Julia C Schedler

Contact Information	Cal Poly San Luis Obispo Statistics Department San Luis Obispo, CA, 93410	Phone: (805) 756-5877 E-mail: jschedle@calpoly.edu Website: www.juliaschedler.com		
Education	Rice University, Houston, TX USA			
	Ph.D. in Statistics, May, 2020			
	• Dissertation Title: "Advances in the Analysis of Spatially Aggregated Data"			
	 Novel techniques are presented to account for the spatial dependence between regions using the extended Hausdorff distance. Methods developed balance the geometry of the underlying process while permitting analysis on a level relevant to policy and municipal decision-making processes. Also, a spatio-temporal case-crossover model is explored. Advisor: Katherine B. Ensor 			
	M.A. in Statistics, May, 2018			
	California Polytechnic State University, San Luis Obispo, CA USA			
	B.S. Statistics and Mathematics (Pure Mathematics), June, 2014			
	Senior Project Topic: "An Exploration of Stein's Paradox"Advisor: Kevin J. Ross			
Teaching Experience	Cal Poly, San Luis Obispo, CA Instructor: Statistical Meth	USA ods for Engineers (Stat 312/542)	Winter 2025	
	• Introduce students of various engineering backgrounds to the field of statistics			
	• Use various real-world case studies to motivate the high volume of course content (<i>Challenger</i> launch decision, John Snow Cholera epidemic, Theranos statistical malpractice)			
	• Engage students in sonifica	ation research (see Active Projects below)		
	Instructor: Statistical Analy	ysis of Time Series (Stat 416)	Fall 2024	
	• Introduce students to the analysis of temporally dependent data based on expanded course outcomes			
	• Develop a simulation-based approach to introducing the autocovariance function			
	• Design activities to engage with math anxiety and set student expectations for their relation- ship to math in their career, including use of AI tools			

Rice University, Houston, TX USA Instructor: Methods of Data Analysis and System Optimization January-May 2019

- Introduce students with a broad range of more advanced Statistical techniques they are likely to encounter in management positions.
- Emphasis on ability to understand the results of analyses and how you could (and could not) use them to make business decisions.
- Reading/discussions of the book *Naked Statistics* as well as articles from the website fivethirtyeight.com

• Semester-long project: formulating a research question, finding data, assessing whether their data could answer their research question, analyze and present their findings to the class.

Instructor: Probability and Statistics

Engaged students using a problem-based approach and emphasized effective statistical communication. Assessments included:

- Oral Final Exam
- In-class discussions based on readings from books like "The Lady Tasting Tea" or YouTube videos such as "Bertrand's Paradox".
- Collaborative group work (regular class and portion of midterm grade)

Graduate Certificate in Teaching and Learning

I completed a four course, accredited certificate program that focused on course design, pedagogy, designing and interpreting research in the area of the Scholarship of Teaching and Learning (SoTL), a peer feedback course with teaching demos, and a final independent study to build my teaching portfolio.

Teaching Assistant

Duties included designing and grading homeworks and exams as well as guest lecturing and holding office hours.

California Polytechnic State University, San Luis Obispo, CA USA

Supplemental Workshops in Science Facilitator Provided extra, course-specific practice for students twice a week. I prepared activities for the students such as practice exams, games, worksheets, and data sets to analyze in Minitab, R or JMP.

Study Session Leader

Met with students in various sections of a given course twice a week. I provided worksheets and answered homework questions.

Teaching Assistant

Attended lectures to help the instructor answer student questions during programming activities and provided occasional guest lecturing.

Research Spatial and Spatio-temporal statistics, time series, statistical communication and literacy, effective INTERESTS collaboration, simulation and problem-based statistics education, sonification

ACTIVE PROJECTS

• A Nonlinear State-Space Time Series Approach to Monitor Virus Levels in Wastewater

- A fast on-line algorithm for real-time statistical evaluation of deviations in virus levels from a city-wide trend, aiding in the detection of outbreaks.
- Soon to be submitted. An extension of our previous paper in *Scientific Reports* with the team at Rice University.
- Sonification in the Statistics Classroom: Can students hear the shape of a distribution?
 - While exploratory data analysis often involves assessment of distributions by eye via data visualizations, humans have other sensory organs
 - The field of sonification is broadly concerned with translating data or data summaries into sound

Jan - March 2011

Fall 2013

compl. 2017

May-June 2017

Sept 2011-Dec 2013

August 2014 - December 2015

- Sonification of data visualizations such as boxplots and histograms has been explored. but work has stagnated since the 1990s
- Prior studies of auditory box plots focused on comparing two sonified distributions, rather than extracting information from just one distribution
- This work seeks to determine whether the listener can determine the shape of a distribution (via an auditory box plot)
- Pilot study/data collection ongoing
- Geometrically Aware Specifications of Spatial Weight matrices
 - This project extends the work from my dissertation on the specification of spatial weight matrices for lattices with irregularly-shaped polygons
 - The extended Hausdorff distance is used as opposed to the more popular centroid-based or contiguity-based specifications
 - Outputs include vignettes and R packages
 - This work is used in the Nonlinear state space project mentioned above.

