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Experiences of JSM 2015

Thilaksha Tharanganie, who is a PhD student in the Department of Econometrics and Business Statistics at Monash University, Australia, wrote to share her experiences from the Joint Statistical Meetings (JSM) on August 2015 in Seattle, USA.

JSM is the largest gathering of statisticians held in North America and this time attended more than 6,800 people. This was my first time attending a JSM and I found it a little overwhelming. I was one of the recipients of an Institute of Mathematical Statistics Travel Award, which assisted me with the costs of attending JSM.

The conference was well organised, with many parallel sessions on numerous fields in statistics. I obtained constructive comments on my talk and expanded my knowledge by listening to other presentations. I networked with peers from all over the world.

For me, the highlight of attending the JSM was to attend the 2015 NISS/ASA/IMS Writing Workshop for Junior Researchers. I learnt effective writing techniques on how to write journal articles and grant proposals. Most importantly, the feedback I received on my writing sample from the mentor, Professor David Banks from Duke University, was invaluable. In addition, I was selected to attend the Mentoring Workshop and had been matched with a mentor, Ms Erin Tanenbaum, who is a Senior Statistician in the Statistics and Methodology department with NORC at the University of Chicago. I am immensely grateful to her for all her advice and for sharing this mentoring experience.

Student member Thilaksha Tharanganie presented her talk at JSM in Seattle.

During the conference, I also attended the IMS Presidential Address and Awards Ceremony, which was open to all delegates.

Overall, my participation in this 2015 JSM opened up doors to the wider world. My humble thank you to the IMS for supporting me to attend this largest statistical conference in the world. It is really worth attending the JSM!

Thilaksha was able to travel to attend JSM and present a talk thanks to an IMS Travel Award. IMS Travel Awards fund travel to IMS sponsored or co-sponsored meetings, for New Researchers (within five years of PhD), with priority given to those from reduced dues countries. The deadline is February 1, 2016: see http://imstat.org/awards/travel.html for details of how to apply.

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IMS Awards, COPSS Awards

It's that time of year again to consider who to nominate for the IMS awards.

The Carver Medal was created by the IMS in honor of Harry C. Carver, for exceptional service specifically to the IMS. It is open to any IMS member who has not previously been elected President. See http://imstat.org/awards/carver.html. Deadline February 1.

IMS Fellows demonstrate distinction in research in statistics or probability, by publication of independent work of merit; alternatively, as well-established leaders whose contributions to the field of statistics or probability other than original research is judged of equal value; or whose work has contributed greatly to the utility of and the appreciation of these areas. Candidates for fellowship should have been members of the IMS for at least two years. See http://imstat.org/awards/fellows.htm. Deadline January 31.

The Tweedie New Researcher Award funds travel to present the *Tweedie New Researcher Invited Lecture* at the IMS New Researchers Conference. The recipient will have received their PhD within five years. See http://imstat.org/awards/tweedie.html. Deadline December 1.

Nominate for 2016 COPSS Awards

Each year, the statistical profession recognizes outstanding members at the Joint Statistical Meetings in an awards ceremony organized by the Committee of Presidents of Statistical Societies (COPSS). Nominations are an important part of the process, and everyone can contribute—from the newest to most senior members of our societies. We recognize excellence in our mentors, colleagues, and friends, and it is important to single out those who have made exceptional contributions to the profession. So take a few minutes, review the various COPSS Awards for 2016, and see if you can identify worthy individuals.

Nominations are being sought for the following COPSS awards, which will be presented at the 2016 JSM in Chicago, Illinois (July 30–August 4). See http://copss.org/awards/ for details of each award's committee chairs and submission procedures.

The Fisher Award and Lectureship is awarded each year for outstanding contributions to aspects of statistics and probability that closely relate to the scientific collection and interpretation of data. The award exists to recognize the importance of statistical methods for scientific investigations. The lecture is delivered at JSM. Eligible nominations should be sent in PDF format by December 15, 2015, to the Fisher Award committee chair.

The Presidents' Award is presented yearly in recognition of outstanding contributions to the statistics profession. It is typically granted to an individual who has not yet reached his or her 41st birthday. In the special case of an individual who has received his or her statistically related terminal degree fewer than 12 years prior to the nomination deadline, the individual will be eligible if he or she has not yet reached his or her 46th birthday during the year of the award. Nominations should be sent in PDF format by January 15, 2016, to the Presidents' Award committee chair.

The Elizabeth L. Scott Award is presented biennially (even years) to an individual who has helped foster opportunities in statistics for women and exemplifies the contributions of Elizabeth Scott's lifelong efforts to further the careers of women in academia. Nominations should be submitted in PDF format by January 15, 2016, to the Elizabeth Scott Award committee chair.

These awards are jointly sponsored by IMS, ASA, ENAR, WNAR, and SSC. They represent a discipline-wide acknowledgment of the outstanding contributions of statisticians, regardless of their affiliations with any professional society.

Donors to IMS Funds

The IMS has eight funds that are open to contributions, detailed below. The Institute would like to thank the following individuals and organizations for contributing to the IMS. If you would like to make a contribution, please visit http://imstat.org/membership/gift.htm.

Blackwell Lecture Fund

The Blackwell Lecture Fund is used to support a lecture in honor of David Blackwell. The purpose of this lecture is to honor Blackwell, to keep his name alive and to inspire young people to emulate his achievements. The first lecture was presented in 2014.

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IMS Gift Membership Fund (contributors from 2012 forward)

The IMS Gift Membership Program provides IMS memberships and journals for statisticians and probabilists in regions of the world where payments in hard currency would impose a difficult financial burden.

Gopal K Basak; Ernest Bowen; Louis Chen; Herman Chernoff; Joel Dubin; Steven Ellis; Arnoldo Frigessi; Diana Gillooly; Ramanathan Gnanadesikan; Susan Gruber; Irwin Guttman; Risto Heijmans; Estate V. Khmaladze; Ernst Linder; Ryan Machtmes; Donald McClure; Edmund McCue; Luke Miratrix; Richard A. Olshen; Walter Sievers; Charles Stein; Steven Thomson; Bruce E. Trumbo; Anton Wakolbinger; Donald Ylvisaker.

Le Cam Lecture Fund

The Le Cam Lecture Fund is an endowment fund set up by friends of Lucien Le Cam to memorialize his contributions to our field. The Le Cam lecturer should be an individual whose contributions have been or promise to be fundamental to the development of mathematical statistics or probability.

Charles Antoniak; Miguel Arcones; Frederick Asare; Dianne Carrol Bautista; Rudolf Beran; Thomas Billings; David Blackwell; William Brady; Karl Broman; Lawrence Brown; F Thomas Bruss; Prabir Burman; Andrew Carter; Yu-Lin Chang & Pao-Kuei Wu; Gang Chen; Louis Chen; Chin Long Chiang; Bertrand Clark; Michael Cohen; Anirban DasGupta; Roger Day; Jay Devore; Kjell Doksum; David Donoho; Lutz Duembgen; Robert Elashoff; Jianqing Fan; Kai-Tai Fang; Dorian Feldman; Thomas Ferguson; Dean Foster; Anthony Gamst; Li Gan; Jayanta Ghosh; Dennis Gilliland; Evarist Giné; Prem Goel; Alex Gottlieb; Z Govindarajulu; Priscilla Greenwood; Yuli Gu; Shanti Gupta; Peter Guttorp; Charles Hagwood; James Hannan; Paul Holland; Rafael Irizarry; Lancelot James; Paramaraj Jeganathan; Kun Jin; Iain Johnstone; Rafail Khasminski; Ja-Yong Koo; Hira Koul; Andrzej Kozek; Yury Kutoyants; Louise Le Cam; Kee-Won Lee; Erich Lehmann; Lei

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Model-free inference in statistics: *how and why*

Dimitris Politis is a professor in the Department of Mathematics at the University of California in San Diego. He is one of the *IMS Bulletin*'s Contributing Editors, and a former Editor (January 2011–December 2013). Here, he writes about his most recent pastime, Model-Free Prediction:

1. Estimation

Parametric models served as the cornerstone for the foundation of Statistical Science in the beginning of the 20th century by R.A. Fisher, K. Pearson, J. Neyman, E.S. Pearson, W.S. Gosset (also known as "Student"), etc.; their seminal developments resulted into a complete theory of statistics that could be practically implemented using the technology of the time, i.e., pen and paper (and slide-rule!). While some models are inescapable, e.g. modeling a polling dataset as a sequence of independent Bernoulli random variables, others appear contrived, often invoked for the sole reason to make the mathematics work. As a prime example, the ubiquitous—and typically unjustified—assumption of Gaussian data permeates statistics textbooks to the day. Model criticism and diagnostics were subsequently developed as a practical way out.

With the advent of widely accessible powerful computing in the late 1970s, computer-intensive methods such as resampling and cross-validation created a revolution in modern statistics. Using computers, statisticians became able to analyze big datasets for the first time, paving the way towards the 'big data' era of the 21st century. But perhaps more important was the realization that the way we do the analysis could/should be changed as well, as practitioners were gradually freed from the limitations of parametric models. For instance, the great success of Efron's (1979) bootstrap was in providing a complete theory for statistical inference under a nonparametric setting much like Maximum Likelihood Estimation had done half a century earlier under the restrictive parametric setup.

Nevertheless, there is a further step one may take, i.e., going beyond even nonparametric models. To explain this, let us first focus on regression, i.e., data that are pairs: $(Y_1,X_1), (Y_2,X_2), \dots , (Y_n, X_n)$ where Y_i is the measured response associated with a regressor value of X_i. The standard homoscedastic additive model in this situation reads:

$$Y_i = \mu(X_i) + \epsilon_i \qquad (1)$$

where the random variables ϵ_i are assumed to be independent, identically distributed (i.i.d.) from a distribution $F(\cdot)$ with mean zero.

- Parametric model: Both $\mu(\cdot)$ and $F(\cdot)$ belong to parametric families of functions, i.e., a setup where the only unknown is a finite-dimensional parameter; a typical example is straight-line regression with Gaussian errors, i.e., $\mu(x) = \beta_0 + \beta_1 x$ and $F(\cdot)$ being $N(0, \sigma^2)$.
- Semiparametric model: $\mu(\cdot)$ belongs to a parametric family, whereas $F(\cdot)$ does not; instead, it may be assumed that $F(\cdot)$ belongs to a smoothness class, e.g., assume that $F(\cdot)$ is absolutely continuous.
- Nonparametric model: Neither $\mu(\cdot)$ nor $F(\cdot)$ can be assumed to belong to parametric families of functions.

Despite the nonparametric aspect of it, even the last option constitutes a model, and can thus be rather restrictive. To see why, note that eq. (1) with i.i.d. errors is not satisfied in many cases of interest even after allowing for heteroscedasticity of the errors. Nevertheless, it is possible to shun eq. (1) altogether and instead adopt a *model-free* setup that can be described as follows.

- Model-Free Regression:
  - *Random design.* The pairs $(Y_1,X_1), (Y_2,X_2), \dots , (Y_n, X_n)$ are i.i.d.
  - *Deterministic design.* The variables $X_1, \dots , X_n$ are deterministic, and the random variables $Y_1, \dots , Y_n$ are independent with common conditional distribution, i.e., $P\{Y_j \le y | X_j = x\} = D_x(y)$ not depending on j.

Inference for features, i.e. functionals, of the common conditional distribution $D_x(\cdot)$ is still possible under some regularity conditions, e.g. smoothness. Arguably, the most important such feature is the conditional mean $E(Y \mid X = x)$ that can be denoted $\mu(x)$. When $\mu(x)$ can be assumed smooth, it can be consistently estimated by a local average and/or local polynomial. Asymptotic normality and/or resampling can then be invoked to construct confidence intervals for $\mu(x)$.

