

# SILVER STATE-ISTICS



Nevada Chapter of American Statistical Association

**Nevada Chapter Newsletter** 

Vol. 18 No. 4

# Dear Nevada ASA Members and Friends,

Read on for information on what our Chapter has been up to. Please keep an eye on our website for information on upcoming events.

# https://community.amstat.org/nevadachapter/home

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Elections and Officers 

Andrey Sarantsev of UNR and Cheryl Vanier of Touro U were elected as Northern Vice President and Secretary respectively for the 2022-2023 terms. There were no candidates for the office of President. Glenn Waddell, one of the write-in candidates, agreed to fill that position for 2022. The previous Treasurer resigned, effective 12-Nov-2021; Charles Davis was appointed to fill the remainder of her term, through 2022.

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# The President's Corner

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Christopher Tong

First of all, my thanks to all the presenters at the 2021 (virtual) Fall Symposium, and to the chapter volunteers who again helped the event run smoothly.

On our website, we have updated the consolidated slide deck of "State of Data Science Education" presentations to combine the 8 talks from the 2020 Fall Symposium with the two additional talks from 2021. We are pleased to make this resource available to the public, with the permission of the speakers. You can read details of the rest of the meeting elsewhere in these pages.

Second, I would like to thank our Treasurer, Alejandra Livingston, who is stepping down from her position with NV-ASA. She has been the most hardworking officer, especially this past year with the transition to Wild Apricot membership management software. I also congratulate her on her appointment to the American Correctional Association's Research Council, a prestigious national-level position. A few other chapter officers, who are ending their terms, will be assuming other roles on the chapter's executive committee, as you can read about elsewhere in these pages. I would also like to welcome our newly elected officers, who bring a fresh perspective and new energy to the executive committee. Finally, I will not be serving as your Past President, since I departed from the chapter at the end of 2021, and I thank Alicia Hansen for agreeing to continue in the role of Past President. May you all enjoy the chapter's 20th anniversary in 2022.

In other chapter news, our article in the ASA Council of Chapters' Chapter Chatter newsletter was indeed published, which will help maintain a favorable partnership with the CoC and, hopefully, encourage their future financial support for our activities. I am sad to report, though, that we did not have a float in the annual Nevada Day parade on Oct. 30!

Having attended that parade for the first time in 2021, please allow me to end my final contribution to *Silver State-istics* with some actual Silver State statistics:

- NV voter turnout, 2020 general election: 77.3%.\*
- NV self-response rate, 2020 US census: 66.6%. (Almost at the median among states. However our recently departed Lieutenant Governor says that Nevada ranks first in terms of improvement in self-response rate from 2010.)
- NV vaccination rate as of Dec. 28, 2021, 5 years and older with at least one shot: 63.9%; completed vaccination: 54.2%. (Almost at the median among states.)
- NV mathematics proficiency, grades 3-6, 2020-2021 school year: 26.3%. (Only 54% of the students in the Clark County School District participated in the evaluation, whereas the participation rate in the rest of the state's counties ranged from 84-98%.)
- NV unemployment rate (seasonally adjusted, Nov. 2021): 6.8%. (Second highest in the nation after CA.)

Sources: NV Secretary of State, US Census, NV HHS, NV Dept. of Education, US Dept. of Labor, respectively, with additional information from the *Nevada Independent*.

\*Other sources such as US Census give a much lower estimate of our statewide voter turnout rate; we're well below the median among states.

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# Fall Symposium – AM1

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Our Fall Symposium took place virtually Saturday, October 16, 2021. There were several invited speaker and panel sessions, followed by our Annual Business Meeting. The first session featured presentations on career paths in Data Science.

In this early morning session we first had an update on the State of Data Science Education in Nevada. Lei Yang of the UNR Dept of Computer Science told us about the Big Data Minor in the UNR College of Engineering. Pavel Solin told us about NCLAB and its Data Analyst Certificate program, offered in partnership with UNR. Information about each of these can easily be found online.