California Polytechnic State University, San Luis Obispo, CA USA

Assistant Professor

RESEARCH

EXPERIENCE

September 2024- Present I am involved in a new interdisciplinary (inter-departmental and inter-institutional) collaboration broadly focused on exploring science literacy through a STEAM perspective. My portion involves studying perceptions of data sonifications as an alternative to data visualizations.

See active projects above.

Student research assistants:

Donya Behroozi, Sonification project

Rice University, Houston, TX USA

Research Scientist 1

My position is part of the Rice University/City of Houston wastewater epidemiology partnership, a CDC National Wastewater Surveillance System Center of Excellence.

- Time series modeling- Moving the spline methodology currently employed by the City of Houston into a state-space modeling framework, allowing for separate estimates of process and sampling/lab variability.
- Spatial modeling Analyzing dependence among the sewer catchment areas for the City of Houston using lattice models for spatial data
- Statistical process control- Applying the tools of statistical process control to compare information gained from large, centralized wastewater treatment plants to that of upstream sampling sites.
- **Reproducible research** GitHub and Shiny app for sharing code, tutorials, and apps to help advance the use of appropriate statistical models

PhD Candidate

In graduate school, my research focused on the methodological side of spatial statistics, particularly in the context of areal count data (observed on or aggregated to regions).

- (Extended) Hausdorff Distance for spatial weight matrices)
- A Zero-Inflated Hierarchical Poisson model with a spatial component- We investigate the relationships between crime, streetlights, and racial/ethnic background using crime counts and light density at the block level, and racial/ethnic composition at the block group level.

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February 2023- August 2024

August, 2014 - November 2019

June 2013 - August 2014

and on-site visits to determine data and analytics needs.

Professional zyBooks, A Wiley Brand, Campbell, CA, USA

EXPERIENCE

Originally a startup which was acquired, zyBooks focuses on the creation of digitally native, interactive textbook replacements for computer science, math, statistics, data science, and engineering.

• Geometrically aware spatial weight matrices - An extension of the ideas behind the Hausdorff distance are used to construct a spatial weighting scheme which accounts for irregular lattice

• Short Course on Spatial Statistics - Topics included choice of neighborhood weighting structure, SAR and CAR models, Kriging, Geographically Weighted Regression, and Land Use Re-

Various projects with Dr. Quianta Moore at Rice's Baker Institute for Public Policy. Responsibilities include analysis of survey data, write-ups for the Board of Directors of the funding organization,

Statistics Content Lead

structure

Research Assistant

- Research, planning, and implementation of new statistics titles for the catalog, such as R for Data Science
- Supervised a team of 3 mathematicians/statisticians

gression. Example code was provided in both R and Stata.

- Trained new authors
- Participated in the creation of a new junior position for those with Bachelors degrees
- Created demos and provided instructor support in collaboration with sales and marketing teams

Statistics Content Author

- Completed training on the zyBooks authoring style and pedagogy
- Collaborated with software engineers and external authors to create interactive web apps for supporting simulation-based instruction
- Authored interactive content as part of a digital versioning of the print book *Introduction to* Statistical Investigations, 2E

Q-Aces, LLC, San Luis Obispo, CA USA

Director of Data Development

Start-up focused on the creation of a Search Engine Optimization (SEO) firm auditing tool to help lawyers make informed decisions about who to hire for their SEO needs.

- Created a database system in collaboration with Dr. Alex Dekhtyar implemented on an Amazon EC2 instance.
- Applied web scraping and SEO APIs to collect data on site relevance to create a lawyer-friendly process to identify and target the best keywords in order to maximize Search Engine Marketing ROI.
- Performed SEO work for client websites.

IMVU, Inc, Redwood City, CA USA

Data Science Intern

IMVU is an online social entertainment destination where members use 3D avatars to meet new people, chat, create and play games with their friends.

- Performed an in-depth analysis and critique of the current A/B testing analysis system. Findings were presented to an inter-departmental meeting which included company VPs. I pointed out the statistical methodology flaws and explained how they impacted the company.
- Survival analysis models in R to analyze new customer behavior and retention.
- Obtained and cleaned data for analysis by marketing teams.

