NISS

Parameters

IN THIS NEWSLETTER...

ANNUAL NISS AWARDS

S³ Statistics Serving Society
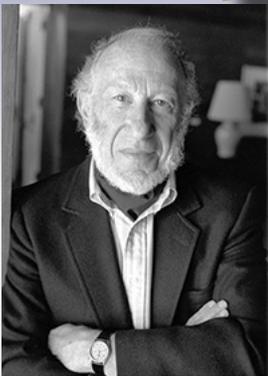
RESEARCH

EVENTS

Essential Data Science for Business

OptimizationComputer
Consulting Science Visualization
Tools Analysis Communication
Causal Exploratory
MachineModeling Data Uplift Ethics
Soft Social Analytics DeepApplication
Areas Knowledge
Domain Learning Skills
Descriptive Predictive Programming
Analytical
Unstructured
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Inference

NISS Writing Workshop for Junior Researchers (at JSM)

Welcome to the Summer 2020 edition of the NISS Parameters Newsletter

Despite the Covid-19 limits on travel NISS has increased the number of activities offered to our affiliates and sponsored many webinars and meet-ups open to the public. The annual NISS sponsored Writing Workshop, normally held at JSM, was recreated as a virtual two day Zoom meeting, with 27 new researchers, mentored by 16 seasoned mentors including former editors of the best journals in statistics. The participants gathered two days to hear presentations and meet individually with their mentors in Zoom breakout rooms for individual feedback on their writing samples. Thanks to Lingzhou Xue, NISS Assistant Director, who recruited this very diverse group of new researchers, from California to Boston in the USA, and from Saudi Arabia, India, and South Korea, and coordinated the presentations from statistical leaders in the publishing world.

The virtual JSM provided the setting for NISS to announce the winners of several awards, typically presented at the NISS reception. The winner of the 2020 Jerome Sacks Award for Outstanding Cross-Disciplinary Research went to Francesca Dominici, of Harvard Biostatistics, the Distinguished Alumni Award to Jennifer Clark for her acheivements as a former NISS postdoc, and the Distinguished Service Award to Christy Chuang-Stein for her exceptional service to NISS during the past 6 years. See below for more details on these presentations.   Christy Chuang-Stein deserves immense credit for the recent flurry of NISS offerings impacting the statistical and data science community this year, from p-values, to Covid-19 modeling, to professional development activities for our affiliates including eight career fairs this past year. These activities are all available to view on the NISS website - see News / Meetup Recordings.

The latest Ingram Olkin Forum: Unplanned Clinical Trial Disruptions, held on July 21 and 28, presented the Covid-19 challenges to ongoing clinical trials from the viewpoint of government regulators, with videos and slides now available at www.niss.org/news. Working sessions to tackle these chalenges are planned for September with interested persons invited to participate to propose solutions.   Another recent event was a one-hour introduction to Essential Data Science for Business, by Victor Lo, Fidelity Investments, which will be followed by a series of tutorials on the top ten topics. Watch the NISS website www.niss.org/events for these.

The Washington DC offices of NISS, led by Nell Sedransk, continues to serve government agencies with expertise in solving their most challenging problems. She describes the current issues, during this most disruptive time in the Federal Government….

Jim Rosenberger, Director, NISS

Vibrant is a good word to describe NISS-DC in 2020. Since the beginning of the year, high-impact projects coupled with expansion of personnel that have not diminished with the onslaught of Covid-19. In addition, the annual evaluation of NISS as a Department of Education contractor awarded NISS uniformly "Exceptional" ratings in all categories (quality and performance).

Expert panels for NCES addressed the technical and the substantive issues in making available to researchers the test-response data with click-by-click detail as individual students progress through a digital-based test. The first NISS panel examined technical issues for these "process data"; the second panel addressed substantive issues such as creation of new standard summary variables. In April, NCES announced its first-ever release of process data. Reports from both panels are on the NISS website: NCES Report Library.

Everyone seems to assume that someone must know what comprises the US K-12 school facilities. But no repository for these data currently exists. NISS convened an expert panel for NCES to explore the feasibility of using remote sensing data to quantify US space devoted to K-12 schools. This panel identified resources and produced a viable outline for integrating existing government remote sensing data with existing school information at NCES by combining the expertise in IT, in AI and in statistics to estimate current facility measures and to provide a continual process for updating records. Report from this panel is also in the NCES Report Library on the NISS website.

NASS continues to roll out new projects with NISS Research Associates and Senior Mentors in leading roles. Integrating data of heterogeneous types and from multiple sources opens the possibilities for new crop estimation and yield prediction processes. At the same time, increasing the granularity of estimates and predictions requires innovation in small area modeling. NISS researchers play key roles in NASS innovations.

