

DEPARTMENT OF STATISTICS



From left to right: Joshua Keller, Aaron Nielsen, Elizabeth Scofidio, Ben Sharp, and Zach Weller

5 NEW FACULTY MEMBERS WELCOMED TO STATISTICS DEPARTMENT

In fall 2018, the Statistics Department was excited to welcome five new faculty to our growing department. Our new faculty will allow the department to meet increasing demands in undergraduate and graduate teaching and will help establish research partnerships around the university.

Joshua Keller is a biostatistician whose research focuses on statistical methods for environmental health problems. After two years as a postdoctoral fellow with Dr. Roger Peng at Johns Hopkins School of Public Health, Dr. Keller joined the CSU Statistics faculty in August 2018. Throughout his career, Dr. Keller has collaborated extensively with atmospheric scientists and environmental epidemiologists, and he looks forward to working with new colleagues in those areas at CSU. An avid hiker, he is excited for all of the outdoor recreation opportunities in and around Fort Collins. Dr. Keller is married to Whitney Pennington, who also just joined CSU as a staff member in the Environmental and Radiological Health Sciences Department.

Aaron Nielsen joined the Department of Statistics in Fall 2018 as an assistant professor, specializing in undergraduate instruction. Over the past six years, Aaron has taught introductory statistics courses at CSU (while obtaining an M.S. in Statistics), as well as undergraduate and graduate courses in mathematics and statistics at CU (while obtaining a Ph.D. in Applied Mathematics). He enjoys watching Chicago Cubs baseball, reading at coffee shops, seeing live music, and traveling with his wife Rachel, a kindergarten teacher in Boulder. Aaron is originally from Lincoln, Nebraska and has resided in Colorado for the last twenty years.

Elizabeth Scofidio is originally from Buffalo, NY. She received her Bachelor's in Mathematics and International Studies as well as her Master's in Mathematics from Saint Louis University in Missouri. She completed her Master's in Applied Statistics at Colorado State University in the summer of 2018. She enjoys hiking, photography, and petting dogs.

Ben Sharp has been a student and/or an employee at three major land-grant universities. His research involves innovative approaches to life-cycle assessment (LCA), building on measures of sustainability using proactive applications. He enjoys basically any outdoor activity but has toned it down in the last several years. Otherwise, he might be found dragging his family to a local brewery (preferably with outdoor seating).

Zach Weller completed his bachelor's degree at Concordia College (MN) and his Ph.D. in statistics here at CSU. Zach rejoins the department as an assistant professor after spending the last year and half completing a post-doc in the CSU Department of Biology. Zach will be doing statistical consulting with the Stat Lab and teaching statistics courses. Outside of work, Zach enjoys brewing beer, camping, fishing, and hunting.

Message from the Chair



Dear Alumni and Friends,

Each time I write a Chair's letter, I find that it is a real struggle to capture all the energy, activity, and success of the department faculty, students, and staff in such a short space. But, that is great problem to have!

One exciting development is the establishment of the Mulrow Scholarship, which will help encourage and support undergraduate and graduate statistics students who are interested in a career in the public sector. Ed (Ph.D., 1986) and Jeri (M.S., 1985) Mulrow earned their degrees from our department and, having established very successful careers, they wish to be a positive influence on future generations of students. This scholarship is very timely, as it will pair naturally with the new initiative to develop a formal student internship program.

We have also started a search for a new tenure track faculty position to teach STAT511 and STAT512, with generous support from the Provost. These courses are essential to graduate education across campus. The demand for seats in 511/512 and MAS courses has exploded during the last few years, which has put a severe strain on department resources. The campus jumped in with strong support for the statistics department, and the Provost responded. This gives us the bandwidth to carry out exciting curriculum development in graduate applied statistics (while we continue to offer the traditional 511/512).

These changes in graduate-level statistics courses parallel the progress in implementation of PUMAS (Pathways to Understanding and Mastery of Statistics), which is our re-design of the undergraduate introductory courses. We are well into the redesign of STAT201, 201, 307. In fall 2018, Professor Mary Meyer taught the new STAT100 course in statistical literacy. She has tackled the challenge of delivering a meaningful course in statistical thinking to CSU undergraduate students, regardless of their prior background in mathematics. STAT100 provides the tools and language to understand, criticize, and question conclusions drawn from quantitative information.