Then Will Thompson, Staff Machine Learning Scientist with Tempus Labs presented *From Trading* to Healthcare Startup: Career Paths in Data Science. He started by giving has overview of the broad field called "Data Science". His three main sub-areas (with job titles) are Experimental Design (Data Scientist, Quantitative Analyst, Statistician), Data Analysis/Data Interpretation/Visualization (Data Scientist, Product Analyst), and Machine Learning (Data Scientist, Machine Learning Engineer/MLE, Research Scientist/RS, Applied Scientist/AS, Machine Learning Scientist/MLS, Software Engineers/SWEs). He gave some details about various ones of these he has been involved with in his career path, including doing quantitative research in support of high-frequency stock trading, developing ML and NLP (Natural Language Processing) procedures with Wells Fargo, and presently (though perhaps not finally) dealing with deep learning with large-scale patient datasets with Tempus Labs.

This theme was continued by Sam Havens, Director of NLP Engineering at Writer in Portland. His title was Careers are Long: Transfer Learning for Humans and Machines. He describes his company Writer as the AI writing assistant for the world's smartest brands. He described some of the evolution in Machine Learning and Neural Networks related to Natural Language Processing. In particular, he discussed an architecture called the Transformer, a "very large deep learning model" developed by Google researchers, whose building block is a socalled "attention mechanism". Such models can then be pre-trained on unlabeled data (in his example, by asking it to function as a masked language modeler), then applied (with fine-tuning) to a new machine learning problem, where it is fine-tuned and adapted to the specialized task. This is called transfer learning. The idea is that you can teach a system much faster if it has been pre-trained on some other problem. This happens to be a direct analog for human career development. Sam advocated that data scientists should adopt a transfer learning mindset because their profession inherently is multidisciplinary, and meta-rational principles must learned on the (https://metarationality.com/). Sam's own career began in physics, proceeded to high school teaching, a master's in math, then software engineering, data science, and management, illustrating human transfer learning.

The second morning session was a roundtable discussion on software for teaching data science and statistics. Panelists were Julia Anderson (Cigna), Sharang Chaudhry (Wells Fargo), and Chad Cross (UNLV School of Public Health); announced commentators were Charles Davis (EnviroStat), Glenn Waddell (UNR College of Education), and Christopher Tong (NV-ASA President). Major themes of the discussion included (1) what software is useful in assisting students at various levels in learning the concepts and state of the art in data science and statistics practice and (2) software and skills students should learn to be well equipped when applying for positions in this field. Regarding (1), participants had various suggestions, individual cost and availability of site-wide licenses being a consideration. Regarding (2), familiarity with R and Python was a common theme, as was familiarity with databases and SQL.

Chris Tong expanded on this theme with comments on the history of EXCEL. It is recognized that familiarity with EXCEL is expected of anyone involved with data. However, EXCEL has been evolving, and there is a history of issues arising in prior versions being corrected. Some of these involve less-than-ideal precision in numerical computations. After the symposium Chad Cross called our attention to an article in the October 2021 issue of Significance discussing the need for quality control for important calculations implemented using spreadsheets (page 46). That article mentions the European Spreadsheet Risks Interest Group (eusprig.org), giving the following summary of the situation. "Research has repeatedly shown that an alarming proportion of corporate spreadsheet models are not tested or controlled to the extent necessary to meet their obligations. Uncontrolled and untested spreadsheet models pose significant business risks." Keegan Phillips followed up on that by telling us of a podcast series by Tim Hartford, particularly the episode "Cautionary Tales: Wrong Tools Cost Lives" (Google it), describing lives lost in the UK because an old version of EXCEL did not have enough capacity for handling its Covid contact tracing system.

The bottom line in all of this is that one should be very cautious and wary of one's software and one's data. As your editor heard once in a talk, "love your data [and software] but don't trust them." Recall the article "Floating Point Arithmetic and Data

Science" by Chris Tong which appeared in the previous Newsletter.

