CURRICULUM VITAE
ABIGAIL LAUREN HORN
November 2023

PERSONAL INFORMATION

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CURRENT APPOINTMENTS

Lead Scientist, Information Sciences Institute, Viterbi School of Engineering
Research Assistant Professor of Industrial and Systems Engineering, Viterbi School of Engineering

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA 2016
Ph.D. in Engineering Systems from the Institute for Data, Systems, and Society
Dissertation: *Locating the Source of Large-Scale Outbreaks of Foodborne Disease*

Instituto Superior Téchnico, Lisbon, Portugal 2010
Advanced Studies Degree in Bioengineering Systems
Capstone: *Data Extraction and Modeling to Improve the Survival of Critically Ill Patients*

College of Creative Studies, University of California, Santa Barbara 2007
B.A. in Physics with Honors

RESEARCH EXPERIENCE

Postdoctoral Scholar Research Associate, University of Southern California (USC) 2020-2021
Division of Biostatistics, Department of Population and Public Health Sciences
Advisor: David Conti, PhD

- Developed an integrated risk and epidemiological model to estimate risk-stratified COVID-19 outcomes for Los Angeles County and analyzed disparities in outcomes across socio-economic and medically at-risk subpopulations
- Developed counterfactual projections of how epidemic dynamics change with varying policy implementations and analyzed how policy decisions may mitigate or aggravate disparities
- Provided regular updates on model-estimated quantities to the Los Angeles County Department of Public Health and ad hoc modeling requests from Chief Science Officer

This work resulted in a first-authored publication in PLOS with LACDPH, a policy brief informing state-level vaccination policy in CalMatters, a manuscript submitted to MMWR Weekly, and two manuscripts in preparation. Awarded funding from a Keck Foundation COVID-19 Rapid Research Grant, and a consultantship on a University of California funded project using travel

activity data and an agent-based model to explore intervention policy analysis in Los Angeles County.

NIH Postdoctoral Fellow, University of Southern California (USC) 2019-2021

Division of Health Behavior Research, Department of Population and Public Health Sciences
Advisor: Kayla de la Haye, PhD

- Conceived of first study to use big data on human mobility from smartphones to study food-seeking behaviors and relationships with nutritional health
- Demonstrated that food-seeking behaviors observed in population-scale mobility data can provide meaningful indicators of food intake and diet-related diseases
- Initiated collaboration with Dr. Esteban Moro and Dr. Sandy Pentland at MIT

This work resulted in a first-author manuscript under review at JAMA Network Open, a reviewed conference proceedings in ACM, and two manuscripts in preparation. Awarded funding from a USC Keck School of Medicine Dean's Pilot Grant and fellowship funding from NIH T32 award.

Postdoctoral Fellow, Kühne Logistics University, Germany 2016-2018

Division of Transportation Modeling and Policy
Advisor: Hanno Friedrich, PhD

- Developed multi-scale spatio-temporal mathematical models of foodborne disease contamination transmission across the German food supply system and logistic models of food flows between retailers and consumers using transport survey data
- Evaluated application of models of foodborne disease outbreak source identification developed in my PhD work to recent large-scale outbreaks of foodborne disease in Germany

This work resulted in 4 publications in The Journal of the Royal Society (first author), Annual Reviews in Food Science and Technology, IJERPH (first author was mentored student), a reviewed conference proceedings, a book chapter, a preprint, and a manuscript in progress. Awarded funding from the German Research Foundation (DFG) and a €450,000 grant from German Federal Ministry of Education and Research (BMBF).

Research Scientist, German Federal Institute for Risk Assessment (BfR), Germany 2017-2018

Division of Epidemiology, Zoonoses, and Antibiotic Resistance

- Implemented and documented contaminated source identification models and algorithms via Institute's internal platform "Food Risk Labs" as a decision-making tool for use during foodborne disease outbreaks
- Shared tools and documented examples with decisionmakers via briefings and reports to inform future applications and tool development, as well as investments into building a center around food supply chain modeling infrastructure and algorithms.

Work resulted in a new center at the BfR devoted to building modeling infrastructure for food supply chain models and tools for tracing outbreak sources, including 2 new hires for this center. I was awarded fellowship funding from the Bayer Foundation.