2. Prediction

Traditionally, the problem of prediction has been approached in a model-based way, i.e., (a) fit a model such as (1), and then use the fitted model for prediction of a future response Y_f associated with a regressor value x_f. Note that even in the absence of model (1), the conditional expectation $\mu(x_f)=E(Y_f | X_f = x_f)$ is the Mean Squared Error (MSE) optimal predictor of Y_f. As already mentioned, $\mu(x_f)$ can be estimated in a Model-Free way and then used for predicting Y_f but a problem remains: how to gauge the accuracy of prediction, i.e., how to construct a prediction—as opposed to confidence—interval.

Interestingly, it is possible to accomplish the goal of point and interval prediction of Y_f under the Model-Free regression setup in a direct fashion, i.e., without the intermediate step of model-fitting; this is achieved via the **Model-Free Prediction Principle** expounded upon in Politis (2015). Model-Free Prediction restores the emphasis on observable quantities, i.e., current and future data, as opposed to unobservable model parameters and estimates thereof. In this sense, the Model-Free Prediction Principle is concordant with Bruno de Finetti's statistical philosophy. Notably, being able to predict the response Y_f associated with the regressor X_f taking on *any* possible value (say x_f) seems to inadvertently also achieve the main goal of modeling, i.e., trying to relate how Y depends on X. In so doing, the solution to interesting estimation problems is obtained as a by-product, e.g. inference on features of $D_x(\cdot)$ such as its mean $\mu(x)$. In other words, as prediction can be treated as a by-product of model-fitting, key estimation problems can be solved as a by-product of being able to perform prediction. Hence, a Model-Free approach to frequentist statistical inference is possible, including prediction and confidence intervals.

3. The Model-Free Prediction Principle

Consider the Model-Free regression set-up with a vector of observed responses $\underline{Y}_n = (Y_1, \dots, Y_n)'$ that are associated with the vector of regressors $\underline{X}_n = (X_1, \dots, X_n)'$. Also consider the enlarged vectors $\underline{Y}_{n+1} = (Y_1, \dots, Y_n, Y_{n+1})'$ and $\underline{X}_{n+1} = (X_1, \dots, X_n, X_{n+1})'$ where (Y_{n+1}, X_{n+1}) is an alternative notation for (Y_f, X_f); recall that Y_f is yet unobserved, and X_f will be set equal to the value x_f of interest. If the Y_is were i.i.d. (and not depending on their associated X value), then prediction would be trivial: the MSE–optimal predictor of Y_{n+1} is simply given by the common expected value of the Y_is, completely disregarding the value of X_{n+1}.

In a nutshell, the Model-Free Prediction Principle amounts to using the structure of the problem in order to **find an invertible transformation H_m that can map the non-i.i.d. vector $\underline{Y}_m$ to a vector $\underline{\epsilon}_m = (\epsilon_1, \dots, \epsilon_m)'$ that has i.i.d. components**; here m could be taken equal to either n or $n+1$ as needed. Letting H_m^{-1} denote the inverse transformation, we have $\underline{\epsilon}_m = H_m(\underline{Y}_m)$ and $\underline{Y}_m = H_m^{-1}(\underline{\epsilon}_m)$, i.e.,

$$\underline{Y}_m \overset{H_m}{\longmapsto} \underline{\epsilon}_m \text{ and } \underline{\epsilon}_m \overset{H_m^{-1}}{\longmapsto} \underline{Y}_m \qquad (2)$$

If the practitioner is successful in implementing the Model-Free procedure, i.e., in identifying (and estimating) the transformation H_m to be used, then the prediction problem is reduced to the trivial one of predicting i.i.d. variables. To see why, note that eq. (2) with $m = n+1$ yields $\underline{Y}_{n+1} = H_{n+1}^{-1}(\underline{\epsilon}_{n+1}) = H_{n+1}^{-1}(\underline{\epsilon}_n, \epsilon_{n+1})$. But $\underline{\epsilon}_n$ can be treated as known (and constant) given the data $\underline{Y}_n$; just use eq. (2) with $m = n$. Since the unobserved Y_{n+1} is just the $(n+1)^{\text{th}}$ coordinate of vector $\underline{Y}_{n+1}$, we have just expressed Y_{n+1} as a function of the unobserved ϵ_{n+1}. Note that predicting a function, say $g(\cdot)$, of an i.i.d. sequence $\epsilon_1, \dots, \epsilon_n, \epsilon_{n+1}$ is straightforward because $g(\epsilon_1), \dots, g(\epsilon_n)$, $g(\epsilon_{n+1})$ is simply another sequence of i.i.d. random variables. Hence, the practitioner can use this simple structure to develop point predictors for the future response Y_{n+1}.

Prediction intervals can then be immediately constructed by resampling the i.i.d. variables $\epsilon_1, \dots, \epsilon_n$; this can be thought to give an extension of the model-based, residual bootstrap of Efron (1979) to Model-Free settings since, if model (1) were to hold true, the residuals from the model could be considered as the outcomes of the requisite transformation H_n.

4. Time series

Under regularity conditions, a transformation such as H_m of the Model-Free Prediction Principle always exists but is not necessarily unique. For example, if the variables $(Y_1, \dots, Y_m)$ have an absolutely continuous joint distribution and no explanatory variables X_m are available, then the Rosenblatt (1952) transformation can map them onto a set of i.i.d. random variables. Nevertheless, estimating the Rosenblatt transformation from data may be infeasible except in special cases. On the other hand, a practitioner may exploit a given structure for the data at hand, e.g., a regression structure, in order to construct a different, case-specific transformation that may be practically estimable from the data.

Recall that the Rosenblatt transformation maps an arbitrary random vector $\underline{Y}_m = (Y_1, \dots, Y_m)'$ having absolutely continuous joint distribution onto a random vector $\underline{U}_m = (U_1, \dots, U_m)'$ whose entries are i.i.d. Uniform(0,1); this is done via the probability integral transform based on conditional distributions. For $k > 1$ define the conditional distributions

$$F_k(y_k | y_{k-1}, \dots, y_1) = P\{Y_k \le y_k | Y_{k-1} = y_{k-1}, \dots, Y_1 = y_1\},$$

and let $F_1(y_1) = P\{Y_1 \le y_1\}$. Then the Rosenblatt transformation amounts to letting

$$U_1 = F_1(Y_1),\ U_2 = F_2(Y_2 | Y_1),\ U_3 = F_3(Y_3 | Y_2, Y_1),$$
$$\dots, \text{ and } U_m = F_m(Y_m | Y_{m-1}, \dots, Y_2, Y_1).$$

The problem is that the distributions F_k for $k \ge 1$ are typically unknown and must be estimated (in a continuous fashion) from the $\underline{Y}_n$ data at hand. However, unless there is some additional structure, this estimation task may be unreliable or plain infeasible for large k. As an extreme example, note that to estimate F_n we would have only

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Obituary: Esther Seiden

1908–2014

Practically all of the biographical information contained herein comes from Ester Samuel-Cahn's "A Conversation with Esther Seiden." Statistical Science*, 1992, 7, pp. 339–357.*

Esther Seiden

On March 3, 1908, Esther Seiden was born in a small town in West Galicia, Poland—at that time ruled by the Austro-Hungarian monarchy. In her long life she took on many challenges with a determination and strength that amazed those who knew her. That life ended in Jerusalem on June 3, 2014 under the loving care of her colleague and friend Ester Samuel-Cahn and her caregiver Margie Lentija.

Early on, Esther showed an interest in and aptitude for mathematics. Her father did not favor mathematics as a subject or career for girls. Yet the family valued education, and with self-study and yearly trips to a city, she sat and passed examinations for advancement in school. Her father sent her to a Zionist Organization-sponsored gymnasium in Krakow for her last year; Esther matriculated in 1927.

Esther went to Stefan Batory University in what is now Vilnius to major in mathematics and minor in physics. She supported herself by tutoring in mathematics and Hebrew before her talent was recognized and a fellowship was awarded for her last year of study. Esther earned a Magister of Philosophy and was thinking that as a young woman she was limited to teaching in high school. However, a professor knew of her interest in mathematical logic and arranged a fellowship that allowed Esther to study one year under Alfred Tarski and Stanislaw Leśniewski at the University of Warsaw.

After that year, Esther sought a position teaching in the Warsaw school system. The only position available was teaching first grade. Esther taught a class of 65 first grade students! She also taught mathematics at higher levels.

In 1935, Esther immigrated to Palestine and for five years taught high school mathematics. She attended the Hebrew University, but lost interest in mathematics and became actively involved in the Haganah, the Jewish paramilitary defense organization. Tiring of high school teaching, Esther supported herself during World War II by working as a secretary for the Red Cross.

By chance, Esther met a woman who worked at the British Government Bureau of Statistics; this led to an interview and a position working on the Census of Industry, her first exposure to statistics. Esther thought about returning to graduate studies in statistics and began attending lectures by Aryeh Dvoretzky and reading papers by R. A. Fisher.

Professor Tarski, now at Berkeley, recommended Esther to Jerzy Neyman. Esther came to Berkeley in Spring 1947 and was awarded a much needed research assistantship in 1948. Visiting Professor R. C. Bose gave two courses in summer 1947. There, Esther was introduced to finite projective geometry, orthogonal Latin squares and Euler's conjecture. She was fascinated with the ease with which open problems could be stated: one was that of determining the number of points in a projective space satisfying a certain constraint. Her solution was accepted for publication in the *Proceedings of the American Mathematical Society* and it, together with some results in hypothesis testing, prompted Neyman to say it was her time to get out. Her PhD in Statistics was awarded in September 1949.

Her subsequent academic career included appointments at the University of Buffalo, the University of Chicago, Howard University, and the American University in Washington DC. She was on the faculty at Northwestern University for five years, with the fourth year on leave to the Indian Statistical Institute. Esther accepted a position in the Department of Statistics at Michigan State University in 1960 and remained there until 1978. That "retirement" was followed by years of appointments at the Hebrew University in Jerusalem.

The contact with Bose in 1947 led to Esther's quest to disprove Euler's conjecture, a conjecture that was finally disposed of by Bose, Shrikhande and Parker (see Bose, R. C., Shrikhande, S. S. and Parker, E. T. "Further Results on the Construction of Mutually Orthogonal Latin Squares and the Falsity of Euler's Conjecture." *Canad. J. Math.*, **12**, 189, 1960). In the 1970s, Esther and collaborators Walter Federer and A. S. Hedayat developed F-squares and a method of sum composition of orthogonal Latin Squares. It must have been particularly satisfying for Esther that the method gave a simple way to produce orthogonal Latin Squares of order ten.

Esther was a problem solver. Professor

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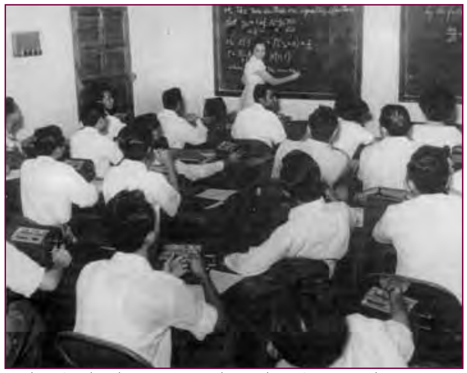
James Stapleton recalls a problem he presented to Esther that was suggested by a local physician. A knee has $n = 7$ muscles. The physician wanted cadaver knees to test after cutting subsets of muscles. Since the same knee can be used for more than one subset, the question was: What is the minimum number of cadaver knees needed to test for all possible subsets? Jim noted that the number is at least $C_{7,3} = 35$ and told Esther about the problem. A week or so later he was called about 10 pm with the answer 35. Subsequently, she tackled the general n question and with Professor Patrick Laycock published the solution (and more) in Laycock, P.J. and Seiden E., "On a Problem of Repeated Measurement Design with Treatment Additivity." *Ann. Statist.*, 1980, **8**, 1284–1292.