Covid-19 restrictions arrived and offices closed while staff started working from home. But instead of slowing, work increased and NISS-DC expanded. Megan Glenn's contributions steadily increased, so that she was hired directly (instead of a temporary placement) for an expanded commitment. To support new projects at NASS, Zach Terner (2020 PhD from UC-Santa Barbara) was recruited to join the NISS Research Associates already there. To handle more senior research responsibilities at NASS, Bruce Craig (professor at Purdue) joined NISS as a Senior Fellow and Mentor.

Sadly, Cliff Spiegelman passed away unexpectedly in the spring leaving a big hole in every organization he was part of. For NISS especially the loss is keenly felt; Cliff was a longtime friend, a wonderful colleague and collaborator, and a supporter of NISS and a remarkable role model for all the NISS Research Associates he mentored.

Nell Sedransk,   Director - DC

ABOUT NISS

The National Institute of Statistical Sciences (NISS) is a national institute that delivers high-impact research in science and in public policy by leveraging the rich expertise of its staff with that of its base of affiliated organizations in academia, industry, and government. NISS works on issues where information and quantitative analysis are keys to solutions and decisions. NISS functions in three ways: as an expert advisor, as a basic researcher, and as a collaborator.

OUR MISSION

The National Institute of Statistical Sciences (NISS) is an independent research organization that serves as a neutral, objective expert in delivering research in science and public policy to its affiliates in academia, industry and government. NISS identifies, catalyzes and fosters high-impact cross-disciplinary and cross-sector research involving the statistical and data sciences.

The Jerome Sacks Award for Cross-Disciplinary Research

The NISS Board of Trustees established the Jerome Sacks Award for Cross-Disciplinary Research in 2000 to honor Sacks' service as the founding director of NISS. The annual prize of $1,000, presented at the NISS JSM Reception, recognizes sustained, high-quality cross-disciplinary research involving the statistical sciences.

Francesca Dominici, the Clarence James Gamble Professor of Biostatistics, Population and Data Science at the Harvard T.H. Chan School of Public Health, and Co-Director of the Data Science Initiative at Harvard University, is the 2020 recipient of the Jerome Sacks Award for Cross-Disciplinary Research.

To quote from the nomination: "*Dr. Dominici is an international leader at the interface of statistics, Big Data, environmental research, cancer research, and public health. Her intellect, talent, determination and passion are unmatched. She was in 2019 one of the most highly cited researchers, ranking in the top 1% of scientists cited in her field worldwide. Her selection is a tribute to the work that Dr. Sacks has done to bridge environmental scientists and statistics.*"

Francesca's citation reads: "*For her leadership in high-impact cross-disciplinary research that brings together statistical innovation, heterogeneous data, and diverse scientists to address critical challenges in environmental epidemiology, especially regarding the effects of air pollution on public health.*"

The NISS Distinguished Service Award

The NISS Distinguished Service Award was established by the Board of Trustees in 2005 to recognize individuals who have given extraordinary service that significantly advances NISS and its mission. The recipient of the 2020 Distinguished Service Award is **Christy Chuang-Stein**.

Christy Chuang-Stein is an independent statistical consultant with 30 years of experience in the pharmaceutical industry. She was Vice President, Head of the Statistical Research and Consulting Center (SRCC) when she retired from Pfizer in 2015. Christy is a Fellow of the American Statistical Association with more than 145 publications including several book chapters and two books. Christy was a vice president of the (ASA, 2009-2011), and she received ASA's Founders' Award in 2012 and the Distinguished Achievement Award of the International Chinese Statistical Association in 2014.

Christy's citation reads: "*For her distinguished service to NISS serving two terms on the board of trustees, for her excellent leadership as chair of the Affiliates Committee for three years, and as vice-chair of the board this past year. Christy established planning committees in both the Academic and Government Affiliate Programs and led the efforts to expand and enrich the value proposition for Affiliates in both programs through activities such as Meetups, webinars and career fairs.*"

The NISS Distinguished Alumni Award

The NISS Distinguished Alumni Award is intended for former NISS postdocs or research associates who have had distinguished careers. Examples might include academics who have been promoted to full professor, and individuals who have had successful careers in business, or as leaders in industry or government. Only former NISS postdocs or research associates who left NISS more than 10 years prior to the awarding year are eligible for the award.

The 2020 recipient of this award is **Jennifer L. Clarke**, Professor of Statistics and of Food Science and Technology at the University of Nebraska-Lincoln. Since 2013, she was Director of the Quantitative Life Sciences Initiative, a cross-campus data science research and training initiative. Jennifer was a NISS postdoctoral researcher for 18 months under the mentorship of **Jerome Sacks**, with guidance from **Stan Young** and **Alan Karr**.