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Summer 2010, 2011, 2012

July 2021-November 2022

October 2019-July 2021

March 2015 - August 2017

PUBLICATIONS Katherine B. Ensor, **Julia C. Schedler**, Jose Palacio, Rebecca Schneider, Kaavya Domakonda, and Lauren B. Stadler. "A Nonlinear State-Space Time Series Approach to Monitor Virus Levels in Wastewater". *In Progress.*

Sun, Thomas Y., Julia C. Schedler, Daniel R. Kowal, Rebecca Schneider, Lauren B. Stadler, Loren Hopkins, and Katherine B. Ensor. "Uncovering Dynamics between SARS-CoV-2 Wastewater Concentrations and Community Infections via Bayesian Spatial Functional Concurrent Regression." arXiv, December 4, 2024. https://doi.org/10.48550/arXiv.2412.02970. Submitted.

Zhou S, Lou E, **Schedler J**, Ensor KB, Hopkins L, Stadler LB. Comparative analysis of culture- and ddPCR-based wastewater surveillance for carbapenem-resistant bacteria. Environmental Science: Water Research & Technology. Published online August 16, 2024. DOI https://doi.org/10.1039/D4EW00525B.

Wolken M, Wang M, Schedler J, Campos RH, Ensor K, Hopkins L, et al. PreK-12 school and citywide wastewater monitoring of the enteric viruses astrovirus, rotavirus, and sapovirus. Science of The Total Environment. Published online April 23, 2024:172683. doi:10.1016/j.scitotenv.2024.172683

Ensor, K.B., Schedler, J.C., Sun, T. et al. Online trend estimation and detection of trend deviations in sub-sewershed time series of SARS-CoV-2 RNA measured in wastewater. Sci Rep 14, 5575 (2024). https://doi.org/10.1038/s41598-024-56175-2

Fagnant C, Schedler JC, Ensor KB. Spatial-Temporal Extreme Modeling for Point-to-Area Random Effects (PARE). In press to *Journal of Data Science*.

Schedler JC, Ensor KB. A spatiotemporal case-crossover model of asthma exacerbation in the City of Houston. Stat. 2021;10(1):e357. doi:10.1002/sta4.357

PRESENTATIONS Schedler, Julia (presenter) "Online trend estimation and detection of trend deviations in subsewershed time series of SARS-CoV-2 RNA measured in wastewater" SDSS 2024 in Richmond, VA

Schedler, Julia (presenter) "Online trend estimation and detection of trend deviations in subsewershed time series of SARS-CoV-2 RNA measured in wastewater" upcoming Colloquium talk, Cal Poly Humboldt, October 2023

Fagnant, Carlynn; Schedler, Julia (presenter); and Ensor, Katherine (2023) "Spatial-Temporal Extreme Modeling through Point-to-Area Random Effects (PARE)" at Symposium on Data Science and Statistics, May 2023, St. Louis, MO

Schedler, Julia (2020) 'A spatiotemporal case crossover model of asthma attacks in the City of Houston" at Symposium on Data Science and Statistics, 2020 (virtual)

Schedler, Julia and Ensor, Katherine (2019) "Understanding Urban Pollution Through Spatial Modeling" at Joint Statistical Meeting 2019, Denver, CO.

Schedler, J.C. (2016), "Data Science in the Classroom: A Focus on Student Learning". Poster Session at Data Science Meetup, Rice University, Houston, TX.

Ensor, K. B., Guerra, R., Schedler, J.C., Melnikov, O., Raath, K., (2016), "Urban Data Platform (UDP)". Poster Session at Data Science Meetup, Rice University, Houston, TX.

SERVICE February 2025 Reviewer, Journal of Data Science

August 2024- Present Guest Editor, Journal of Data Science, Special Issue for SDSS 2024

	November 2024-Present Secretary/Treasurer, Government Statistics Section		
	2024-2025 Reviewer, Journal of Hazardous Materials		
	x November 2024 Organized Speaker Visit to Cal Poly– Robert Lund		
	2024 Reviewer, Journal of Data Science		
	2024 Reviewer, Epidemics		
	April 2024 Judge for ASA DataFest at Cal Poly, San Luis Obispo		
	${\bf August}~{\bf 2022}$ Judge for Statistics and Data Science Education Poster Session. (JSM)		
	${\bf 2017\text{-}2018}$ Association for Women in Mathematics, President of Rice University Chapter		
Computing Skills	 Statistical Packages: R, Stan, SAS, WinBUGS, Stata. Languages: R, Python, MySQL. Learning JavaScript! Applications: IAT_EX, ArcGIS. Version Control: Git 		
Continuing Education	2024 Designing Learner-Centered and Equitable Courses (ACUE 6 week course)		
	2024 Large-Scale Spatial Data Science (JSM Short Course)		
Honors and	2014 Cal Poly State University: graduated with Honors, 2014		
Awards	2014 Cal Poly State University: Statistics Department Outstanding Senior Award, 2014		
	2013 Western Users of SAS Software Honorable Mention Student Scholar, 2013		
	2013 Advancement of Science and Technology Scholarship, 2013 2012 Mu Sigma Rho		