http://intindstat.org



IISA Newsletter Autumn 2017

IISA is 25!

Hyderabad (Courtesy: Can Stock Photo Inc./snehitdesign

We are excited to celebrate 25 years. Look through the following pages to see the photos from the past 25 years of our members.



Update Your Contact Information

Please visit <u>www.infindstat.org/</u> <u>update-contact</u> to update your information.



Contribute to the News!

Please submit items of interest to <u>newsletter@intindstat.org</u>

Contents

201010101

President's Message By Sujit K. Ghosh	2
ISA Election Results	4
ISA 2017 Conference in Hyderabad	5
ISA 2017 Awards	6
Does Machine Learning Reduce Racial Disparities in Policing? By Jyotishka Datta and Grant Drawve, Jniversity of Arkansas, Fayetteville	10
Donate to the Bahadur Lecture Series	13
IISA 2018 Conference in Florida By Somnath Datta, University of Florida, Gainesville	14
An Outlook into the Principle of Restricted Choice By Rahul Zalkikar, University of Virginia	15
Member News	18
Dbituary for Jayanta Kumar Ghosh (1937-2017) 3y R. V. Ramamoorthi, Michigan State University	
Upcoming Conferences and Workshops	20
Memories from JSM 2017	22
Advertisements:	
Fordham University	23
Cytel	24
Department of Health and Human Services	25

1

Dear Members of IISA (Bandhugan!):

This is my last article as IISA president and I'd like to express my sincere thanks to each one of you for giving me an opportunity serve in my role as the president for 2017 and as president-elect last year. I will continue to serve as past-president next year in my role as a member of the IISA Executive Board (EB). It has been an incredible journey and I think we have reached some important milestones but much more remains to be accomplished. It is my pleasure to pass on the baton to our next president, Somnath Datta, who has already been serving as president-elect since last January and is actively involved with many activities of the association, and so "bandhugan" you will be in very good hands. Somnath da: look forward to your leadership and working with you next year.

In my very first article in the spring edition, I mentioned to you about learning from the past (so-called 'Prior') and after we have 'sampled' (literally by the survey that the IISA Membership and Outreach Committee has carried out), we gained some critical knowledge from the IISA community and now this is my final posterior inference! In this newsletter, you will find interesting articles written by members of our community and I sincerely urge you to take some time out of your busy schedule, relax, and enjoy the winter break by reading some of these stories.

I look forward to seeing many of you at the 2017 Annual IISA Conference and look forward to celebrating our silver jubilee in the beautiful city of Hyderabad. For the most recent information, please visit the conference website: <u>http://iisaconference.</u> org/ and if needed, please get in touch with the cochairs of the Scientific Program Committee, Ansu Chatterjee and Isha Dewan who have been working tirelessly to put together a variety of exciting sessions. For local logistics, please contact Mahesh Iyer who has been working hard to make sure everything goes well at the convention center. In this issue you will find an excellent article written by the three leading organizers, Ansu, Isha, and Mahesh. Please read it!

To continue with our 25th anniversary celebrations, we have included photographs taken by H.N. Nagaraja from IISA events throughout the years. These photos can be identified with the "Blast from the past!" captions. Enjoy!

By now, you all know that the 2018 Annual IISA conference will be held in Gainesville, Florida and updates about the conference are available online. Also, the article written by Somnath Datta in this issue

Board of Trustees

N. Balakrishnan, McMaster University Dipak K. Dey, University of Connecticut Nandini Kannan, National Science Foundation

Executive Board

President: Sujit K. Ghosh, North Carolina State University Past President: Amarjot Kaur, Merck Research Labs President Elect: Somnath Datta, University of Florida Treasurer: Subrata Kundu, George Washington University Secretary: Soutir Bandyopadhyay, Colorado School of Mines

India Chapter

President: Ayanendranath Basu, Indian Statistical Institute, Kolkata **Vice President:** Vishwanath (Mahesh) Iyer, Novartis **Treasurer:** Sanjeev Sabnis, IIT Mumbai

Newsletter

Editor-in-Chief: Chaitra H. Nagaraja, Fordham University Editors: Soutir Bandyopadhyay, Colorado School of Mines; N. Rao Chaganty, Old Dominion University; Jyotishka Datta, University of Arkansas; Sowmya R. Rao, Boston University. Production Editor: Rhiannon Sheaparé, Cytel



contains further details about the conference and we look forward to seeing you there as well.

We had a great turnout of IISA members and activities at JSM 2017 where IISA was the main sponsor for two invited sessions, a topic contributed session, a contributed session and several SPEED poster sessions. Thanks to Veera Baladandayuthapani for representing IISA on the JSM Program Committee. IISA also partially sponsored a reception at the meeting and a group dinner. The turnout at the dinner was beyond what we expected! More than 60 members attended and the restaurant was fortunately able to accommodate the extra attendees. Everyone had a good time enjoying the food and the gala dinner. Some photos from JSM are sprinkled throughout the newsletter.

Recently you have seen the report from the IISA Member Survey that was shared with you via email.

Thanks to Soumi Lahiri and her team for leading the effort to conduct the survey and summarizing the findings. Several important matters came out of this survey and the IISA EB is working to improve those aspects (e.g., increasing diversity among members) that have been aptly pointed out in the report.

I'd urge each one of you to read the report if you haven't already and look I forward to hearing from you on how IISA can better serve the needs of its members. In particular, members would like to see more training workshops or webinars launched by IISA to serve members who do not have access to state-of-the-art research at their own institutions. IISA EB is planning to address many such requests.

I'd like to thank the IISA nomination committee for coming up with two superb candidates for the post of president for year 2019 and a new member for the IISA Board of Trustees (BoT). As you may have noticed in one of our earlier email broadcasts, Amit Bhattacharyya has been elected as the president for 2019. He will start as president-elect next year and will continue his role as past-president in 2020. It is also a pleasure to know that Sastry Pantula has been elected as the new member of the IISA Board of Trustees and he will begin his three-year term in January of 2018. Congratulations to both Bhattacharyya and Pantula. We look forward to your dedicated service and leadership.

In order to continue our congratulations, the IISA Awards Committee has also recently completed reviews of nominations for the prestigious IISA Lifetime Achievement Award and Young Researcher Awards. I heard from the chair of the Award Committee, T.N. Sriram, that this year we received an excellent pool of nominations for all the awards and thanks to him and his sub-committees who have patiently reviewed all the nominations and come up with their final selections. Congratulations to the selected winners in each category. You can read about the winners in this issue.

I have heard from many of you at JSM that you have really enjoyed reading some of the fun articles published in our previous newsletters and we would like to continue these types of articles under the leadership of our Newsletter Editor-in-Chief, Chaitra Nagaraja who has not only worked tirelessly to make the newsletter comprehensive in its content but also has encouraged members to contribute articles that would be of general interest. In this issue you will find two such fun, yet informative articles by Jyotishka Datta and Rahul Zalkikar and I'd very much encourage you to read them.

> In the midst of all of the abovementioned celebratory activities, I am very saddened to report that we have lost one of our greatest minds in Statistics, Professor Jayanta K. Ghosh (who is passionately known as simply JKG). He passed away recently and an obituary has been kindly

written by R.V. Ramamoorthi (see later in this Newsletter). We have definitely lost a great human being, a leader, a teacher, a person who was known to care for others regardless of whether the person was a student or a well-known researcher, and a person who showed keen interest to listen to others and provide insightful feedback.

Finally, I'd like to reiterate, if you are interested in collaborating with scientists in India or elsewhere or if you are aware of scientists in India who are in need of statistical expertise, please feel free to contact me (<u>sujit.ghosh@ncsu.edu</u>) or our Secretary Soutir Bandyopadhyay (<u>secretary@intindstat.org</u>) and let us know about your thoughts. I promise that you will hear back from us!