Jennifer's citation reads: "*Honoring her distinguished career and research contributions in computational biology, bioinformatics and statistical methods with applications to human health and plant sciences, and for her excellent service at the university level and in both national and international organizations.*"

Thursday, August 27th, 3 - 4:30 pm ET

The impact of the COVID-19 pandemic has reached all aspects of our lives both personal and professional. As teachers this has catapulted us in to teaching methods and approaches that are perhaps unfamiliar territory. How can we make the best of this situation bring the most value to our new teaching requirements? For instance, what's the biggest difference between teaching online and in-person that instructors need to be aware of when preparing to teach? And, what is our role in maintaining academic integrity? And, with all the technologies available today – where do you start?

What are the key things that we need to know or plan for?

The NISS Affiliates committee is bringing together three experienced experts in teaching statistics online to provide their advice, strategies, methods and a review of helpful technologies.

John Haubrick, instructional designer and Assistant Teaching Professor at Penn State University, will focus on the challenges and opportunities for handling larger classes online and Kristin Lynn Sainani, Associate Professor from Stanford University, will focus on small or large classroom settings. In particular, how do you put yourself into an average student's shoes when preparing for classes? Is there a technology and/or a mental checklist before I start teaching via Zoom. How can we engage students in synchronous online sessions? Similarly, how do you stay connected to your students if you prefer asynchronous teaching?

Moderator: Esra Kurum (University of California, Riverside) Speakers: John Haubrick (Penn State University), Kristin Lynn Sainani (Stanford University) and Melinda Clardy (South Louisiana Community College).

Melinda Clardy, Assistant Professor of Mathematics from South Louisiana Community College, will focus mostly on assessments and maintaining academic integrity side of things. For instance, what kind of assessments work best for which classes? How can we encourage students to maintain academic integrity? How often should we require assignments or exams?

If you are getting ready to teach your Fall classes online, remotely, mixed-mode or even "mask-to-mask" – this is a session that you will not want to miss!

UPCOMING EVENT: NISS-MERCK VIRTUAL MEET-UP ON ISSUES IN VACCINE DEVELOPMENT

September 16, 2020 11-12:30 ET

The National Institute of Statistical Science (NISS) and Merck are sponsoring a Virtual Meet-Up on Vaccine Development.

With the COVID pandemic having such a profound effect, everyone is hoping for a highly protective and safe vaccine soon. Yet most have little understanding of the difficult road for discovery and development of a vaccine. In this meet-up we will discuss some of the challenges of vaccine development and novel ways those challenges can be met.

Moderator: Dan Holder (Merck) Speakers: (left to right) Ivan Chan, (AbbVie Inc.), Joshua Chen, (Sanofi Pasteur), Marc Lipsitch, (Harvard University)

Check the NISS Events webpage for up to date event info!

NISS CONTINUES TO WORK TO IDENTIFY TOPICS OF INTEREST TO STATISTICIANS FROM ALL DIFFERENT SECTORS AND THEN GATHER EXPERTS TO CONTRIBUTE TO A CONVERSATION THAT HELPS TO NOT ONLY INFORM AND BUT ALSO PROVOKE FURTHER THINKING ON THESE TOPICS. KEEP YOUR EYE ON THE NISS WEBSITE FOR FUTURE EVENTS THAT MIGHT BE OF INTEREST TO YOU OR YOUR COLLEAGUES!

NISS-NCES PANELS FOCUS ON RELEASE OF DATA ON HOW STUDENTS TAKE DIGITAL TESTS!

NISS

As schools in the United States are using more and more digital technology for teaching assessment a new window is opening into students' actual processes of arriving at responses to each item. The National Center for Education Statistics (NCES) charged NISS with convening two panels to consider how best to organize and provide access to nationally administered tests – starting with released items from NAEP (National Assessment of Educational Progress, i.e., "the nation's report card").

Digitally-based testing records each student's progress through a test, click by click with each action time-stamped. In addition digitally-based assessments provide greater opportunity for the use assistive technology and can be adapted to provide enhanced accommodations for students with special needs. Most importantly, collecting these new types of data, can serve to enhance understandings of what students know and can do as they engage with technology to problem solve.

Test process data is now, for the first time, being made available to researchers – with consulting expertise from NISS!

These new data are the test process data that reveal in detail the paths students follow as they progress through an online test. For example, some students go from start to finish in an orderly way, even more follow different paths. Some jump forwards and backwards, some return to items to change answers even while they are proceeding through the test and some students return to check or change answers before submitting; some students never look back. Since each click is time-stamped, it is also easy to learn how long a student spent on a single question and what response the student chooses each time the student visits that question.

"*Researchers have been waiting for this kind of data that chronicles the click-by-click path of each individual student as the student responds to the items on a test. Now testing can be studied by analyzing more than just correctness of responses. This has implications for constructing better tests as well as for understanding students' thought processes.*"

Nell Sedransk, NISS Director-DC

NISS was commissioned by NCES to convene panels of technical experts to advise on how to most efficiently and safely release the data in a useful form. Panelists included leading researchers in the technical fields of technology-based assessment, computational psychometrics, psychology of testing, machine learning and natural language processing, federal statistical data systems, and statistical and data sciences.