Graduate Student, Massachusetts Institute of Technology 2010-2016

Institute for Data, Systems, and Society
Co-Advisors: Richard Larson, PhD; Stan Finkelstein, MD

- Developed and evaluated network-theoretic methods for identifying the source of large-scale foodborne contamination events
- Developed stochastic models of foodborne contamination transmission processes and network models of US food supply structures and commodity flow dynamics
- Designed a decision model for guiding investigators to implement effective interventions

This work resulted in a publication in Omega. Awarded funding from the Robert Wood Johnson Foundation.

Graduate Student, Instituto Superior Técnico, Portugal 2009-2010

Departments of Bioengineering Systems and Mechanical Engineering

Advisor: João C. Sousa, PhD

- Applied optimization, machine learning, and data extraction methods to construct a classification model of prognosis of sepsis patients to improve survival

This work resulted in peer-reviewed publications in Expert Systems with Applications and the proceedings of the IFAC. Fellowship funding awarded by the Rotary Club.

PUBLICATIONS

* To indicate mentored student
† To indicate authors contributed equally

Manuscripts submitted or under review *(available upon request)*

1. Bulle-Bueno, B., **Horn, A.**, Bahrami, M., Bell, B.*, Bozkaya, B., de la Haye, K., Pentland, S., Moro, E. "You are where you eat: Effect of mobile food environments on fast food visits." *medRxiv*, **2022**. Available at: https://www.medrxiv.org/content/10.1101/2022.09.20.22280128v1
2. Seo, D., **Horn, A.**, Abeliuk, A., Burghardt, K. "What's On the Menu? Towards Predicting the Nutritional Quality of a Restaurant Menu." *Under review*
3. **Horn, A.**, Fuhrmann, M., Schlaich, T.*, Balster, A., Filter, M., Polozova, E.*, Kaesbohrer, A., Friedrich, H. "Information-theoretic methods for food supply network identification in foodborne disease outbreaks" *Preprint.*

Peer-Reviewed Publications

4. **Horn, A.**, Bell, B., Bulle-Bueno, B., Bahrami, M., Bozkaya, B., Wilson, J., Cui, Y., Pentland, S., Moro, E., de la Haye, K. Population mobility data provides meaningful indicators of fast food intake and diet related diseases in diverse populations. *Nature Partner Journals (npj) Digital Medicine*. **2023**; 10.1038/s41746-023-00949-x.
5. Lee, B.Y., Ordovás, J.M., …, **Horn, A.**, …, Parks, E. Research Gaps and Opportunities in Precision Nutrition: An NIH Workshop Report. *American Journal of Clinical Nutrition*. **2022**; 116(6):1877-1900.
6. **Horn, A.**, Jiang, L., Washburn, F., Hvitfeldt, E., de la Haye, K., Nicholas, W., Simon, P., Pentz, M., Cozen, W., Sood, N. and Conti, D.V., 2021. "An integrated risk and epidemiological model to estimate risk-stratified COVID-19 outcomes for Los Angeles County: March 1, 2020—March 1, 2021" *PLOS One*, *16*(6), p.e0253549, **2021.** *Jointly devised the aims and designed the study, developed the model, led the data analysis, and wrote the manuscript.*
7. Deng, X., Cao, S., **Horn, A.** "Emerging Applications of Machine Learning in Food Safety" *Annual Reviews in Food Science and Technology*, Volume 12, pp.513-538, **2021.** *Wrote section of the manuscript describing the use of Novel Data Streams (NDS) and machine learning in food safety.*
8. Liu, I.*, Abeliuk, A., de la Haye, K., **Horn, A.** "A continuous indicator of food environment nutritional quality." *Proceedings of August 15 KDD Workshop on Data-driven Humanitarian Mapping, 27th ACM SIGKDD Conference*. ACM, New York, NY, USA, 7 pages, **2021.** *Primary advisor to I. Liu; devised the aims, designed the study, contributed to data analysis, and led manuscript writing.*
9. Schlaich, T.*, **Horn, A**., Fuhrmann, M., & Friedrich, H. "A Gravity-Based Food Flow Model to Identify the Source of Foodborne Disease Outbreaks." *International Journal of Environmental Research and*