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# Fall Symposium – PM1

The first afternoon session discussed crosspollination among the data professions. There are several professions identified as something like \*\*\*metrics and \*\*\*informatics. Some that come to mind are chemometrics, biometrics, econometrics, environmetrics, and sabermetrics (the latter involving baseball statistics). We heard from specialists in two of these during this session. Daniel Wright, Kimberly Jennison, and Kelley Wheeler of the UNLV College of Education presented What is Psychometrics? Dan showed us a Venn diagram with three intersecting regions: Psychology, Statistics, and Assessment. Intersections of these are Quantitative Psychology, Assessment Specialists, and Educational Psychologists. He described some of the history of the field and its contributions to methodology, including latent variable models and methods used in assessments in various settings.

Then Juli Petereit of the Nevada Bioinformatics Center and the Data Science Core for Biomedical Research, NIH IDeA INBRE of UNR gave some insight into What is Bioinformatics. "Bioinformatics" was coined in 1978; it is the science of collecting, organizing, and analyzing biological data using computers. Juli showed us three common Venn diagrams, one of which involved statistics, biology, mathematics, computer science, and big data. The last is particularly relevant when dealing with human genome data. Being able to deal effectively with big data enables new insights and questions/hypotheses, which lead to needs for advances in technology, and the cycle continues. Applications she mentioned include precision medicine (gene therapy), evolution biology, insect resistance investigation and even forensic analysis, plus several more. Languages and software mentioned are R, Python, Bash/shell, SQL, MATLAB, Perl, SAS, C/C++, and Ruby. Another skill of importance is communication, particularly between experts in different disciplines. To learn more, Google Nevada INBRE. INBRE supports undergraduate research in the biomedical field. Applications are due 2/25/2022 for FLARE (Faculty-Led Authentic Research experience at WNC, TMCC, GBC, NSC, CSN) and UROP Undergraduate Research Opportunities Program at all NSHE institutions). See the box on the last page for links for these and other research opportunities.

Christopher Tong, NV-ASA President, was the session discussant. He described several examples of how methods and ideas from psychometrics, econometrics, and bioinformatics have influenced his work in biostatistics or provided general principles that he feels statisticians should humbly learn from. Among the latter are the 2021 Nobel Laureates in Economics' urging of a "credibility revolution" by improving research designs for observational data, and by deemphasizing p-values and statistical significance; as well as the explicit separation of discovery and validation data sets and analyses practiced in the Genome Wide Association Studies community, to ensure that the same data used to generate hypotheses are not used to confirm them.

# Fall Symposium - PM2

We then had two student research presentations, both from the Dept of Mathematical Sciences of UNLV. First was MD Nahid Hasan, who presented Synergy and Antagonism in Log-Linear Models. The application here is whether two drugs given together to treat a disease have a greater effect than each given individually (synergy) or a less effect (antagonism). Nahid described two common approaches for modeling these issues, and then presented some of his studies on how these play out in log-linear models.

Anjan Mandal presented Efficient Compositional Sampling Through the Circular Manifold with an Application to Neuroimaging Data, a Bayesian method of finding the structure of neural fibers in the brain based on diffusion MRI data. His proposed method incorporated prior information based on continuity of fibers in the spatial neighborhood of the voxel of interest, and a new way of sampling observations on the simplex (i.e., where the coordinates are non-negative and add up to 1.) Results of simulation studies presented showed that the proposed method had a high degree of accuracy in correctly estimating the fiber direction in medium to high signal-to-noise ratio instances of the MRI data.

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# Wild Apricot \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Our chapter membership has increased considerably during the past couple of years. In order to better keep track of new members, membership renewals and calculating proper event fees based on

membership categories, NV-ASA is engaged in a trial run of the Wild Apricot membership management software. Registrations for our Fall Symposium were handled through WA. You may expect to receive membership notifications from it as well.