The first panel focused the experts' attention to both the data base and data extraction methods used so that data could be released effectively and comprehensively would maintain strict privacy and confidentiality requirements avoiding unacceptable security or disclosure risks. (read the full report: Release of Process Data to Researchers (2019))

The second panel's attention was focused on the definitions used for calculated variables so that these data could also be made directly available in addition to the raw "click data". This second charge required substantial IT/data base collaborative expertise to efficiently extract these data into a usable, standardized data file that allows researchers to access and work with this complex, high-dimensional data. (read the full report: Release of Process Data to Researchers, (2020))

Who needs these data? Not just test developers! More importantly, this is data that those who study how students solve problems and what differentiates different ways of processing information are very interested in being able to review. For example, as a result of having access to this deeper set of student behavior data in an online test-taking environment, researchers can analyze students' strategies, their attitudes and abilities to focus in responding to the challenge of a test. Researchers who study special groups of students such as English language learners or students with particular disabilities can look at differences in response paths compared to mainstream students and may be able to identify the potential for biased assessment from particular kinds of questions or presentations of item stem information.

For more on this see "The Nation's Report Card": Response Process Data From the 2017 NAEP Grade 8 Mathematics Assessment

NISS is proud to have become a partner with NCES and others in tackling challenges where information and quantitative analysis are keys to solutions and decisions. NISS is always looking for ways to leverage the rich expertise of its staff with that of its base of affiliated organizations in academia, industry and government to provide high-impact research in science and in public policy.

For these reports and other reports that NISS has been involved in authoring with NCES visit the NCES Report Library on the NISS website!

Read the press release from the NAEP on the use of digitally based assessments.

https://nces.ed.gov/nationsreportcard/dba/

To honor the work and actions of the late Ingram Olkin, an eminent statistician, mentor and contributor to social causes, NISS brings together experts and researchers together from a variety of fields and backgrounds into multi-day forums.

The focus of these forums is to bring forward a current societal issue that might benefit from attention from the statistical community and others.

Do Clinical Trials Face Irreversible Losses?

Since March, 2020 unplanned changes to daily routines due to the mandatory isolation and social distancing requirements during the COVID-19 pandemic have occurred across the globe. These disruptions have wreaked havoc on clinical trials in progress as well as those in the planning stages.

What are the implications of these disruptions? What strategies can be put into place to mitigate those data that have already or will not be collected? Are there changes to methods or plans that researchers can put into place moving forward?

Day One: NIH Perspectives

To start off this series of forums, Day One involved gathering the perspectives from prominent statistical leaders in government agencies. Three senior and experienced researchers provided their thoughts and shared examples from their own institutions in the National Institutes of Health. Over 140 were in attendance to hear what they had to say.

Nancy L. Geller is the Director of the Office of Biostatistics Research at the National Heart, Lung, and Blood Institute (NHLBI) was the first speaker. Nancy directed attention to identifying a number of important factors including when the disruption occurred, how far along was accrual, the nature of the intervention, and how to modify the data collection and analysis. Nancy was followed by Dean Follmann who is Chief at the Biostatistics Research Branch at the National Institute of Allergy and Infectious Diseases. Dean shared two examples as well. The first example involved the use of monoclonal antibodies as a seasonal protection against children getting malaria and how this trial was adapted to deal with disruptions in administration and data collection. The second example involved a blinded randomized trial of 3,200 women at risk of HIV infection and the strategies that were put into place to deal with the problems that resulted because of the inability to intervene or follow up with subjects. The final speaker of Day One was Lisa McShane, an Associate Director at the Division of Cancer Treatment & Diagnosis and Chief at the Biometric Research Program at the National Cancer Institute. She discussed four major topics: the immediate consequences of disruptions, modifications to trial procedures, the impact on study design and feasibility and lastly, the leveraging of expertise, trial resources and infrastructure to provide insight. (Read the full story about Day One of the Forum.)

## Day Two: CDC, FDA, and EMA Perspectives

Lilly Yue is a Deputy Director in the Division of Biostatistics, Center for Devices and Radiological Health in the U.S. Food and Drug Administration (FDA). Lilly began by sharing two documents that have been published by the FDA, the FDA Guidance on Conduct of Clinical Trials of Medical Products during COVID-19 Public Health Emergency, and the Statistical Considerations for Clinical Trials During the COVID-19 Public Health Emergency. One point that all of the speakers emphasized often was "Ensuring the safety of trial participants is paramount." Lilly was followed by G. David Williamson, who is Associate Director for Science, National Center for Environmental Health (NCEH) and Agency for Toxic Substances and Disease Registry (ATSDR), Centers for Disease Control and Prevention (CDC). David shared an example of an ATSDR study that focuses on a large class of man-made chemicals called per- and polyfluoroalkyl substances (PFAS). David shared what steps were taken as a result of this stoppage, and discussed the key issues of consideration involved in restarting the study. The final speaker of Day Two was Aldana Rosso, a Senior Adviser in Biostatistics at the Danish Medicines Agency. She shared the European Medicines Agency response to the pandemic. Aldana emphasized the major points of this response including a 'safety first' mentality, the need for a case-by-case assessment of implications on a clinical trial, and the need to collect all trial related information. (Read the full story about Day Two of the Forum.)