Esther Seiden lecturing at the Indian Statistical Institute in 1958.

Esther Seiden never tired—or retired, for that matter. Esther was tenacious and strong-willed. The day after major surgery, at 70 years of age, she walked over three miles to her home rather than call for help. Years later her fondness for long walks manifested itself while staying with a colleague in rural England. On such a walk she compared living in England to living inside a cabbage, it was all so green!

Esther's work in the design of experiments, and her example of strength of character, continue to live on.

Written by Dennis Gilliland,
Professor of Statistics and Probability,
Michigan State University

Model-free Inference continued

Continued from **page 5**

one point (in n-dimensional space) to work with. Hence, without additional assumptions, the estimate of F_n would be a point mass which is a completely unreliable estimate, and of little use in terms of constructing a probability integral transform due to its discontinuity.

An example of additional structure is the Markov setup. To elaborate, suppose that the data $Y_1, \dots, Y_n$ are a realization of a stationary (and ergodic) Markov chain. In this case, the conditional distributions F_k for all $k > 1$ are completely determined by the one-step transition distribution, namely F_2. To see why, note that the Markov assumption implies that $P\{Y_k \leq y_k | Y_{k-1} = y_{k-1}, \dots, Y_1 = y_1\} = P\{Y_k \leq y_k | Y_{k-1} = y_{k-1}\}$ for $k > 1$. Hence, the practitioner may use kernel smoothing or a related technique on the data pairs $\{(Y_j, Y_{j+1})$ for $j = 1, \dots, n-1\}$ in order to estimate the common joint distribution of these pairs. In turn, this yields estimates of F_1 and F_2, and by extension F_k for $k > 2$, so that the Rosenblatt transformation can be practically implemented as part of the Model-Free Prediction Principle.

Further examples of transformations applicable to diverse settings with regression and/or time series data are discussed in Politis (2015).

References

[1] Efron, B. (1979). Bootstrap methods: another look at the jackknife, *Ann. Statist.*, vol. 7, pp. 1–26.

[2] Politis, D.N. (2015). *Model-Free Prediction and Regression: A Transformation-Based Approach to Inference,* Springer, New York.

[3] Rosenblatt, M. (1952). Remarks on a multivariate transformation. *Ann. Math. Statist.*, vol. 23, pp. 470–472.

Recent Papers: *Statistical Science*

Volume 30, number 3: August 2015

The central purpose of *Statistical Science* is to convey the richness, breadth and unity of the field by presenting the full range of contemporary statistical thought at a moderate technical level, accessible to the wide community of practitioners, researchers and students of statistics and probability. The Editor is Peter Green.

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

Recent papers: *Bernoulli*

Volume 22, no 2: May 2016 (First Online)

Bernoulli is published by the Bernoulli Society for Mathematical Statistics and Probability and disseminated by the Institute of Mathematical Statistics on behalf of the Bernoulli Society. The journal provides a comprehensive account of important developments in the fields of statistics and probability, offering an international forum for both theoretical and applied work.

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

The Kids are Alright: Divide by n when estimating variance

Jeffrey S. Rosenthal, Professor of Statistics, University of Toronto, writes:

It happens to the instructor of every university-level introductory statistics class. You define the mean m, and the variance v. You explain how to estimate the mean from an i.i.d. sample, via $\bar{x} = \frac{1}{n} \sum x_i$. Then you have to explain how to estimate the variance. Nervously you write down the usual estimate, $s^2 = \frac{1}{n-1} \sum (x_i - \bar{x})^2$. At which point, every student in the class raises their hand, and asks, "Why do you divide by $n-1$, instead of by n?"

You then have a choice. You can awkwardly explain that this division "will be explained later". Or you can protest that if n is large then "it doesn't really matter". Or you can mystically muse that "if n=1 then the answer should be undefined, not zero". Or you can launch into a confusing and premature explanation of unbiased estimators, which at that stage will enlighten almost no one. (The situation is so dire that some instructors refuse to teach s^2 at all, cf. [1].) Meanwhile, the students would prefer to simply divide by n, corresponding to taking an average value, which everyone understands. So why can't they?

The usual answer, of course, is that s^2 is an *unbiased* estimator of v, i.e. $E(s^2) = v$. And everyone knows that unbiased estimators are *so* important that they trump any concerns about simplicity or comprehensibility.

Or do they? In preparing my teaching this year, I started to question this assumption. After all, the true value of an estimator is how accurately it estimates. And the best way to measure the accuracy of an estimate is through the *mean squared error* (MSE). Now, the MSE is the sum of the bias squared plus the estimator's variance. If the estimator is unbiased, then the bias term is zero, which is good. But could this come at the expense of increasing the estimator's variance, and hence increasing its MSE? Perhaps yes!

For a simple example, suppose a true parameter is 8, and our estimator equals either 6 or 10 with probability ½ each. Then the estimator is unbiased, with MSE = 2^2 = 4. Now, suppose we instead "shrink" our estimator by some factor r (slightly less than 1), so it equals either $6r$ or $10r$ with probability ½ each. Then the MSE = $((10r-8)^2+(8-6r)^2)/2$. If r = 0.95, then MSE = 3.77, significantly *less* than 4. That is, a smaller, shrunken, biased estimator actually *reduces* the MSE here.

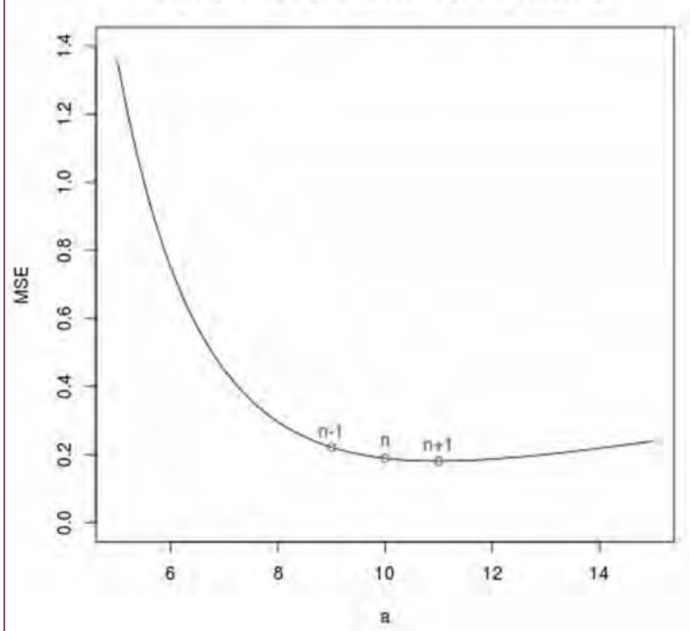
This example suggests the *possibility*, at least, that $\frac{1}{n-1} \sum (x_i - \bar{x})^2$ might not have the smallest possible MSE after all—and perhaps the more natural estimator $\frac{1}{n} \sum (x_i - \bar{x})^2$ has a smaller MSE!

Fortunately, such calculations have already been done (see e.g. [2]). Indeed, if v is estimated by $\frac{1}{a} \sum (x_i - \bar{x})^2$ for any $a>0$, then the MSE is known to be

$$\frac{n-1}{na^2}\left[(n-1)\gamma+n^2+n\right]v^2-\left(\frac{2(n-1)}{a}-1\right)v^2$$

where $\gamma=E[(X_1-m)^4]/v^2-3$ is the excess kurtosis. If the X_i are Gaussian, then γ=0, and the MSE is smaller when $a=n$ than when $a=n-1$; in fact the MSE is minimised when $a=n+1$ (not when $a=n-1$). See Figure 1 for the case v=1 and γ=0 and n=10.

Figure 1: MSE as a function of the divisor 'a'

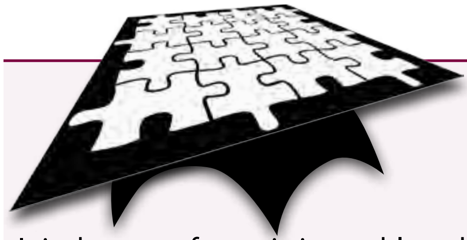


So, the next time I explain estimating the variance, I am going to divide by n, not by $n-1$. This will save a lot of confusion, and make much more sense to the students. It's true that my estimator will be biased, but it will still have a smaller MSE than yours. Besides, there will be plenty of time to discuss unbiased estimators later on. And the next time your students want to divide by n rather than $n-1$, well, the kids are alright.

References

[1] D.J. Rumsey (2009), Let's just eliminate the variance. *Journal of Statistics Education* **17**(**3**). Available at: www.amstat.org/publications/jse/v17n3/rumsey.html

[2] Wikipedia, Mean squared error: Variance. Retrieved August 26, 2015. Available at: en.wikipedia.org/wiki/Mean_squared_error#Variance. (See also www.probability.ca/varmsecalc)



Student Puzzle Corner 12

It is the turn of a statistics problem this time. Abraham Wald literally opened up a major new framework for thinking about and doing statistical inference by proposing that methods (procedures) of inference be evaluated in terms of their risk functions, defined as the expected value of the incurred loss. Lower the risk, better the procedure. Two difficulties many practicing statisticians face in following Wald's formulation of inference are the need for a specific loss function, and that risk functions of intuitively reasonable procedures usually cross. Thus, universal risk optimality is not a practical possibility. The two most common optimality criteria for getting around the conundrum of crossing risk functions are the Bayes and the minimax criteria. Although minimax procedures are generally interpretable Bayesian-ly, the principle of minimaxity does not require user specification of a prior distribution, only a loss function, and this some (many?) find attractive. Having said that, exact evaluation of a minimax procedure is usually difficult; there would have to be a happy confluence of a friendly loss function and a great deal of mathematical structure in the probabilistic model for one to be able to exactly find a minimax procedure. Interest is more in the risk of the minimax procedure to guard yourself against being too gutsy, rather than in the minimax procedure itself. Even when we can find the minimax procedure exactly, it may be sufficiently odd or strange that you would not want to actually use it: a famous example is the unique minimax estimator of the binomial p parameter for squared error loss. You would rather use the MLE.

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

Student members of the IMS are invited to submit solutions (to bulletin@imstat.org with subject "Student Puzzle Corner"). The deadline is **January 15, 2016**.

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.

Minimaxity is not just alive as a research theme; it is definitely kicking and very well. It is here to stay as a trusted benchmark, a guardian of sense and sensibility. If you find minimaxity to be too timid as a criterion, it has been diluted by looking at penalized or restricted minimax procedures. But most of all, a lot of us do much of our research motivated by fun and curiosity, and minimaxity will give you a handful and more! We will consider a simply stated minimaxity problem in this issue. We can make it a lot harder! But that can wait for another day.

Before stating the problem, here are thirty references on minimaxity, arranged chronologically. If you do not like my choice of thirty references, surely I understand. I would expect disagreement on which thirty to cite: Hodges and Lehmann 1952, Efron and Morris 1976, Haff 1977, Bickel 1980, Pinsker 1980, Stein 1981, Ibragimov and Hasminskii 1981, Berger 1982, Assouad 1983, Speckman 1985, Rubin and DasGupta 1986, Ermakov 1990, Heckman and Woodroofe 1991, Lepskii 1991, Groeneboom and Wellner 1992, Fan 1993, Birgé and Massart 1995, Donoho and Johnstone 1996, Brown 1998, Cai 1999, Yang and Barron 1999, Devroye and Lugosi 2000, Nemirovski 2000, Strawderman 2000, Vidakovic 2000, Brown 2002, Kerkyacharian and Picard 2002, Tsybakov 2009, van de Geer 2009 (the paperback edition costs less), Korostelev and Korostelev 2011.