I hope to see you all at the beautiful Hyderabad International Convention Center on December 27-30.

Bidaay (for now) bandhugan! Again, it was a real pleasure working with all of you and I look forward to continuing my journey with the next leaders of IISA.

Sujit Ghosh 2017 IISA President

" Bidaay (for now) bandhugan! Again, it was a real pleasure working with all of you"

IISA Election Results



We are pleased to share the news that Amit Bhattacharyya, Vice President of Biometrics at ACI Clinical, has been elected IISA President for 2019. He will be President-Elect in 2018 and Past-President in 2020. In addition, Sastry Pantula, Professor of Statistics at Oregon State University was elected to the IISA Board of Trustees. His three-year term will begin on January 1, 2018. Congratulations!

Dr. Amit Bhattacharyya is Vice President of Biometrics at ACI Clinical, a niche service provider in the



various committee support in the safety domains for clinical trials. In his current role, Bhattacharyya oversees ACI's Biometrics service delivery in the Safety monitoring committees for all clients in various therapeutic areas in pharmaceutical drug development. In addition, Bhattacharyya leads the Statistical Consultancy services for ACI to support small pharma-

ceutical and biotech companies in the industry. Prior to joining ACI last year, Bhattacharyya spent more than 2 decades at GlaxoSmithKline in various capacities leading statistics and programming groups in nonclinical, clinical and health outcome teams across the United States, the United Kingdom and India. **Professor Sastry Pantula**, Professor of Statistics at Oregon State University, is nationally and internationally

recognized as a leader in statistical sciences. He served as the Dean of the College of Science for four years at Oregon State University from August 2013 to August 2017, after serving a



three-year term as Director for the Division of Mathematical Sciences at the National Science Foundation. Pantula spent more than 30 years as a faculty member at North Carolina State University (NCSU), where he began his academic career in 1982. At NCSU, he also served as the Director of Graduate Programs (1994-2002) and the Head of the Department of Statistics (2002-2010). He has been a leader in graduate education, developing partnerships with industry, including GlaxoSmithKline, Eli Lilly, Merck and SAS to increase graduate traineeships and fellowships.



Hyderabad (Courtesy: Can Stock Photo Inc./snehitdesign)

We hope you will all join us in Hyderabad for the 2017 IISA International Conference: Statistics and Data Science for Better Life, Society, and Science. The conference will take place at the Hyderabad International Convention Centre from December 27th through the 30th.

Vishwanath (Mahesh) Iyer of Novartis, IISA's India Chapter Vice President is the chair of the Organizing Committee. The Scientific Program Committee is co-chaired by Ansu Chatterjee from the University of Minnesota and Isha Dewan from ISI, Delhi. They have put together an exciting program for the conference.

We have 5 plenary talks by Sanghamitra Bandyopadhyay, Indian Statistical Institute; Malay Ghosh, University of Florida; Irene Gijbels, KU Leuven in Belgium; Ian McKeague, Columbia University; and Donna Speigelman, Harvard University. The inaugural R. R. Bahadur Lecture will be given by J. Sethuraman from Florida State University. A memorial session on J.K. Ghosh's contributions to statistics is scheduled for December 29th. Furthermore, there are 14 special invited talks by renowned researchers from all over the world and nearly 90 invited sessions covering a range of topics in statistics and data science. The speakers come from diverse backgrounds including academia, research institutes, IIMs, government bodies, and industry.

Lively panel discussions have been planned giving an opportunity for statisticians to debate current issues such as, "Are Statisticians Prepared for the Data Science Challenge?", "Women in Data Science", and "Challenges for Data Scientists—Research Opportunities for Academia".

At the conference, the Lifetime Achievement Award, Young Researcher Awards, and IISA Service Award will be presented. You can read about the winners in the first two award categories in the next article. (Congratulations!) The Service Award winner will be announced at the conference banquet.

About 75 young researchers and PhD students will get an opportunity to present their work in talks or in poster presentations. There will be prizes for student paper presentations and student poster presentations. Abstracts for the poster competition were selected by the following committee: Mallik Rettiganti, University of Arkansas (chair); Sayantan Banerjee, IIM, Indore; Swarnali Banerjee, Loyola University, Chicago; Arindom Chakraborty, Visva-Bharati University; Jyotishka Datta, University of Arkansas; Arnab Laha, IIM, Ahmedabad; Siuli Mukhopadhyay, IIT, Bombay; Chaitra H. Nagaraja, Fordham University; and T.V. Ramanathan, Savitribai Phule Pune University.

For more information, please visit <u>https://www.</u> intindstat.org/iisaconference2017/.



We are happy to announce the winners of the Lifetime Achievement Award and the Young Researcher Awards. Malay Ghosh, from the University of Florida, will receive the Lifetime Achievement Award. The Young Researcher Award in the Theory and Methods category will be awarded to both Debdeep Pati from Texas A&M University and Surya Tokdar from Duke University. Finally, the Young Researcher Award in the Applications category will be awarded to both Bibhas Chakraborty from Duke-NUS Medical School and Samiran Ghosh from Wayne State University. The awards will be presented at the IISA Conference in Hyderabad at the end of the month. The committee who chose the winners was chaired by T.N. Sriram, University of Georgia. The members were: Pandurang Kulkarni, Eli Lilly; Rahul Mukherjee, IIM Calcutta; Sanjay Shete, MD Anderson Cancer Center; and Satrajit Roychoudhury, Pfizer. Subrata Kundu, George Washington University, assisted with the administrative processes. The IISA Service Award will be announced at the Hyderabad conference, so stay tuned...

Congratulations to our winners!



Blast from the past! IISA dinner at JSM 1999 in Baltimore. (Courtesy: H.N. Nagaraja)



Blast from the past! IISA dinner at JSM 2000 in Indianapolis . (Courtesy: H.N. Nagaraja)

Lifetime Achievement Award Malay Ghosh

Professor Malay Ghosh is a Distinguished Professor of Statistics at the University of Florida and is receiving the IISA Lifetime Achievement Award. Ghosh obtained his Bachelor and Masters degrees in Statistics from the University of Calcutta. His Ph.D. degree was also in Statistics from the University of North Carolina at Chapel Hill under the supervision of Professor Pranab Kumar Sen. He began his teaching career at the Indian Statistical Institute, Kolkata, moving to Iowa State University, and then to the University of Florida in 1982. In addition, he has held visiting appointments in several academic institutions and federal agencies within the US and overseas.

Ghosh's research encompasses several areas of statistics. Early in his career, he worked on nonparametrics, sequential analysis, and problems in decision theory. While working on Stein estimation, he developed an interest in empirical and hierarchical Bayesian analysis, leading eventually towards an appreciation for the Bayesian paradigm. Ghosh has made a lasting impact with his research in small area estimation. The topic involves simultaneous estimation for a large number of areas, for example all counties of the United States, typically with a small sample size in each area. This necessitates "borrowing strength" by explicit or implicit use of models linking all these areas. Ghosh has developed Bayesian techniques to address this problem and his work is widely cited in the literature.

In recognition for his research accomplishments, Ghosh is an elected Fellow of the Institute of Mathematical Statistics, the American Statistical Association and the International Society for Bayesian Analysis. He is also an elected member of the International Statistical Institute. He has served for six years in the Census Advisory Committee, NIH panel, and most recently in a panel of the National Academy of Sciences, just to name a few. Furthermore, Ghosh has supervised or co-supervised 57 Ph.D. students thus far and is currently working with 5 students.

Congratulations to Professor Ghosh for his outstanding contributions to statistics!