Day Three through Day Six: Invited Working Group Sessions

Following these first two days, working group sessions whose purpose is to tackle the technical and methodological issues that emerged from the opening sessions will take place. Participants, chairs, moderators, and recorders will be selected from among participants. Each working group will be charged with producing a white paper or a manuscript for the purpose of sharing the findings that result. These working group sessions will take place through the Fall.

Visit the NISS website for full coverage including links to the slides used by the speakers and recordings of these sessions.
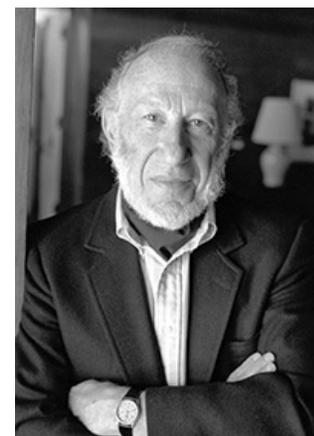
S³ Statistics Serving Society

What do you think are the top ten, key and practical data analytics methods in that are in use in the business world today?

On Wednesday, July 29th Victor Lo (Fidelity Investments) provided a comprehensive overview of those topics that he feels are proving to be these essential methods. He organized his 'top ten' list into three major categories: descriptive, predictive and prescriptive analytics. In addition, he contended that the topics in this list are those that might not necessarily be covered in many statistics programs. He then provided an informed and authoritative presentation of the major features that describe the following approaches:

1. Analytical Consulting, Communication and Soft Skills

2. Computer Science, Programming, and Tools

3. Descriptive Analytics, Exploratory Data Analysis, and Data Visualization

4. Predictive Analytics and Machine Learning

5. Deep Learning

6. Causal Inference and Uplift Modeling

7. Predictive Analytics and Optimization

8. Unstructured Data Analysis

9. Social Sciences and Data Science Ethics

10. Domain Knowledge and Application Areas

Through various snippets and examples into the viability and practicality of these approaches during his presentation, Victor effectively paved the way for NISS to unveil a new series of tutorials that will tackle each of these approaches in turn. Three hour tutorial type sessions will delve deeper into each of these topics and provide practical and useful Information about each.

Approximately 120 attendees had plenty of questions regarding the use or the implications of one type of analysis or another. Lingzhou Xue, Assistant Director of NISS served as moderator of this event.

Keep your eye on the NISS Events website for more information on these upcoming tutorials!
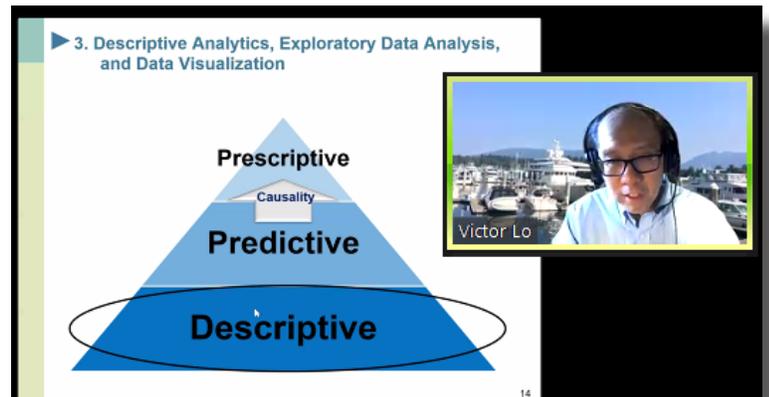
Victor Lo (Fidelity Investments) makes a point during an overview of the top ten data science essentials for business..

Check the NISS Events webpage for up to date event info!

NISS Writing Workshop for Junior Researchers (at JSM)

NISS Writing Workshop for Junior Researchers
August, 2020

Friday, August 7th was the first of what has become an annual event at JSM, NISS Writing Workshop for Junior Researchers (at JSM).

As you know, JSM went virtual this year and so did the writing workshop. And, because of the virtual access participants that might not have been able to travel to Philadelphia (even under normal circumstances) were able to participate in this year's event.

Day One

The first day led off with a couple of speakers. First speaker was Leland Wilkinson (H2o.ai and University of Illinois at Chicago) who gave a lengthy and very informative presentation entitled "*Writing for Data Science and Statistics*" focused on writing skills and the second looked at evaluating good and bad writing. What made this workshop a bit different than the larger webinars that NISS has hosted lately is that participants were able to 'raise their hand' and using their microphone ask their own questions live. This made for much more interactive experience. In fact, a virtual lunch time followed where participants were sent to virtual break-out rooms with the senior mentor that they had been assigned to so that they could get to know each other and discuss the publication pieces that they have been involved in.

