# NISS

# *Affiliates Update*

*WELCOME!*

This monthly Affiliates Update highlights upcoming NISS sponsored events and activities.

PLEASE CIRCULATE THIS AFFILIATES UPDATE TO YOUR COLLEAGUES!

NISS sponsored events encourage cross-sector and cross-disciplinary networking. Let us know if you are planning an event and would like NISS to co-sponsor it. NISS affiliates can use their award funds to support these events or receive discounted registration. For more information about the NISS Affiliate program, see: https://www.niss.org/affiliate-program-information.

James Rosenberger
Director NISS

## *UPCOMING EVENT:* NISS/MERCK MEETUP ON STATISTICAL AND DEEP LEARNING METHODS FOR BIOMEDICAL IMAGES

### Tuesday, March 15, 2022 - 11 am - 12:30 pm ET

The National Institute of Statistical Sciences (NISS) and Merck are sponsoring a Virtual Meet-Up on the use of Statistical and Deep Learning Methods for Biomedical Images.

### Overview

Imaging plays an important role in clinical diagnosis, biomedical research, and pharmaceutical Research & Development. For decades, innovative statistical methods have been applied to various biomedical image modalities. In the past 10 years, deep learning and AI have begun increasingly dominating this field. Currently, biomedical image analysis has become an extremely complex area, because of the diversity both in image modality and the analysis methodology. This meetup attempts to provide a snapshot of this vital interdisciplinary area with three talks, delivered from speakers with either academic or industrial backgrounds.

This session will be moderated by **Peining Tao**, Merck

### Speakers

**Hongtu Zhu**, University of North Carolina
**Andrew Janowczyk**, Case Western Reserve University
**John Kang**, Merck

## Register for this Event Today!



# MERCK
## INVENTING FOR LIFE

# SPRING 2022 COMPETITION: NISS STATISTICALLY ACCURATE INTERACTIVE DISPLAYS ... IN GRAPHICS!

NISS

## NISS has a New COMPETITION FOR YOU!

The National Institute of Statistical Science is sponsoring a **student data visualization contest** - for creating examples of how interactive data visualization techniques can be applied to enhance the data presentations in several public reports about education. Simply put, NISS is looking for *Statistically Accurate Interactive Display in Graphics -- SAID in Graphics*!

Your mission is to design an innovative visualization that attracts the reader to explore the data more deeply - and helps them to do so!

### THE DATA

The data for the contest is from the Digest of Education Statistics from the National Center for Education Statistics.

There are five choices of data to select for the contest that present different types of data (including geographic and longitudinal) with different types of variables.

### ELIGIBILITY

The competition is open to graduate and undergraduate students at a US or Canadian institution of higher education. Entries may either be for a team of up to five students or as an individual. A team may submit up to two graphics for the same or different data sets. An individual may submit only one graphic.

### THE REQUIREMENTS

The goal is to demonstrate how interactive visualization can be used to prod readers of various backgrounds to investigate substantive educational questions more deeply.

### THE PRIZES

The prize for the overall winning entry will be $1000. There also be two runner-up prizes of $500 each: one for the entry with the best "entry point", demonstrating how an initially static visualization can draw in viewers to interactively explore additional questions, and one for the entry that best demonstrates how the flexibility of being interactive can assist in understanding and interpreting and understanding uncertainty in the data. Prizes awarded to winners' departments.

### QUESTIONS?

Please direct all questions to Brian Habing ([BHabing@niss.org](mailto:BHabing@niss.org)). He is also available for video conference consultations.
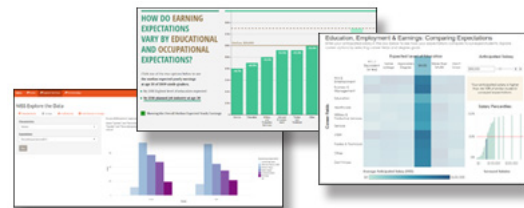
*See the NISS website for complete competition details and registration!*
*Registrations Due March 18 - Entries Due April 12!*

# UPCOMING EVENT: RCPP (R AND C++) WITH DIRK EDDELBUETTEL

### Friday, March 25, 2022 - 1 pm - 2 pm ET

R has risen to become the _lingua franca_ of statistical research and applications. At the same time, user demands on computing resources and performance have also increased. This is driven chiefly by the ever-growing size of datasets, and may sometimes be coupled with increases in their complexity. The quest for computing with larger datasets, as well as the ever-present desire to also compute "faster" make complementing the interpreted language-processing at the core of R with native code extensions a natural next step.

