Spring 2018 For Members and Friends of the NV ASA

SILVER STATE-ISTICS

Nevada Chapter of American Statistical Association

Nevada Chapter Newsletter Vol. 15 No. 2

Dear Nevada ASA Members and Friends,

Read on for information on
what our Chapter has been up to and
what we are planning for the future.
Please keep an eye on our website
for more details on upcoming events.

www.amstat.org/chapters/

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Coming Events

Our **Annual Meeting** will take place in the South this coming Fall. The tentative date is Saturday, October 13; stay tuned for announcements of this and other events.

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Elections

Two NV-ASA executive committee positions will be up for election in the fall of 2018: Treasurer and Southern Vice President. Debra Stiver, Past President, serves as nominating committee chair. She is happy to provide information on officer positions and elections and can be reached at stiver@unr.edu. Look for announcements as we move closer to the Annual Meeting. ∞

Poster Competition 2018

Our annual K-12 Statistics Poster Competition was held earlier this year under the capable leadership of Tia Maria Price, now at Durango High School. Grade categories are K-3, 4-6, 7-9, and 10-12. First, Second, and Third prizes are awarded in every category when possible, along with Honorable Mentions as appropriate. All recognized posters have been forwarded to the National ASA Competition. A total of 183 posters were judged March 10, submitted by 315 students from 20 schools.

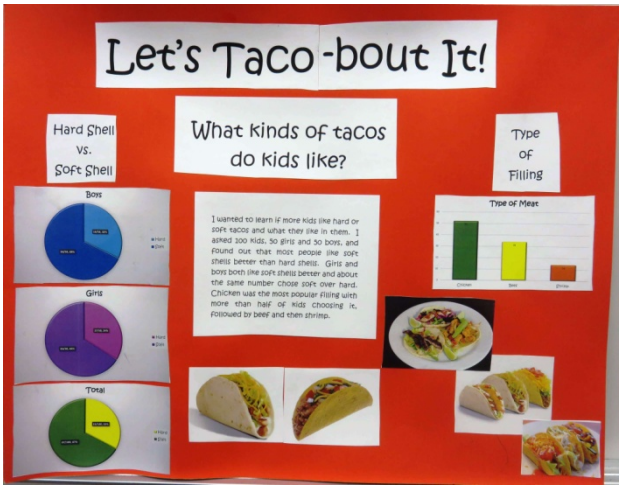
We thank the Southern Nevada Mathematics Council for their generous support of this competition.

Here are the state winners. Images of the winning posters may also be found on our website.

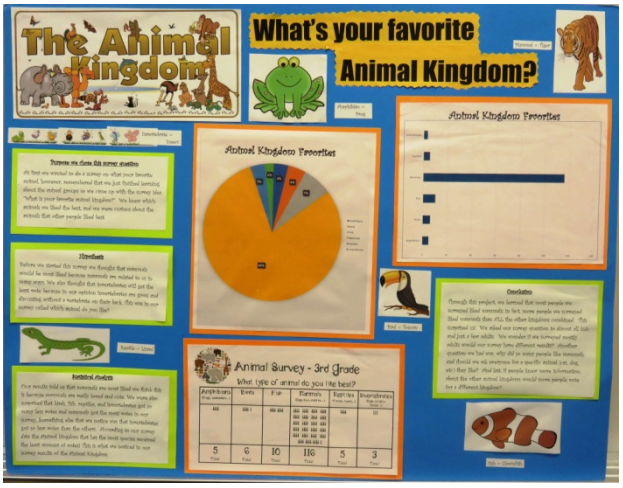
K – 3

First Place: David Rather, 3rd grade at Vassiliadis Elementary School, Las Vegas: *What Color Skittle Are You Most Likely to Get?* (advisor: Brandon Komuro).

Second Place: Penelope Arena, 3rd grade at Vassiliadis Elementary School, Las Vegas: *Let's Taco-bout It* (advisor: Brandon Komuro).