Blast from the past! IISA dinner at JSM 2000 in Indianapolis. From left to right: J.K. Ghosh, Gauri Datta, and Malay Ghosh. (Courte-sy: H.N. Nagaraja)



Blast from the past! Enjoying the beach during the 2010 IISA conference in Visakhapatnam. (Courtesy: H.N. Nagaraja)





Young Researcher Award Theory and Methods

Debdeep Pati

Debdeep Pati is an Associate Professor at Texas A&M University and is receiving the Young Researcher Award in the Theory and Methods category. Pati earned an MS in Statistics in 2010 and PhD in Statistics in 2012, both from Duke University. Prior to that he earned an MS in Statistics with a specialization in Mathematical Statistics and Probability in 2008 from the Indian Statistical Institute, Kolkata. Pati received an honorable mention for the Leonard J. Savage Award for an outstanding dissertation in Bayesian statistical theory and methods in 2013 from the International Society for Bayesian Analysis and a Distinguished Student Paper Award from the International Biometric Society (ENAR). He is an Associate Editor of Sankhya, Series A (Mathematical Statistics and Probability).

Pati's research involves developing Bayesian theory and methods for complex objects including highdimensional sparse vectors, matrices, shapes of non-Euclidean objects and large graphs. He is also interested in studying Bayesian model selection consistency when the marginal likelihood is analytically intractable. Modeling the distributions of objects contained within images motivate some of his collaborative work, e.g., in applications of tumor tracking in targeted radiation therapy. More recently, he has become interested in building models for discovering communities in large networks and to predict cognition from connectomics data.

Young Researcher Award Theory and Methods

Surya Tokdar



Surya Tokdar is an Associate Professor of Statistical Science at Duke University and a faculty member at the Duke Institute of Brain Sciences. Tokdar is receiving the Young Researcher Award in the Theory and Methods category. He specializes in nonparametric statistics and Bayesian inference and has worked extensively on density estimation, density regression and joint quantile regression. A theoretician by training, Tokdar examines asymptotic guarantees of Bayesian inference in nonparametric estimation problems. He equally enjoys formulating new inference models and designing and implementing computing algorithms to make them practicable. His current areas of application include neuroscience, the social sciences, sports analytics and ecology.

After completing his Bachelor's and Master's in Statistics from the Indian Statistical Institute, Kolkata, Tokdar obtained a Ph.D. in Statistics from Purdue University in 2006, under the supervision of Jayanta K. Ghosh. He was a Morris H. DeGroot Visiting Assistant Professor of Statistics at Carnegie Mellon University between 2006 and 2009 and joined Duke University in 2009. Tokdar lives in North Carolina with his wife and daughter. He enjoys painting, graphic arts, outdoor sports, board games, and reading popular science.



Young Researcher Award Applications

Bibhas Chakraborty

Bibhas Chakraborty is an Associate Professor and Director of the Center for Quantitative Medicine at the Duke-NUS Medical School, Singapore, and concurrently an Associate Professor in the Department of Statistics and Applied Probability at the National University of Singapore (NUS). He also holds an Adjunct Associate Professor position in the Department of Biostatistics and Bioinformatics at Duke University. Chakraborty is receiving the Young Researcher Award in the Applications category. Previously, he was an Assistant Professor of Biostatistics at Columbia University (2009-2013), where he won the prestigious Calderone Research Prize from the Mailman School of Public Health in 2011.

Chakraborty received his PhD in Statistics from the University of Michigan in 2009. His primary research interest lies in developing data-driven dynamic treatment regimes, which are sequential decision rules that recommend individually tailored

treatments to patients based on their ongoing information, and thus operationalize precision medicine in a time-varying setting. In fact, he is the first author of the first textbook on this cutting-edge topic, Statistical Methods for Dynamic Treatment Regimes: Reinforcement Learning, Causal Inference, and Personalized Medicine. In addition, he is also interested in the design of sequential multipleassignment randomized trials and various adaptive clinical trials, and more recently, in mobile health interventions. Apart from his core methodological research, he has also been involved in collaborative, interdisciplinary research in the domains of public health, medicine and health services research, often in the broad area of chronic diseases and aging. Currently he is the Principal Investigator of a methodological grant from the Ministry of Education, Singapore, and co-investigator on several other grants in Singapore and the US.

Young Researcher Award Applications

Samiran Ghosh



Samiran Ghosh is currently an Associate Professor of Biostatistics at Wayne State University School of Medicine and is receiving the Young Researcher Award in the Applications category. He earned his doctorate degree in statistics from the University of Connecticut in 2006. Before joining Wayne State University, he held appointments at Indiana University-Purdue University, Indianapolis and Weill Cornell Medical College, New York. He currently co-directs the NIEHS-funded Integrative Health Sciences Facility Core (a NIH-P30 center) and is also a founding director of Biostatistics in the Biostatistics and Epidemiology Research Design (BERD) core at Wayne State University. Ghosh's current research focuses on primarily two areas, (i) methods development for adaptive clinical trial design and (ii) modeling high dimensional data. Traditionally these two areas of research developed with little or no interaction. However, with the advent of personalized/precision medicine, Ghosh is working on some interesting problems which encompass techniques leveraging both areas. He is also working on some modeling aspects of the missing data problem, especially when it threatens the validity of clinical trial results. He is an Academic Editor of the journal *PLoS-One* and Associate Editor of *Sankhya, Series B.* He enjoys teaching and is currently mentoring two post-doctoral trainees in statistics. His research is funded by PCORI, NIH and DOD.

Does Machine Learning Reduce Racial Disparities in Policing? By Jostishka Datta and Grant Drawte

Since the mid-1990s, there have been strategic reforms across the United States to improve criminal justice policies to control the unchecked growth of mass incarceration and reduce the racial disparities in policing. Yet reports of systematic biases in law enforcement e.g. police brutality against specific race-groups more than the others, continue to trouble us. In a 2016 study, Ashley Nellis[1] documented these racial disparities: the rate of incarceration of African Americans across state prisons is 5.1 times more than that of whites, crossing 10:1 in five states. A key driver of such inequality, as Kristian Lum points out in a recent Nature paper, is demographically disparate treatment by the courts [2], which in turn is caused by "implicit" racial biases that affect even the most well-intended judges' discretion and can act independently of their explicit beliefs about racial inequality [3]. To counteract this, law enforcement agencies are relying more and more on machine learning tools to build an objective and fair criminal justice system, as we see the rise of "predictive policing". Perry et al. (2013) [4] define predictive policing as "the application of analytical techniques - particularly quantitative techniques - to identify likely targets for police intervention and prevent crime or solve past crimes by making statistical predictions."

Predictive policing is becoming more common in law enforcement agencies, similar to how hot spot techniques spread across agencies. Kelly (2015) [5] indicates an issue law enforcement agencies face is the ability to define a "high-crime area", especially with the U.S. Supreme Court's decision in Illinois v. Wardlow (528 U.S. 119, 124 (2000)) allowing for reasonable suspicion to be a plus-factor for neighborhoods classified as high-crime. "The courts' failure to require law enforcement agencies to present concrete evidence demonstrating that a neighborhood has a heightened propensity for crime raises significant constitutional concerns" (pp. 304, Kelly, 2015) [5]. In particular, safe-guarding Fourth Amendment protections against unreasonable searches and seizures without probable cause and general reasonable suspicion. As Ferguson (2012) [6] discusses in relation to predictive policing, "...this predictive information will be used to justify stops under existing Fourth Amendment precedent."

But what is a high-crime area? The proverbial "officer gut-instinct" does not hold as much merit with statistical techniques capable of operationalizing "high-crime areas", however are predictive policing algorithms unbiased?

"The way to stop discriminating on the basis of race is to stop discriminating on the basis of race."

-Chief Justice of the U.S. Supreme Court John Roberts in 2007.

