian, 2009.)



This might help.

This month, however, I did not want to concentrate on applications. Rather, I wanted to induct my fellow statisticians and probabilists into the exclusive club of people who use words like 'homology' as freely as we say t-test and Chebychev. Now, the next time a topologist throws strange-sounding words at you, you can respond with a sneer and say something deprecating like "Simple homology is *so passé*. Personally, I do it with persistence".

Coming up

In the next two columns I want to concentrate on what is missing from the above: randomness. For example, if the function used above for my example is random (e.g. a random field if you are a probabilist, an empirically based density estimator if you are a statistician) then the resulting barcode is also a random object. How a statistician should cope with this in order to draw inferences, or to estimate structures, and how a probabilist might want to generate and analyze random barcodes, are difficult problems, and at the forefront of a lot of current research activity.

Recent papers

Annals of Probability

Volume 42, number 4: July 2014

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* will also publish authoritative review papers and surveys of areas in vigorous development. The editor is Krzysztof Burdzy (from 2012–2014).

Access papers at http://projecteuclid.org/aop

Annals of Applied Probability

Volume 24, number 6: December 2014

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. The editor (2013 to 2015) is Timo Seppäläinen.

Access papers at http://projecteuclid.org/aoap

The London Workshop Report

Statistics and Science: A Report of the London Workshop on the Future of the Statistical Sciences (http://bit.ly/londonreport) is the product of a high-level meeting in London last November attended by 100 prominent statisticians from around the world. This invitation-only summit was the capstone event of the International Year of Statistics, a year-long celebration during 2013 that drew as participants more than 2,300 organizations from 128 countries.

The report is written in an accessible style so people who are not experts in statistics can understand its messages and the field's impact on society. It can be used as a resource by students interested in studying statistics at university, by policymakers who want to better understand the value statistics provides society and by the general public to learn more about the misunderstood field of statistical science.

We encourage you, as someone interested in The World of Statistics (as the International Year of Statistics is now known: http://www.worldofstatistics.org) to make the workshop report accessible wherever you are, by:

- Sharing the link to the report with your statistical and professional colleagues
- Sharing the report with government agencies and private entities that provide research funding in your country
- Sharing the report with the national statistical organization and other appropriate agencies in your country's government
- Posting a short note about the report with its link to your website
- Sharing the report and link with your membership or employees by including a story about it in a future issue of your organization's official publication—magazine or newsletter—or via blast email
- Sharing a copy of the report or its link to the media in your country along with a brief explanation
- Sending a copy to the statistics departments at universities in your country
- Share the report with statistics-related organizations in your country that are not participating in The World of Statistics

Read more at http://www.worldofstatistics.org/2014/08/20/future-of-statistical-science-healthy-with-a-mix-of-challenges-opportunities/

Nominate an IMS Named or Medallion Lecturer

Beginning this year, the IMS Committee on Special Lectures is accepting nominations for IMS Named and Medallion Lectures. Available for nomination this year are the **2016 Wald and Rietz Lecturers, and the 2017 Medallion Lecturers**.

See http://imstat.org/awards/lectures/nominations.htm

Deadline for nominations is October 1.

The submission process is simple: send the nomination materials listed below via email to Elyse Gustafson **e** erg@imstat.org, with the subject line *LECTURE NOMINATION: <last name of nominee>*. The items should be sent as a single PDF attachment. You will receive an email confirming receipt within 72 hours. If you do not receive this confirmation, please email or call Elyse: **e** erg@imstat.org or **t** 216.295.2340.

Nomination Materials: a nomination letter of half a page, including the nominator's name, the nominee's name and the name of the IMS lecture for which the nominee is nominated; together with a list of the nominee's five most relevant publications, with a URL where these publications are accessible.

IMS Lectures in 2015

In 2015 the named and medallion lectures will be given as follows:

At **ENAR** (Miami, March 15–18, 2015):
Medallion lecture: Tilmann Gneiting

At **APS** (Istanbul, July 5–8, 2015):
Medallion lecture: Kavita Ramanan

At **SPA 2015** (Oxford, July 13–17, 2015):
Schramm lecture: Michel Ledoux
and two Medallion lectures: Scott Sheffield and Gregory Miermont

At **JSM** (Seattle, August 8–13, 2015)
Wald lectures: Susan Murphy
Le Cam lecture: Jon Wellner
and four Medallion lectures, Jiashun Jin, Michael Kosorok, John Lafferty and Nicolai Meinshausen

Women faculty in US Stat/Biostat Departments

Marcia Gumpertz and Jacqueline Hughes-Oliver investigated the status of female faculty members in Statistics and Biostatistics departments across the US. Marcia reports on their findings: In Fall 2013 we conducted a small survey to learn about the demographic distributions of faculty in US departments of Statistics and Biostatistics. Twenty-nine of the 58 departments polled responded, including eight departments of Biostatistics and 21 departments of Statistics. In addition to understanding the gender and racial/ethnic breakdown of the faculty, we were particularly interested in the relationship between faculty gender balance and the gender of the department leadership.

In the 29 responding departments (see sidebar opposite), women comprised just 26% of tenured and tenure track faculty (Table 1 below), 24% in Statistics Departments and 32% in Biostatistics Departments. In about two thirds of departments (69%) women made up fewer than 30% of faculty and in a fifth of departments (21%) women made up fewer than 15% of the faculty. The levels 30% and 15% are commonly thought to be levels at which representation of a group reaches a critical mass that changes the department climate (Etzkowitz et al. 2002; Nelson and Brammer 2010).

Women were more highly represented in non-tenure track positions than would be expected based on doctorates awarded. They made up 44% of non-tenure track faculty; whereas women earned 38% of PhDs awarded in these 29 departments in 2012–13, which is similar to the proportion of PhDs awarded to women (37%) in Statistics across the US in 2012 (NSF 2013). Women comprised a slightly lower fraction, 34%, of tenure track assistant professors. The proportion female in tenure line positions decreased at every rank, to 30% of associate professors and only 20% of full professors.