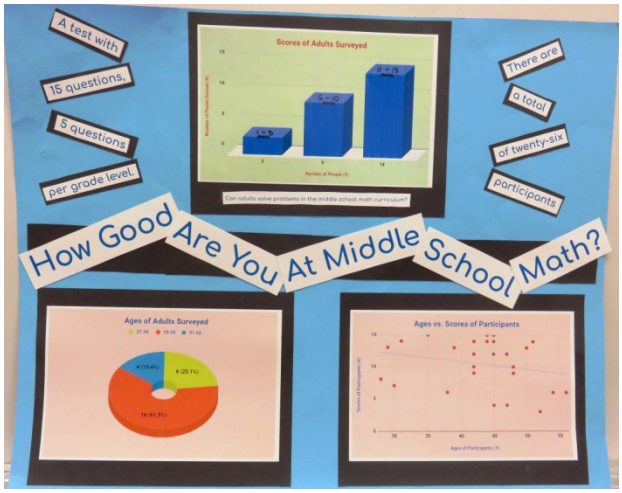
Third Place: Lily Morris, Elizabeth Fabela, Tania Campos, and Bianca Moreno-Velazquez, 3rd grade at Agnes Risley Elementary School, Sparks: *What's Your Favorite Animal Kingdom?* (advisors: Christin O'Keefe and Emily Gransbery).



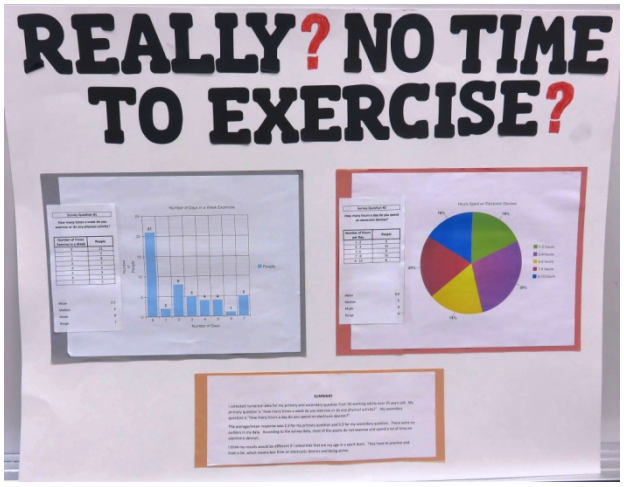
Honorable Mention: Jace Clark, 3rd grade at Vassiliadis Elementary School, Las Vegas: *What is the Most Frequently Visited National Park in the United States?* (advisor: Brandon Komuro)

4 – 6

First Place: Ashritha Kalakuntla, Vidya Indrakumar, Vanita Indrakumar, and Lillian Levine, 6th grade at Hyde Park Middle School, Las Vegas: *How Good Are You at Middle School Math?* (advisor: Judy Kraus)

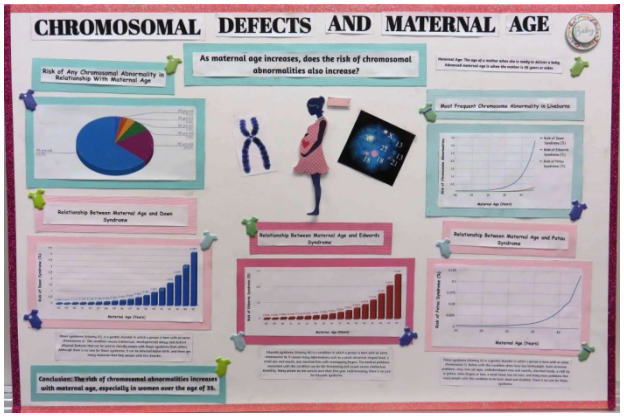


Second Place: Ostin Oei, 6th grade at Walter Johnson Junior High, Las Vegas: *Really? No Time to Exercise?* (advisor: Hillary Zeune de Soto)