Perry et al. (2013) compare conventional methods with full-scale predictive analysis techniques, e.g. whereas the former would look for "hot spots" from a small amount historical crime data, the latter promises to harness the power of "big data" and sophisticated mathematical modeling, yielding risk terrains using regression, classification and clustering. The underlying assumption is that these models, based on large amounts of data rather than human judgment, will bring fairness and objectivity to decision making. As a statistician, one would naturally wonder, do these machine learning tools, powered with "big data", really help reduce the inequalities? Any graduate student of statistics would tell you, it depends on the data that the models are fed. The rand.org guidebook by Perry et al. (2013) warns its users, "Predictive policing has been so hyped that the reality cannot live up to the hyperbole." Such

a "crystal ball" cannot exist as "predictions are only as good as the underlying data used to make them." Lum and Isaac (2016) [7] warn of the negative consequences, "if biased data is used to train these predictive models, the models will reproduce and in some cases, amplify those same biases. At best, this renders the predictive models ineffective. At worst, it results in discriminatory policing."

Lum and Isaac (2016) further investigate the impact of predictive policing by investigating the "hot spots" yielded by PredPol [8-11],

one of the biggest vendors of predictive policing software, that applies a sliding window approach to forecast crime using only data on type of crime and time and places of past crimes. Their case study shows that PredPol reinforces the apparent biases in existing police records, disproportionately targeting communities of color and low-income. While there is no "ground truth" to act as a reference frame, Lum and Isaac (2016) combine a demographically representative synthetic population data with National Survey of Drug Use and Health (NSDUH) data that produces a map of drug crimes more evenly distributed than police records, where some areas are significantly over-represented. The authors conclude, "This creates a feedback loop where the model becomes increasingly confident that the locations most likely to experience further criminal activity are exactly the locations they had previously believed to be high in crime: selection bias meets confirmation bias."

"Even though it's not me that's the yellow guy, your

officers are going to treat whoever comes out of that house in his boxer shorts as the yellow guy,'' Jouvenal, 2016 [12].

A hidden danger is the "tautological obscurity" that leads to shifting accountability from human decision makers to machines that are treated as black-boxes. While sophisticated algorithms like PredPol claim to produce a forecasting system that is race-neutral, its mathematical underpinnings are beyond the reach of its users.

For example, PredPol uses a method inspired by seismology, and posits that like aftershocks following an earthquake, probability of reoccurrence of the same event in a similar place would increase after the first occurrence of an event [11]. Hunchlab [13] claims to sharpen PredPol's method by adding

risk terrain modeling (RTM) [14-15] based on classifying geographical landmarks as crime attractors or generators. The statistical methodoloay for the risk terrain model [14] would appear familiar to any graduate student of statistics: use penalized regression to select only a few of 192 variables, where most of the coefficients are forced to be zero to favor sparsity. Indeed, the utility uses an elastic net regularized regression with Poisson distributed events, with further model simplification using a bidirectional stepwise Bayesian regression, using Information Criterion (BIC).

A statistician might also tell you that an "elastic net" is unstable in high dimensions, especially when predictors are correlated (Zou, 2006) [16], and question the "bet on sparsity" principle, i.e. is the truth necessarily sparse? Model selection methods inherently act like "Occam's razor" or favor parsimonious models. Philosophically pleasing as they may be, their influence on crime forecasting must be questioned: a simpler model of crime is not necessarily the best model for crime.

More important is perhaps the underlying technological barrier: the agency deploying this model would not challenge the hidden assumptions, even if they understand the operational aspects.

The second category of predictive policing is the more disturbing, albeit not as widely adopted, strategy of predicting offenders from their digital footprints. Chicago's "heat-list" compiles names of individuals likely to be involved in major crimes (Papachristos, 2009) [18]. Another method, "Beware" [17], claims to

me that's the yellow guy, your officers are going to treat whoever comes out of that house in his boxer shorts as the yellow guy,''

"Even though it's not

-Jouvenal, 2016 [12]

use data from social media to calculate individuals' threat scores although, "neither are people made aware of the score that is assigned to them, nor does the police department have any insight into how the score is calculated [18]." The future of predictive policing looks disturbingly close to the movie Minority Report (http://www.imdb.com/title/tt0181689/).

How accurate are these models in real life prediction? On a 400x400 square feet area, hot spot analyses with RTM provides an accuracy of 25%, increasing to 68% in an 800x800 square foot cell [16]. A statistician must interpret these accuracies in the light of the heavily unbalanced lengths of positive and negative examples and issues of overfitting and sparsity. Although the true positives far outweigh the false positives [19] negative effects of the wrongful assumptions are not scarce: ranging from false positives in the heat-list leading to false accusations and financial harm to assigning threat scores based solely on the address of a house.

What can we do as statisticians? Most importantly, we can educate the community at large about the potential negative consequences of naively applying deep learning methods, not just in the context to arrest records to predict hotspots, but also caution that algorithms can be biased when they ignore the socio-technical context. One key step is reducing the obfuscation of machine learning techniques: knowing the assumptions behind the methods and their inductive biases can help the agencies critically evaluate the algorithms deployed. Equally important is taking a proactive role in this rapidly evolving process that affects our society, contribute in building accurate and interpretable methods for crime forecasting keeping the human cost in mind.

Teach our future generations of statisticians, "let the data speak for themselves," but more importantly, teach them, "garbage in, garbage out"!

Envoi: India is not far behind: a tool called CMAPS (Crime Mapping, Analytics and Predictive System) is being developed by Delhi Police in collaboration with Indian Space Research Organization to forecast crime activities [20]. Although CMAPS is reported to design predictive policing algorithms based on stored records of criminal data, it stands out from their offshore counterparts by using "space technologies" (details of the method were not available at the time of writing this article).

References:

[1] Nellis, Ashley. The color of justice: Racial and ethnic disparity in state prisons. The Sentencing Project (2016). (<u>http://www.</u> sentencingproject.org/publications/color-of-justice-racial-andethnic-disparity-in-state-prisons/)

[2] Lum, Kristian. "Limitations of mitigating judicial bias with machine learning." Nature Human Behaviour 1.7 (2017): s41562-017.

[3] Clemons, John Tyler. "Blind injustice: The Supreme Court, implicit racial bias, and the racial disparity in the criminal justice system." Am. Crim. L. Rev. 51 (2014): 689.

[4] Perry, Walt L. Predictive policing: The role of crime forecasting in law enforcement operations. Rand Corporation (2013).

[5] Koss, Kelly K. "Leveraging predictive policing algorithms to restore fourth amendment protections in high-crime areas in a post-Wardlow world." *Chi.-Kent L. Rev.* 90 (2015): 301.

[6] Ferguson, Andrew G. (2012). Predictive Policing and Reasonable Suspicion. *Emory Law Journal*, 259-325.

[7] Lum, Kristian, and William Isaac. "To predict and serve?" Significance 13.5 (2016): 14-19.

[8] Mohler, G. O., Short, M. B., Brantingham, P. J., Schoenberg, F. P., & Tita, G. E. (2011). Self-exciting point process modeling of crime. J. Amer. Statist. Assoc., 106(493), 100-108.

[9] Mohler, G. (2013). Modeling and estimation of multi-source clustering in crime and security data. *Ann. of Appl. Stat.*, 7(3), 1525-1539.

[10] Mohler, G. O., Short, M. B., Malinowski, S., Johnson, M., Tita, G. E., Bertozzi, A. L., & Brantingham, P. J. (2015). Randomized controlled field trials of predictive policing. *J. Amer. Statist. Assoc.*, 110(512), 1399-1411.