Public Health, *17*(2), 444, **2020**. *Master's thesis committee of T. Schlaich; contributed to designing the study, developing the models, data analysis, and manuscript writing.*

10. **Horn, A.**, Friedrich, H. "Locating the source of large-scale outbreaks of foodborne disease" *Journal of the Royal Society Interface,* 16(151), 20180624. PMID: 30958197, **2019.** *Designed the study, designed the model, led the data analysis, and wrote the manuscript.*
11. **Horn, A.**, Friedrich, H. "The Network Source Location Problem in the Context of Foodborne Disease Outbreaks" *In Ghanbarnejad F., Saha Roy R., Karimi F., Delvenne JC., Mitra B. (Eds), Dynamics On and Of Complex Networks, Springer Proceedings in Complexity*, pp. 151-165, **2019**. *I joinly designed the analysis and led writing of the manuscript.*
12. Schlaich, T.*, Friedrich, F., **Horn, A**. "A Gravity-Based Approach to Connect Food Retailers with Consumers for Traceback Models of Food-Borne Diseases." *Proceedings of the International Conference on Complex Networks and Their Applications*, Springer, Cham., 10 pages, **2019.** *Master's thesis committee of T. Schlaich; contributed to designing the study, developing the models, analyzing the data, and writing the manuscript.*
13. Liu, X.†, **Horn, A.**†, Su, J., Jiang, J. "A Universal Measure for Network Traceability" *Omega: The International Journal of Management Science*, 10.1016/j.omega.2018.09.004, **2018. († contributed equally).** *Jointly devised the aims, designed the study, carried out the data analysis, and wrote the manuscript.*
14. Cismondi, F., **Horn, A.**, Fialho, A., Vieira, S., Reti, S., Sousa, J., Finkelstein, S. "Fuzzy multi-criteria decision-making to improve survival prediction of ICU septic shock patients" *Expert Systems with Applications*, 39(16), 12332 – 12339, **2012**. *Contributed to designing the study application and developing the model; led the data analysis.*
15. **Horn, A**., Cismondi, F., Fialho, A., Vieira, S.M., Sousa, J.M., Reti, S., Howell, M., & Finkelstein, S. (2011). "Multi-Objective Performance Evaluation Using Fuzzy Criteria: Increasing Sensitivity Prediction for Outcome of Septic Shock Patients" *Proceedings of the 18th International Federation of Automated Control (IFAC) World Congress, Milan, Italy, 6 pages,* **2011**. *Contributed to designing the study application and developing the model, led the data analysis and manuscript writing.*

Policy briefs and reports

- Rodier, C., **Horn, A.**, Zhang, Y., Kaddoura, I., Müller, S. "Effectiveness of Nonpharmaceutical Interventions to Avert the Second COVID-19 Surge in Los Angeles County: A Simulation Study." *Study Report,* 2023. Available at: https://escholarship.org/uc/item/5f78h654
- Sood, N., **Horn, A.**, Conti, D. "Those previously infected with COVID-19 should delay getting a vaccination" *CalMatters*, **2021**. *Contributed to designing the study, developed of the model, conducted data analysis, and contributed to manuscript writing.*
- **Horn, A.,** Deng, X., Cao, S. "Emerging Opportunities for Machine Learning in Food Safety: Potential and Pitfalls." *Food Safety Magazine*, **2021.** *Led manuscript writing.*

Software

- **Horn, A**. *FoodItemID: Information-theoretic methods for food supply network identification in foodborne disease outbreaks (R and Matlab)*, **2021**. URL: https://abigailhorn.github.io/FoodItemID/
- Liu, I., Abeliuk, A., **Horn, A**. *MenuAnalysis: Analyze nutritional content of menus of different food venues in LA (Python)*, **2021**. URL: https://sites.google.com/view/continuous-food-indicator/home
- **Horn, A**. *COVID-19 Risk-Stratified Stochastic Epidemic Model for Los Angeles County (R),* **2020.** URL: https://abigailhorn.github.io/COV2-LA/

- Polozova, E.* and **Horn, A.** *FoodborneSourceID*: *Locating the Source of Outbreaks on Networks (Matlab)*, **2017.** URL: https://elenapolozova.github.io/locating-outbreak-source.