Over the dozen+ years since its initial release, the Rcpp package has become the most-widely used language extension for the R system. By our calculations, almost a quarter (23.5%) of CRAN packages use compiled code. And well over half (56.2%) of these deploy Rcpp---a total of 2502 packages making it the most-widely-used language extension.

This talk aims to gently introduce going to _compiled code_ without fear thanks to sophisticated tooling which makes otherwise complicated and sometimes feared steps of compiling, linking, loading and launching compiled code a relative breeze that is accessible directly from R---by leveraging the excellent and robust build toolchain supplied by R. It also highlights key aspects, and motivations, of using Rcpp---and will also warn of a few common pitfalls. Pointers for further study as well as to additional examples offer an opportunity for self-study following this introductory talk.



*Register for this Event Today!*

# UPCOMING EVENT: NISS WRITING WORKSHOP FOR EARLY RESEARCHERS!



The National Institute of Statistical Sciences (NISS) has been hosting the Writing Workshop for Early Researchers since 2007!

Each year, in conjunction with JSM, NISS gathers a host of senior authors, editors, grant writers/reviewers—individuals who take valuable time out of their day to share their advice and experiences with a group of junior faculty and early researchers. Evidence of the value of this workshop experience can be judged by:

1) the number of experienced, senior statisticians, authors and editors that have volunteered for years on end to share their wisdom and advice and 2) the number of session contributors that were once actual participants in the workshop!

Writing Workshop in 2022? You bet!

It is never too late to think about who might benefit next from this workshop at JSM 2022. Keep your eye on the NISS website or subscribe to our newsletter for all of the latest information about this and other professional development activities!

Virtual or In-Person? NISS is already in the planning stages for this year's Writing Workshop for Early Researchers 2022! You should be planning for it too!

### Keep your eye on NISS Events webpage for the latest information!


*2021 NISS Writing Workshop for Junior Researchers*


*NISS Writing Workshop for Junior Researchers (at JSM)*

# RECENT EVENT: THE IMPORTANCE OF A BEING A GOOD MENTOR FEATURED IN VIRTUAL DISCUSSION

**Dr. Joel Dubin** began the day's discussion advising to be adaptive and keep communication lines open. He states that it is beneficial to communicate your expectations to your mentees, your general mentoring style but to make sure you aren't too rigid. Ensuring that mentees are comfortable with communicating with you will be very helpful in the long run. He also encourages mentors to think about keeping in touch in different ways. As a mentor, you want to apply your soft skills, skills in leadership and empathy. Think about leading a research team so that you can have multiple mentees in one place and learn from each other.

> *"No two mentees are the same and not everyone comes from the same backgrounds, not everyone works at the same pace either."*
> - Dr. Joel Dubin

As the next speaker **Dr. Renee Moore** explained how the different roles of mentoring are diverse. You will be providing resources to students, setting goals, and be expected to meet deliverables and timelines with your mentees. Mentoring is also being an advocate for your mentee, helping them find their own direction. "Can we and should we be an advocate for every student that comes to you?" Not always. Dr. Moore suggests directing them to alternative sources if they need help or engage them with your older mentees to find balance.

> *"It takes time to be a good mentor but it's such an honor to be a mentor, and it's very rewarding. It's been great to learn from my mentees."*
> - Dr. Renee Moore

**Dr. Dan Jeske** presented his advice on mentorship next separating the different types of mentees in academia from mentoring students to mentoring other faculty. He suggested that mentoring is more of a collaborative relationship in all of its stages. As a mentor, it's important to resist the temptation to solve problems for students. Instead, Dr. Jeske insists that we ensure students have the limelight, it's their show. The mentor's job is to discover your mentee's capabilities and work with these.