Asian and International students accounted for 60% of the doctorates awarded in Statistics and Biostatistics from these 29 departments, but only 36% of the faculty. At the tenure track assistant professor level, however, this group accounted for 54% of the faculty. White US citizens and permanent residents made up a substantially larger fraction of the tenure track assistant professors than the doctorates awarded (38% compared to 25%), while other groups (e.g., black, Hispanic, American Indian) were underrepresented at the assistant professor level compared to the proportion of doctorates awarded (8% vs 14%).

We found that departments with female department chairs had significantly higher numbers of female tenure track assistant professors (logistic regression, p-value=.03) and tenure line faculty more generally (p-value=.003) than departments led by men. The ratio of female-to-male tenured and tenure-track faculty was almost twice as high in departments with female chairs than otherwise. The proportion of female tenure track assistant professors also increased with the number of female full professors in the department (p-value =.03).

Department heads' views about the relationship between leadership and female representation among the faculty ranged widely. Eighteen department chairs provided responses to the survey's invitation to comment on "your view of the effect of department leadership on the gender composition of your department". All indicated a desire to increase female representation, but not all were convinced that department leadership makes a difference. One stated flatly that:

Table 1.

Faculty demographics of 29 US departments of Statistics and Biostatistics (number of female [F] and male [M] faculty)

	US Permanent Resident						Non-US Resident	
	Asian		White		Other			
	F	M	F	M	F	M	F	M
Non-Tenure Track Faculty	**13**	**12**	**66**	**80**	**6**	**4**	**5**	**18**
Tenured/Tenure Track Assistant Professor	**9.25**	**22**	**17**	**31**	**3**	**7**	**14**	**23**
Tenured/Tenure Track Associate Professor	**20**	**49**	**15**	**34**	**4**	**10.25**	**1**	**0**
Tenured/Tenure Track Full Professor	**10**	**57**	**37**	**135**	**2**	**12.49**	**2**	**0**

"There is no effect of department leadership on gender composition of our department." One attributed change to critical mass, but not to department leadership: *"Our department had one tenured/tenure-track female from 1994–2006 [currently three]. Critical mass for females seemed to be very important. The single female was not able to convince the faculty to hire more females. When a second female came (in a spousal accommodation), that completely changed the climate and we were able to increase our numbers. We've had three or four female faculty since 2007. This change was not due to department leadership. There has never been much leadership about diversity from the department chair or by the college administration."*

About a third of the respondents, however, described actions that department leaders had taken that made a marked difference. We close by quoting one department chair who provided a blueprint for departments wishing to increase the diversity among their faculty:

"Department leadership has the power to move the needle a great deal on gender composition—through effects such as setting a cultural tone, creating recruitment packages that attend to flexibility needs, energetic outreach and inclusion of women in the recruitment process, and attentiveness to subtle and subconscious biases in the assessment process. However there are pipeline issues that are beyond department leadership to address fully whereby applications to tenure track positions in leading universities seem to not reflect the gender composition of those emerging with doctoral degrees in our fields, and the profession as a whole must address in the mentorship of graduate students and postdoctoral fellows."

The 21 Statistics and 8 Biostatistics departments which responded were: Boston University Biostatistics, Colorado State University Statistics, Columbia University Statistics, Emory University Biostatistics and Bioinformatics, Florida State University Statistics, George Mason University Statistics, George Washington University Statistics, Johns Hopkins University Biostatistics, Kansas State University Statistics, Michigan State University Statistics and Probability, North Carolina State University Statistics, Oregon State University Statistics, Penn State University Statistics, Purdue University Statistics, Rice University Statistics, Stanford University Statistics, University of California at Berkeley Statistics, UCLA Statistics, University of Connecticut Statistics, University of Florida Statistics, University of Georgia Statistics, University of Illinois at Urbana Champaign Statistics, University of Iowa Statistics and Actuarial Science, University of Minnesota Biostatistics, University of North Carolina Chapel Hill Biostatistics, University of Pittsburgh Biostatistics, University of Pittsburgh Statistics, University of Washington Biostatistics, University of Wisconsin Biostatistics and Medical Informatics.

This article is adapted from the essay "The status of women faculty in departments of Statistics and Biostatistics in the United States" (Gumpertz and Hughes-Oliver 2014).

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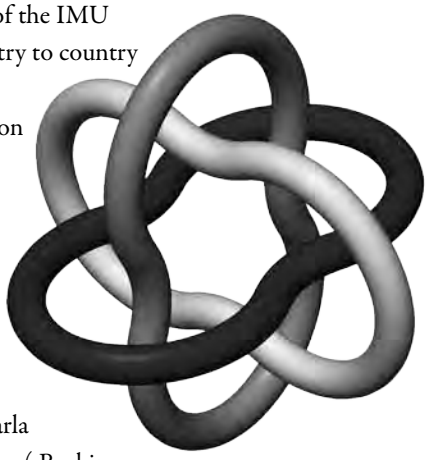
National Science Foundation (NSF). 2013. *"Doctorate Recipients for U.S. Universities: 2012 Data Tables"* Survey of Earned Doctorates [http://www.nsf.gov/statistics/srvydoctorates/]

Nelson, Donna J. and Christopher N. Brammer. 2010. *A National Analysis of Minorities in Science and Engineering Faculties at Research Universities*, 2nd Ed. Jan 4, 2010. [http://faculty-staff.ou.edu/N/Donna.J.Nelson-1/diversity/Faculty_Tables_FY07/07Report.pdf]

New '*International Women in Maths*' website

In March 2013 the Executive Committee of the International Mathematical Union (IMU) approved the establishment of an Advisory Group for Women in Mathematics, charged with creating and overseeing a section of the IMU website entitled Women in Mathematics (WiM). Opportunities for women vary widely from country to country and a main aim is to enhance the participation of women in all mathematical communities.



The new WiM website was launched at the International Congress of Women Mathematicians on August 12th just prior to the International Congress of Mathematicians, at the address http://www.mathunion.org/wim/

The site includes information about organizations, people, events, resources and initiatives of interest to women mathematicians world-wide. In order to maximize the usefulness of this site, we welcome suggestions from the community. Indeed, advice concerning items for inclusion is important to us.

