

ALLISON HORST

Bren School of Environmental Science and Management, UC Santa Barbara

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PROFESSIONAL PROFILE

- 10+ years of experience developing curriculums and leading statistics & environmental data analysis courses for 100+ graduate students using modern data science software and approaches
- Demonstrated excellence and innovation in teaching, recognized by the student-selected Bren School Distinguished Teaching Award (2018) and UCSB Academic Senate Distinguished Teaching Award (2019)
- Train students with transferable skills across modern data science software, including: data and project management, reproducible workflows, good coding habits, and data visualization
- Prepare students with limited programming experience for courses, thesis projects, and the workplace by teaching applied skills using real-world environmental datasets
- Co-founded, organize and host Santa Barbara R-Ladies and UCSB Tidy Tuesday Coding Club, groups working to create welcoming, inclusive, and diverse communities of practice in data science

EDUCATION

PhD, Environmental Science and Management (2012)

Emphasis: Environmental nanotoxicology

Bren School of Environmental Science and Management & University of California Center for Environmental Implications of Nanotechnology

University of California at Santa Barbara, Santa Barbara, CA 93106-5131

MS, Mechanical Engineering (2007)

Emphasis: Environmental and Ocean Engineering

Department of Mechanical Engineering

University of California at Santa Barbara, Santa Barbara, CA 93106-5070

BS, Chemical Engineering (2005)

Emphasis: Environment, Risk and Management

Department of Chemical Engineering

University of California at Santa Barbara, Santa Barbara, CA 93106-5080

DISTINCTIONS

UC Santa Barbara Distinguished Teaching Award (2019)

Awarded the 2019 campus-wide Distinguished Teaching Award at UC Santa Barbara for “excellence in teaching and inspiring innovation in teaching.”

Bren School of Environmental Science and Management Distinguished Teaching Award (2018)

Awarded the 2018 Distinguished Teaching Award by Bren School graduate students.

TEACHING

CONTINUING LECTURER (2019 - Present)

*Bren School of Environmental Science and Management
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ESM 206: Introduction to Statistics and Data Analysis in Environmental Science and Management

- Teach introductory statistics, data analysis, and computational data science in R and RStudio to all incoming Master of Environmental Science and Management students (~85/year) at the Bren School.
- Emphasize coding basics and good habits, project management, data analysis, and data visualization to build foundations for responsibly working with and analyzing environmental data.

ESM 244: Advanced Data Analysis

- Lead a survey course on advanced topics in environmental data analysis to 50+ graduate students and researchers from the Bren School and other departments, includes a weekly data analysis lab.
- Reinforce and continue building transferable skills for data science, including data organization and project management, collaboration, reproducibility, and communication.

ESM 438: Presentation Skills for Environmental Professionals

- Lead lectures and facilitate weekly labs for Bren School students teaching how to prepare, practice, and receive feedback on data visualization, slide design, and research storytelling.
- Build foundational skills for public speaking (e.g. tone, posture, pace) through in-class and lab participation, encourage active listening, and teach approaches for giving and receiving critical feedback.

Quantitative Skills Refresher and R/RStudio Workshop for Incoming PhD Students

- Proposed, created and lead a 7-day intensive workshop for incoming PhD students covering algebra, probability statistics, integration and derivatives, and programming basics using R with RStudio.
- Attended by ~30 PhD students annually from 6+ UCSB departments including Bren, Geography, Molecular, Cellular and Development Biology, Political Science, Ecology, Evolution and Marine Biology, Anthropology, and the Interdepartmental Graduate Program in Marine Science.

Essential Math and Calculus Workshop for Incoming Master's Students

- Lead a 7-day intensive math and calculus workshop reviewing algebra, multivariate functions, integral calculus and derivatives to prepare incoming Master's students for classes at the Bren School.