> *"Step back so that your mentees can step up."*
> - Dr. Dan Jeske

**Dr. Nick Horton** was our last speaker for this event. He applauded the NISS Affiliates Committee for putting this together and emphasized how critical mentoring is at different levels. He also mentioned that he feels blessed to have received effective mentoring and had the chance to interact with many talented mentees. Among his comments, he stated that he believes that academia has the potential to institutionalize good mentoring, working with people who aren't necessarily good at mentoring, helping them work with students and most important, becoming better listeners.

> *"There are a lot of ways we can improve mentoring and end up with a lot of productive conversations."*
> - Dr. Nick Horton

The moderator of this event was **Dr. Y. Samuel Wang**, (Cornell University).

### Read the Complete News Coverage with links to speaker slides and event recording!

When **Luca Sartore** (NISS Research Fellow) joined NISS and the Research and Development Division of the National Agricultural Statistics Services (NASS) in 2015, his first research project addressed the problem of ensuring consistency for totals across different levels of aggregation (at county, state and/or national levels) since integer weights are required. A problem arose because separately rounding of the each unit's weights led to totals for small units (e.g., county or state) that did not equal the totals at a higher level (e.g., state or nation). This work, with **Cliff Spiegelman** as his mentor at NASS, has now gone into production and has been adapted for additional NASS surveys.

## A Calibration Method for Benchmarking with Integer Weights

The National Agricultural Statistics Service (NASS) relies on US Census of Agriculture data, and employs calibration methods to address tabulation-consistency issues. NASS has historically used rounded calibrated weights to address these issues across different levels of aggregation rather than rounding the tabulated totals.

Until 2017, NASS's rounding method of choice was based on stochastic algorithms then considered to be state-of-the-art in the survey statistics literature. These algorithms (e.g., the cube method) produced integer calibration weights for agricultural data without impacting the estimated number of farms. However, the rounding process did not account for relationships implicit in the calibration constraints; consequently, most (if not all) administrative benchmarks were not preserved.

Improving the rounding process and providing optimal integer calibrated weights on all responding records required a reconsideration of calibration benchmarks as a multi-objective optimization problem.

As a starting point for an iterative algorithm, a priority ordering was defined for processing the initial, non-integer weights based on relative contribution to estimated totals. The gradient of an objective function then was used to force the estimated totals to be as close as possible to the administrative benchmarks. This first version of the iterative algorithm ("Integer Calibration") yielded rounded weights that were better than those from the old stochastic rounding method. This new approach was computationally appealing, but not a full solution.

The first adjustment to the algorithm replaced the standard raking method and used an integer lattice for computation, which did improve the quality of the estimates.

The second revision used a continually updated priority index, based on the gradient of the objective function. This minimized the number of operations required for simultaneous minimization of all relative errors (differences between estimated totals and calibrated benchmarks).

With these revisions, the new Integer Calibration method was again evaluated relative to the old raking methods used for the 2012 US Census of Agriculture. Actual 2012 Census data was used to compare performance for the Integer Calibration method against 2012 calibration benchmarks. The new method attained more calibration benchmarks than the earlier method; and correlations were higher between the initial dual-system-estimation weights and the final ones for the new method.

Additional computational improvements further reduced processing time for large datasets. First, well-defined benchmarking equations led to faster evaluation of the calibration errors. Second, sparse matrix representations considerably reduced the amount of memory required to store the data. Third, L1-normed objective functions resulted in faster evaluations of gradient by using recursive updating formulas. With these improvements, optimal integer weights are now computed within minutes rather than hours.

The Integer Calibration method was fully implemented for the 2017 US Census of Agriculture, allowing NASS analysts to quickly evaluate the quality of the estimates across several levels of aggregation. Based on this success, NASS has applied similar methodology to the Local Food Survey and the Labor Survey as well.