CONFERENCES AND LECTURES

Organized Symposia

Horn, A., Menichetti, G. "Networks in Food Systems and Nutrition (FoodNutri)", Satellite at the *International School and Conference on Network Science (NetSci), Burlington, May 2019*. URL: http://foodnutri-netsci.org/

- Featured 50+ registered participants, 3 invited keynote speakers, and 10 contributed talks across four research areas: food supply networks and food environment; food science, technology, and health implications; population health networks and tracking technologies; and network medicine.
- Received the *Young Scientist Award for Best Satellite at Network Science Society* ($1,000)

Invited Panel and Symposia Presentations

- Symposium lecture at the 2022 Nanoscale Science and Engineering for Agriculture and Food Systems Gordon Research Conference, "Opportunities for Big Data and Mathematical Models of the Food Supply System for Food Safety Risk Assessment," **2022**.
- Panelist in Unequal Impacts of COVID-19 Session at the Southern California Association of Governments *(SCAG) and USC 32nd Annual Demographic Workshop*, Los Angeles (Virtual), **2021**.
- Panelist in *Systems Science, Data Science, and Computational Analytics Session at the NIH Precision Nutrition: Research Gaps and Opportunities Workshop*, NIH (Virtual), **2021**.
- Panelist in the *Transdisciplinary Innovations to Assess and Change Local and Global Food Systems to Support Healthy Eating Symposium, Society for Behavioral Medicine (SBM) Annual Meeting*, "Objective measurements of food environment exposure and access in Los Angeles from big mobility data," **2020** (cancelled due to COVID-19).
- Symposium lecture in *Food Safety and Big Data Analytics Session, International Association for Food Protection (IAFP) Annual Meeting,* Louisville, "Opportunities for Big Data and Mathematical Modeling in Mitigating Foodborne Disease Outbreaks," **2019**.
- Symposium lecture at the *Nutrition Data Summit, Tufts Friedman School of Nutrition Science and Policy*, Boston, "Mathematical Modeling and Computational Tools to Identify the Source of Outbreaks of Foodborne Disease," **2018**.

Selected Oral Presentations

- **Horn, A.**, Bell, B., Bulle-Bueno, B., Bahrami, M., Bozkaya, B., Wilson, J., Cui, Y., Pentland, S., Moro, E., de la Haye, K. "Investigating mobility-based fast food outlet visits as indicators of dietary intake and diet-related disease." *International Conference on Computational Social Science (IC^2S^2)*, University of Chicago, **2022**.
- Liu, I., Abeliuk, A., de la Haye, K., **Horn, A.** "A continuous indicator of food environment nutritional quality." *August 15 KDD Workshop on Data-driven Humanitarian Mapping, 27th ACM SIGKDD Conference*, New York (Virtual), **2021.**
- **Horn, A.**, Fuhrmann, M., Friedrich, H. "Network-based signal detection to identify emerging foodborne disease outbreaks." *International School and Conference on Network Science (NetSci2020),* Rome (Virtual), **2020**.