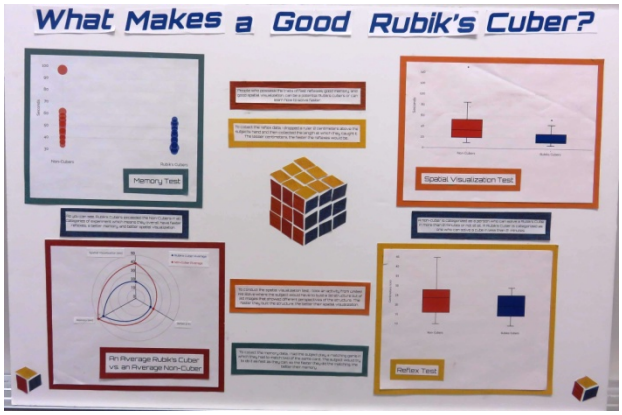


7 – 9

First Place: Linh Pham, 7th grade at Hyde Park Middle School, Las Vegas: *Chromosomal Defects and Maternal Age* (advisor: Denise Romonoski)

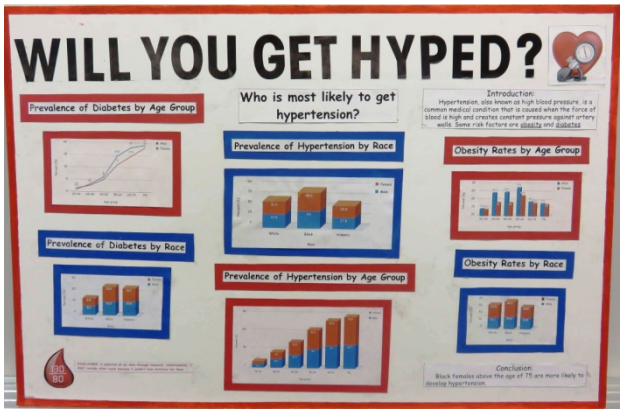


Second Place: Kennedy Jamison, 7th grade at Hyde Park Middle School, Las Vegas: *What Makes a Good Rubik's Cuber?* (advisor: Denise Romonoski)



Third Place: Suebin Hur, 7th grade at Hyde Park Middle School, Las Vegas: *Personality On Paper* (advisor: Denise Romonoski)

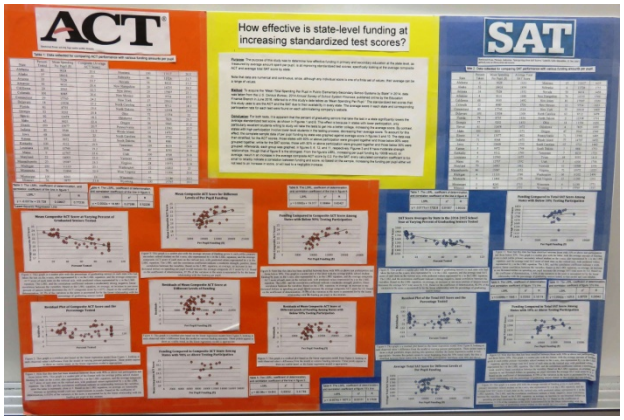
Honorable Mention: Hannah Pham , 7th grade at Hyde Park Middle School, Las Vegas: *Will You Get Hyped?* (advisor: Denise Romonoski)



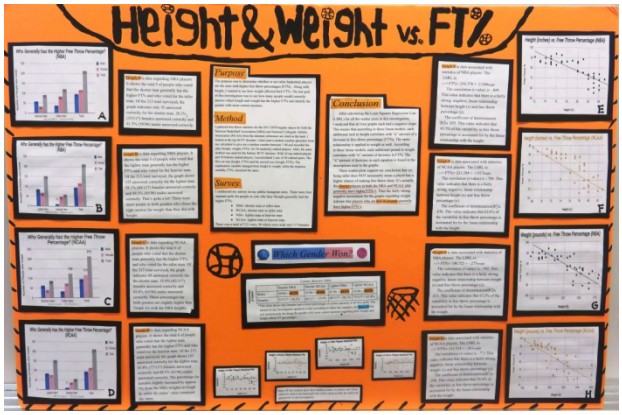
Honorable Mention: Patrick Donn Dimasin, 7th grade at Hyde Park Middle School, Las Vegas: *Fishy Foods* (advisor: Denise Romonoski)