LECTURER (2013 - 2019)

*Bren School of Environmental Science and Management
University of California, Santa Barbara*

Courses summary:

- Developed and led graduate-level courses in quantitative skills, statistics, data analysis, and presentation skills in 18+ quarters of teaching with consistently exceptional course reviews. Courses taught:
 - ESM 244 - Advanced Data Analysis (2014 – 2019)
 - ESM 438 - Presentation Skills for Environmental Professionals (2016 - 2019)
 - Quantitative Skills and R/RStudio Workshop for Incoming PhD Students (2017 – 2018)
 - Essential Math and Calculus Workshop for Incoming Master's Students (2013 – 2018)
 - ESM 206 - Introduction to Statistics and Data Analysis (2013 – 2018)
 - ESM 219 - Microbial Processes in the Environment (2014)

TEACHING (CONTINUED)

TEACHING ASSISTANT AND INSTRUCTOR OF RECORD (2008 – 2012)

*Bren School of Environmental Science and Management & Department of Environmental Studies
University of California, Santa Barbara*

Essential Math and Calculus Workshop for Incoming Master's Students (2008 – 2012)

- Redesigned and successfully led the 2-week intensive quantitative refresher workshop for all incoming students (~85/year) at the Bren School.

Environmental Studies 25: Quantitative Thinking in Environmental Science (2010)

- Taught quantitative thinking skills and applied methods to ~30 undergraduate Environmental Studies students, including data entry and organization, graphing and basic statistical analyses in Excel.

Teaching Assistant, Environmental Studies 25: Quantitative Thinking in Environmental Science (2010)

- Led Excel labs and discussion sections for ~15 undergraduate students to build skills for working with data in spreadsheets; based on performance was asked to lead the course the following summer.

INNOVATIVE CONTRIBUTIONS to DATA SCIENCE EDUCATION

Artist, illustrations for statistics and data science education (ongoing)

- Illustrate free, open artwork for R and statistics teachers to lower learning barriers and improve understanding of statistics and coding skills, used in courses and workshops around the world.
- Contribute to student understanding: in a course at University College London, 31 of 32 surveyed students found the artwork was “a fair amount of help” or “a lot of help” when learning about t-tests.
- Invited by Hadley Wickham, 2019 COPSS President’s Award Winner and Chief Technical Officer at RStudio, to be RStudio’s first artist-in-residence in support of my artistic contributions to the R community.
- As an NCEAS artist-in-residence, created artwork for the [Openscapes program](#) presentations and website.

Co-author, [R for Excel Users](#) (eBook) and Workshop Materials (February 2020)

- Co-authored open-source eBook with Dr. Julia Lowndes for our RStudio Conference “R for Excel Users” Workshop covering reproducible workflows, collaboration, data wrangling and viz for modern R users.

Data Visualization Workshop Instructor, Southern CA Coastal Waters Research Project (November 2019)

- Led a 1-day introduction to data visualization workshop for SCCWRP employees to introduce the hierarchy of data visualization design; building responsible graphs; and making engaging graphics.

Co-author, *Supercharge your research: a 10-week plan for open data science* (October 2019)

- JSS Lowndes, HE Froehlich, A Horst, N Jayasundara, ML Pinsky, AC Stier, NO Therkildsen, CL Wood. [Supercharge your research: a 10-week plan for open data science](#). Nature Career Column, 31 Oct 2019. doi: 10.1038/d41586-019-03335-4.

Workshop Instructor, R & RStudio Online Refresher for Bren School Alumni (August 2019)

- Independently organized, created and led a free live-streamed 4-session workshop for Bren School alumni to refresh and build new R skills for environmental data analysis, remotely attended by ~25 alumni.

Instructor, [Eco-Data-Science](#) (2018 – 2019)

- Created and led two sessions for the Eco-Data-Science skill-sharing group organized by Jamie Montgomery at UC Santa Barbara: *Intro to data visualization with ggplot2*, and *Intro to ganimate*.