# NISS POSTDOCTORAL/EARLY CAREER STATISTICIANS & DATA SCIENTISTS

## New Research Positions at NISS for Spring and Summer 2022!

### RESEARCH THAT MAKES A DIFFERENCE

Early career researchers at NISS have the opportunity to work with researcher leaders to develop innovative data science technology and statistical modeling methodology to address high impact problems. Projects are variously located at NISS-DC, at a NISS Affiliate/hub or at federal statistical agencies. and to see the impact as these solutions are implemented. Research projects at NISS make a difference by developing innovative data science technology and statistical modeling methodology for high priority projects at federal statistical agencies. Primary focus of each project may call for specific expertise such as:

◊ statistical and AI modeling of massive, high dimensional data,
◊ Bayesian modeling for prediction of highly defined small subset properties, including small area estimation/prediction,
◊ latent factor analysis to define new metrics of difficulty
◊ visualization of statistical data,
◊ statistical/mathematical/AI space-time modeling that integrates heterogeneous data types (satellite image, GIS, sample survey, theoretical/empirical model),
◊ GANS or other AI simulation for synthetic networks and complex data as suitable surrogates for privacy-restricted large scale data
◊ other data science and statistical computation tools.

NISS Research Associates are highly successful and publish and present their research regularly. As testimony to their research on high-priority challenges, especially for methodology defining key national statistics and indicators, NISS Research Associates continue to receive awards both for individual contributions and for work with multidisciplinary teams.

NISS appointments are for one year with expectation of renewal. Positions are open as early as February 2022. Applicants must be able to work in multidisciplinary context and to bring statistical theory and data science technology to a research team with the goal of formulating a comprehensive technical approach problem solving.

US citizenship may be required for some NISS positions.

Applications are accepted on the NISS website. Please include citizenship/visa status and date of availability with the application.

## MARCH

### NISS/Merck Meetup on Statistical and Deep Learning Methods for Biomedical Images

**Event Date:** Tuesday, March 15, 2022 - 11 am - 12:30 pm ET
**Event Type:** Online Webinar
The National Institute of Statistical Sciences (NISS) and Merck are sponsoring a Virtual Meet-Up on the use of Statistical and Deep Learning Methods for Biomedical Images. Overview Imaging plays an important role in clinical diagnosis, biomedical research, and pharmaceutical Research &... (read more)

### NISS Statistically Accurate Interactive Displays ... in Graphics!

**Event Date:** Registration due March 18, 2022 & Entries due April 12, 2022 by Noon ET
**Event Type:** Graduate Student Competition
Do you love to make insightful discoveries in education data and cutting-edge visualizations to display them? NISS has a New COMPETITION FOR YOU! Great examples of data visualization and interactive graphics are popping up everywhere! See the examples collected at these sites: The 34 Best... (read more)

### Virtual Career Fair - Insurance & Finance Companies

**Event Date:** Wednesday, March 23, 2022 - 12 noon - 1:30 pm ET
**Event Type:** Webinar

Interested in a statistics or data science position in the insurance or finance industry sector? Then this session should interest you! NISS hosts Career Fair sessions that focus on academic positions, others on positions in government agencies and industry. This session will describe ... (read more)

### Rcpp (R and C++) with Dirk Eddelbuettel

**Event Date:** Friday, March 25, 2022 - 1 pm - 2 pm ET
**Event Type:** Online Webinar
Overview R has risen to become the _lingua franca_ of statistical research and applications. At the same time, user demands on computing resources and performance have also increased. This is driven chiefly by the ever-growing size of datasets, and may sometimes be coupled with increases in their... (read more)

## APRIL

### 14th Annual Conference on Statistical Issues in Clinical Trials: Subgroup Analysis

**Event Date:** April 12, 2022, 8:30 AM to 4:30 PM ET
**Event Type:** Virtual Conference

Conference Theme is Subgroup Analysis. Registration is open! Speakers include: David Kent, MD (Tufts University), Ellis Unger, MD (Consultant), Tom Fleming, PhD (University of Washington), Lisa McShane, PhD (NCI) and others... (read more)

### Virtual Career Fair - Pharmaceutical Companies

**Event Date:** Wednesday, April 13, 2022 - 12 noon - 1:30 pm ET
**Event Type:** Webinar

The pharmaceutical industry provides interesting and challenging career and research opportunities for statisticians and data scientists. Is work in the pharmaceutical sector something that you would like to know more about? Then this session is for you! NISS hosts Career Fair sessions that focus ... (read more)