10 – 12

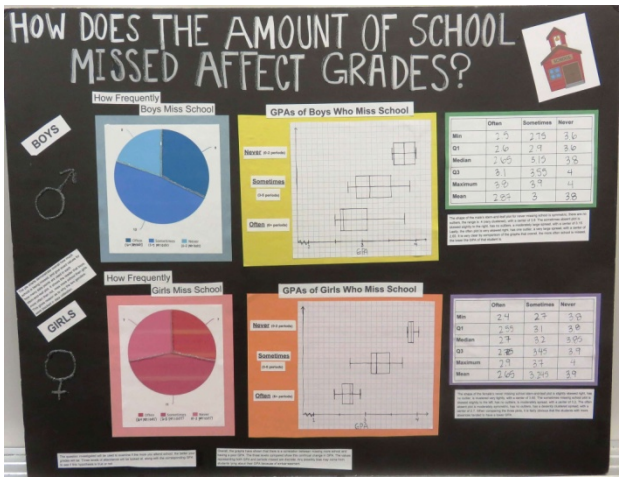
First Place: Richard Huang, 11th grade at Palo Verde High School, Las Vegas: *How Does State Funding Affect Standardized Test Scores?* (advisor: Tara Crouch)



Second Place: Alexis Ho, 12th grade at Palo Verde High School, Las Vegas: *Height & Weight vs. FT%* (advisor: Tara Crouch)



Third Place: Jaclyn Hazlett, 12th grade at Palo Verde High School, Las Vegas: *How Does the Amount of School Missed Affect Grades?* (advisor: Tara Crouch)



NV-ASA Spring Event

Thursday, April 19, we heard from Aaron Luttman of Mission Support & Test Services, LLC, Management and Operations contractor for the U.S. Department of Energy's Nevada National Security Site (NNSS, formerly the Nevada Test Site). He spoke to us about "Statistical Polytheism: A Pragmatist's Approach to Tackling Real Problems in Nuclear Security". The "polytheism" in his title refers to using techniques derived from frequentist, Bayesian, and other schools of thought on how one might or should proceed. His talk was prepared jointly with Marylesa Howard, also of MSTS.

The focus of Aaron's presentation was on image analysis for subcritical nuclear experiments. These experiments

are quite expensive, and hence sample sizes are quite low. Nonetheless, one is required to attempt to quantify the uncertainty in one's conclusions; "error bars" are mandated (though not defined!). The presentation described the nature of the data arising in a particular example, and then reviewed a number of projects in which the approach of choice was frequentist, or Bayesian, or as yet undecided.

Exciting discussion ensued. Excerpts from the presentation are provided at the end of this Newsletter.

Update on "The UNLV West Side Story"

A year ago our Spring event in the South was called "The UNLV West Side Story". Dr. Lung-Chang (JoJo) Chien (Epidemiology and Biostatistics Program, Department of Environmental and Occupational Health, UNLV) told us about his research into the epidemiology of the Zika virus. He sends us the following update.

Dr. Chien has published a research article entitled "Surveillance on the endemic of Zika virus infection by meteorological factors in Colombia" in *BMC Infectious Diseases* in April, 2018. This is a population-based study to propose an early warning surveillance system for monitoring ZIKV infection in a large scale of space and time by using a spatiotemporal modeling approach incorporating the distributed lag nonlinear model and Markov random fields. He and the research team applied the method among 32 departments (similar to states in the United States) in Colombia, one of the countries suffering most from the Zika virus, from 2015 to 2016. 15 meteorological measurements were used to predict the outbreaks of Zika virus infection, resulting in identifying 3 best predictors in terms of average humidity, maximum temperature, and rainfall. The three meteorological measurements can significantly predict an outbreak at least 14 weeks earlier when any of them is observed. The corresponding measurements causing the highest relative risk in the three weather conditions were also detected. More importantly, the surveillance system identified 12 of 32 departments with a significant threat of Zika virus; most of them are located between the Equator and 6°N. This is the first epidemiological research for Zika virus infection in a large space-time scale, and it is flexible enough to build a similar surveillance system in any other area of the world with a high prevalence of ZIKV infection. Σ