[11] http://predpol.com

[12] Jouvenal J (2016) The new way police are surveilling you: calculating your threat 'score'. The Washington Post, January 10. https://www.washingtonpost.com/local/public-safety/ the-new-waypolice-are-surveilling-you-calculating-your-threatscore/2016/01/10/e42bccac-8e15-11e5-baf4-bdf37355da0c_ story.html

[13] https://www.hunchlab.com

[14] Caplan, J. M., Kennedy, L. W., & Miller, J. (2011). Risk terrain modeling: brokering criminological theory and GIS methods for crime forecasting. *Justice Quarterly*, 28(2), 360-381.

[15] Caplan, J. M., Kennedy, L. W., Barnum, J. D., & Piza, E. L. (2015). Risk terrain modeling for spatial risk assessment. Cityscape, 17(1), 7. Papachristos, A. V. (2009). Murder by structure: Dominance relations and the social structure of gang homicide. *Amer. J. of Soc.*, 115(1), 74-128.

[16] Zou, H. (2006). The adaptive lasso and its oracle properties. J. Amer. Statist. Assoc. 101 1418–1429. MR2279469.

[17] https://www.west.com/safety-services/public-safety/powerdata/.

[18] Degeling, M., & Berendt, B. (2017). What is wrong about Robocops as consultants? A technology-centric critique of predictive policing. AI & SOCIETY, 1-10.

[19] Drawve, G. (2016). A metric comparison of predictive hot spot techniques and RTM. Justice Quarterly, 33(3), 369-397.

[20] https://timesofindia.indiatimes.com/city/delhi/Predictive-policing-to-nail-criminal-minds/articleshow/52824404.cms

Donate to the Bahadur Lecture Series



Hira Koul appeals to you on behalf of the IISA Fundraising Committee to donate for establishing a series of Bahadur Lectures at every IISA meeting, in the spirit of the Wald Lectures at IMS conferences. The invited person would give 1-3 lectures on a current topic. It will cost around \$10,000 to establish this lecture series so please donate for this noble cause. Any amount helps! Donations to IISA are U.S. federal tax deductible. You can send your check made out to IISA (please mention the purpose) to

Prof. Subrata Kundu, Treasurer, IISA Department of Statistics George Washington University Washington, DC 20052

Alternately, you can also make an online donation by going to <u>https://www.intindstat.org</u> and clicking on the link on the left in the "Donate" box.

Mark Your Calendar for the IISA 2018 Conference

By Somnath Datta, University of Florida, Gainesville

IISA would like to invite its members and friends to attend the 2018 annual meeting which will be a four-day international conference, titled "IISA 2018: From Data to Knowledge, Working for a Better World". The conference will take place at the HPNP Complex of the University of Florida, Gainesville, from May 17 – May 20, 2018.

The format of the conference includes plenary talks, special invited talks, invited sessions and contributed posters. The Scientific Program Committee (SPC) will strive to maintain a healthy presence of women and minorities in all these categories and of young researchers (within five years of their doctoral degrees) in invited sessions. In addition, a special panel discussion on mentoring and career development, especially geared toward women statisticians is being organized. For students, the conference will provide numerous opportunities such as a student paper competition and contributed poster sessions at IISA 2018. A number of outstanding researchers and leaders have already confirmed



Blast from the past! Paramjit Gill volunteering at the IISA booth during JSM 2010 in Vancouver. (Courtesy: H.N. Nagaraja)

their participation and a full list of speakers will be available on the website in the future.

Housing and registration information are already available on the conference website <u>http://iisa2018.</u> <u>biostat.ufl.edu</u>/. We encourage everyone to plan early and take care of their registration now to take advantage the early-bird rates.

The SPC is currently accepting proposals for invited sessions. The details are provided at the conference website. We encourage members and the wider academic community to organize invited sessions at IISA 2018.



Blast from the past! Current IISA president, Sujit Ghosh, speaking at the 2011 IISA Conference at North Carolina State University. (Courtesy: H.N. Nagaraja)



How many times have you done something simply because you had to? How many times have you chosen one thing over another because you had no other choice? I can name a couple of times I have done a similar thing on multiple choice tests. "Stick with your first answer" is a phrase that frequently rung in my head when wanting to go back to questions to change some of my previous answers. That phrase is something that teachers have told me under the commonly assumed pretext of "Going with your gut", if I am still considering two possible answers for a question after I finished the rest of my test. But is it true? Is it really effective to go with your natural intuition in this scenario?

After finishing the test, should one stay with their first guess, or should they switch?

Let us look at this conflicting scenario in a different light by investigating a related problem. A statistical puzzle known as the Monty Hall Problem can directly model that switching your first guess is always the better option, and illustrates that reasoning through the Principle of Restricted Choice. This problem is roughly based on the game show Let's Make a Deal and has continued to stump all kinds of people for 40 years, even Nobel prize-winning physicists!

The Monty Hall Problem: "Suppose you're on a game show, and you're given the choice of three doors: Behind one door is a car; behind the others, goats. You pick a door, say No. 1, and the host, who knows what's behind the doors, opens another door, say No. 3, which has a goat. He then says to you, 'Do you want to switch to door No. 2?' Is it to your advantage to switch your choice?"

The 3 assumptions:

- 1. The host must always open a door that was not picked by the contestant.
- 2. The host must always open a door to reveal a goat and never the car.
- 3. The host must always offer the chance to switch between the originally chosen closed door and the remaining closed door.

So, what are the chances of switching doors and winning the car?

The chances are actually 66% to 33%, in favor of switching doors instead of the commonly assumed 50% to 50% chances. Table 1 shows this empirically using computer simulation.

If thought over logically, there are three possible scenarios. Suppose you choose Door 1 (for this

example, the following would apply true to any choice of door). The car could be behind Door 1, in which case, congrats, you win without switching doors! However, the car could be behind Door 2. The host of this problem, Monty, is aware of the placement of the car behind the door,

Table 1: Trial Data from Computer Simulation

(Each trial represents 1 million executions of the Monty Hall Problem.)

	% Chance of Winning by NOT SWITCHING doors	% Chance of Winning by SWITCHING doors	
Trial 1	33.3232%	66.6768%	_
Trial 2	33.3479%	66.6521%	_
Trial 3	33.3418%	66.6582%	
Trial 4	33.2619%	66.7381%	_
Trial 5	33.3847%	66.6153%	_

(For each trial, the standard deviation is 00.047%.)

and therefore will not choose to open the door that would win the car. Monty chooses Door 3 to open and unveils a goat. He offers the chance to switch to Door 2, and you decline, and lose. The last scenario is that the car is behind Door 3, in which case Monty would unveil a goat at Door 2, and offer you to switch to Door 3. You decline and you lose again. For you there is thus 1 win, 2 losses, in 3 scenarios. This is one way of deducing the 1/3 (33%) of winning the car if you stay with original door choice, and the 2/3 (66%) chance of winning the car if you switch doors.

The key to this problem is the idea of the host's restricted choice.

Assuming that you choose Door 1 and it doesn't win the car, Monty, your host, has no choice of which door to open for you. Since Monty is the host of the problem, he must open a door that reveals a goat, and therefore his choice is restricted. If the car is behind Door 3, Monty must open Door 2, and if the car is behind Door 2, Monty must open Door 3.

Let's say that Monty then opens Door 3 to unveil a goat to you. That makes Door 2 more likely to hold a car behind it because if Door 2 would not win the car, Monty could have opened that door to unveil the goat behind it. This idea is the key to the problem: Monty's choice of which door to open for you was restricted.

This is where the Principle of Restricted Choice comes in. This principle is related to Bayesian inference and the idea of biased information. The Principle dictates that prior knowledge of a host changes a player's probability of winning.

This principle is fascinating because two scenarios identical can be in appearance, but in one scenario the priorknowledge and therefore restricted choice of the "host" could dramatically probability alter the distribution for the "player", while in the other not so.