The Advisory Group may be contacted at info-for-wim@mathunion.org

The WiM Advisory Group: Ingrid Daubechies (Chair) (USA), Petra Bonfert-Taylor (USA), Carla Cedarbaum (Germany), Nalini Joshi (Australia), Sunsook Noh (Korea), Marie-Françoise Ouedraogo (Burkina Faso), Dušanka Perišić (Serbia), Claudia Sagastizábal (Brazil), Caroline Series (UK), and Carol Wood (USA).

IMS Travel Award winners in Sydney

Meet the seven IMS Travel Award winners who attended the IMS awards session in Sydney (pictured with Bin Yu, center). This year's award enabled 18 new researchers to travel to a variety of IMS meetings as well as this one: JSM, ENAR, WNAR, Asia-Pacific Rim meeting, and the International Society of Non-Parametric Statistics Conference.

Jiangyan Wang (pictured right) is a PhD student at Soochow University, China. She said, "I value the significant experience gained from attending this meeting, which gave me the chance to express innovative ideas and learn from other people. I believe that attending the 2014 IMS Annual Meeting has deepened my understanding of statistics and will benefit me during my PhD study. Thank you very much."

The deadline for applications for next year's awards is **February 1, 2015**. Read more at http://imstat.org/awards/travel.html

Front row, from left–right: Jinyuan Chang, Bin Yu (then IMS President), Wenxin Zhou
Middle row l–r: Susan Wei, Jiangyan Wang
Back row l–r: Takashi Owada, Bin Guo, Takumi Saegusa

IISA Conference report

2014 IISA Conference recognizes young researchers and PhD students

Subir Ghosh, University of California, Riverside, reports:

The International Indian Statistical Association (IISA) Conference on Research Innovations in Statistics for Health, Education, Technology, and Society, was held July 11–13, 2014 at the Riverside Convention Center, in Riverside, California. Plenary speakers were Nicholas P. Jewell, UC Berkeley and Kathryn Roeder, Carnegie Mellon University. Special invited speakers were Sudipto Banerjee, University of Minnesota; Joyee Ghosh (Young Researcher), The University of Iowa; Ryan P. Hafen (Young Researcher, IISA President's invited speaker on Big Data), Pacific Northwest National Laboratory; William DuMouchel, Oracle Health Sciences; Marc A. Suchard, UC, Los Angeles; Adityanand Guntuboyina (Young Researcher), UC, Berkeley; Mark. J van der Laan, UC Berkeley; and Gourab Mukherjee (Young Researcher), University of Southern California. Distinguished researchers representing many countries as invited speakers include Ivan Mizera, University of Alberta, Canada; Regina Liu, Rutgers University; Mia Hubert, KU Leuven, Belgium; Jon A. Wellner, University of Washington, Seattle; Peter F. Thall, M.D. Anderson Cancer Center, Huston; Valerii V. Fedorov, Quintiles; Christine Müller, TU Dortmund University, Germany; Joseph Heyse, Merck Research Laboratories; Hira L. Koul, Michigan State University; and George Michailidis, University of Michigan, Ann Arbor. Highly talented young researchers and fresh PhDs took the center stage at the conference along with mid-career prominent and senior distinguished researchers. Speakers were from academia, industries, research centers, and government organizations.

Biostatistics invited sessions include cancer research; drug development; clinical trials; enrichment strategy; healthcare; pharmacometrics and pharmacological modeling; incidence rate, life time and benefit risks; survival analysis; multiple testing; case control; disease diagnosis; genomics data; '-omics' data; and selective genotyping.

Statistics invited sessions included several sessions on inference and learning in high dimension; graphical and network models; feature modeling, screening, and clustering; data depth; functional data; spatial statistics; large spatial and multivariate data; time series; long-memory processes; pattern recognition; inverse problems; model selection; mixed model; reliability and SPC; method comparison studies; robust statistics; asymptotics; survey estimation; Gini index; order and circular statistics.

Invited sessions on Probability included sessions on modeling; queuing networks; optimal pricing and capacity sizing in queuing systems.

Following the IISA tradition for the Young Researcher Awards, three young (i.e. under 45) researchers were honored: Bhramar Mukherjee, University of Michigan, Ann Arbor (Methods and Applications), Debashis Paul, UC Davis (Theory and Methods) and Shalabh, IIT Kanpur, India (also Theory and Methods).

The conference had three Student Paper Competition sessions. Nineteen students were selected from the first round of competition presented at these sessions. Again, following the IISA tradition for the Best Student Paper Awards, four students were selected based on the quality of their work as well as presentations. They were, in Theory and Methods, Sumanta Basu and Pratima Bagchi both from University of Michigan, and in Methods and Applications, Subhabrata Sen (Stanford University) and Raymond Wong (UC Davis). There were also three Contributed Paper Sessions where 17 students presented their papers.

At the conference banquet, Tamara Broderick, a fresh PhD from UC Berkeley, gave an outstanding dinner presentation. Nineteen students selected from the first round of student competition were also recognized at the banquet.

The complete conference program, photos, and award details can be viewed at the website: http://2014iisa.intindstat.org.

Mouli Banerjee, University of Michigan (left) in discussion with Jon Wellner, University of Washington

Young researcher Tamara Broderick (Berkeley) describing her work at the conference banquet

Naveen Narisetty (PhD student, University of Michigan), right, sharing his thoughts with Chaitra Nagaraja (Fordham University)

IMS meetings around the world

IMS co-sponsored meeting

XIII CLAPEM: *Congreso Latino-americano de Probabilidad y Estadística Matemática*

September 22–26, 2014

Cartagena de Indias, Colombia

w http://www.clapem.unal.edu.co/

The Latin American Congress on Probability and Mathematical Statistics (CLAPEM, by its initials in Spanish) will be holding its 13th edition in Cartagena de Indias, Colombia, September 22–26, 2014. CLAPEM is the largest event in Probability and Statistics of the Latin American region and has been held every two/three years in different countries of the region since 1980.

The XIII CLAPEM will include three short courses, six plenary conferences, eighteen thematic sessions, contributed talk sessions and poster sessions. Short courses by Bin Yu, Department of Statistics, University of California, Berkeley, USA; Alison Etheridge, Department of Statistics, University of Oxford, UK; and Paul Embrechts, Department of Mathematics, ETH Zurich, Switzerland.