There are two other activities worth mentioning. Professor Julia Sharp mentored five undergraduate students as part of the National Science Foundation Research Experience for Undergraduates Program. The Data Science Concentration in the Masters of Applied Statistics Program was approved and we admitted our first class.

Finally, we are in the midst of searches for 3 tenure track faculty positions: a senior position in biostatistics in conjunction with the Translational Medicine Institute, a mid-career position in data science, and a junior position in statistics.

It was an exciting fall for our department and I am looking forward to what the spring semester will bring.

A handwritten signature in black ink, appearing to read 'Don Estep'.

Don Estep
University Distinguished Professor and Chair

Department Highlights

Mulrow Scholarship Supports Students Seeking Public Sector Careers

The Department of Statistics at Colorado State University fosters many strong relationships among faculty, students, and alumni. Ed (Ph.D., 1986) and Jeri (M.S., 1985) Mulrow met while pursuing their graduate degrees in statistics at CSU. Both of these American Statistical Association Fellows have had successful careers in academia, the private sector, and government. Jeri is currently the Principal Deputy Director for the Department of Justice's Bureau of Justice Statistics. Ed is currently Vice President of Statistics and Methodology for NORC at the University of Chicago.

The Mulrows have been active in practicing and promoting quality quantitative investigations and the profession of statistics throughout their careers. They have generously established a fund to provide scholarships for students in the Department of Statistics at CSU. The scholarships are applicable to junior- or senior-level undergraduates, or graduate students who maintain an overall 3.2 GPA. The preferred recipient of the scholarship is one that is pursuing a career in the public sector using quantitative statistics skills.



Department of Statistics Funded as NSF-REU Site



The American Statistical Association was funded for hosting National Science Foundation – Research Experiences for Undergraduates (NSF-REU) sites between 2016 and 2018. Each year, the ASA funds 3 REU sites around the US, each with four students. The Department of Statistics at Colorado State University was funded as an ASA-NSF REU site in 2018. The College of Natural Sciences and the statistics department funded a CSU student, in addition to the four funded by ASA.

REU participants collaborated with researchers in Chemistry, Biology, and Horticulture on domain science projects. Specific research projects included using machine learning techniques to classify beef quality based on USDA grade, production history, breed and tenderness from a new rapid evaporative ionization mass spectrometry (REIMS) technology, and estimating nanoparticle interactions using constrained splines. The 10-week REU provided students with valuable real-world application of statistics, and culminated in a poster session where the five students showcased their research.

New Data Science Specialization for the MAS Degree



The Master of Applied Statistics (MAS) degree program was started in 2012 as a one-year master's program emphasizing practical methods in statistics, and de-emphasizes theoretical development. The goal of this program is to enable students to begin working immediately as a practicing statistician upon graduation. Beginning in fall 2018, the MAS program began offering two specializations: in Data Science and in Statistical Science.

The Statistical Science specialization is similar to the original MAS degree, but with additional options for elective courses. Students are now able to take courses in Statistical Learning and Machine Learning as part of their degree, in addition to the other elective courses previously offered (e.g., Survey Statistics, Nonparametric Methods, Analysis of Time Series, and Methods in Spatial Statistics).

The Data Science (DS) specialization shares 16 credits in common with the Statistical Science specialization, so that students receive a solid background in the core areas of statistics necessary for a career in data science (e.g., probability, mathematical statistics, regression, generalized regression). In addition to the core MAS courses, the DS specialization curricula also includes courses in programming, database management, statistical learning, machine learning, and graduate level linear algebra. Students in this specialization may also select elective coursework in business intelligence, data mining, mixed models, multivariate analysis or Bayesian analysis. Students receive a strong background in statistical and business computing while completing this specialization.

Both specializations emphasize practical applications over theory, with the goal of preparing students to work as a data scientist or an applied statistician in business, industry, or government immediately after graduation. Full time students in either specialization complete the MAS degree in 11 months, and part time students may complete the degree in two to four years. Both specializations are offered online, as well as on campus.