The Monty Hall Problem is most affected by the Principle of Restricted Choice because it contains only 3 doors for Monty (the host) and the player to choose from and switch to. However, what if we were to add a door, making the problem have 4 doors instead of 3? Now let's say

you choose Door 1. Let's say only the host knows the car is behind Door 4, and so he is restricted between choosing Door 2 or Door 3 to open (1/2 chance for each door). Once Monty opens only one door, you have the choice to switch to another door or remain with Door 1.

With the introduction of another door to this problem, it is possible that neither Door 1, nor the door the player decided to switch to wins the car. A simulation of this scenario (trials containing 3 to 10 total doors) led to the results in Figure 1.

The results of this simulation show that as more doors are added to the Monty Hall problem, the chances of winning from switching doors (originally 66%) and the percent chances of winning from not switching doors (originally 33%) become increasingly similar in value. This is shown by the blue and red lines getting closer and closer (although never being exactly the same) until there are negligible differences in the chances of winning based on switching doors or not. These results reflect that with the addition of more objects of chance (more doors that have goats behind them), the host's prior-knowledge has a smaller and smaller effect on the statistical probability of winning for the player, since the host has more and more options as to which doors to open to the player. This data analysis therefore concludes that: The Principle of Restricted Choice most dramatically alters probabilities when dealing with the lowest number of objects of chance.

When the host has prior knowledge of the problem, the probability of a revealed door distributes to

the remaining unopened and unchosen doors. In the Monty Hall Problem, assuming YOU choose Door 1, and the host opens Door 2 to reveal a goat, original probability the of Door 2 (p=1/3) would distribute to the then remaining Door 3; making the probability of winning by switching to Door 3 equal to 2/3 (p=1/3 + 1/3). However, if there was no

prior knowledge available to the host in the same scenario described, where the player chooses Door 1 and the host opens Door 2 to reveal a goat, the new probability of Door 2 winning would equal 1/2 and Door 1 also 1/2.

This concept that unique prior-knowledge of the host figure leads to the application of the Principle of Restricted Choice, and then results in a drastic (the lower the number of objects of chance = the more drastic) alteration of statistical probability for the player figure...is something which is shown empirically through my computer simulation.

How does this concept manipulate probabilities in favor of the host and the player?

When the host is restricted, the player gains an advantage over the host. However, many times this key advantage goes unrealized and therefore the player can be manipulated at the hands of the host. The statistical probability data modeled and analyzed above demonstrates that the Principle of Restricted Choice is altered with respect to various objects of chance. If a player was aware of the probabilities in these types of scenarios, the player would be able to act accordingly and adjust to the present scenario.

This concept is also observed in the card game Bridge, where it always good to finesse and not play for the drop (also 2/3 to 1/3 odds) because when an opposing player decides to play a certain card, you should assume this was because he/she HAD to play that card, and was therefore restricted.

In this application, the objects of chance are cards. If there were more cards for the opponent (host) player to use in the same situation, we can conclude through our data analysis that the probability would not be as extreme towards finessing.

This article is meant to create an advantage for the player over the host so that whenever a reader is presented with a problem from a host or opponent exhibiting the Principle of Restricted Choice, the player can take advantage of understood probabilities and make an accounted decision to succeed.

So, does the Principle of Restricted Choice apply to the "going with your gut" conflict in a situation where you are considering changing your answer to different one?

Yes...in a way.

Your calculations of the probability can be manipulated at the hands of the host and your natural intuition can fail you in scenarios where the Principle of Restricted Choice is in effect. In the multiple-choice test-taking scenario the "host" is the test-giving teacher. The teacher could have priorknowledge of the test answers and/or what the students' thought processes are. The teacher could be restricted because the students have to be presented with complete course-related material and in a relatively challenging way, with two or more considerable answer choices for problems. But how does this change your probability of scoring well?

When you are taking a multiple-choice test suppose you first look at Answer 1, which seems a very possible answer at that moment and so you decide to circle it. You move on to Answer 2 and it makes you doubt your first answer, since it is also very plausible. You move to Answers 3, 4 and 5 and they are all wrong. If we relate this to the Monty Hall Problem, we see that the teacher has unveiled to us (along with some work of our own) that these answers are completely wrong. Then, you further think about the problem or you finish the rest of the test and go back to that problem—feeling more and more doubtful of your original choice of Answer 1. At this point, the Principle of Restricted Choice begins to affect probabilities. The Principle in this particular conflict acts as an application of Bayesian updating as evidence accumulates. Your additional thought-process/action leads you to further doubt your original answer and therefore lowers the chances of Answer 1 being correct and serves as an update [increase] in your own probability of answering correctly if you switch to Answer 2. This phenomenon can be evidenced by research.

Several studies in the last few years have concluded that changing answers (for the questions that one is unsure of) is "generally beneficial" for testtakers, and that those students who knew of the statistical benefit of changing answers when in doubt changed more answers and scored higher on their exams than those who didn't know (an average net-point increase of 1.1% for first changes [According to a study conducted in 2007]).

In a world that is constantly updating information, probabilities are also constantly changing, even for you.

Now that you know—make change!

Original Java Simulation Code: The Monty Hall Problem: <u>https://docs.google.com/document/d/1Lgw</u> mZjaRDiG4uExkFqzI6YkoAQIIIrvQBYFrA25DvQI/ edit?usp=sharing

The Principle of Restricted Choice (Coding Classes): https://docs.google.com/document/d/1RAkloL AEZ0epLwjz2SQD7s5tCzXv1yb954U0F2pA1E/ edit?usp=sharing

Member News

Sayantan Banerjee

Sayantan Banerjee, Assistant Professor at IIM Indore, received the IIM Indore Best Teacher Award 2017. The award ceremony was held in October at the university during the Institute's 21st Foundation Day.

Susmita Datta

Susmita Datta, Professor of Biostatistics at the University of Florida, Gainesville, was the opening plenary speaker at the 2017 Women in Statistics and Data Science Conference.

Debasis Kundu

Debasis Kundu, Professor of Mathematics and Statistics at IIT Kanpur, is the recipient of the first Professor Mahalanobis Memorial Award, awarded by the Operation Research Society of India. He received the award for being a Distinguished Educator in Mathematics and Statistics.

Cyrus Mehta

Cytel Software Corporation, whose President is Cyrus Mehta, will be partnering with New Mountain Capital, LLC. This partnership will help Cytel expand into "machine learning, genomics, and bio-informatics, while simultaneously deepening [their] core strength in clinical drug development."

Bhramar Mukherjee

Bhramar Mukherjee, the John D. Kalbfleisch Collegiate Professor of Biostatistics at the University of Michigan, was elected 2017 Fellow of the American Association for the Advancement of Science (AAAS). She received the award for her contributions to Bayesian methodology when analyzing genomic data.

J.N.K. Rao

J.N.K. Rao, Distinguished Research Professor in Mathematics and Statistics at Carleton University, received the Award for Outstanding Contribution to Small Area Estimation by the International Association of Survey Statisticians. The award was presented at the ISI Satellite Meeting on Small Area Estimation in Paris for his pivotal contributions to the field.

V. Srinivasa Rao

V. Srinivasa Rao, Professor of Statistics and University Head at the Agricultural College in Acharya N.G. Ranga Agricultural University in Bapatla, was elected to be the Editor of *The Andhra Agricultural Journal* for 2017-2019.

P.G. Sankaran

P.G. Sankaran, Professor of Mathematics and Statistics and Head of the Department of Statistics at Cochin University of Science and Technology, was appointed Pro-Vice Chancellor of his university by the Government of Kerala.