Plenary speakers: Gerard Biau, Université Pierre et Marie Curie, France; Sourav Chatterjee, Courant Institute of Mathematical Sciences, USA; Carenne Ludeña, Universidad Central de Venezuela; Thomas Mikosch, University of Copenhagen, Denmark; Roberto Imbuzeiro Oliveira, IMPA, Brazil; and Victor Rivero, CIMAT, Mexico. The Invited thematic session titles can be found at www.clapem.unal.edu.co

The deadlines for abstract submission for the contributed talk and poster sessions, and for applying for financial support, have passed.

ENAR, 2015–2017

IMS sponsored meeting

2015 ENAR/IMS Spring Meeting

March 15–18, 2015

Miami, Florida, USA

w http://www.enar.org/meetings.cfm

IMS sponsored meeting

2016 ENAR/IMS Spring Meeting

March 6–9, 2016

Austin, Texas

w http://www.enar.org/meetings.cfm

IMS sponsored meeting

2017 ENAR/IMS Spring Meeting

March 12–15, 2017

Washington DC

w http://www.enar.org/meetings.cfm

IMS sponsored meeting

2018 ENAR/IMS Spring Meeting

March 25–28, 2018, Atlanta, GA

w http://www.enar.org/meetings.cfm

Joint Statistical Meetings dates, 2015–2020

IMS sponsored meeting

IMS Annual Meeting @ JSM 2015: August 8–13, 2015

Seattle, WA, USA

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

IMS sponsored meeting

JSM 2016: July 30–August 4, 2016, Chicago, IL, USA

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

IMS sponsored meeting

IMS Annual Meeting @ JSM 2017: July 29–August 3, 2017

Baltimore, MD, USA

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

IMS sponsored meeting

JSM 2018

July 28–August 2, 2018

Vancouver, Canada

IMS sponsored meeting

IMS Annual Meeting @ JSM 2019:

July 27–August 1, 2019, Denver, CO

IMS sponsored meeting

JSM 2020

August 1–6, 2020

Philadelphia, PA

At a glance:

forthcoming IMS Annual Meeting and JSM dates

2015

IMS Annual Meeting @ JSM: Seattle, WA, **August 8–13, 2015**

2016

IMS Annual Meeting: Toronto, Canada, **July 11–15, 2016**

JSM: Chicago, IL, **July 30 – August 4, 2016**

2017

IMS Annual Meeting @ JSM: Baltimore, MD, **July 29 – August 3, 2017**

2018

IMS Annual Meeting: TBD

JSM: Vancouver, Canada, **July 28–August 2, 2018**

2019

IMS Annual Meeting @ JSM: Denver, CO, **July 27–August 1, 2019**

IMS co-sponsored meeting

International Symposium in Statistics (ISS) 2015

Parametric and Semi-parametric Inferences for Spatial-temporal, and Multi-dimensional Familial-longitudinal Data

July 6–8, 2015

Memorial University, St. John's, Canada

w http://www.iss-2015-stjohns.ca/

The ISS-2015 is planned to discuss the methodological advances and challenges in the analysis of continuous and discrete correlated data both in parametric and semi-parametric setup.

The main topics of interest of this symposium are:

- Multivariate analysis in a wider non-normal elliptical distribution setup;
- Multivariate analysis for longitudinal categorical data;
- Time series volatility models;
- Spatial-temporal data analysis;
- Familial longitudinal data analysis in semi-parametric setup.

It is also of interest to discuss further challenges in analysis when data may contain measurement errors, missing values, and/or outliers, for example.

The scientific program will include keynote, special invited, invited, and contributed paper sessions.

IMS co-sponsored meeting

38th Conference on Stochastic Processes and their Applications

July 13–17, 2015, Oxford, United Kingdom

w http://www.oxford-man.ox.ac.uk/events/spa2015

IMS co-sponsored meeting

INFORMS Applied Probability Society Conference 2015

July 5–8, 2015, Istanbul, Turkey

w TBC

The next APS meeting will be held at the Koc University campus (Istanbul, Turkey) on July 5–8, 2015.

IMS co-sponsored meeting

9th World Congress on Probability and Statistics

July 11–15, 2016

Toronto, Canada

w http://www.fields.utoronto.ca/programs/scientific/16-17/WC2016/

This meeting is jointly sponsored by the Bernoulli Society and the IMS. The Scientific Programme Chair is Alison Etheridge. The Local Chair is Tom Salisbury.

IMS co-sponsored meeting NEW

9th International Conference on Extreme Value Analysis: EVA 2015

June 15–19, 2015

Ann Arbor, Michigan

w http://sites.lsa.umich.edu/eva2015

IMS Representative on Program Committees:
Liang Peng **e** peng@math.gatech.edu

The ninth international conference on Extreme Value Analysis will take place at the University of Michigan, Ann Arbor. It will feature recent research on the probability and statistics of extreme value phenomena and its important applications to climate and weather, finance, insurance, engineering and computer science. All students, researchers, practitioners, and scientists with interests in statistics of extremes are welcome to EVA in Ann Arbor!

IMS sponsored meeting

2015 IMS-China Conference on Statistics and Probability

July 1–4, 2015

Kunming, Yunnan, P. R. China

w http://www.2015imschina.com

Contact: Qiwei Yao **e** q.yao@lse.ac.uk

The fifth IMS-China International Conference on Statistics and Probability will be held in Kunming, China, from July 1–4, 2015. Its scientific program will cover a wide range of topics in probability, statistics and their related areas. The conference will also provide an excellent forum for scientific exchanges and for forging new research collaborations. The conference website contains updated information and contact details.

IMS co-sponsored meeting

2015 European Meeting of Statisticians

July 6–10, 2015

Amsterdam, The Netherlands

w http://ems2015.nl/

The European Meeting of Statisticians (EMS) is the main conference in statistics and probability in Europe. It is organized in a roughly two-yearly schedule and is sponsored by the European Regional Committee of the Bernoulli Society. The program consists of invited and contributed lectures, and posters, addressing a full range of subjects in statistics and its many applications.

The conference will be held at the campus of the VU University Amsterdam, from Monday, July 6 to Friday, July 10, 2015.