And now, here is this issue's exact problem:

Let $n \geq 1$ and $X_1, \ldots, X_n \stackrel{\text{iid}}{\sim} N(\mu, 1)$, where the mean μ is unknown and $-\infty < \mu < \infty$ is the parameter space. Suppose we wish to estimate $m = |\mu|$ using squared error loss function $(a - m)^2$ and an action space equal to the whole real line. Find explicitly a minimax estimator $\delta(X_1, \ldots, X_n)$ of m and its maximum risk $\sup_\mu E_\mu[\delta(X_1, \ldots, X_n) - m]^2$, and minimum risk $\inf_\mu E_\mu[\delta(X_1, \ldots, X_n) - m]^2$.

As a hint, take the estimator that makes intuitive sense seriously, to solve this problem.

Vlada's Point: The Survey and Beyond

Contributing Editor Vlada Limic writes the last column in her series about work**shops** and **work**shops, and reports on the results of her "learnering" survey, which she announced in the April 2015 issue:

I wonder how would you react to the following announcement: *"The survey on learnering ran for more than four months. The data collected strongly suggests that (a) more than 70% of our peers are willing or likely willing to participate in a learnering, (b) fewer than 1% are unlikely willing or not willing to participate, and (c) all the unlikely willing or unwilling peers would still encourage a junior colleague to participate in a learning. The learnering is therefore overwhelmingly supported within our community."* This note would probably be received with skepticism, and for good reason. Indeed, to reach the above conclusions, the survey data would have to be used in a rather manipulative way, as explained below.

The first claim made above is correct—the survey was opened in mid-April and was closed on September 1. In the rest of this text, I will refer to the mathematicians (predominantly, but not exclusively, probabilists) and statisticians, whose email addresses are on my list of email contacts, as *my neighbors* (or *neighborhood*). I was also included in this neighborhood. *Another peer's neighborhood* could be defined in complete analogy. The underlying assumption is that my neighborhood, with respect to responding to the learnering survey, is not much different from yours, or from that of any other peer (mathematician or statistician as defined for example in the Wikipedia article by Jean-Pierre Bourguignon[1] entitled "Mathematicians in France and the World"[2]).

My neighborhood did expand by a little in the course of the survey, due to peers from outside contacting me specifically about the survey or **work**shop. The expansion rate of 1% might seem surprisingly small, but then again it might not be in view of the total response rate.

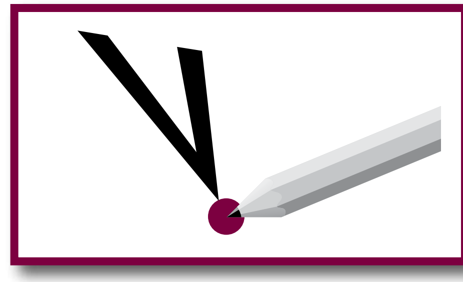
Each member of my neighborhood was sent a unique electronic invitation to the survey. A bit more than one-fifth of invitees responded by filling out the questionnaire, about 7% responded by actively opting out (either by sending me a short email message, or by clicking on a button in the SurveyMonkey widget), and the rest did neither.

The conclusions announced in the opening paragraph are misleading, even though derived from the actual survey data. For example, to arrive at the 70%+ figure, I took into consideration only the neighbors who filled out the questionnaire (in analogy to any democratic vote), while the 1% figure was obtained by dividing the number of unlikely willing or unwilling answers with the total size of my neighborhood.

In case you are wondering, the percentage who claimed that they would *not* encourage a junior colleague to participate in a learnering is again smaller than 1%. However, as already indicated, all of these peers would be (at least possibly if not likely) willing to participate in a learnering themselves.

There is no doubt that the gathered data is moderately if not strongly biased by the fact that the more willing a peer is to participate in a learnering (or a **work**shop in general), the more likely they were to fill out the questionnaire. I am not sure what this bias is called, or if there is any way to account for it. Let us then take all the opt-outs as unwilling to participate in any kind of **work**shop, which I sense would be somewhat unfair, yet it is a way to get objective lower bounds on the estimates.

Applying this simplification, one arrives at the following conclusion: *at least one-fifth of my neighbors claimed to be (at least possibly) willing to participate in a learnering in their respective research area* (this 20% is made up



of 15% likely willing or willing answers, and of 5% possibly willing answers). The analogous figures corresponding to potential intra- or inter-disciplinary participation are smaller (due to limited space I do not quantify this decrease), but still non-negligible.

According to Bourguignon, there are about 80,000 active mathematicians (including statisticians) in the world, of which many work in industry[3]. Even by halving the 80,000, we have a small town full of mathematicians working in academic research institutions. Using the uniformity over neighborhoods assumption, we can reach the conclusion that *at least a fifth* (meaning *multiple thousands*) of active mathematicians, working in academic institutions anywhere on the planet, are enthusiastic about **work**shop format in general (and learnering in particular).

This seems important enough. Even though it is not clear at the moment where and how to look for a large scale **work**shop funding, it seems worthwhile for each member of the fifth to look for the other enthusiasts in his/her own neighborhood, in order to start thinking about co-organizing **work**shops with readily available resources. If you wish to know more about the survey and/or my own efforts on this path, do contact me: vlada.limic@math.u-psud.fr

1 https://en.wikipedia.org/wiki/Jean-Pierre_Bourguignon

2 http://smf4.emath.fr/en/Publications/ExplosionDesMathematiques/pdf_en/smf-smai_explo-maths_92-97_en.pdf

3 The estimate given for France is that one mathematician in three works in industry.

World Statistics Day Statement on Global Development

Over 50 organizations, including the IMS, marked World Statistics Day (20th of October) with a statement urging that global development must no longer be hampered by a lack of the most basic data about the social and economic circumstances in which people live.

In September, at the United Nations General Assembly, heads of states and governments came together to launch a new and ambitious agenda for world development from 2016 to 2030. The Sustainable Development Goals set out 17 goals with 169 targets and more than 300 indicators to monitor progress. In the lead up to the launch of the goals, a report by a high-level panel of eminent persons set up by the UN Secretary General to advise on the Post–2015 Development Agenda, recognised that for too long **development efforts have been hampered by a lack of the most basic data about the social and economic circumstances in which people live.**

If the world is to live up to the promises made by our leaders then more, and better, data will be essential. To abolish poverty everywhere, in all its forms, the world will need to ensure that everyone is counted, that progress is being monitored and that this information is made available in an accessible and usable form as widely as possible. This will require a true data revolution, one that makes use of the possibilities provided by new technology, but also one that keeps the information about individuals confidential and which provides information that is trusted and credible.

The signatories to this statement support the call for a data revolution and recognise the importance of data for policy making and for accountability in all countries of the world. The challenges of the new development agenda require new approaches including a much greater emphasis on open data and the use of new data sources. We have to take advantage of the opportunities provided by new technology and big data and national statistical systems are central to this effort. These systems—set up and financed by governments to collect, process and disseminate the information needed to manage government activities—are crucial. They operate within a framework of legislation and ethical principles that promote objectivity, independence, confidentiality and accountability. These principles are likely to be even more important in the next 15 years than they have been in the past.

Considerable progress has been made throughout the world in building and strengthening the capacity of national statistical systems since the launch of the Millennium Development Goals in 2000, but much still remains to be done. Too many countries operate under severe financial and human resource constraints. To meet the data challenges of the sustainable development goals, national statistical systems must be properly financed, the development of statistical skills and expertise must be supported, and access to new tools and technology must be provided. Also, support must be provided not just to the collection of data, but to its transformation into useful and actionable information. Above all a true data revolution that puts useful and usable information into the hands of everyone who needs it, especially the poor and the marginalised, must be pursued.

A full list of the signatories is on the Royal Statistical Society's website at http://www.rss.org.uk/RSS/Influencing_Change/World_Statistics_Day_statement/RSS/Influencing_Change/World_Statistics_Day_statement.aspx?hkey=c261be5f-4079-4392-aa0e-35f6021aee6c

Solution to Student Puzzle Corner 11

Bulletin Editor Anirban DasGupta writes:

The exact problem was: Fix $\epsilon > 0$. Give examples of two absolutely continuous distributions with densities f and g such that $|f(x) - g(x)| \le \epsilon$ for all x, and one of the two distributions is infinitely divisible but the other is not. Such an example can be constructed using numerous different sufficient conditions for non-infinite divisibility. One can use the no zero property of the characteristic function, or property about tails, and if we don't mind it if one has a bounded support, then by also using the bounded support condition. For example, given $\epsilon > 0$, take f to be the density of the $N(0, \frac{2}{\pi\epsilon^2})$ distribution, and g to be the density of the uniform distribution on $[-\frac{1}{\epsilon}, \frac{1}{\epsilon}]$. Then, $\sup_{x\in\mathcal{R}} |f(x) - g(x)| \le \epsilon$, and the $N(0, \frac{2}{\pi\epsilon^2})$ distribution is infinitely divisible, while the uniform distribution on $[-\frac{1}{\epsilon}, \frac{1}{\epsilon}]$ is not, because it has a bounded support. Examples can be constructed easily even if both f, g are supported on the whole real line: just perturb a standard normal density slightly.

Donors to IMS Funds: Thank you all!

Continued from **page 3**

Li; Shili Lin; Hung-Kung Liu; Albert Lo; Richard Lockhart; VS Mandrekar; James Marron; George Martin; John McDonald; Paul Meier; Max Moldovan; Per Mykland; Peter Ney; Deborah Nolan; Richard Olshen; Michael Ostland; Edsel Pena; Mark Pinsky; Gilles Pisier; Madabhushi Raghavachari; RV Ramamoorthi; Guilherme Rocha; Walter Rosenkrantz; George Roussas; Habib Salehi; Frederic Schoenberg; Richard Smith & Amy Grady; Terry Speed; James Stapleton; Philip Stark; Charles Stein; David Steinsaltz; Stephen Stigler; Shiaoyun Sun; Takeru Suzuki; Anders Rygh Swensen; Shigeo Takenaka; Michael Talagrand; Steven Thomson; Lanh Tran; Howard Tucker; Sara van de Geer; Constance van Eeden; Guenther Walther; Jane-Ling Wang; Yazhen Wang; Shaoli Wang; Jon Wellner; Robert Wijsman; Colin Wu & Li-Ping Yang; Shen X; Jian-Lun Xu; Grace Yang; Yuhong Yang; Yannis Yatracos; Bin Yu; Marvin Zelen; Ping Zhang; Hongyu Zhao.

Open Access Fund

The Open Access Fund supports the establishment and ongoing operation of IMS's open-access publications, including: Probability Surveys, Statistics Surveys, Electronic Journal of Probability, Electronic Communications in Probability *and* Electronic Journal of Statistics. *Two further IMS open access ventures are the posting of all IMS journal articles to ArXiv, and assistance to members in posting to ArXiv.*

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Schramm Lecture Fund

The Schramm Lecture Fund was created jointly by IMS and the Bernoulli Society. The lecture in probability and stochastic processes is named in honor of Oded Schramm. The lecture will be given annually and will be featured at meetings (co)-sponsored by the IMS or the Bernoulli Society with a strong attendance by researchers in probability and stochastic processes.