C.R. Rao Prize Recipients

The Pennsylvania State University Department of Statistics held the 2017 Rao Prize Conference on May 12, 2017, and honored three recipients: the 2017 C. R. and Bhargavi Rao Prize Recipient is Donald B. Rubin, the John L. Loeb Professor of Statistics at Harvard University; the 2017 C. G. Khatri Lecturer is Paul R. Rosenbaum, the Robert G. Putzel Professor of Statistics at the Wharton School; and the 2017 P. R. Krishnaiah Lecturer is Satish Iyengar, Professor of Statistics at the University of Pittsburgh.

Obituary for Jayanta Kumar Ghosh (1937-2017)

By R. V. Ramamoorthi, Michigan State University



J.K. Ghosh

Professor Jayanta Kumar Ghosh, affectionately known as JKG, passed away on September 30, 2017. He was an eminent statistics scholar and emeritus professor at Purdue University. His contributions to statistics are well-known and well-documented in the profile written by Subhashis Ghoshal and Bertrand Clarke in the IMS Collection, "Pushing the limits of contemporary statistics; Contributions in honor of Jayanta K. Ghosh." The obituary by Anirban Dasgupta (http://www.stat.purdue.edu/news/2017/jayanta-ghosh. html) contains an excellent account of his research.

J.K.Ghosh was well verse din many branches of mathematics including ergodic theory, set theory, and probabilistic number theory. These scholarly accomplishments alone do not account for the respect, admiration, and affection that he evoked in his students and colleagues. He was fond of saying "people are infinite dimensional." He himself was a prime example.

Mathematics and Statistics played a major role in his life, but there was much more to him beyond these two subjects. The first thing that would strike you when you met him was his gentleness. He was gentle in demeanor, gentle in conversation and gentle in conduct. Being considerate came naturally to him. His office door was always open. You could walk in anytime and talk about whatever was on your mind—academic or otherwise. He would set aside whatever he was doing, listen and help if needed. In matters academic, he had a knack of converting our vague, half-baked thoughts to meaningful questions.

He was fond of literature and had read widely in Bengali and in English. He was familiar with most of the classics in history, literature and general fiction. He absorbed them, remembered them and would, at times, describe succinctly a situation with a quote. Here is vintage JKG, amused after reading a description of himself as the author of so many papers and so many books, writing to me: "It reminded me of Macaulay who was described by a wit as a 'book in breeches.'" Later in his life, he found children's books more cheerful and preferred reading them.

He had a great love for the city of Kolkata. Whenever he returned from Kolkata, he would start talking about his next visit. Towards the end, he wanted to go back to his city. Unfortunately, the circumstances of his illness did not allow him to do that.

Another major part of his life was the Indian Statistical Institute (ISI). During the final stages of his life, he would often talk of ISI, C.R. Rao, summer school in Visakhapatnam in the late sixties, and the good old days. He found that one of his old theorems with D. Basu was rediscovered and wrote, ""...[He] found Basu and I had proved it in our 1969 paper in the Annals, that's forty years ago. It brings back to me more than even the memory of the pleasure of joint work, the pleasure of friendship so common in old days in Stat Math. I also remembered that when I told Basu of this result, [he] told everyone in the dingy tea club we had... This must have been in 1966 soon after I joined ISI."

This love of ISI was also a weakness, for he could not distance himself from it and this did result in some unhappy moments.

He was generally a cheerful person and loved humor. However, in the last couple of years, his illness and a cardiac surgery began to take its toll. His mood turned a bit somber. In late 2015, he wrote to me:

"My memory is pretty bad, I feel sad how what was once a very good memory is slipping now, still bearable, but requiring regular checks along with medical checkups. I try to impress my interrogators by saying I still remember a full novel like the Isherwood's Berlin stories, though I may not remember the day of the week unless I go to office! It doesn't impress them as much as one hopes! How shabbily old age treats us!"

Despite his attempts to infuse some humor, what prevails is a sense of sadness.

No mention of J. K. Ghosh's life would be complete without mentioning his wife Ira. She was the mainstay of his life. She took care of his needs, his social obligations and helped him to be what he was. They had many friends, many visitors and as a host she excelled in graciousness. She loved reading and gardening. Her presence became essentially indispensable towards the last months of his life. Unfortunately, she herself was hit with serious illness and passed away just two weeks before him.

J. K. Ghosh was a humanist who believed in rational thought, while also conscious of its limitations. He admired Buddhism and valued compassion. He lived a life that truly reflected these beliefs. To quote him from a letter:

"Finally, the first things last, as in life. As one gets old and the once solid foundations of one's life begin to disintegrate, a warm friendship matters more than anything else."

The warm friendships, they had in plenty. Even as we, their friends, mourn and miss their presence, we are thankful that, at least for a while, JKG and Ira were part of our life.

Upcoming Conferences and Workshops

Please click on the end of the link to connect to the conference websites.

Statistical Methods in Finance 2017 Chennai Mathematical Institute, India December 16-19, 2017 http://www.cmi.ac.in/%7Esourish/StatFin2017/

2017 International Indian Statistical Association Conference—Statistics and Data Science for Better Life, Society, and Science Hyderabad International Convention Centre, India December 27-30, 2017 http://www.intindstat.org/iisaconference2017/

PCM 125: International Conference in Statistics and Probability Indian Statistical Institute, Kolkata, India January 2-4, 2018

http://www.isid.ac.in/~pcm125spconf/

National Workshop on Bayesian Analysis and Data Analytics Bharathiar University, Tamil Nadu, India January 3-4, 2018 http://cdn.b-u.ac.in/seminar/stat_2018_2.pdf

International Conference on Theory and Applications of Statistics and Information Sciences (TASIS 2018) Bharathiar University, Tamil Nadu, India January 5-7, 2018 http://cdn.b-u.ac.in/seminar/

stat 2018 2.pdf

12th International Conference on Health Policy Statistics

Charleston Marriott Hotel, South Carolina, USA January 10-12, 2018 http://ww2.amstat.org/meetings/ ichps/2018/index.cfm

International Conference on Changing Paradigms and Emerging Challenges in Statistical Sciences (IPECS-2018)

Pondicherry University, Puducherry, India

January 29-31, 2018 http://www.ssca.org.in/ upcomingconference.html

IISA 2018: From Data to Knowledge, Working for a Better World University of Florida at Gainesville, USA May 17-20, 2018 http://iisa2018.biostat.ufl.edu

Midwest Machine Learning Symposium Logan Center, Chicago, USA June 6-7, 2018 http://midwest-ml.org

ICSA 2018 Applied Statistics Symposium Hyatt Regency New Brunswick, New Jersey, USA June 14-17, 2018 http://www.icsa.org/icsa/events/june-14-17-2018-icsa-2018-applied-statistics-symposium

ICSA 2018 ICSA China Conference

Shangri-La Hotel, Shandong, China July 2-5, 2018 http://www.icsa.org/icsa/events/july-2-5-2018-2018-icsachina-conference

New Lifetime IISA Members

Sanjib Basu, University of Illinois at Chicago
Samiran Ghosh, Wayne State University
B. G. Manjunath, University of Hyderabad
Siuli Mukhopadhyay, IIT Bombay
Rajesh Nandy, University of North Texas Health Science Center
Somnath D. Pawar, Shivaji University
Navdeep Singh, Labour Bureau, Chandigarh
Natesh Pillai, Harvard University
Latika U. Shinde, Prof. N. D. Patil Mahavidyalaya
Debajyoti Sinha, Florida State University
Anuj Srivastava, Florida State University
Surya Tokdar, Duke University
Abdus S. Wahed, University of Pittsburgh
Your name here To become a lifetime member go to http://www.intindstat.org/membership

ISBIS 2018 Meeting on Statistics in Business and Industry University of Piraeus, Greece July 4-6, 2018 http://conf.sta.unipi.gr