Program committee: Marc Hallin (Belgium, chair); Claudia Klüppelberg (Germany); Susanne Ditlevsen (Denmark); Dominique Picard (France); Daniel Hlubinka (Czech Republic); Luigi Augugliaro (Italy); Geurt Jongbloed (Netherlands); Niels Hansen (Denmark, ERC Bernoulli Society)

Other meetings around the world

Integrative Approaches to Understand Allelic Function
NEW
November 20–21, 2014
Boston, Massachusetts, USA

w http://www.hsph.harvard.edu/2014-pqg-conference/

The conference will seek to examine the use of evolutionary functional genomics, statistical genetics, and integrative approaches to understand the function of rare and common human alleles. We will discuss the interdisciplinary challenges of data analysis involved. The conference schedule includes time for scientific presentations, as well as a poster session for submitted abstracts.

NIMBioS Investigative Workshop: Information and Entropy
NEW
April 8–10, 2015
Knoxville, Tennessee, USA

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

Information theory and entropy methods are becoming powerful tools in biology, from the level of individual cells, to whole ecosystems, to experimental design, model-building, and the measurement of biodiversity. The aim of this investigative workshop is to synthesize different ways of applying these concepts to help systematize and unify work in biological systems.

Greek Stochastics ζ′
NEW
December 20–22, 2014
Athens, Greece

w http://www.stochastics.gr/meetings/zeta/

The meeting's primary aim is to facilitate a broad discussion of current research themes related to Networks. The workshop will consist of: three short courses, a limited number of contributed talks, and poster presentations.

The three short courses will be given by: Remco van der Hofstad (Eindhoven University of Technology), Christian Brownlees (Universitat Pompeu Fabra) and Patrick Wolfe (University College London).

Speakers include: Dimitris Achlioptas (University of California, Santa Cruz, TBC); Nick Polson (University of Chicago Booth); Sofia Olhede (University College London); Leonardo Bottolo (Imperial College London); Simon Godsill (Cambridge, TBC); Ajay Jasra (National University of Singapore); Mihalis Markakis (Universitat Pompeu Fabra, Barcelona); Kostas Spiliopoulos (Boston University); Sergios Agapiou (University of Warwick).

Deadline for submission of contributed talk: 25 September 2014 (notification of acceptance by 15 October 2014). Deadline for submission of poster presentation: 15 October 2014.

Applied Statistics and Public Policy Analysis
NEW
December 11–12, 2014
Charles Sturt University, Wagga Wagga, NSW

w http://csusap.csu.edu.au/~azrahman/ASPPAC2014

Applied statistics plays a vital role in the analysis and evaluation of public policies in various fields including social sciences, economics, health sciences, population studies etc. On the other hand, with society apparently expecting more and more from all three levels of government; it becomes increasingly important that public policy should be based on reliable and up-to-date data that covers the important issues. This conference aims to promote research collaborations and exchange ideas between applied statisticians who will detail the latest innovations in research to gather and disseminate information, and from public policy analysts who will describe how they use existing information and indicate areas in which there need to be statistical developments. Another aim is to establish connections between researchers at tertiary institutions and working in industry in Australia and overseas. This conference is sponsored by Australian Mathematical Sciences Institute (AMSI) and Charles Sturt University (CSU).

Keynote speakers: Matthew Gray, Australian National University; Peter Davis, University of Auckland; Laurie Brown, University of Canberra; Catherine D'este, Australian National University; You-Gan Wang, University of Queensland.

We are currently accepting abstracts for this event on the conference theme or other aspects of applied statistics and public policy analysis. To find out more please visit our conference website or contact Azizur Rahman / Kenneth Russell at asppac2014@csu.edu.au.

56th Annual Conference of the South African Statistical Association
NEW
October 27–30, 2014
Grahamstown, South Africa

w http://www.sastat.org.za/sasa2014

The South African Statistical Association (SASA) and Department of Statistics at Rhodes University are proud to host the 56th annual SASA conference. The SASA conference will be held from 27 to 30 October 2014 at Rhodes University in Grahamstown. Our aim is to bring statisticians and other quantitative researchers from around the country and abroad together in Grahamstown to share their research, discuss emerging ideas and challenges in their respective fields. Workshops: 27 October 2014, main conference: 28–30 October. Registration is open, early bird registration closes on 5 September 2014 and late registration closes on 3 October 2014. Abstract submission (oral and poster) deadline 5 September 2014.

24th International Workshop on Matrices and Statistics: IWMS-2015
NEW

May 26–28, 2015

Haikou, Hainan, China

w http://iwms2015.csp.escience.cn/dct/page/1

The purpose of the Workshop is to stimulate research and, in an informal setting, to foster the interaction of researchers in the interface between statistics and matrix theory. The Workshop will provide a forum through which statisticians may be better informed of the latest developments and newest techniques in linear algebra and matrix theory and may exchange ideas with researchers from a wide variety of countries.

The Workshop will comprise Plenary Talks, Invited Mini-symposia and Contributed Talks and Special Sessions honoring the 75th Birthday of Professor Kai-Tai Fang and the 70th Birthday of Simo Puntanen. Among confirmed Plenary Speakers are Zhi Geng (China), Lynn Roy LaMotte (USA) and Peter Semrl (Slovenia).

The Mini-symposia topics are Design and Analysis of Experiments, Generalized inverses and Linear Models, Linear and Mixed Models, Magic Matrices, Matrices in Applied Probability, Matrices useful for Modelling Multi-level Models, Matrices with Economic and Financial Applications, Model Selection and Post estimation,Statistical Simulation,Teaching Matrices within Statistics.

The Scientific Organizing Committee comprises Jeffrey J. Hunter (Chair), Simo Puntanen (Vice-chair), Chuanzhong Chen, S. Ejaz Ahmed, Kai-Tai Fang, Shuangzhe Liu, Yonghui Liu, Augustyn Markiewicz, George P.H. Styan, Kimmo Vehkalahti, Julia Volaufova, Dietrich von Rosen, Hans Joachim Werner.

Contacts: International Organizing Committee: Jeffrey J. Hunter **e** jeffrey.hunter@aut.ac.nz, Local Organizing Committee: Chuanzhong Chen **e** ccz0082@aliyun.com, IWMS website **w** http://www.sis.uta.fi/tilasto/iwms/

9th Annual International Conference on Statistics
NEW

June 29–July 2, 2015

Athens, Greece

w http://www.atiner.gr/statistics.htm

The conference is soliciting papers (in English only) from all areas of Statistics and other related areas. You may participate as panel organizer, presenter of one paper, chair a session or observer.