Anonymous; Anonymous; Anonymous; A. Barbour; Cambridge University Press; Raisa (Raya) Feldman; Antal Jarai; Thomas Kurtz; Russell Lyons; John McDonald; Microsoft; Roberto Oliveira; Richard Olshen; Ross Pinsky; Gilles Pisier; Thomas Salisbury; Timo Seppäläinen; Jeffrey Steif; David Steinsaltz; Kenneth Stephenson; Edward C. Waymire.

To make your own donation to any of these IMS funds, please visit https://secure.imstat.org/secure/orders/donations.asp. Thank you!

Scientific Legacy Fund

The Scientific Legacy Fund supports the development of IMS web pages dedicated to ensuring the preservation of valuable historical information on IMS members and leaders of our fields. The IMS will use funds to cover costs of the development and maintenance of such pages.

Anonymous; William Mietlowski; Springer.

Tweedie New Researcher Fund

The Tweedie New Researcher Award Fund was originally set up with funds donated by Richard L. Tweedie's friends and family. Funds are used to fund the travel of the Tweedie New Researcher Award recipient to attend the IMS New Researchers Conference and to present the Tweedie New Researcher Invited Lecture.

William Anderson; Elja Arjas; Dianne Carrol Bautista; William Brady; Peter Brockwell; Bradley Carlin; Alicia Carriquiry; Kathryn Chaloner; Louis Chen; John Connett; Keith Crank; William Dunsmuir; Gary & Carol Gadbury; Joseph Gani; Charles Geyer; Ramanathan Gnanadesikan; Jay & Anne Goldman; Peter Hall; Yu Hayakawa; James Hodges; Iain Johnstone; Thomas Louis; Robert Lund; Roy Mendelssohn; Sean Meyn; William Mietlowski; Max Moldovan; Philippe Naveau; Deborah Nolan; Esa Nummelin; Daniel Ocone; Roberto Oliveira; Gilles Pisier; Jeffrey Rosenthal; Kenneth Russell; J. Andrew & Lynn Eberly Scherrer; Arusharka Sen; Lynne Seymour; David Smith; Richard Smith & Amy Grady; Terence Speed; David Steinsaltz; Naftaly & Osnat Stramer; Shigeo Takenaka; William Thomas; Lanh Tran; Marianne Tweedie; Nell Tweedie; Cathy Tweedie; Xuan Yang; Marvin Zelen; Huiming Zhu; IMS General Fund; Gopal Basak; Asit Basu; Louis Chen; Joel Dubin; William Harkness; Gilles Pisier; Walter Sievers; Steven Thomson; Donald Ylvisaker; Ken-ichi Yoshihara; Marvin Zelen.

IMS meetings around the world

Joint Statistical Meetings: 2016–2020

IMS sponsored meeting

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

w http://amstat.org/meetings/jsm/2016

The 2016 Joint Statistical Meetings will be held July 30 to August 4 at McCormick Place, 2301 South Lake Shore Drive, Chicago, IL 60616. The theme of JSM 2016 is "The Extraordinary Power of Statistics."

The IMS program chair for invited sessions is Jan Hannig, University of North Carolina **e** jan.hannig@unc.edu. The contributed program chair is Alexander Aue, University of California, Davis **e** aaue@ucdavis.edu

Make a note of these important dates. Online submission of abstracts (all those except invited papers and panels) is open December 1, 2015–February 1, 2016. Topic-contributed session proposals must be submitted online by January 14, 2016, and Computer Technology Workshop (CTW) proposals by the following day. Submitted abstracts can be edited between March 31 and April 18, 2016.

Registration and housing open May 2, 2016, and the early registration deadline is June 1. The 2015 JSM housing reservations went very quickly, so if you are planning to attend, be sure to book your accommodation via the JSM website as soon after May 2 as possible.

IMS sponsored meetings: JSM dates for 2017–2021

IMS Annual Meeting @ JSM 2017: July 29–August 3, 2017, Baltimore, MD	**JSM 2018 July 28–August 2, 2018 Vancouver, Canada**	**IMS Annual Meeting @ JSM 2019 July 27–August 1, 2019, Denver, CO**	**JSM 2020 August 1–6, 2020 Philadelphia, PA**	**IMS Annual Meeting @ JSM 2021 August 7–12, 2021, Seattle, WA**

IMS co-sponsored meeting

The 10th ICSA International Conference
December 19–22, 2016
Shanghai Jiao Tong University, Shanghai, China

IMS Rep: Ming Yuan, University of Wisconsin–Madison

w http://www.math.sjtu.edu.cn/conference/2016icsa/

The tenth ICSA international conference will be held at Xuhui campus of Shanghai Jiao Tong University in China. The theme is *Global Growth of Modern Statistics in the 21st Century*. The International Chinese Statistical Association (ICSA) is a non-profit organization, established in 1987, with the aim of promoting the theory and applications of statistical disciplines through scholarly activities, including publication of journals in statistics and probability, scientific meetings, and other educational programs. The plenary speakers are: Jim Berger, Tony Cai, Kai-Tai Fang, Zhiming Ma, Marc A. Suchard, Lee-Jen Wei and C.F. Jeff Wu.

The submission deadline for invited session proposals from the public is January 5, 2016. See the website for details.

At a glance:

forthcoming IMS Annual Meeting and JSM dates

2016

IMS Annual Meeting/ 9th World Congress: 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**

2020

IMS Annual Meeting: TBD

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

IMS co-sponsored meeting

NEW

Advances in Statistics, Probability and Mathematical Physics
June 10–11, 2016
Pavia, Italy

w http://www-dimat.unipv.it/eugenioconference/

The conference will honor Eugenio Regazzini on the occasion of

his 70th birthday. It will take place at the University of Pavia, Italy, on June 10–11, 2016. The program will feature invited talks of authoritative speakers who have been working on topics related to the ones Eugenio has contributed to in Statistics, Probability and Mathematical Physics. Invited speakers: Jim Berger, Eric Carlen, Persi Diaconis, Ed George, Alexander Gnedin, Robert C. Griffiths, Ildar Ibragimov, Michael Jordan, Giovanni Peccati, R.V. Ramamoorthi, Chiara Sabatti.

IMS co-sponsored meeting

NEW

2017 IMS-China International Conference on Statistics and Probability
June 28–July 1, 2017. Nanning, Guangxi Province, China

w TBC

Local organizing committee chair: Zijia Peng, Guangxi University for Nationalities, China **e** pengzijia@126.com. Scientific program committee chair: Ming Yuan, University of Wisconsin–Madison, USA **e** myuan@stat.wisc.edu. The website is under construction, but please mark your calendars not for this conference.

IMS co-sponsored meeting

UPDATED

The 25th ICSA Applied Statistics Symposium 2016
June 12–15, 2016
Atlanta, Georgia, USA

w http://www.math.gsu.edu/~icsa/

Contact: Yichuan Zhao **e** yichuan@gsu.edu

Keynote speakers: Bin Yu, David Madigan and Paul Albert; Banquet speaker Michael Eriksen. Details of the scientific programs are on the symposium website.

The 2016 Annual Meeting of the International Chinese Statistical Association will be held at the Hyatt Regency, 265 Peachtree Street, Atlanta, GA 30303.

The International Chinese Statistical Association (ICSA) is a non-profit organization dedicated to educational, charitable, and scientific purposes. Its membership is open to all individuals and organizations in all statistics-related areas.

See the website for calls for the Student Paper Award applications and short course proposals.

IMS co-sponsored meeting

NEW

2016 UK Easter Probability Meeting
April 4–8, 2016
Lancaster, UK

w http://www.lancaster.ac.uk/maths/easter-probability-meeting/
e probability@lancaster.ac.uk

The 2016 UK Easter Probability Meeting is on "Random Structures Arising in Physics and Analysis" and consists of four mini-courses and twelve invited talks. The mini-course speakers and topics are:

Alice Guionnet on "Random matrices, free probability and topological expansions",

Michel Ledoux on "Concentration inequalities: basics and some new challenges",

Jason Miller on "Quantum Loewner Evolution", and

Vladas Sidoravicius on "Three lectures on random walk in dynamically changing environments".

The invited speakers are Vincent Beffara, Dmitry Belyaev, Noam Berger, Natasha Blitvic, Erwin Bolthausen, Dimitris Cheliotis, Ivan Gentil, Jon Keating, Kay Kirkpatrick, Elizabeth Meckes, Anatoly Vershik and Fredrik Viklund.

There will also be shorter talks by PhD students, a poster session, an excursion and dinner-cruise in the Lake District National Park,

and break-out sessions for discussing open problems.

Registration is open until 29th February 2016.

IMS co-sponsored meeting

NEW

Reproducibility of Research: Issues and Proposed Remedies
March 8–10, 2017
Washington DC, USA

w http://www.nasonline.org/programs/sackler-colloquia/upcoming-colloquia/

This meeting is one of the Arthur M. Sackler Colloquia, which address scientific topics of broad and current interest that cut across the boundaries of traditional disciplines. Each year, three to four colloquia are scheduled, typically two days in length and international in scope. Each colloquium features presentations by leading scientists in the field and discussions among one hundred or more researchers with an interest in the topic.

This colloquium is organized by David B. Allison, Stephen E. Fienberg and Victoria Stodden.

More IMS meetings around the world

IMS sponsored meetings

ENAR Spring Meeting: March 6–9, 2016, Austin, Texas

w http://www.enar.org/meetings/spring2016/index.cfm

The 2016 ENAR Spring Meeting will be held at the JW Marriott Austin. The meeting brings together researchers and practitioners from academia, industry and government, connected through a common interest in Biometry. The scientific program will cover topics of great interest to researchers and practitioners, such as data science (big data), genomics, clinical trials, neuroimaging, biomarkers, health policy, electronic health records, ecology, and epidemiology. Abstract submission: The abstract submission deadline for all contributed and invited papers/posters is October 15, 2015. This is also the submission deadline for the Distinguished Student Paper Awards.

Fostering Diversity in Biostatistics Workshop

On Sunday, March 6, 2016 ENAR will host a workshop to provide a forum for discussion of important issues related to diversity. Themes will include career and training opportunities within biostatistics. The workshop will focus on connecting underrepresented minority students interested in biostatistics with professional biostatisticians in academia, government and industry. Current biostatistics graduate students as well as biostatistics professionals in academia, government, and industry will share their experiences and discuss mentoring, recruiting, and retaining students in related graduate programs. Registration is required: see w http://www.enar.org/meetings/diversity/index.cfm

ENAR 2017 & 2018 dates

IMS sponsored meetings

March 6–9, 2016: in Austin, Texas
March 12–15, 2017: in Washington DC
March 25–28, 2018: in Atlanta, GA

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

IMS co-sponsored meeting UPDATED

Seminar on Stochastic Processes (SSP) 2016
March 16–19, 2016
University of Maryland, College Park, MD

w https://www-math.umd.edu/seminar-on-stochastic-processes.html **[new website]**

The Seminar on Stochastic Processes (SSP) in 2016 will be held from Wednesday, March 16, through Saturday, March 19. It will be hosted by the University of Maryland. The local organizers will be Sandra Cerrai, Dmitry Dolgopyat, Mark Freidlin and Leonid Koralov.

The invited speakers will be:

- Claudio Landim (*who is the Kai Lai Chung Lecturer*)
- Louigi Addario-Berry
- Yuri Bakhtin
- Yimin Xiao
- Thaleia Zariphopoulou

The tutorial lectures will be delivered on March 16 by Konstantin Khanin.

The first Seminar on Stochastic Processes was organized in 1981 by Kai Lai Chung, Erhan Çinlar and Ronald Getoor.