New Course – STAT 100 Statistical Literacy



Statistical literacy is profoundly important for citizens to understand concepts of quantitative information. At CSU, a new course in statistical literacy (STAT100) has been developed for undergraduates in non-STEM majors, for whom this will likely be the only college course in statistics or mathematics. Topics covered in the course are chosen to be what a person needs to know about statistical ideas in a world where we are inundated with quantitative information. Although only a middle-school level of mathematics is needed (mathematical notation and formulas are completely avoided), the material requires a higher level of conceptual thinking, logic, and reasoning. The goal is for the students to be able to think critically about statistical studies and claims made from data summaries, which are ubiquitous in the media.

Students completing this course will be able to read a description of a statistical study and identify response and predictor variables, as well as important covariates. Students can determine whether a statistical study is observational or an experiment, and explain why this is important. Students will be able to detect and explain possible confounding in observational studies. They will also be able to identify other types of biases and statistical fallacies that are all too common, such as selection bias, data snooping, and post-hoc hypothesis testing. In short, STAT100 provides the tools and language to understand, criticize, and question conclusions drawn from quantitative information.

CNS Teaching and Mentoring Award Winners

The College of Natural Sciences (CNS) annually awards excellence in teaching to deserving faculty and graduate students. Awards are based on activity, impact, and quality of teaching and mentoring activities. Ben Prytherch, faculty, and Charles Vollmer, a graduate student in the Department of Statistics received CNS Teaching and Mentoring Awards in 2018.



Ben Prytherch was honored with the CNS Faculty Excellence in Undergraduate Teaching and Mentoring award. Ben has been a leader for the undergraduate major and minor in Statistics, significantly impacting curriculum reform and course redevelopment, and serving as the undergraduate student advisor. Some of his other major contributions include creating online materials

supporting student success, supervising the implementation and maintenance of the Statistics Success Center, integrating JMP Statistical Software in non-major introductory statistics courses, and collaborating on a new program to create statistics entry and success pathways for students of all backgrounds and preparation.



Charles (Charlie) Vollmer was recognized with the CNS Graduate Student Teaching and Mentoring Award. Charlie made the usual progression as a teaching assistant through the undergraduate courses as both a recitation instructor to the teacher of record. He contributed substantial improvements to the calculus-based introductory statistics undergraduate course and has prepared Masters of

Applied Statistics students with boot camp short courses prior to their program start. He has substantially helped mentor MAS and undergraduate students in research.

Alumni Spotlight – Sandy Thompson



Sandy Thompson studied under the direction of Geof Givens for her MS (1996) and Jennifer Hoeting and Richard Davis for her Ph.D. (2001). Her research focused on Bayesian model averaging applied to spatial prediction. Sandy enjoyed the camaraderie in the department, playing volleyball games on the oval, sharing offices with great people, and learning from collaborative statisticians like Jim ZumBrunnen, Phil Chapman, and Tom Boardman. She also enjoyed learning about multidisciplinary works for Paul Mielke, Givens, and Hoeting. Her most interesting memories are associated with the flood in 1997 – walking to campus the morning of the flood, the material from the library and bookstore had flooded with the water, and paper was scattered everywhere.

Sandy was hired at Pacific Northwest National Laboratory following graduation at CSU and has worked there for almost 18 years. She did a 3-year assignment in Washington, DC as a technical advisor for the Simulation, Algorithm and Modeling program within the National Nuclear Security Administration. She began her career considering survey data for aviation safety and applying time series analysis techniques to understand the decisions impacted by individual home electrical pricing. Today, she works with scientists in diverse areas (physics, chemistry, data science, analysis,

biology, climate, power grid) to generate and use data to answer critical questions. CSU taught Sandy to think like a statistician; she uses these skills every day.

Support the Department

Your support of the department is incredibly valuable. Please consider making a difference to today's students, faculty, facilities, and programs at whatever level is right for you. Thank you!

For more information on giving, please contact Simone Clasen, Associate Vice President of Philanthropic Operations.

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