Special arrangements will be made with a local luxury hotel for a limited number of rooms at a special conference rate. In addition, a number of special social events will be organized: http://www.atiner.gr/2015/SOC-STA.htm.

Please submit an abstract by December 1, 2014: see the website for instructions.

International Conference on Robust Statistics 2015
NEW

January 12–16, 2015

Kolkata, India

w http://www.isical.ac.in/~icors2015/

The International Conference on Robust Statistics (ICORS) has been an annual international conference since 2001. The aim of the conferences is to bring together researchers interested in robust statistics, data analysis and related areas. Traditionally this conference has involved theoretical statisticians, applied statisticians and data analysts, ranging from leading experts to junior researchers and graduate students. The 2015 version will be held at the Indian Statistical Institute, Kolkata.

Abstract submission and registration are open.

This conference will cover all areas of statistics having a robustness component or robustness perspective.

For further details visit the website, or write to Dr. Ayanendranath Basu/Dr. Diganta Mukherjee at icors2015@gmail.com.

16th Applied Stochastic Models and Data Analysis International Conference (ASMDA)
NEW

June 30–July 4, 2015

Piraeus, Greece

w http://www.asmda2015.com

The 16th ASMDA conference will focus on new trends in theory, applications and software of Applied Stochastic Models and Data Analysis. In this conference we will celebrate the 34 years from the first ASMDA organized in Brussels (1981).

The ASMDA 2015 will be held in Piraeus, Greece, from the 30th of June to the 4th of July, 2015. ASMDA 2015 is organized by the ASMDA International Society and the Department of Statistics and Insurance Science of the University of Piraeus Greece. Piraeus is the main harbour of Greece, situated upon the Saronic Gulf, very close to Athens.

ASMDA main objective is to welcome papers, both theoretical or practical, presenting new techniques and methodologies in the broad area of stochastic modeling and data analysis. An objective is to use the methods proposed for solving real life problems by analyzing the relevant data. Also, the use of recent advances in different fields will be promoted such as for example, new optimization and statistical methods, data warehouse, data mining and knowledge systems, computing-aided decision supports and neural computing.

Particular interest will be given to interesting applications in engineering, productions and services (maintenance, reliability, planning and control, quality control, finance, insurance, management and administration, inventory and logistics, marketing, environment, human resources, biotechnology, medicine).

FIELDS

THEMATIC PROGRAM ON STATISTICAL INFERENCE, LEARNING, AND MODELS FOR BIG DATA

JANUARY - JUNE, 2015

PROGRAM

JANUARY 12 – 23, 2015

Opening Conference and Boot Camp
Organizing Committee: Nancy Reid (Chair), Sallie Keller, Lisa Lix, Bin Yu

JANUARY 26 – 30, 2015

Workshop on Big Data and Statistical Machine Learning
Organizing committee: Ruslan Salakhutdinov (Chair), Dale Schuurmans, Yoshua Bengio, Hugh Chipman, Bin Yu

FEBRUARY 9 – 13 , 2015

Workshop on Optimization and Matrix Methods in Big Data
Organizing Committee: Stephen Vavasis (Chair), Anima Anandkumar, Petros Drineas, Michael Friedlander , Nancy Reid, Martin Wainwright

FEBRUARY 23 – 27, 2015

Workshop on Visualization for Big Data: Strategies and Principles
Organizing Committee: Nancy Reid (Chair), Susan Holmes, Snehelata Huzurbazar, Hadley Wickham, Leland Wilkinson

MARCH 23 – 27, 2015

Workshop on Big Data in Health Policy
Organizing Committee: Lisa Lix (Chair), Constantine Gatsonis , Sharon-Lise Normand

APRIL 13 – 17, 2015

Workshop on Big Data for Social Policy
Organizing Committee: Sallie Keller (Chair), Robert Groves, Mary Thompson

JUNE 13 – 14, 2015

Closing Conference
Organizing Committee: Nancy Reid (Chair), Sallie Keller, Lisa Lix, Hugh Chipman, Ruslan Salakhutdinov, Yoshua Bengio, Richard Lockhart
to be held at AARMS of Dalhousie University

GRADUATE COURSES

JANUARY TO APRIL 2015

Large Scale Machine Learning
Instructor: Ruslan Salakhutdinov (University of Toronto)

JANUARY TO APRIL 2015

Topics in Inference for Big Data
Instructors: Nancy Reid (University of Toronto), Mu Zhu (University of Waterloo)

This thematic program emphasizes both applied and theoretical aspects of statistical inference, learning and models in big data. The opening conference will serve as an introduction to the program, concentrating on overview lectures and background preparation. Workshops throughout the program will highlight cross-cutting themes, such as learning and visualization, as well as focus themes for applications in the social, physical and life sciences. It is expected that all activities will be webcast using the FieldsLive system to permit wide participation. Allied activities planned include workshops at PIMS in April and May and CRM in May and August.

ORGANIZING COMMITTEE

Yoshua Bengio (Montréal)
Hugh Chipman (Acadia)
Sallie Keller (Virginia Tech)
Lisa Lix (Manitoba)
Richard Lockhart (Simon Fraser)
Nancy Reid (Toronto)
Ruslan Salakhutdinov (Toronto)

INTERNATIONAL ADVISORY COMMITTEE

Constantine Gatsonis (Brown)
Susan Holmes (Stanford)
Snehelata Huzurbazar (Wyoming)
Nicolai Meinshausen (ETH Zurich)
Dale Schuurmans (Alberta)
Robert Tibshirani (Stanford)
Bin Yu (UC Berkeley)

For more information, allied activities off-site, and registration, please visit:

www.fields.utoronto.ca/programs/scientific/14-15/bigdata

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Ontario
CANSSI INCASS

More meetings around the world

NIMBioS Investigative Workshop: "Lymphoid Cells in Acute Inflammation"
January 15-16, 2015
NIMBioS at the University of Tennessee, Knoxville
w http://www.nimbios.org/workshops/WS_lymphoid

The National Institute for Mathematical and Biological Synthesis (NIMBioS) is now accepting applications for its Investigative Workshop, "Lymphoid Cells in Acute Inflammation," to be held January 15–16, 2015, at NIMBioS.