IMS co-sponsored meeting

WNAR Annual Meeting in conjunction with the XXVIII International Biometric Conference
July 10–15, 2016
Victoria, BC, Canada

w http://biometricconference.org/conference-information/

The next WNAR Annual Meeting, in conjunction with the XXVIII International Biometric Conference (IBC2016), will be held July 10–15, 2016 at the Victoria Conference Centre in Victoria, British Columbia, Canada.

A list of invited sessions is at http://biometricconference.org/invited-sessions/. There will also be four full day short courses: *Analysis of life history data with multistate models* (Richard Cook and Jerry Lawless); *An introduction to the joint modelling of longitudinal and survival data* (Dimitris Rizopoulos); *A statistical approach to machine learning* (Andreas Ziegler and Marvin Wright); and *Design of complex experiments* (Andrew Mead and Steven Gilmour).

Registration will open later this year.

IMS co-sponsored meeting

UK Easter Probability Meeting 2016: Random Structures Arising in Physics and Analysis
April 4–8, 2016
Lancaster University, UK

w http://www.lancaster.ac.uk/maths/easter-probability-meeting/

Lancaster University, UK, is hosting the UK Easter Probability Meeting 2016, on "Random Structures Arising in Physics and Analysis". The meeting will take place from April 4–8, 2016. The UK Easter Probability Meeting is a long-standing tradition that brings together the UK probability community. The aim is to discuss recent developments, to speak about future research and also to give PhD students an opportunity to become part of the UK probability community. The 2016 meeting in Lancaster consists of four mini-courses of three lectures each, given by leading international researchers on current topics in probability theory. The remaining time is reserved for 45 minute talks by invited speakers, shorter talks by PhD students, a poster session and time for discussions.

IMS co-sponsored meeting

Stochastic Networks Conference 2016
June 20–24, 2016
San Diego, CA

w http://stochasticnetworks2016.ucsd.edu/

The aim of the conference is to bring together researchers who share an interest in stochastic network models, to survey recent developments, and to identify future research directions. As in the past, the 2016 meeting will be structured in a workshop format, with approximately 20 hour-long invited talks, allowing ample unscheduled time to maximize interactions between speakers and participants and to facilitate a fruitful exchange of ideas. In addition, there will be a poster session for contributed papers.

Stochastic networks is a multifaceted area of research dealing with the modeling, stability, control, performance, approximation, and design of stochastic networks. It gives rise to challenging and subtle mathematical problems, whose solution often requires a combination of ideas and techniques from several branches of mathematics, including probability theory, stochastic processes, analysis, optimization, algorithms, combinatorics, and graph theory. Research in this area is strongly motivated by applications in diverse domains, ranging from the traditional areas of telecommunications and manufacturing to service operations, biological and social networks, revenue management, and health care.

Like its predecessors, the 2016 Stochastic Networks Conference will emphasize new model structures and new mathematical problems that are motivated by contemporary developments in various application domains, as well as new mathematical methods for stochastic network analysis.

IMS co-sponsored meeting

Sixth IMS–ISBA joint meeting: BayesComp at MCMSki
January 5–7, 2016. Lenzerheide, Switzerland

w http://www.pages.drexel.edu/~mwl25/mcmskiV/program.html

The next joint IMS–ISBA meeting, also known among participants as “MCMSki V”, will be held in Lenzerheide, Switzerland, from Tuesday, January 5 to Thursday, January 7, 2016. This year the meeting will be the first meeting of the newly created BayesComp section of ISBA. The InterDisciplinary Institute of Data Science at USI (Università della Svizzera Italiana) will co-sponsor the meeting and help with the organization. Other sponsors for MCMSki V include Springer, Google, the journal *Statistics and Computing*, Blossom Skis and Deviation Skis. MCMSki V will see the return of the Richard Tweedie ski race, on the afternoon of Wednesday January 6th. The fastest man and woman will be rewarded with a pair of skis (one pair each of Blossom skis and Deviation skis). The plenary speakers are Stephen Fienberg, Steve Scott, David Dunson, Krys Latuszynski, Tony Lelièvre.

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.

The 9th World Congress on Probability and Statistics will be hosted by the Fields Institute. Previous congresses have been held in Istanbul (2012), Singapore (2008), Barcelona (2004), Guanajuato (2000), Vienna (1996), Chapel Hill (1994), Uppsala (1990), and Tashkent (1986).

IMS co-sponsored meeting

Fourth IMS Asia Pacific Rim Meeting
June 27–30, 2016
Hong Kong, China

w http://ims-aprm2016.sta.cuhk.edu.hk/

The Institute of Mathematical Statistics Asia Pacific Rim Meeting series promotes interaction and networking among statisticians and probabilists from Asia, the Pacific Rim, and other parts of the world. The previous three meetings were successfully held in Seoul, Tsukuba, and Taipei. We are pleased to announce that the fourth meeting will take place on the beautiful campus of The Chinese University of Hong Kong, during the period June 27–30, 2016. The program covers recent developments and the state-of-the-art in a variety of modern research topics in statistics and probability. For more information, you may contact the program chairs: Ming-Yen Cheng (cheng@math.ntu.edu.tw) and Xuming He (xmhe@umich.edu).

IMS co-sponsored meeting

39th Conference on Stochastic Processes and their Applications (SPA)
July 24–28, 2017
Moscow, Russia

w TBC

Other meetings around the world

Applied Probability Symposium
August 1–3, 2016
Ilulissat, Greenland

w http://thiele.au.dk/events/conferences/2016/ilulissat/

Invited speakers: Hansjörg Albrecher, Lausanne; Søren Asmussen, Aarhus; Mogens Bladt, UNAM, Mexico City; Jose Blanchet, Columbia; Serguey Foss, Heriot-Watt University/Sobolev Institute of Mathematics; Peter Glynn, Stanford; Jevgenijs Ivanovs, Lausanne; Offer Kella, Hebrew University, Jerusalem; Thomas Mikosch, Copenhagen; Leonardo Rojas-Nandayapa, Queensland; Tomasz Rolski, Wroclaw; Peter Taylor, Melbourne.

The website is under construction. For urgent questions, please contact Søren Asmussen, asmus@math.au.dk

International Society for Clinical Biostatistics 2016 Conference
August 21–24, 2016
Birmingham, UK

w http://www.iscb2016.info/

The 37th annual conference of the International Society for Clinical Biostatistics, ISCB 2016, will provide a scientific forum for international exchange of theory, methods and applications of clinical biostatistics among biostatisticians, epidemiologists and other medical researchers.

The Keynote speaker is Sir David Spiegelhalter, University of Cambridge, and the ISCB President's Invited Speaker is Diego Kuonen, Switzerland, who will be talking on, "A Statisticians's 'Big Tent' View on Big Data and Data Science in Pharmaceutical Development"

Programme details to follow. Abstract submission is open from Monday 4 January 2016 to Monday 21 March 2016.

The International Society for Clinical Biostatistics (ISCB) was founded in 1978 to stimulate research into the principles and methodology used in the design and analysis of clinical research and to increase the relevance of statistical theory to the real world of clinical medicine.

Fourth Asian Quantitative Finance Conference
February 21–23, 2016
Osaka, Japan

w http://www.math.kansai-u.ac.jp/yamazaki/AQFC2016/index.html

Contact: Kazutoshi Yamazaki

e kyamazak@kansai-u.ac.jp

The AQFC has been an annual international conference since 2013. The aim of the conference is to feature the latest developments in the field of quantitative finance and promote its research in Asia. It also hopes to bring together researchers as well as practitioners on quantitative finance in Asia and elsewhere and provide a platform for interaction and cooperation. There will be plenary talks as well as contributed talks.

38th Annual Conference of the International Society for Clinical Biostatistics
July 9–13, 2017
Vigo, Spain

w TBC

We are pleased to announce the 38th Annual Conference of the International Society for Clinical Biostatistics, to be held in Vigo (Spain) on 9–13 July, 2017.

The International Society for Clinical Biostatistics (ISCB) was founded in 1978 to stimulate research into the principles and methodology used in the design and analysis of clinical research and to increase the relevance of statistical theory to the real world of clinical medicine. More info at http://www.iscb.info/

Like previous annual conferences of ISCB [*the announcement of the 2016 conference is above*], the 2017 conference will provide a scientific forum for international exchange of theory, methods and applications of biostatistics in medical research and practice among clinicians, statisticians and members of other disciplines, such as epidemiologists, clinical chemist and clinical pharmacologists, working or interested in the field of clinical biostatistics.

Future conference locations: 2018 (ISCB39) in Melbourne, Australia; 2019 (ISCB40) in Leuven, Belgium. See http://www.iscb.info/Events.html. Details to follow.

UAB 5th short course on Next-Generation Sequencing: *Technology and Statistical Methods*
December 14–17, 2015. Birmingham, Alabama, USA

w http://www.soph.uab.edu/ssg/nhgri_r25/fifthshortcourse

The University of Alabama at Birmingham's Section on Statistical Genetics is pleased to announce our NHGRI-funded conference on Statistical Analysis for Next Generation Sequencing. Next-generation sequencing technology is impacting almost all aspects of biomedical research. This technology generates an unprecedented wealth of data that demands novel analysis strategies. While IT infrastructure and bioinformatics developments are obviously required to enable sound information extraction, sophisticated statistical methodologies and algorithms are also essential for interpreting the data. We are calling statisticians, genetic epidemiologists, bioinformaticians, and genome biologists, to discuss the statistical challenges and opportunities in next-generation sequencing data analysis. We believe that this course will provide a venue for exchanging of cutting-edge information and ideas, and fostering collaborations among methodologists, analysts, and biomedical investigators.

Topics to include: Technical overview of NGS (platforms; chemistry; library construction); Next Generation Sequencing in methylation studies; Predicting causal variation; StatGenLab - a virtual machine for genetics data analysis; Functional genomics; Variant calling & assembly NGS data; Rare variants analysis; Transcriptome analysis; ChIP-Seq data analysis; Methylation using bisulfite sequencing; Cloud computing; Statistical methods for NGS data. Software Demos: R & Bioinformatics File Formats; Exome & Whole Genome NGS; RNA-Seq, BSmooth & DSS; & ChIP-Seq Galaxy.

Funded by the National Human Genome Research Institute (NHGRI).

Australian Statistical Conference *in conjunction with the* 14th Australasian Data Mining Conference (AusDM) *and the* 9th Conference on Teaching Statistics (OZCOTS)
December 5–9, 2016 at Hotel Realm, Canberra, Australia

w www.asc2016.com.au

The date and venue have been confirmed for the 23rd Australian Statistical Conference 2016. The conference in conjunction with SSAI, AusDM and OZCOTS will take place from 5–9 December 2016 at Hotel Realm, Canberra, Australia. The theme for the conference is Big Data: Mining, Analysing and Teaching.
The conference dates are:
SSAI Program: 5–9 December, 2016
AusDM Program: 6–8 December, 2016
OZCOTS Program: 8–9 December, 2016
For more information visit www.asc2016.com.au

IWMST-2016: International Workshop on Mathematics and Statistics
May 28–29, 2016
Istanbul, Turkey

w http://conf-scoop.org/science/iwmst

The International Workshop on Mathematics and Statistics is a peer-reviewed academic event held annually. The workshop is part of the International Conference of Basic Sciences, which consists of three separate workshops in different disciplines. All the papers are peer reviewed, and originality reports of the papers are obtained using the Turnitin originality checker computer program. Reviewer comments together with the originality report of your paper will be e-mailed to you. Selected papers will also be published on our online journal.

See the call for papers (deadline February 1, 2016) at the conference website.