BREN SCHOOL MASTER'S PROGRAM CAPSTONE PROJECT WORKSHOPS

Presenter, Bren Master's Thesis Project Faculty Review Workshop (2020)

- Co-presenter, with Dr. Satie Airamé and Sean Kerr, for a 1-hour workshop on creating and delivering strong research presentations to prepare Bren School Master's students for their thesis project reviews.

Instructor, Bren Master's Thesis Project Outreach Manager Workshops (2018 – present)

- Creator and leader (with Dr. Lisa Leombruni) of 1.5-hour workshops for student Outreach Managers of Bren School group thesis projects, each Spring and Fall Quarter.
- Work with outreach managers in, and outside of, workshops to clarify research problems, define research questions and objectives, and create cohesive and compelling research stories.

Instructor, Bren Master's Thesis Project Public Presentations Workshop (2017 - present)

- With Sean Kerr, lead a 1-hour workshop to prepare Bren School Master's students for public presentations including logistics, presentation guidelines, and tailoring presentations for public audiences.

Instructor, Bren Master's Thesis Project Poster and Briefs Workshop (2017 - present)

- Lead a 1-hour workshop for graduating Bren School Master's students on designing clear and engaging scientific posters and project briefs to share their work with clients, colleagues, and the public.
- Mentor teams during poster and briefs design process, review drafts and provide feedback.

Reviewer, Bren School Master's Project Public Presentations and PhD Symposium (2017 – present)

- Preview and provide critical feedback on presentation skills, slide design, content, and research storytelling for Bren Master's and PhD students preparing for public presentations and events.

LEADERSHIP IN DIVERSITY AND INCLUSIVE DATA SCIENCE COMMUNITIES

Founder and organizer, UCSB Tidy Tuesday Coding Club (2019 - Present)

- Created and run the first in-person Tidy Tuesday club, a weekly meetup for participants to practice and share coding skills based on the online R for Data Science Community's [Tidy Tuesday](#) initiative.
- Manage UCSB Tidy Tuesday membership with 100+ members representing >6 UCSB departments and alumni, organize and confirm locations, and share information with meetup details.
- Host weekly meetups to welcome participants (~15 people/week), help beginning R-users get started in RStudio, answer questions, and assist participants with code troubleshooting.

Participant, [Openscapes Mentorship Program](#) (2019)

- Selected by Dr. Julia Lowndes to participate in Openscapes, a 10-week program that empowers educators and mentors with strategies and tools to improve collaboration and culture in data science teams.
- Implemented Openscapes strategies for fostering inclusive classrooms, including by incorporating new tools for data science collaboration, creating our Tidy Tuesday club, and making [course materials](#) public.

Co-founder and organizer, [R-Ladies Santa Barbara](#) (2018 - Present)

- Co-organize and co-host ~5 events/year for our local chapter of [R-Ladies Global](#) – an organization to increase intersectional gender diversity the R community.
- Created and led skill-sharing event on “Intro to building Shiny apps in R” for ~50 SB R-Ladies members.

COMMITTEES, PANELS, and MENTORSHIP

Member, Review & Selection Committee, UCSB Academic Senate Distinguished Teaching Awards (2020)

- Member of the 2020 UCSB Academic Senate's Distinguished Teaching Award selection committee that will evaluate candidate submissions to decide the 2020 Distinguished Teaching Award recipients.

Presenter, Bren School Women's Caucus (2018)

- Presented (alongside other women faculty and researchers) on gender bias and challenges for women in the environmental workplace to ~50 Bren School students, researchers, staff, and faculty.

Panel Moderator, Equity and Bias in the Environmental Workplace (2018)

- Moderated a panel discussion at the Bren School of Environmental Science and Management on intersectional bias in the environmental workplace.

External Advisor, Master's Group Thesis Project (2016)

- Advised a group of 4 Master's students on data visualization, framework organization and science communication for their project to create a framework for desert tortoise recovery in the Mojave Desert.