After the lunch time interaction with mentors, everyone returned to the 'main' room for a presentation by Nick Jewell (University of California, Berkeley & London School of Hygiene & Tropical Medicine) entitled "*Choosing Where to Publish (and some clues as to how to get published)*." Nick was followed by a series of shorter presentations from a panel of speakers that was moderated by Lingzhou Xue (Assistant Director, NISS and Penn State University). These panelists inlcuded the following experienced statisticians below, (the titles of their talks follow):

- Xuming He (University of Michigan) - "*Statistical theory and methods journals*"

- Nicole Lazar (University of Georgia and Penn State University) - "*Publishing in Neuroscience and Social and Behavioral Science Journals*"

- Tyler McCormick (University of Washington) - "*Thoughts on Publishing*"

- David Rocke (University of California, Davis) - "*Publishing in Biostatistics, Bioinformatics, and Bio(medical) science Journals*"

- Hal Stern (University of California, Irvine) - "*Publishing in Methods/Applications Journals*"

After this panel session participants were placed back into their break-out rooms with their mentors for another round of conversation

Day 2 of this workshop was held a week later, Friday August 14. In previous years when JSM and this workshop was a face-to-face event, participants would only have from Sunday to Tuesday to think about how to incorporate all of the suggestions that were discussed. Because this is a virtual event NISS organizers thought that participants would benefit from the extra time to think about and respond to all of the comments that were shared. Perhaps this is a strategy that will be a permanent part of these workshops moving forward? Only time will tell.

Day Two

Sessions resumed with Naomi Altman (Penn State University) providing advice on "The Review and Revision Process." She was followed by Susan Ellenberg (University of Pennsylvania) whose comments focused on "How to Write a Collaborative Paper." Peter Imrey (Cleveland Clinic) rounded out the morning with an insightful and important presentation that focused on "Ethical Issues and Reproducibility." The end of his presentation included a number of actual ethical situations for participants to think about appropriate responses.

The afternoon panel sessions were first practical approaches to writing grants, followed by insightful stories of personal career advancement. The grant writing session moderated by Keith Crank involved the following speakers:

- Cheryl Eavey (NSF SBE Program Director)

- Karen Messer (NIH BMRD Study Section Chair & University of California, San Diego)

- Judy Wang (NSF DMS Statistics Program Director & George Washington University)

The second session speakers included:

- Emma Benn (Icahn School of Medicine at Mount Sinai)

- Edsel Peña (University of South Carolina)

- Ali Shojaie (University of Washington)

- Judy Wang (NSF DMS Statistics Program Director & George Washington University)

Read the full coverage of this event on the NISS website including a Photo Album of this virtual event!

WRITING

WORKSHOP

PANELS

# SUSCEPTIBLE-INFECTED-RECOVERED (SIR) MODELING THE FOCUS OF NISS/ASA TUTORIAL

The Susceptible-Infected-Recovered (SIR) model is being used by scientists around the world to study the infectious disease dynamics of the COVID-19 epidemic and guide public health policy decisions for mitigating the impact of the disease. The National Institute of Statistical Sciences (NISS) and the American Statistical Association Section on Statistics in Epidemiology (ASA-SIE) teamed up to co-sponsor a special two-hour tutorial on SIR methods. The instructor for this session was Dr. Ottar Bjornstad, Ph.D. (Penn State University), an exceptional researcher whose specialty is the mathematical and computational aspects of population ecology and population dynamics.

Ottar Bjornstad is not a conventional webinar presenter. For online webinars, the convention is to create a series of slides and then use these to work your way through the content you want to present. This is very straightforward, but does this one format always lend itself to what you are trying to explain?

Instead, Ottar braved the technological elements by switching formats to fit the need of the concepts or methods he was trying to convey. Amazingly, he pulled this off pretty well! Ottar started with slides that helped to set the stage for the session but then quickly moved to the whiteboard in order to establish the mathematical foundations for understanding the flows of transmission, which in turn lead defining the characteristics of the key parameter, reproduction number or basic reproduction ratio, represented by the notation Ro, and further, the probabilities involved in a simple SIR model.