UNLV News

A student chapter of the ASA has been created at UNLV, being officially established in January 2018. Its initial focus has been on recruiting student members. The organizer and contact person is Michael Schwob (schwom1@unlv.nevada.edu). It has held three meetings so far. The student chapter hopes to collaborate with NV-ASA to host seminars. One of the goals for the student chapter is to get our members to volunteer within the community and lend their statistical knowledge to local businesses, local government, etc. Ω

Joining NV-ASA!

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 ($2 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 $100. 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/chapters**. Otherwise, whether a national ASA member or not, you can join through PayPal on our website or by contacting our Treasurer Chris Tong. Any way you do it, please obtain an information form from our website, complete it, and send it to Dr. Tong at the address listed on the form.

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

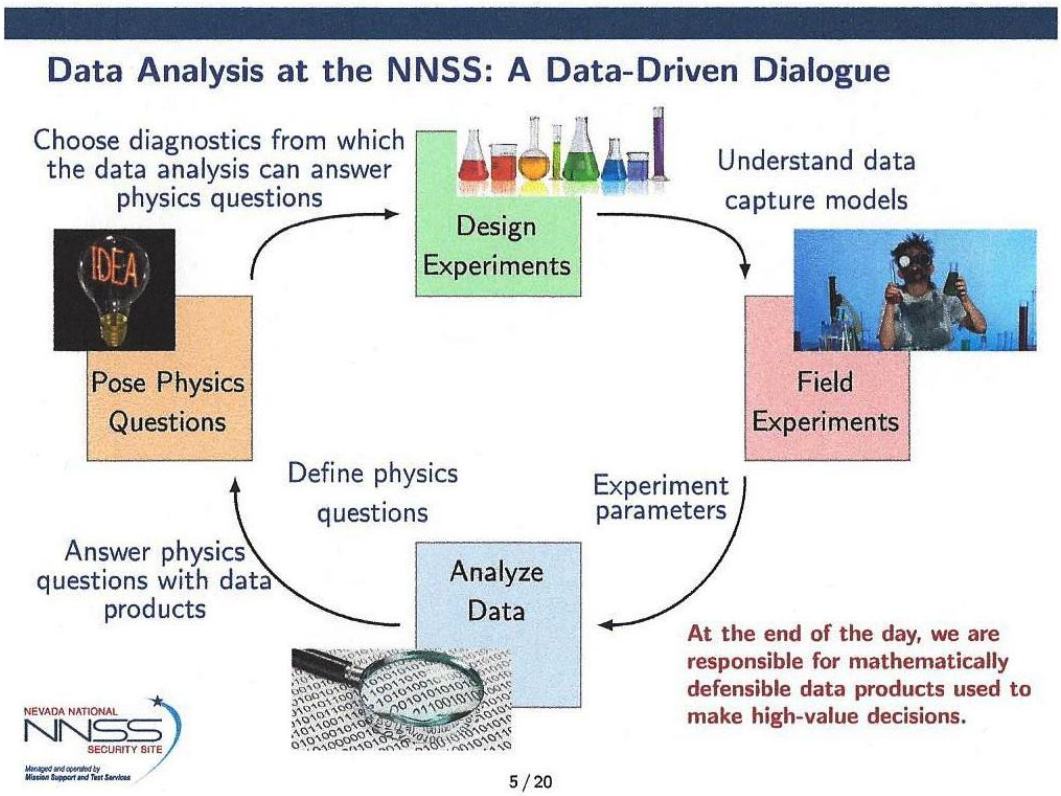
President:	Alicia Chancellor Hansen (2018-2019)
Past President:	Debra Stiver (2016-2019)
Northern Vice President:	Glenn Waddell (2018-2019)
Southern Vice President:	Charles Davis (2015-2018)
Secretary:	Mihye Ahn (2018-2019)
Treasurer:	Chris Tong (2017-2018)
Chapter Representative:	Chad Cross (2018-2019)