- Bahrami, M., **Horn, A.**, de la Haye, K., Moro, E., Pentland, S. "Leveraging Big Mobility Data to Understand Food Access and Eating Behavior Beyond the Neighborhood." *International Conference on Computational Social Science (IC^2S^2)* (Virtual), **2020**.
- **Horn, A.**, Friedrich, H. "Identifying the Food and Location Source of Large-Scale Outbreaks of Foodborne Disease," *International Conference on Computational Social Science (IC^2S^2),* Amsterdam, **2019**.
- **Horn, A.** "Identifying the source of large-scale outbreaks of infectious disease," *Southern California Applied Mathematics Symposium (SOCAMS)*, Caltech, **2019**.
- **Horn, A.**, Fuhrmann, M., Kaesbohrer, A., Weiser, A., and Filter, M. "Identifying the Food and Location Source of Large-Scale Outbreaks of Foodborne Disease," *International Association for Food Protection (IAFP) Annual Meeting*, Salt Lake City, **2018**.
- **Horn, A.**, Polozova, E., and Friedrich, H. "Identifying the Food and Location Source of Large-Scale Outbreaks of Foodborne Disease," *International School and Conference on Network Science (NetSci),* Paris, **2018**.
- **Horn, A**. "Modeling Food Supply System Network Structure," *Workshop on Food Complexity and Nutrition, International Conference on Complex Systems*, Boston, **2018**.
- **Horn, A.**, and Friedrich, H. "Identifying the source of large-scale outbreaks of infectious disease," *German Physical Society (DPG) Spring Meeting, Physics of Socio-Economic Systems Division*, Technical University of Berlin, **2018**.
- **Horn, A.**, Polozova, E., and Friedrich, H. "Source Detection in Networks Weighted by Temporal and Volume Dimensions." *Contagion on Networks Satellite, International School and Conference on Network Science (NetSci)*, Indianapolis, **2017**.
- **Horn, A.** "Spatio-temporal Origin Location During Outbreaks of Foodborne Disease." *Epidemics Symposium at the Conference on Complex Systems (CCS)*, Amsterdam, **2016**.
- **Horn, A.**, Finkelstein, S., and Larson, R. "Contaminations of the Food Supply Chain: Rapid Targeting of Sources with Modern Data Analytics." *International Association for Food Protection (IAFP) Annual Meeting*, St. Louis, **2016**.
- **Horn, A.**, Finkelstein, S., and Larson, R. "Tracing Sources of Food Contamination." *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Philadelphia, **2015**.

Selected Invited Talks

- "Information-theoretic methods for food supply network identification in foodborne disease outbreaks," *Networks Seminar,* ***University of Oxford Mathematical Institute***, Oxford, UK (Virtual), November **2021**.
- "Epidemic Modeling to Demonstrate the Impact of Vaccination Rates on COVID-19 Cases, Hospitalizations, and Deaths in Los Angeles County," ***COVID-19 Pandemic Research Center, University of Southern California***, Los Angeles (Virtual), November **2021.**
- "Food system network modeling utilizing novel data streams to prevent foodborne diseases," *IBM Research Seminar Series,* ***IBM Research Almaden***, San Jose (Virtual), October **2020**.
- "Opportunities for Big Data in Preventing and Mitigating Foodborne Disease Outbreaks," ***Center for Food Safety 27th Annual Meeting***, University of Georgia, March **2020**.
- "Modeling Food Supply System Structure to Trace Outbreak Origins," *Science and Technology Seminar Series,* ***US Department of Agriculture Food Safety and Inspection Service (USDA-FSIS)***, Washington DC, September **2018**.

- "Integrating Network Modeling and Emerging Data Sources to Approach Large-Scale Problems in Public Health." *Workshop: Perspectives on Complex Systems,* ***Institute for Theoretical Physics, TU Berlin***, December **2018**.
- "Modeling Food Supply System Structure to Trace Outbreak Origins," ***Network Science Institute, Barabasi Lab, Northeastern University***, Boston, September **2018**.
- "Large-scale Spatial Epidemiological Approaches to Trace Outbreak Origins," *National Infection Service,* ***Public Health England***, London, UK, September **2018**.
- "Modeling Food Supply System Structure to Trace Outbreak Origins," *Gastrointestinal Infections, Zoonoses and Tropical Infections, Infectious Disease Epidemiology,* ***Robert Koch Institute****,* Berlin, Germany, August **2018**.
- "A Digital Epidemiology Approach to Identify the Source of the 2011 E.coli/EHEC Outbreak." *HealthMap Research Group Seminar****, Harvard Medical School***, June **2017**.
- "Algorithms and Data for Source Detection During Outbreaks of Infectious Disease." *Data Science Applications Seminar Series,* ***Black Swan Data Company***, London, UK, May **2017**.
- "Locating the Source of Large-Scale Outbreaks of Foodborne Disease." Operations Research Seminar, ***Kühne Logistics University***, Hamburg, Germany, October **2016**.

RESEARCH GRANTS (TOTAL CONTRIBUTED TO: $3,000,000)

Ongoing Funded Research

June 2023 – May 2024 *ChefRecs: A.I.-Driven Meal Prescriptions To Meet Sociocultural and Nutritional Dietary Needs*
PI: Abigail Horn, PhD
Information Sciences Institute Keston Exploratory Research Award, **$100,000**
Role: PI. I developed this project, including acquiring data and partnership with dieticians in organ transplant, to apply techniques from machine learning to recipe data to develop a mobile app that will support clinicians in implementing meal prescription interventions that are tailored to the needs of patients with diverse sociocultural backgrounds and food preferences.