Objectives: The Acute Inflammatory Response (AIR) to infection or traumatic injury has largely been characterized by the actions of complement, immune cells such as macrophages and neutrophils, and the inflammatory mediators they produce. Recent advances have highlighted the early and important role of regulatory T cells and innate lymphoid cells in the AIR, and these findings have begun to alter the perception that effects on lymphoid cells occur later in the response to infection or injury. Along with the biological advances in the area, mathematical modeling studies have highlighted the dynamic nature of the AIR, and have pointed toward the need to consider lymphoid cells in order to explain key biological phenomena as well as impacting clinical translation. This workshop aims to survey and organize what is currently known about the role of lymphoid cells and their mediators in the AIR, how the role of lymphoid cells may differ in acute inflammation due to infection versus traumatic injury, and efforts at computational modeling of the AIR. Implicit in this aim is the goal of determining what relevant experimental datasets are available and how best to use them for the modeling efforts.

This workshop will inspire new primary research collaborations between those who have not had the opportunity to work closely with researchers developing and using computational methods to investigate biological questions. Likewise, those whose expertise is in modeling and computational methods will be able to establish connections with experimental or theoretical immunologists. The workshop should foster new collaborations by highlighting the benefits of interdisciplinary efforts in answering fundamental questions in immunology.

Co-Organizers: Judy Day (Mathematics and Electrical Engineering and Computer Science, Univ. of Tennessee) and Yoram Vodovotz (Director, Center for Inflammation & Regenerative Modeling, Univ. of Pittsburgh)

Participation in the workshop is by application only. Individuals with a strong interest in the topic are encouraged to apply, and successful applicants will be notified within two weeks of the application deadline. If needed, financial support for travel, meals, and lodging is available for workshop attendees.

Application deadline: September 30, 2014

International Conference on Statistics and Mathematics 2014
November 27–28, 2014
Surabaya, Indonesia
w http://icsm.its.ac.id

This conference is a forum to share ideas on the latest progress in statistics and mathematics. With theme *"Challenge of Statistical and Mathematical Applications for interdisciplinary research"*, the conference will bring together active researchers and practitioners to deeply discuss topics on the application of statistics and mathematics in business, economic, industry, environment, etc.

Employment Opportunities around the world

Canada: Waterloo, ON
University of Waterloo
Lecturer Positions - Statistics and Actuarial Science
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19601782

Kazakhstan: Astana
Nazarbayev University
Associate/ Full Professor
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19390258

Switzerland: Lausanne
EPFL
Faculty Positions in Statistics or Computational Applied Mathematics
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19815986

Taiwan: Taipei
Institute of Statistical Science, Academia Sinica
Regular Research Positions
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19863582

Continues on **page 24**

Employment Opportunities *continued*

United Kingdom: Bristol
University of Bristol
Research Assistant/Associate in Statistics
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19641901

United Kingdom: Edinburgh
University of Edinburgh
The Thomas Bayes Chair of Statistics
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19768475

United States: Davis, CA
University of California, Davis, Department of Statistics
Faculty Position: Assistant/Associate/Full
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19427512

United States: Los Angeles, CA
UCLA
UCLA Department of Mathematics Faculty Positions 2015-16
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19560832

United States: Iowa City, IA
University of Iowa, Department of Biostatistics
FACULTY POSITIONS IN BIOSTATISTICS
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19602313

United States: Indianapolis, IN
Eli Lilly
Associate Consultant-Statistician
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19736148

United States: Indianapolis, IN
Eli Lilly
Associate Consultant - Statistician Computation
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19735961

United States: Indianapolis, IN
Eli Lilly
Senior Statistician - Computation
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19735738

United States: Bridgewater, MA
Bridgewater State University
Department of Mathematics, Assistant Professor
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19301039

United States: Ann Arbor, MI
The University of Michigan
Tenure-track Assistant Professor
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=18619140

United States: Bridgewater, NJ
Eli Lilly
Associate Consultant - Statistician Computation
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19736033

United States: Bridgewater, NJ
Eli Lilly
Senior Statistician - Computation
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19735902

United States: Princeton, NJ
INTECH Investment Management LLC
Associate of research
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19270712

United States: Princeton, NJ
Princeton University
Assistant Professor
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19772777

United States: Pittsburgh, PA
Carnegie Mellon University
Statistics
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19839207

United States: Brookings, SD
South Dakota State University
Assistant or Associate Professor of Statistics
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19393789

United States: Fairfax, VA
George Mason University
Tenure-Track Assistant Professors
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=19601663

International Calendar of Statistical Events

IMS meetings are highlighted in maroon with the IMS logo, and new or updated entries have the NEW or UPDATED symbol. t means telephone, f fax, e email and w website. Please submit your meeting details and any corrections to Elyse Gustafson at erg@imstat.org

September 2014

September 7–10: Fort Collins, Colorado, USA. **2014 Graybill/ENVR Conference: Modern Statistical Methods for Ecology w** http://www.stat.colostate.edu/graybillconference/

September 10–11: Besançon, France. **Workshop on empirical processes and applications to statistics w** https://trimestres-lmb.univ-fcomte.fr/Workshop-on-empiricial-processes.html

September 11–13: Shymkent, Kazakhstan. **ICAAM 2014 Second International Conference on Analysis and Applied Mathematics w** http://www.icaam-online.org/index/

September 14–18: Nijmegen, The Netherlands. **The International Chemometrics Research Meeting 2014 w** www.icrm2014.org

September 19–21: University of Cincinnati, Ohio, USA. **Cincinnati Symposium on Probability Theory and Applications w** https://math.uc.edu/probability/

IMS September 22–26: Cartagena de Indias, Colombia **XIII CLAPEM: Congreso Latino-americano de Probabilidad y Estadística Matemática w** http://www.clapem.unal.edu.co/

September 22–25: Leiden, The Netherlands. **Workshop on Statistical Inference for Lévy Processes w** http://tinyurl.com/ph86pbw