Also involved are

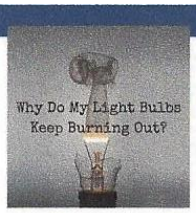
Webmaster:	Alicia Chancellor Hansen
Newsletter Editor:	Charles Davis

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.

For contact information, go to www.amstat.org/chapters/)
Our address for regular mail is
NV-ASA, PO Box 3311, Sparks, NV 89432-3311



Statistical Theism



How many statisticians does it take to change a light bulb?
The answer depends on whether they are frequentist or Bayesian.

Frequentist

- Parameters are fixed but unknown quantities
- Inferences are based on estimators from distributions representing underlying data generating process
- Uncertainty quantification:
  - hypothesis testing
  - p-values
  - confidence intervals
- Constructed confidence intervals **either do or do not** contain true parameter of interest
- Random events are treated probabilistically, no quantification of error in fixed unknown

Bayesian

- Parameters are unknown variables
- Inferences are conditional on data observed
- Uncertainty quantification
  - credibility intervals
  - "distribution of solutions"
- Credibility intervals **contain inferential parameters** of interest with some probability but does not address behavior in the long run
- Allows user to incorporate prior information*

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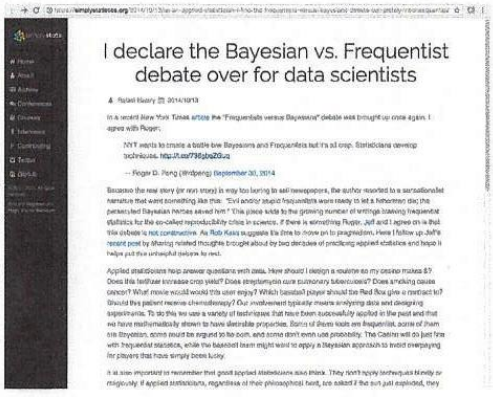
*Can also use uninformative priors

Statistical Theism

Frequentist vs. Bayesian

- Both approaches have their merits
- Both approaches allow us to quantify uncertainties along with estimation
- Does it really have to be "vs."?


I declare the Bayesian vs. Frequentist debate over for data scientists

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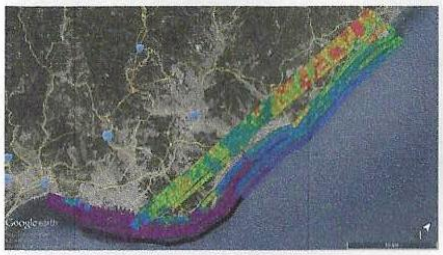
Radiation Detection



Fukushima UH1 Flight on April 6 2011

Spectral clustering shows variation in material deposition and that land deposition varied significantly from the water deposition.

Goal: To understand deposition in Fukushima region

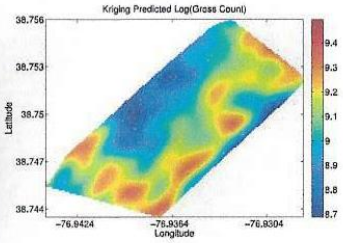
Approach: Frequentist

Radiation counts are measured across a field.

Goal: To understand deposition

Approach: Frequentist & Bayesian kriging

Hyde Ares



The End of 'vs.'

Successful use of both frequentist and Bayesian approaches and implementations for image analysis at the NNSS

- Subcritical Experimentation Analysis Support
- Diagnostic Development
- Emergency Response
- Aerial Measurement Systems