CHI's Clinical Research Statistics for Non-Statisticians
February 23–24, 2016
Miami, FL, USA

w http://www.scopesummit.com/Clinical-Research-Statistics

CHi's Clinical Research Statistics for Non-Statisticians symposium will discuss these statistical methods and their applications in the context of clinical operations for those that are in operations, business, and marketing, as well as those that work with clinical scientists and want to contribute more to conversations about planning and execution. Both biostatisticians and industry experts will guide you through the two-day course, providing both theory and application.

Workshop: "Dependence, Stability, and Extremes"
May 2–6, 2016
Fields Institute, Toronto, Canada.

w http://www.fields.utoronto.ca/programs/scientific/15-16/dependence/

The workshop presents recent results in areas related to heavy tails, extremes and dependence, including topics on a) weak convergence for heavy tailed dependent processes and time series; b) stationary and stable processes; c) stable random fields; d) regular variation and heavy tails; e) complex stochastic systems: random matrices and random networks with heavy tails. The workshop will feature four expository lectures by Gennady Samorodnitsky and Clément Dombry on related background for graduate students and people interested in these areas, and include around 20 talks on recent research advances by well-established or young researchers. There are also a few open problem sessions and a poster session. Funding opportunities are available, with priority given to graduate students and junior researchers.

Employment Opportunities around the world

Canada: Mississauga, ON

University of Toronto Mississauga, Department of Mathematical and Computational Sciences

Assistant Professor - Statistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25361671

Canada: Toronto, ON

University of Toronto

Assistant Professor - Machine Learning

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25361673

Canada: Toronto, ON

University of Toronto, Department of Statistical Sciences

Assistant Professor, Teaching Stream - Statistical Sciences

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25361624

Canada: Toronto, ON

University of Toronto

Assistant Professor, Tenure-Stream, Actuarial Science or Assistant or Associate Professor, Statistical/Mathematical Finance

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25361662

China: Beijing

Tsinghua University, Center for Statistical Science

Assistant/Associate/Full Professor

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25672194

Kazakhstan: Astana

Nazarbayev University

Assistant, Associate and Full Professor

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25460306

Hong Kong: Shatin

香港中文大學
The Chinese University of Hong Kong

Applications are invited for:-

Department of Statistics
Professor / Associate Professor / Assistant Professor
(Ref. 1516/097(408)/2)

The Department invites applications and nominations for a Professorship / Associate Professorship / Assistant Professorship.

Applicants should have (i) a PhD degree in statistics or a related field; (ii) high-quality research output; and (iii) a strong track record in teaching in the area of statistical theory and methodology. Appointment to the appropriate rank will be considered with reference to the candidate's qualifications and experience.

Appointment will normally be made on contract basis for up to three years initially, which, subject to mutual agreement, may lead to longer-term appointment or substantiation later.

Review of applications will begin on January 18, 2016 and will continue until the post is filled.

Further information about the Department is available at http://www.sta.cuhk.edu.hk.

Salary and Fringe Benefits
Salary will be highly competitive, commensurate with qualifications and experience. The University offers a comprehensive fringe benefit package, including medical care, plus a contract-end gratuity for an appointment of two years or longer, and housing benefits for eligible appointee. Further information about the University and the general terms of service for appointments is available at https://www2.per.cuhk.edu.hk/. The terms mentioned herein are for reference only and are subject to revision by the University.

Application Procedure
Application forms are obtainable (a) at https://www2.per.cuhk.edu.hk/, or (b) in person/by mail with a stamped, self-addressed envelope from the Personnel Office, The Chinese University of Hong Kong, Shatin, Hong Kong.

Please send a cover letter, full curriculum vitae, statement of research and teaching interests, and copies of up to five recent publications (in .pdf format) to the Department of Statistics by e-mail to statdept@cuhk.edu.hk, preferably by January 15, 2016. Please also arrange three letters of recommendation to be forwarded by referees directly to statdept@cuhk.edu.hk.

Please quote the reference number and mark 'Application – Confidential' on cover. The Personal Information Collection Statement will be provided upon request.

Taiwan: Taipei

Academia Sinica,
Institute of Statistical Science
Regular Research Positions

The Institute of Statistical Science, Academia Sinica, is seeking candidates for tenure-track or tenured research positions at the level of assistant, associate or full research fellow available in 2016. Candidates in all areas of Statistics will be considered. Candidates should have a PhD degree in statistics or areas related to data science. Application materials must include (1) a curriculum vitae, (2) three letters of recommendation, and (3) representative publications and/or technical reports. Additional supporting materials such as transcripts for new PhD degree recipients may also be included. Except for the letters of recommendation, electronic submissions are encouraged. Applications should be submitted to

Dr. Hsin-Cheng Huang, Chair of the Search Committee, Institute of Statistical Science, Academia Sinica, 128 Sec. 2 Academia Road, Taipei 11529, Taiwan, R.O.C.

Fax: +886-2-27831523

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

Applications should be received by December 30, 2015 for consideration.

Singapore

Faculty Positions at the Department of Statistics & Applied Probability,
National University of Singapore

Applications are invited for regular positions in Statistics. A PhD in Statistics or a related field is required. The Department is considering several possible appointments. One is a Professorial level appointment in any area of statistics or data science. The others are appointments at any level in statistics, data science, biostatistics and probability. For the Professorial level appointment, the applicant should have an outstanding record in research, and demonstrated leadership in teaching and service. For the other appointments, the applicants should have demonstrated potential for excellence in research, teaching and service. There is no deadline for applications but the shortlisting of candidates will begin in December 2015.

Applicants should send an application letter and a CV and arrange for **at least THREE** reference letters to be sent directly to the Department. Applications should be mailed by post or via e-mail to:

Search Committee Department of Statistics & Applied Probability National University of Singapore 6 Science Drive 2 Singapore 117546 E-mail: stasec@nus.edu.sg

NUS offers internationally competitive remuneration, generous research support and funding, relocation assistance and other benefits. The Department of Statistics & Applied Probability has close to 30 faculty. We provide a stimulating environment for our faculty to develop professionally. For more information about the University, Department and Terms of Service, please visit our websites:

University:
http://www.nus.edu.sg/
Department of Statistics & Applied Probability:
http://www.stat.nus.edu.sg/

Saudi Arabia: Thuwal

KAUST (King Abdullah University of Science and Technology)
Assistant, Associate, and Full Professors in Statistics (2016)
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25471112

United Kingdom: Cambridge

University of Cambridge, Department of Pure Mathematics and Mathematical Statistics
University Lecturer in Probability and its Applications
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25293837

United Kingdom: Any UK University

Any UK university
Post Doc Fellowships: Biometrika
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25207903

United States: Fayetteville, AR

University of Arkansas, Deparment of Mathematical Sciences
Tenure Track Assistant Professor: Statistics
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25432624

United States: Berkeley, CA

Department of Statistics, University of California, Berkeley
Neyman Visiting Assistant Professor
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25172156

United States: Davis, CA

University of California, Department of Statistics
Assistant Professor
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=24875281

United States: La Jolla, CA

UC San Diego
Associate or Full Professor, Biostatistician with a focus in Neurosciences or in Translational Research
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25572626

United States: Stanford, CA

Stanford University, Department of Health Research & Policy
Assitant/Associate/Full Professor of Biostatistics
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25125241

United States: Stanford, CA

Stanford University, Department of Statistics
Stein Fellow in Statistics or Probability
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=24925365

United States: Stanford, CA

Stanford University, Department of Statistics
Assistant Professor of Statistics or Probability
http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=24925346

Employment Opportunities continued

United States: Fort Collins, CO

Colorado State University, Department of Statistics

Tenure Track Faculty Position in Biostatistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25200960

United States: Storrs, CT

University of Connecticut

Assistant/Associate Professor, Department of Operations and Information Management

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25669249

United States: Washington, DC

Department of Mathematics and Statistics, Georgetown University

Assistant Professor

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25200740

United States: Orlando, FL

University of Central Florida, Department of Mathematics

Assistant Professor

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25621902

United States: Chicago, IL

The University of Chicago Booth School of Business

Assistant/Associate Professor of Econometrics and Statistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25213454

United States: Indiana, IN

University of Notre Dame

Clare Boothe Luce Junior Faculty Position

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25200932

United States: West Lafayette, IN

Purdue University, Department of Statistics

The Department of Statistics, Purdue University invites applications for two faculty positions

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25231193

United States: Cambridge, MA

Massachusetts Institute of Technology

Statistician - Faculty Positions

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25454631

United States: Atlanta, GA

University of Georgia

Tenure-track assistant professorship in statistics, Department of Statistics, University of Georgia, starting August 2016. Requires Ph.D. in Statistics, and a strong commitment to teaching and research in statistics. For details, see http://www.stat.uga.edu. To apply, use http://facultyjobs.uga.edu/postings/443. Applications received by January 2, 2016, will be assured consideration. The University of Georgia is an Equal Opportunity/Affirmative Action employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability, gender identity, sexual orientation or protected veteran status.

United States: Medford, MA

Tufts University, Department of Mathematics

Probability, Stochastic Processes and their Applications, Assistant Professorship (tenure-track)

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25288611

United States: Williamstown, MA

Williams College

Assistant Professor of Statistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=24448901

United States: Duluth, MN

University of Minnesota Duluth, Department of Mathematics and Statistics

Two Tenure Track Associate/Assistant Professor of Statistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25554898

United States: Chapel Hill, NC

Department of Statistics and Operations Research

Assistant Professor

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25190407

United States: Charlotte, NC

UNC Charlotte

Assistant Professor in Statistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25163273

United States: Lincoln, NE

Statistics Department, University of Nebraska

Assistant Professor of Statistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25485787

United States: Ithaca, NY

Cornell University

ORIE-Tenure Track Positions

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25293834

United States: Ithaca, NY

Cornell University

Biological Statistics & Computation Biology - Asst/Assoc. Professor

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25475366

United States: Ithaca, NY

Cornell University

Faculty Positions

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25473024

United States: New York, NY

Statistics Group in the Department of Information, Operations & Management Sciences at the Stern School of Business, New York University

Tenure Track Faculty Position in Statistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25250471

United States: Corvallis, OR

Oregon State University, Department of Statistics

Two tenure-track or tenured faculty positions

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25295904

United States: Philadelphia, PA

University of Pennsylvania, Wharton Department of Statistics

Assistant, Associate, or Full Professor of Statistics

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25485982

United States: Pittsburgh, PA

Carnegie Mellon Univ

Asst Prof in Applied Statistical Machine Learning

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25583819

United States: New York, NY

Department of Statistics
Columbia University
Limited-term Faculty Position Starting Fall 2016

The Department of Statistics invites applications for a four-year term position at the rank of assistant professor to begin July 1, 2016. A PhD in statistics or a related field is required, as is a commitment to high quality research and teaching in statistics and/or probability. Candidates will be expected to sustain an active research and publication agenda and to teach in the departmental undergraduate and graduate programs.

The department currently consists of 30 faculty members, 45 PhD students, and over 200 MA students. The department has been expanding rapidly and, like the University itself, is an extraordinarily vibrant academic community. For further information about the department and our activities, centers, research areas, and curricular programs, please go to our web page at: http://www.stat.columbia.edu

All applications must be submitted through Columbia's online Recruitment of Academic Personnel System (RAPS) and must include the following materials: cover letter, curriculum vitae, statement of teaching philosophy, research statement, evidence of teaching effectiveness, one writing sample or publication, and the names of 3 references into the system. Applicants also should arrange for three letters of recommendation to be uploaded on their behalf. For more information and to apply, please go to: https://academicjobs.columbia.edu/applicants/Central?quickFind=61471

Inquiries may be made to dk@stat.columbia.edu

Review of applications begins on January 1, 2016, and will continue until the position is filled.