Member, Bren School Group Project Selection Committee (2016)

- Evaluated proposals for Bren School Master's Thesis Projects, then discussed and deliberated with students, faculty and staff to select which projects would advance.

Independent Study Advisor, Math for Environmental Engineering (2015)

- Collaborated with Bren School Master's student Adam Jorge to design and complete a 1-quarter independent study curriculum on essential math skills in environmental engineering.

Proposer and Organizer, Bren PhD Mentorship Program for Master's Thesis (2014 - 2015)

- Successfully proposed (with Dr. Darcy Bradley) and organized the PhD Mentorship Program for Master's thesis projects to provide Bren School PhD students with research mentorship opportunities.
- Oversaw PhD mentorship program informational meetings, application and matching process, and brown-bag mentorship discussions for the first 2 years of the program.

Graduate Student Mentor, UC Santa Barbara Summer Research Mentorship Program (2008)

- Mentored a high-school student for 8-weeks to inspire interest in environmental research by exposing and training mentee in laboratory safety and skills, experimental design, data collection and presentation.

RESEARCH PUBLICATIONS

Horst, A.M., J.H. Priester, R. Vukanti, and P.A. Holden (2012). An assessment of fluorescence and absorbance based assays to study nanoparticle ROS generation and effects on bacterial membranes. *Small* **9**:1753-1764.

Priester, J.H., Y. Ge, R.E. Mielke, **A.M. Horst**, S. Cole Moritz, K. Espinosa, J. Gelb, S.L. Walker, R.M. Nisbet, Y.J. An, J.P. Schimel, R.G. Palmer, J.A. Hernandez-Viezcas, L. Zhao, J.L. Gardea-Torresday, and P.A. Holden (2012). Differential effects and translocation of two manufactured metal oxide nanomaterials in soil cultivated soybean. *PNAS* **109** (37):e2451-2456.

Horst, A.M., Z. Ji, and P.A. Holden (2012). Nanoparticle dispersion in environmentally-relevant aqueous media: A method for TiO₂ and considerations for a general approach. *Journal of Nanoparticle Research* **14**:1014.

Horst, A.M. 2012 (Ph.D. Dissertation) Bacterial exposure to metal-oxide nanoparticles: methods, physical interactions, and biological effects. University of California, Santa Barbara.

RESEARCH PUBLICATIONS (CONTINUED)

- Thomas, C.R., S. George, **A.M. Horst**, Z. Ji, R.J. Miller, J.R. Peralta-Videa, T. Xia, S. Pokhrel, L. Madler, J.L. Gardea-Torresdey, P.A. Holden, A.A. Keller, H.S. Lenihan, A.E. Nel, and J.I. Zink (2011). Nanomaterials in the environment: from materials to high-throughput screening to organisms. *ACS Nano* **5** (1):13-20.
- Horst, A.M.**, A.C. Neal, R.E. Mielke, P.R. Sisljan, W.H. Suh, L. Mädler, G.D. Stucky, and P.A. Holden (2010). Dispersion of TiO₂ nanoparticle agglomerates by *Pseudomonas aeruginosa*. *Applied and Environmental Microbiology* **76** (21): 7292-7298.
- Horst, A.M. 2008** (Master's Thesis). Effects of hexavalent uranium and nanoparticulate titanium dioxide on *Pseudomonas aeruginosa*. University of California, Santa Barbara.
- Holden, P.A., **A. M. Horst**. (Book Chapter). *Microbes* (2007). Gaines, S. and Denny, M. (Eds). Encyclopedia of Tidepools and Rocky Shores. U. C. Berkeley Press.
- Priester, J. H., **A. M. Horst**, L. C. Van De Werfhorst, J. L. Saleta, L.A.K. Mertes and P. A. Holden (2007). Enhanced visualization of microbial biofilms by staining and environmental scanning electron microscopy. *Journal of Microbiological Methods* **68**: 577-587.