June 2022 – Dec 2023 *MenuAnalysis: Analyzing Digital Menu Data to Characterize Nutritional Quality of Food Environments in Los Angeles*
PI: Abigail Horn, PhD
USC Keck School of Medicine Dean's Pilot Grant, **$50,000**
Role: PI. I developed this project, including acquiring data and community partnerships, to apply techniques from machine learning to digital menu data to quantify the nutrition of food sold in restaurants and evaluate nutritional disparaties in the restaurant food environment.

Oct 2021 – Sep 2024 *Using Community Partnerships, Novel Data Streams, and a Data Portal to Strengthen Food Systems, Security, & Justice*
PI: Kayla de la Haye, PhD
National Science Foundation, S&CC-IRG Track 1: Smart & Connected Community Food Systems, **$2,054,156**
Role: Co-investigator (budgeted at 2.4 months/year). I helped to develop the data analytics aim of the proposal.

Prior Funded Research

Mar 2020 – Dec 2022 *Using Big Mobility Data to Map the Food Environments of Diverse Los Angeles Residents*
Pis: Kayla de la Haye, PhD; Esteban Moro, PhD; Sandy Pentland, PhD
USC Keck School of Medicine Dean's Pilot Grant, **$40,000**
Role: Co-author and co-investigator (no effort funded). I worked with Dr. de la Haye to devise the aims and write the proposal. I have led the design and implementation of the data analysis approach.

Jan – Dec 2021 *Incorporation of risk factors in a multi-population stochastic epidemiological COVID-19 model for Los Angeles County*
PI: David Conti, PhD
W.M. Keck Foundation, COVID-19 Rapid Research Fund, **$70,000**
Role: Co-investigator (full time). My work to develop mathematical models of COVID-19 transmission in Los Angeles County was the basis for this grant. I designed and carried out the data science analysis and modeling approach with Dr. Conti.

Sep 2021 – Aug 2024 *FoodDecide: Digital Technologies for Food Safety Decision Support*
PI: Matthias Filter, Diplom Biochemiker
German Federal Ministry of Education and Research (BMBF), **€450,000**
Role: Advisory board member. My postdoctoral work at Kuhne Logistics University and the German Federal Institute for Risk Assessment was the basis for this award.

Jan – May 2022 *Enhanced Analysis of COVID-19 Interventions with Travel Activity Data in Los Angeles County*
PI: Caroline Rodier, PhD
University of California Institute of Transportation Studies, COVID-19 Research Fund, **$100,000**
Role: Consultant. I contributed to the calibration of the epidemiological aspects of the Agent Based Model and designed the model simulation outcome analysis approach across key at-risk populations.

Jan – Dec 2021 *Incorporation of risk factors in a multi-population stochastic epidemiological COVID-19 model for Los Angeles County*
PI: David Conti, PhD
W.M. Keck Foundation, COVID-19 Rapid Research Fund, **$70,000**
Role: Co-investigator (full time). My work to develop mathematical models of COVID-19 transmission in Los Angeles County was the basis for this grant. I designed and carried out the data science analysis and modeling approach with Dr. Conti.

Jan – Dec 2017 *Modeling transport and logistic systems for insight into foodborne disease dynamics*
PIs: Abigail Horn, PhD; Hanno Friedrich, PhD
German Research Foundation (DFG), **$10,000**
Role: Co-Principal Investigator (full support). My PhD work to develop mathematical models of foodborne disease transmission was the basis for this award. I wrote the proposal. I designed and carried out the data analysis and modeling approach with Dr. Friedrich.

Sep 2013 – Jun 2016 *Creating a predictive modeling tool to improve the ability to trace sources of contamination during a foodborne outbreak*
PIs: Stan Finkelstein, MD; Richard Larson, PhD
Robert Wood Johnson Foundation Public Health Systems and Services Research, **$200,000**
Role: Graduate student co-investigator (full support). I wrote the proposal and designed the study. I designed and led the modeling approach with Dr. Finkelstein and Dr. Larson.