September 25–27: Santa Barbara, California, USA. **Conference on Stochastic Asymptotics & Applications and Sixth Western Conference on Mathematical Finance w** http://www.pstat.ucsb.edu/sa-wcmf6/index.html

September 28–October 2: Oxford, UK. **Advances in Probability: Integrability, Universality and Beyond w** http://www.claymath.org/events/advances-probability-integrability-universality-and-beyond

October 2014

October 15–16: Göttingen, Germany. **Time Dynamic Change Point Models and its Applications w** http://www.stochastik.math.uni-goettingen.de/forschergruppe/index.php?id=651&language=en

NEW October 27–30: Grahamstown, South Africa. **56th Annual Conference of the South African Statistical Association w** http://www.sastat.org.za/sasa2014

November 2014

November 16–19: Kuala Lumpur, Malaysia. **ISI Regional Statistics Conference 2014 w** http://www.isi-rsc2014.my/

NEW November 20–21: Boston, Massachusetts, USA. **Integrative Approaches to Understand Allelic Function w** http://www.hsph.harvard.edu/2014-pqg-conference/

December 2014

December 3–5: NIMBioS, Knoxville, Tennessee. **Heart Rhythm Disorders w** http://www.nimbios.org/workshops/WS_cardiac

NEW December 11–12: Wagga Wagga, NSW, Australia. **Applied Statistics and Public Policy Analysis w** http://csusap.csu.edu.au/~azrahman/ASPPAC2014

December 18–21: Bogor, Indonesia. **13th Islamic Countries Conference on Statistical Sciences w** http://www.iccs13.isoss.net

NEW December 20–22: Athens, Greece. **Greek Stochastics ζ' w** http://www.stochastics.gr/meetings/zeta/

January 2015

January 4–7: Trident Hyderabad, India. **IX International Multiple Comparisons Procedures (MCP) Conference w** http://www.mcp-conference.org/hp/2015/

NEW January 12–16: Kolkata, India. **International Conference on Robust Statistics 2015 w** http://www.isical.ac.in/~icors2015/

NEW January 15-16: NIMBioS at the University of Tennessee, Knoxville. **Lymphoid Cells in Acute Inflammation w** http://www.nimbios.org/workshops/WS_lymphoid

February 2015

February 16–20: Wrocław University of Technology, Poland. **12th Workshop on Stochastic Models, Statistics and Their Applications w** http://www.smsa2015.rwth-aachen.de

March 2015

IMS March 15–18: Miami, Florida. **2015 ENAR/IMS Spring Meeting. w** http://www.enar.org/meetings.cfm

International Calendar *continued*

April 2015

NEW April 8–10: NIMBioS, Knoxville, Tennessee, USA. **Information and Entropy** w http://www.nimbios.org/workshops/WS_entropy

May 2015

May 18–29: Singapore. **Workshop on New Directions in Stein's Method** w http://www2.ims.nus.edu.sg/Programs/015wstein/

NEW May 26–28: Haikou, Hainan, China. **24th International Workshop on Matrices and Statistics (IWMS-2015)** w http://iwms2015.csp.escience.cn/dct/page/1

June 2015

ims June (exact dates TBC): Location TBC. 2015 **WNAR/IMS Annual Meeting** w TBC

June 7–10: Oslo, Norway. **Colloquium of the International Actuarial Association** w http://www.actuaries.org/oslo2015

June 15–19: Ann Arbor, Michigan. **9th International Conference on Extreme Value Analysis: EVA 2015** w http://sites.lsa.umich.edu/eva2015

NEW June 29–July 2: Athens, Greece. **9th Annual International Conference on Statistics** w http://www.atiner.gr/statistics.htm

NEW June 30–July 4: Piraeus, Greece. **16th Applied Stochastic Models and Data Analysis International Conference (ASMDA)** w http://www.asmda2015.com

July 2015

ims July 1–4: Kunming, Yunnan, P. R. China. **2015 IMS-China International Conference on Statistics and Probability** w http://www.2015imschina.com

ims July 5–8: Istanbul, Turkey. **INFORMS Applied Probability Society Conference 2015** w TBC

ims July 6–8: Memorial University, St John's, Canada. **International Symposium in Statistics (ISS 2015)** *Parametric and Semi-parametric Inferences for Spatial-temporal, and Multi-dimensional Familial-longitudinal Data.* w http://www.iss-2015-stjohns.ca

ims July 6–10: Amsterdam, The Netherlands. **2015 European Meeting of Statisticians** w http://ems2015.nl/

ims July 13–17: Oxford, UK. **38th Conference on Stochastic Processes and Applications** w TBC

July 26–31: Rio de Janeiro, Brazil. **2015 ISI World Statistics Congress** w http://www.isi2015.ibge.gov.br/

August 2015

ims August 8–13: Seattle, WA. **IMS Annual Meeting at JSM2015.** w http://amstat.org/meetings/jsm/

August 10–14: Beijing, China. **8th International Congress of Industrial and Applied Mathematics** w http://www.iciam2015.cn/

September 2015

September 21–25: Vienna, Austria. **8th International Workshop on Simulation** w http://iws.boku.ac.at/index.php

March 2016

ims March 6–9: Austin, Texas. **2016 ENAR/IMS Spring Meeting** w http://www.enar.org/meetings.cfm

June 2016

June 20–23: Geneva, Switzerland. **ICES-V, the 5th International Conference on Establishment Statistics** w TBC

July 2016

ims July 30 – August 4: Chicago, USA. **JSM 2016** w http://amstat.org/meetings/jsm/

ims July 11–15: Toronto, ON, Canada. **IMS Annual Meeting at 9th World Congress in Probability and Statistics** w TBC

July 2017

ims July 29 – August 3: Baltimore, USA. **IMS Annual Meeting at JSM 2017** w http://amstat.org/meetings/jsm/

July 2018

ims July 28 – August 2: Vancouver, Canada. **JSM 2018** w TBC

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 and Organizational 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 $115. An additional $65 is added to the dues of members for each scientific journal selected ($40 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. **Organizational memberships** are available to departments, corporations, government agencies and other similar research institutions at $169 per year.

Individual and General Subscriptions

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IMS Bulletin

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