Columbia University is an Equal Opportunity/Affirmative Action employer.

Employment Opportunities continued

United States: New York, NY

Department of Statistics
Columbia University
Faculty Positions Starting Fall 2016

The Department of Statistics invites applications for two faculty positions in applied/interdisciplinary statistics to begin July 1, 2016. The positions may be filled at any rank from tenure-track assistant professor through full professor with tenure. A Ph.D. in statistics or a related field and commitment to high quality research and teaching in statistics and/or probability are required. Candidates will be expected to sustain an active research and publication agenda and to teach in the departmental undergraduate and graduate programs. Candidates interested in an affiliation with the Data Science Institute are strongly encouraged to apply.

The Department currently consists of 30 faculty members, 45 PhD students, and over 200 MA students. The Department has been expanding rapidly and, like the University itself, is an extraordinarily vibrant academic community. For further information about the Department and our activities, centers, research areas, and curricular programs, please go to our webpage at: http://www.stat.columbia.edu

For information about the Data Science Institute, please see web page at: http://datascience.columbia.edu

Applicants at all ranks are required to create an applicant profile and upload a CV through Columbia's online Recruitment of Academic Personnel System (RAPS). To begin the application process, please go to: https:// academicjobs.columbia.edu/applicants/Central?quickFind=61490 Additionally, applicants must submit materials through Head Hunter. To apply for the senior position visit this link (https://editorialexpress.com/apply/columbia_statistics_senior_recruiting_2016_a89). To apply for the junior position visit this link (https://editorialexpress.com/apply/columbia_statistics_junior_recruiting_2016_a90) The Department of Statistics positions will be visible in Head Hunter by clicking on "Positions" after logging in to the Candidate Application Interface.

In Head Hunter, applicants for this position at the assistant professor or non-tenured associate professor rank should submit a cover letter, Curriculum Vitae, a brief statement of their research plans, one writing sample, and arrange for three letters of reference to be sent on their behalf. Applicants at the tenured associate professor and full professor rank should submit a cover letter and Curriculum Vitae. Applications will only be considered for the position once the process is completed both in RAPS and in Head Hunter. Inquiries may be made to dk@stat.columbia.edu

Review of applications begins on December 2, 2015, and will continue until the position is filled.

Columbia University is an Equal Opportunity/Affirmative Action employer.

United States: Columbia, SC

University of South Carolina, Department of Statistics

Assistant Professor, Dept. of Statistics/Dept. of Biological Sciences

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25582964

United States: Salt Lake City, UT

University of Utah, Department of Mathematics

Faculty Positions

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25250151

United States: Arlington, VA

National Science Foundation

Deputy Division Director

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25293998

United States: Charlottesville, VA

University of Virginia, Department of Statistics

Lecturer

http://jobs.imstat.org/c/job.cfm?site_id=1847&jb=25153556

International Calendar of Statistical Events

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

December 2015

December 4–5: London, UK. **Complex Systems in Time Series** w http://www.lse.ac.uk/statistics/events/SpecialEventsandConferences/Complex-Systems-in-Time-Series

December 6–11: Atlantic City, NJ, USA. **71st Annual Deming Conference on Applied Statistics** w www.demingconference.com

NEW December 14–17: Birmingham, AL, USA. **Next-Generation Sequencing: Technology and Statistical Methods** w http://www.soph.uab.edu/ssg/nhgri_r25/fifthshortcourse

December 16–19: Pune, India. **IEEE International Conference on Information Processing** w www.icip.in

December 28–31: Kolkata, India. **9th Triennial Calcutta Symposium on Probability and Statistics** w http://triennial.calcuttastatisticalassociation.org

January 2016

ims January 5–7: Lenzerheide, Switzerland. **Sixth IMS-ISBA joint meeting: BayesComp at MCMSki.** w http://www.pages.drexel.edu/~mwl25/mcmskiV/program.html

January 25–27: Lunteren, The Netherlands. **15th Winter School on Mathematical Finance** w https://staff.fnwi.uva.nl/p.j.c.spreij/winterschool/winterschool.html

February 2016

NEW February 21–23: Osaka, Japan. **Fourth Asian Quantitative Finance Conference** w http://www.math.kansai-u.ac.jp/yamazaki/AQFC2016/index.html

NEW February 23–24: Miami, FL, USA. **CHI's Clinical Research Statistics for Non-Statisticians** w http://www.scopesummit.com/Clinical-Research-Statistics

March 2016

March 1–4: Bochum, Germany. **12th German Probability and Statistics Days 2016: Bochumer Stochastik-Tage** w http://www.gpsd-2016.de/

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

ims March 16–19: University of Maryland, College Park, MD, USA. **Seminar on Stochastic Processes (SSP) 2016** w http://depts.washington.edu/ssproc/ssp_nextssp.php

April 2016

April 1–2: Cambridge, UK. **Info-Metrics Institute Spring 2016 Conference: Information-Theoretic Methods of Inference** w http://www.american.edu/cas/economics/info-metrics/conference/Info-Metrics-Spring-2016-conference.cfm

ims April 4–8: Lancaster University, UK. **UK Easter Probability Meeting 2016:** Random Structures Arising in Physics and Analysis w http://www.lancaster.ac.uk/maths/easter-probability-meeting/

April 5–8: Lausanne, Switzerland. **SIAM Conference on Uncertainty Quantification** w http://www.siam.org/meetings/uq16/

May 2016

NEW May 2–6: Fields Institute, Toronto, Canada. **Dependence, Stability, and Extremes** w http://www.fields.utoronto.ca/programs/scientific/15-16/dependence/

May 18–21: Cappadocia, Turkey. **International Conference on Information Complexity and Statistical Modeling in High Dimensions with Applications** w http://www.ic-smhd2016.com/

NEW May 28–29: Istanbul, Turkey. **IWMST-2016: International Workshop on Mathematics and Statistics** w http://conf-scoop.org/science/iwmst

June 2016

June 1–4: Malta. **4th Stochastic Modeling Techniques & Data Analysis Conference** w http://www.smtda.net/smtda2016.html

June 6–10: Pittsburgh, PA, USA **Statistical Challenges in Modern Astronomy VI** w http://www.scma6.org

NEW ims June 10–11: Pavia, Italy. **Advances in Statistics, Probability and Mathematical Physics** w http://www-dimat.unipv.it/eugenioconference/

June 11–16: Avignon, France. **3rd ISNPS Conference** w http://www.isnpstat.org

Continues on **page 26**

International Calendar *continued*

June 12–15: Atlanta, GA. **3rd ICSA Applied Statistics Symposium** **w** http://math.gsu.edu/~icsa/

June 13–17: Sardinia, Italy. **ISBA 2016 World Meeting** **w** http://www.corsiecongressi.com/isba2016/

June 15–18: Cartagena, Colombia. **Second International Congress on Actuarial Science and Quantitative Finance** **w** http://icasqf.org

June 19–22: Santander, Spain. **36th International Symposium on Forecasting** **w** http://forecasters.org/isf/

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

June 20–24: San Diego, CA. **Stochastic Networks Conference 2016** **w** http://stochasticnetworks2016.ucsd.edu/

June 27–30: Hong Kong, China. **Fourth IMS Asia Pacific Rim Meeting** **w** http://ims-aprm2016.sta.cuhk.edu.hk/

June 27–July 1: Barcelona, Spain. **3rd Barcelona Summer School on Stochastic Analysis** **w** http://www.crm.cat/en/Activities/Curs_2015-2016/Pages/3rd-BCN-Summer-School-on-Stochastic-Analysis.aspx

July 2016

July 10–15: Victoria, BC, Canada. **WNAR Annual Meeting in conjunction with the XXVIII International Biometric Conference** **w** http://biometricconference.org/conference-information/

July 11–15: Toronto, ON, Canada. **IMS Annual Meeting at 9th World Congress in Probability and Statistics** **w** http://www.fields.utoronto.ca/programs/scientific/16-17/WC2016/

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

August 2016

NEW August 1–3: Ilulissat, Greenland. **Applied Probability Symposium** **w** http://thiele.au.dk/events/conferences/2016/ilulissat/

NEW August 21–24: Birmingham, UK. **International Society for Clinical Biostatistics 2016 Conference** **w** http://www.iscb2016.info/

August 24–26: Kerman, Iran. **13th Iranian Statistical Conference** **w** http://isc13.uk.ac.ir/index.php?slc_lang=en&sid=1

November 2016

November 9–13: Miami, FL. **International Conference on Questionnaire Design, Development, Evaluation, and Testing** **w** http://www.amstat.org/meetings/qdet2/index.cfm

December 2016

NEW December 5–9: Canberra, Australia. **Australian Statistical Conference, 14th Australasian Data Mining Conference, 9th Conference on Teaching Statistics** **w** www.asc2016.com.au

December 19–22: Shanghai, China. **10th ICSA International Conference** **w** http://www.math.sjtu.edu.cn/conference/2016icsa/

March 2017

NEW March 8–10: Washington DC, USA. **Reproducibility of Research: Issues and Proposed Remedies** **w** http://www.nasonline.org/programs/sackler-colloquia/upcoming-colloquia/

June 2017

NEW June 28–July 1: Nanning, Guangxi Province, China. **2017 IMS-China International Conference on Statistics and Probability** **w** TBC

July 2017

NEW July 9–13: Vigo, Spain. **38th Annual Conference of the International Society for Clinical Biostatistics** **w** TBC

July 24–28: Moscow, Russia. **39th Conference on Stochastic Processes and their Applications (SPA)** **w** TBC

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

July 2018

July 9–13: Edinburgh, UK. **ISBA 2018 World Meeting** **w** TBC

July 28 – August 2: Vancouver, Canada. **JSM 2018** **w** http://amstat.org/meetings/jsm/

July 2019

July 27–August 1: Denver, CO, USA. **IMS Annual Meeting at JSM 2019** **w** http://amstat.org/meetings/jsm/

See the full list at **imstat.org/meetings**

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 $69 is added to the dues of members for each scientific journal selected ($43 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
Subscriptions are available on a calendar-year basis. **Individual subscriptions** are for the personal use of the subscriber and must be in the name of, paid directly by, and mailed to an individual. Individual subscriptions for 2015 are available to *The Annals of Applied Probability* ($194), *The Annals of Applied Statistics* ($194), *The Annals of Probability* ($194), *The Annals of Statistics* ($194), *Statistical Science* ($168), and *IMS Bulletin* ($125). **General subscriptions** are for libraries, institutions, and any multiple-readership use. Institutional subscriptions for 2015 are available to *The Annals of Applied Probability* ($457), *The Annals of Applied Statistics* ($457), *The Annals of Probability* ($457), *The Annals of Statistics* ($457), *Statistical Science* ($260), and *IMS Bulletin* ($113). Airmail rates for delivery outside North America are $130 per title.

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

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

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Advertising job vacancies

A single 60-day online job posting costs just $285.00. We will also include the basic information about your job ad (position title, location, company name, job function and a link to the full ad) in the *IMS Bulletin* at no extra charge. See http://jobs.imstat.org

Advertising meetings, workshops and conferences

Meeting announcements in the *Bulletin* and on the IMS website at http://imstat.org/meetings are free. Send them to Elyse Gustafson; see http://www.imstat.org/program/prog_announce.htm

Rates and requirements for display advertising

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Deadlines and Mail Dates for *IMS Bulletin*

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

** Note that the August 2016 issue has an early deadline of June 15* the **next** issue is

January/ February 2016

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

DEADLINES for submissions

December 1, then **February 1**

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

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

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Articles

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