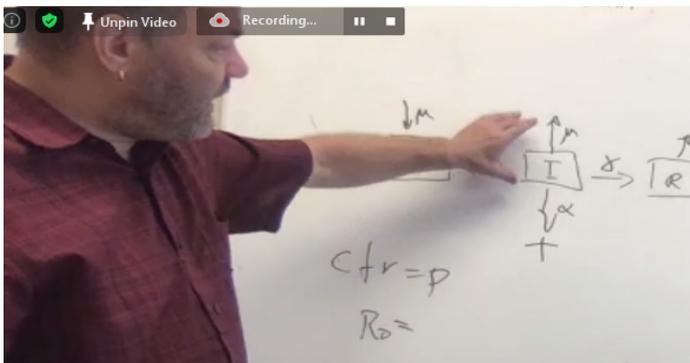Ottar Bjornstad (Penn State University)

From here Ottar moved to sharing his screen to show the explanation and then manipulation of R code examples of the integration of the ordinary differential equations used in the SIR model using RStudio in order to demonstrate the modeling of these methods. Ottar was then able to move to sharing a Shiny app where the concepts and the coding that he was talking about earlier was able to come to life! And, it was here that he was able to play a bit with the parameters to see and comment on what resulted.
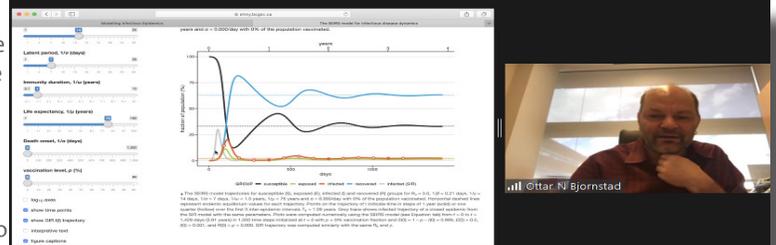
Ottar Bjornstad (Penn State University) SIR Modeling Tutorial Instructor

Questions from attendees were forwarded to Ottar by Jim Rosenberger who served as the moderator of this event. Some involved clarification of what was being implemented and these elicited detailed remarks around the structuring of various models from Ottar. Other questions were much more broad, for example, "What strategies should universities implement in the future? Fall 2020?"

This tutorial described the background and theory of the SIR modeling approach, how it is applied to understand the spread of COVID and other infectious diseases, and how to use R software to fit basic and more complicated SIR models. You can find the materials, readings, codes and links to Shiny apps that were shared on the NISS website.

NEW NISS AFFILIATE!   AUBURN UNIVERSITY, DEPARTMENT OF MATHEMATICS AND STATISTICS

The Department of Mathematics and Statistics at Auburn University has more than 50 professors representing diverse areas of pure mathematics, applied mathematics, and statistics. Many faculty have obtained international recognition for their research. Our graduate and upperclassman courses usually have between five to 15 students, and many of our general undergraduate classes are capped at under 30 students. Thus, the department is able to offer students personalized attention and hands-on interaction with dedicated faculty. Some faculty maintain applied research programs associated with several government and industrial laboratories. Two faculty members hold the Associate of the Society of Actuaries designation and their group has been successful in placing students in actuarial positions.

The Department of Mathematics and Statistics offers undergraduate programs leading to a Bachelor of Science in Mathematics and Applied Mathematics (with options in Applied Mathematics, Discrete Mathematics, or Actuarial Science) and graduate programs leading to a Master of Science in Mathematics, Applied Mathematics, Statistics, Probability and Statistics, and Data Science as well as the Doctor of Philosophy in Mathematics including a concentration in Statistics.

NISS HIGHLIGHT: MEET NEW RESEARCH ASSOCIATE ZACH TERNER!

Zach Terner is a new NISS Research Associate. Zach just started work with the National Agricultural Statistical Service (NASS) at the USDA where his initial challenge at NASS is to help identify and correct errors in responses to agricultural surveys that NASS conducts. The challenge is being able to do this at a large and automated scale because of the many responses to these surveys.

Zach began college as a systems and information engineering major and received his Bachelor of Science degree in systems and information Engineering from The University of Virginia. However, because he enjoyed the courses which covered statistical concepts and methods, he added statistics courses to his schedule until it became a secondary major and eventually a Bachelor of Arts degree in Statistics. This trend stuck! Zach continued taking statistics and data science classes through graduate school. He received his Master of Science degree in Statistics from the University of Virginia as well, then moved to the University of California, Santa Barbara where he earned his Ph.D. in Applied Statistics.

Why Statistics? Why Data?

"*I enjoy helping people and working on projects that can help people. With statistics, one can always find new problems or people to help, especially nowadays when data are so prevalent. If one field gets boring, there are numerous application areas (medicine, biology, chemistry, environmental science) where understanding data and statistics are key to arriving at correct scientific conclusions. The ability to help, and to always have opportunities to learn about new fields, excited me.*"

We look forward to working with and learning more about Zach and are excited about the energy and contributions that he will bring to the research challenges put into his path!

Hey there! Stay connected with us on Twitter for the latest events information!

@NISS_DataSci

Linked in

Do you know that NISS is also active on Linkedin?