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Position Openings

Kyra Morgan has announced biostatistician and related positions at the NV DHHS. See https://lnkd.in/ghAA58vD #analytics #biostatistics #i obs #stateofnevada

During the AM2 session Julia Anderson told us about position openings at Cigna and gave links which were posted on our website. As of this writing, one of those has not yet been filled; see jobs.cigna.com/us/en/job/21017097/Business-Analytics-Senior-Analyst-Evernorth. δ

# NISS On-Line Seminars

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NISS, the National Institute for Statistical Sciences, holds a variety of on-line events in which you may be interested. Coming up shortly is a Virtual Career Fair About Statisticians in National Labs, featuring speakers from Battelle, Los Alamos, and Sandia. This is to take place Wednesday, January 19, 9:00 – 10:30 PST. You can Google NISS Statistics to find information about this and other events.

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Only a minority of the people who receive this newsletter are members of the Nevada Chapter of the American Statistical Association (NV-ASA). Dues are nominal. For full-time students at NV institutions, the cost is \$10 per year (free for student members of the national ASA). Otherwise, it is \$20 per year (\$10 for members of the national ASA). One can become a Life Member for \$200 (\$100 for members of the national ASA).

You can join NV-ASA when you renew your national ASA membership (or join for the first time); this can be done on-line at www.amstat.org. Otherwise, whether a national ASA member or not, you can join through our Wild Apricot

site: <a href="https://ncotasa.wildapricot.org/join-us">https://ncotasa.wildapricot.org/join-us</a>.

Another option is to join while registering for an event such our Fall Symposium and Annual Meeting.

Why should you join? NV-ASA events provide opportunities for networking and contact with other statisticians working in a wide variety of areas in Nevada. But in addition to that, a major reason is that your dues help support the outreach activities of the NV-ASA including the K-12 Poster Competition and Career Days. Our financial needs are not great, so long as we all pitch in our modest amounts.

NV-ASA Officers & Others

Voting officers are

President: Glenn Waddell (2022)
Past President: Alicia Chancellor Hansen

(2020-2023)

Northern Vice President: Andrey Sarantsev (2022-

2023)

Southern Vice President: Sean Breckling (2021-

2022)

Secretary: Cheryl Vanier (2022-

2023)

Treasurer: Charles Davis

(2021-2022)

Chapter Representative: Gayle Allenback (2020-

2022)

Also involved are

Webmaster: Alicia Chancellor Hansen

Poster Competition Lead: Elizabeth Harris Newsletter Editor: Charles Davis Silver State-istics welcomes news items and letters from members and friends of the NV-ASA on matters of interest to the Chapter and the profession. Manuscript or items can be sent as a Microsoft Word document, PDF, or within an e-mail. Silver State-istics is published by the Nevada Chapter of the American Statistical Association.

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For contact information, go to



https://community.amstat.org/nevadachapter/home

Our address for regular mail is

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# **INBRE Undergraduate Research Program Links**

FLARE: <a href="https://med.unr.edu/inbre/programs-and-projects/student-training-programs/undergraduate-program/faculty-led-authentic-research-experience">https://med.unr.edu/inbre/programs-and-projects/student-training-programs/undergraduate-program/faculty-led-authentic-research-experience</a>

UROP: <a href="https://med.unr.edu/inbre/programs-and-projects/student-training-programs/undergraduate-program/undergraduate-research-opportunities-program">https://med.unr.edu/inbre/programs-and-projects/student-training-programs/undergraduate-program/undergraduate-program/undergraduate-research-opportunities-program</a>

RAIN exchange (NM, ID, MT, WY): <a href="https://med.unr.edu/inbre/programs-and-projects/student-training-programs/undergraduate-program/rain-undergraduate-student-exchange-program">https://med.unr.edu/inbre/programs-and-projects/student-training-programs/undergraduate-program/rain-undergraduate-student-exchange-program</a>

#### INBRE Postdoctoral Scholar – Bioinformatics/Biomedical Data Science

https://nshe.wd1.myworkdayjobs.com/en-US/UNR-external/job/University-of-Nevada-Reno---Main-Campus/Postdoctoral-Scholar---Bioinformatics-Biomedical-Data-Science R0127900-1