## MAY

### Virtual Career Fair - Academic Departments

**Event Date:** Wednesday, May 11, 2022 - 12 noon - 1:30 pm ET
**Event Type:** Webinar

Interested in pursuing a career as a statistician at an academic institution? Then you won't want to miss this next career fair sponsored by NISS that will offer essential information about job opportunities for statisticians/data scientists in different academic environments. This session... (read more)

### NISS Graduate Student Network - 2nd Annual Research Conference

**Event Date:** May 14-15, 2022 12 - 5 pm ET
**Event Type:** Online Conference

The NISS Graduate Student Network is very excited once again to announce a two-day graduate student research conference! The first conference took place in June of 2021 and was a resounding success! This second conference will be a two-day event and take place on May 14 and 15, 2021, from noon - 5... (read more)

## JUNE

### ISBIS CONFERENCE 2022 on "Statistics and Data Science in Business and Industry"

**Event Date:** June 20-21, 2022
**Event Type:** Conference

The ISBIS CONFERENCE 2022 on "Statistics and Data Science in Business and Industry" will take place at University of Napoli Federico II in Naples June 20-21, 2022. The Program and Organizing Committees hope to offer the opportunity to meet in person to share perspectives on the newest developments... (read more)

## AUGUST

### 2022 NISS Writing Workshop for Junior Researchers

**Event Date:** August, 2022
**Event Type:** Workshop

Once again this very popular short course will be hosted by NISS. If you are a recent graduate of a doctoral program and want to improve your communication skills - then this event is for you! "Thanks for organizing the writing workshop! We are very glad that we attended the workshop. We learned... (read more)

### International Total Survey Error Workshop (ITSEW) 2022

**Event Date:** 31 August - 2 September, 2022
**Event Location:** University of Manchester, UK

Theme: "Total Error in Official Statistics: Current Practices and New Methods." The International Total Survey Error Workshop 2022 will take place from the 31st of August through the 2nd September 2022. It will be hosted by The Cathie Marsh Institute for Social Research and The Social Statistics Department,... (read more)

## Find Full Details for All Events on the NISS Website!

# NISS ATTENDS GEORGETOWN DATA SCIENCE & ANALYTICS CAREER FAIR

NISS attended the 2022 Georgetown Data Science & Analytics Career Fair actively seeking qualified candidates for new postdoctoral research positions to be filled this Spring and Summer.

Early career researchers at NISS have the opportunity to work with research leaders to develop innovative data science technology and statistical modeling methodology. The focus is on high impact problems, from formulation to solution, leading to implementation. Senior mentors are nationally or internationally recognized leaders in the statistical and data sciences.

New Research Positions at NISS
beginning Spring and Summer 2022

Applications are accepted on the NISS website



# NISS GRAD STUDENT NETWORK - 2ND ANNUAL RESEARCH CONFERENCE

May 14-15, 2022 12 - 5 pm ET

The NISS Graduate Student Network is very excited once again to announce a two-day graduate student research conference!

The first conference took place in June of 2021 and was a resounding success!

This second conference will be a two-day event and take place on May 14 and 15, 2021, from noon - 5 pm ET and will feature graduate student presentations, invited speakers and a social networking hour.

A special thanks to this year's sponsor Procter and Gamble (P&G), our new NISS Industry Affiliate!

Full Conference Details and Registration on the NISS Website

*Abstract Submissions Due by April 15, 2022!*



NISS GRADUATE STUDENT NETWORK PRESENTS

GRADUATE STUDENT RESEARCH CONFERENCE

May 14–15, 2022

Submit abstracts by April 15, 5 PM ET

https://www.niss.org/events/niss-graduate-student-research-conference

## Affiliates! Post Your Job Announcements On the NISS Website!

A link to the Job Announcements page can be found at the bottom of of every page of the NISS website! Share your announcement with other organizations associated with NISS or other visitors to our website. Interested in the positions that have been posted?



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## Check out NISS on YouTube!

NISS YouTube

The National Institute of Statistical Sciences (NISS) is an organization whose mission fosters cross-disciplinary research and advocates for statistical engagement in data science.

NISS