NISS | National Institute of Statistical Sciences

NISS was active at JSM this year despite the event being virtual. Many of the activities that we have all enjoyed in the past such as the NISS Affiliates Luncheon, the NISS Reception when the live announcement of the annual awards took place, and simply having a table with information about NISS which gave many a chance to connect, talk and reach out or catch up with one another.

Perhaps at JSM 2021 in Seattle we can get back to our regular routines when it comes to this conference!

Below is a series of screen shots from the presentations that NISS was involved in. Most importantly it gave the Ingram Olkin Forum a chance to report on the activities from the Gun Violence Statistics Serving Society forum that took place last year as well as provide a preview for the forum that will focus on the data related to the opiod crisis. Keep your eyes open for information about this event!

And, as always, NISS Research Associates are as active as they have ever been working to help solve the statistical challenges inherent in the work of the government institutions they work with.

Data Integration in 21st Century Government Surveys
Dean Resnick, Lu Chen, Sanjay Chaudhuri, Snigdhansu Chatterjee, Yajuan Si

Extreme Machine Learning Methods and Applications: Domestic and International
Felix Jimenez, Jake Abernethy, Kelly Toppin, Luca Sartore

Statistical Issues of Gun Safety and Opioid Epidemic
Erica Smith, James Rosenberger, Sally Morton, Stephanie Lanza, Stephanie Lanza

Data and Challenges for Unraveling Gun Violence
Elizabeth Stuart, Greg Ridgeway, John MacDonald, Yifan Zhang

Abstract #312771
Title: On the Spatial and Temporal Shift in the Archetypal Seasonal Temperature Annual Harmonics
Author(s): Joshua North* and Christopher Wikle and Erin Schliep
Companies: University of Missouri and University of Missouri and University of Missouri

The Impact of Writing Prompts on the Writing Performance of English Language Learners
Ya Mo

AFFILIATES!

SEND YOUR JOB ANNOUNCEMENTS TO NISS!

A link to the Job Announcements page can be found at the bottom of every page of the NISS website! Share your announcement with other organizations associated with NISS or other visitors to our website.

https://www.niss.org/careers

AUGUST

Webinar Series: Mathematical Foundations of Data Science

Event Date: August 18th, 2020 - 3pm ET
Event Type: Online Webinar

Synthetic Interventions Abstract As we face the resurgence of COVID-19 pandemic in the United States, a pressing question is facing us: shall we shut down the economy again? or can we tame the pandemic with effective policies while letting the economy remain (partially) open? Towards that, we first... (read more)

Webinar Series: Mathematical Foundations of Data Science

Event Date: August 25th, 2020 - 3pm ET
Event Type: Online Webinar

Policy Optimization for Linear Optimal Control with Guarantees of Robustness Abstract Policy optimization (PO) is a key ingredient of modern reinforcement learning (RL), and can be used for the efficient design of optimal controllers. For control design, certain constraints are generally enforced... (read more)

Teaching Statistics Online: Approaches, Strategies and Technologies

Event Date: Thursday, August 27th, 3 - 4:30 pm ET
Event Type: Online Webinar

The impact of the COVID-19 pandemic has reached all aspects of our lives both personal and professional. As teachers this has catapulted us in to teaching methods and approaches that are perhaps unfamiliar territory. How can we make the best of this situation bring the most value to our new... (read more)

Data Science Conference on COVID-19 [DSCC-19]

Event Date: August 28th - 10:00 am to 5:30 pm
Event Location: Online Webinar

About this Conference The Data Science Conference on COVID-19 will showcase open source technology and code used to model and analyze the COVID-19 pandemic and will highlight best practices in replicable and reproducible science.   Presentations will explore epidemic models of the virus and the... (read more)

Essential Data Science for Business - Upcoming Tutorials

Event Date: Summer through Fall, 2020 1-2 pm ET
Event Type: Online Tutorial

NISS announces a brand new series of tutorials on some of the most interesting topics in data science that are in use in business today!

- Analytical Consulting, Communication and Soft Skills
- Computer Science, Programming, and Tools
- Descriptive Analytics, Exploratory Data Analysis, and Data Visualization
- Predictive Analytics and Machine Learning
- Deep Learning
- Causal Inference and Uplift Modeling
- Prescriptive Analytics and Optimization
- Unstructured Data Analysis
- Social Sciences and Data Science Ethics
- Domain Knowledge and Case Studies

Dates and times for the top ten topic sessions listed above to be announced soon! (read more)

SEPTEMBER

NISS-Merck Virtual Meet-up on Issues in Vaccine Development

Event Date: September 16, 2020 11-12:30 ET
Event Location: Online Webinar

The National Institute of Statistical Science (NISS) and Merck are sponsoring a Virtual Meet-Up on Vaccine Development. With the COVID pandemic having such a profound effect, everyone is hoping for a highly protective and safe vaccine soon. Yet most have little understanding of the difficult road... (read more)

Check the NISS Events webpage
for up to date event info!

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