Workshop on Mathematical Finance

Indian Institute of Science Education and Research Pune, India July 12-17, 2018

https://sites.google.com/site/mathematicalfinance2018/ home

ASA Biopharmaceutical Section Regulatory-Industry Statistics Workshop

Washington Marriott Wardman Park, Washington DC, USA September 12-14, 2018 http://ww2.amstat.org/meetings/ biopharmworkshop/2018/

ICSA 2019 Applied Statistics Symposium Raleigh Convention Center, North Carolina, USA June 9-12, 2019 http://www.icsa.org/icsa/events/june-9-12-2019-icsa-2019-applied-statistics-symposium



Blast from the past! Ram Tiwari presenting the Lifetime Achievement Award to P.K. Sen at the 2011 IISA Conference at North Carolina State University. (Courtesy: H.N. Nagaraja)



Blast from the past! 2013 IISA Conference in Chennai. From left to right: Barry Arnold, N. Balakrishnan, Suvra Pal, Katherine Davies, and Adelchi Azzalini. (Courtesy: H.N. Nagaraja)



Blast from the past! Amarjot Kaur and Subir Ghosh presenting the Young Researcher Award to Swati Biswas at the 2016 IISA Conference at Oregon State University. (Courtesy: H.N. Nagaraja)



Blast from the past! T.N. Sriram presenting the Best Student Paper Award to Subho Majumdar at the 2016 IISA Conference at Oregon State University. (Courtesy: H.N. Nagaraja)

Memories from JSM 2017, Baltimore MD



Ben Ward, Chaitra Nagaraja, Ranjan Maitra, and Sujit Ghosh volunteering at the IISA booth during JSM 2017.



Vijay Nair and Naveen Narisetty at the IISA dinner at JSM 2017.



Pushpa and Ramesh Gupta meet friends at the IISA dinner at JSM 2017.



Malay Ghosh, Snehalata Huzurbazar, and Amarjot Kaur at the IISA dinner during JSM 2017.



Soutik Ghosal, Debamita Kundu, Sinjini Sikdar and Sandipan Dutta at the IISA mixer at JSM 2017.



Sastry Pantula with Sat Gupta and his family at the IISA mixer during JSM 2017.

DEVELOP THE EXPERTISE YOU NEED IN DATA SCIENCE IN THE HEART OF NEW YORK CITY.

FORDHAM

Gabelli School of Business

STEM-DESIGNATED MS IN APPLIED STATISTICS AND DECISION-MAKING

total scholarships awarded to new Gabelli entrants

25%

92%

FALL 2017

MSSD admitted students receiving scholarships in Fall 2017

share of MSSD scholarships that went to international students in Fall 2017

THE MSSD PROGRAM ADVANTAGE:

- Specialized electives in programming, business intelligence and finance allow students to customize their degree
- Fordham Business Analytics Society
- Research-focused Innovation Lab
- March Data Crunch Madness competition

fordham.edu/DiscoverMSSD

Shaping the Future of Drug Development

Meaningful Work | Collaborative Culture | Stimulating Challenges

Biostatisticians - US, Europe

You will have an MS or PhD with three-to-five (3 - 5) years working on clinical trials.

Additionally, we require:

- A thorough understanding of statistical principles
- Some knowledge of medical/biological terminology and clinical trial designs in relevant therapeutic areas
- Good written and oral communication skills including grammatical/technical writing skills
- Conversant with SAS programming, and knowledge of SAS procedures and other statistical software
- Demonstrated organizational skills with the ability to prioritize workload
- An effective communicator: able to explain methodology and consequences of decisions in lay terms
- An effective team player; willingness to go the extra distance to get results, meet deadlines, etc.
- Ability to be flexible when priorities change
- Ability to deal with ambiguity.

Senior Statistical Programmers - US, Europe

Senior Statistical Programmer Qualifications and Experience You will have a BA/BSc or higher degree in Statistics, Mathematics, Computer Science, Life Sciences or other related scientific subject, and a minimum 5 years of relevant career statistical programming experience in a clinical development environment.

Additionally, we require:

- Excellent SAS data manipulation, analysis and reporting skills
- Familiarity with drug development life cycle and experience with the manipulation, analysis and reporting of clinical trials data
- Working knowledge of latest CDISC SDTM standards and familiar with CDISC ADaM and Define standards
- Ability to work effectively and successfully in a globally dispersed team environment with cross-cultural partners
- Excellent oral and written English communication skills
- Ability to provide quality output and deliverables, in adherence with challenging timelines
- Willingness and ability to learn and follow Company's standard
- processes and procedures.
- Ability to lead small team projects effectively
- Ability to effectively perform complex statistical programming
- and related tasks
- Willingness and ability to provide guidance to team members on technical and process questions
- Strong ability to implement the latest CDISC SDTM, CDISC ADaM, and Define standards

Multiple Openings for Biostatisticians and Statistical Programmers

To Apply, Contact:

Noemi Owens Director, Recruiting

Noemi.Owens@Cytel.com

www.cytel.com/careers

BRANCH CHIEF POSITION IN BIOSTATISTICS AND COMPUTATIONAL BIOLOGY

Department of Health and Human Services National Institutes of Health National Institute of Environmental Health Sciences Research Triangle Park, North Carolina

The National Institute of Environmental Health Sciences (NIEHS) is recruiting an accomplished scientist to serve as Chief of the Biostatistics and Computational Biology Branch (BCBB) <u>http://www.niehs.nih.gov/research/atniehs/labs/bb/index.cfm</u>.

Members of the BCBB carry out methodologic research and collaborate broadly across the Institute to address a wide range of questions related to effects of the environment on human health. The Branch currently has 4 tenured investigators, 1 tenure-track investigator, 5 staff scientists and additional trainees, with more recruitments anticipated. Research at NIEHS incorporates both human- and laboratory-based studies including epidemiology, genetics, epigenetics, toxicology, imaging, and structural biology. This research provides both opportunities and analytic challenges related to high-dimensional data.

The Branch Chief directs their own independent research program, provides leadership, and facilitates the research and collaborative activities of Branch scientists. In addition to administrative oversight, the Chief will supervise staff members, mentor tenure-track investigators and post-doctoral fellows, and ensure the scientific excellence of the Branch's research portfolio. The successful candidate must have a keen interest in synergizing collaborations, both within the BCBB and with other Intramural and National Toxicology Program investigators at NIEHS. The Chief will lead the BCBB into new directions as biostatistics, computational biology, and environmental science continue to evolve.

Qualifications: The ideal candidate will have an outstanding record of publication, achievement, and leadership, with broad interests in biostatistics and computational biology. Applicants must have a Ph.D. or equivalent degree in statistics/biostatistics/computational biology/bioinformatics or a related field, a record of accomplishments commensurate with an academic rank of tenured associate or full professor, and meet the requirements for tenure at the NIH (<u>https://oir.nih.gov/sourcebook/tenure-nih-intramural-research-program</u>). To be eligible, an applicant must be a U.S. citizen, resident alien, or non-resident alien with, or eligible to obtain, a valid employment-authorization visa.

Salary/Benefits: The Branch Chief will be eligible for a tenured appointment with excellent start-up, salary, and benefit packages.

How to Apply: Interested persons should send a cover letter, their curriculum vitae, a 3-page statement of research interests, goals and leadership/administrative experience, and contact information for 3 references in one combined PDF, to Ms. Bonnie Earnhardt at <u>int-appls@niehs.nih.gov</u>, citing Vacancy Announcement **DIR-AC1322 in the subject line**. Incomplete applications or paper applications will not be accepted. We will begin evaluating applications on November 12, 2017. Applications will be accepted until the position is filled.

The NIH is dedicated to building a diverse community in its training and employment programs. HHS and NIH are Equal Opportunity Employers.

Applications from women, minorities, and persons with disabilities are strongly encouraged.