FELLOWSHIPS & AWARDS (TOTAL: $170,000)

Top Poster Award, Health Equity in Action Annual Workshop of the NIH National Institute on Minority Health and Health Disparities Research Coordinating Center to Reduce Disparities in Multiple Chronic Diseases (RCC-RD-MCD)	2022
NIH T32 Postdoctoral Fellowship ($97,608)	2019-2020
Young Scientist Award for Best Satellite at Network Science Society ($1,000)	2019
Bayer Foundation Fellowship ($6,000)	2016-2017
International Association for Food Protection (IAFP) Travel Award ($1,000)	2016
Santa Fe Institute for Complex Systems Summer School Travel Award ($3,000)	2012
MIT Engineering Systems Division Research Award ($24,000)	2011-2013
Rotary Club Ambassadorial Scholarship ($30,000)	2009-2010
UCSB Environmental Studies Department Research Award ($2,000)	2007
UCSB Summer Undergraduate Research Award in Nanotechnology ($2,500)	2006

TEACHING EXPERIENCE

University of Southern California, Department of Population and Public Health Science

Course developer and instructor Spring 2023
Course: Introduction to Health Analytics (ISE 599 Special Topics)
Responsibilities: Developed course materials and taught this course (3 units).

Instructor Spring 2022
Course: Data Analysis (PM511a)
Responsibilities: I will serve as primary instructor of this course on introduction to biostatistics and regression analysis for the Online Masters of Public Health – Biostatistics Concentration students.

Co-instructor Fall 2021
Course: Introduction to Public Health Data Science (PM566)
Responsibilities: I led 2 1.5-hour lectures and two 3-hour interactive lab sessions in R on interactive visualization and website creation, created and graded a homework assignment, and oversaw final projects.

Course co-developer and co-instructor (with Meredith Franklin, George Vega Yon, Emil Hvitfeldt) Fall 2020

Course: Introduction to Public Health Data Science (PM566) (Virtual)

Responsibilities: I attended planning meetings and helped design curriculum for this first offering of this required course for Health Data Science Master's students. I developed and taught two 1.5-hour lectures and two 3-hour interactive lab sessions in R on interactive visualization and website creation, and created a homework assignment.

Guest lecturer Fall 2020

Course: Introduction to the Theory of Statistics (PM522a) (Virtual)

Responsibilities: I taught a 1.5-hour lecture on Markov Chains and Markov Processes.

Advisor Fall 2020

Course: R Bootcamp for Scientific Computing (Virtual)

Responsibilities: I oversaw development of workshop curriculum, advised Ph.D. student presenters, and fielded questions during the workshop.

Guest lecturer Fall 2019

Course: Introduction to the Theory of Statistics (PM522a)

Responsibilities: I developed and taught a 1.5-hour lecture on Markov Chains and Markov Processes. The lecture involved interactive components including think-pair-share and Q&A.

Guest lecturer Fall 2019

Course: Spatial Statistics (PM569)

Responsibilities: I developed and taught two 1.5-hour theory-based lectures and two 2-hour interactive labs in R on spatial Poisson processes. I also developed a homework assignment.

Massachusetts Institute of Technology, Institute for Data, Systems, and Society

Course co-developer and co-instructor (with M. Peña-Alcaraz) Winter 2015

Course: Probabilistic Models and Tools for Research (IAP)

Responsibilities: I designed and taught a short course (5 modules, 15 hours) on probability modeling for application in engineering systems research. This included developing lecture materials, exercise, and live demos. The material developed in this short course was later used in Quantitative Methods in Systems Engineering courses at Carnegie Mellon University and George Washington University.

Guest lecturer Spring 2014

Course: Models, Data and Inference for Socio-Technical Systems (15.078)

Responsibilities: I developed and taught two lectures introducing students to probabilistic simulation and sampling from random variables, and led a live simulation demo.

Teaching assistant and recitation leader Spring 2014

Course: Models, Data and Inference for Socio-Technical Systems (15.078)

Responsibilities: I developed and led 3-hour long weekly recitations and problem sessions on fundamental and applied probability, co-designed and graded assignments, and supervised student projects. Overall student rating: 6.8/7.0.

Curriculum development research assistant Spring 2014

Course: Introduction to Engineering Systems (ESD.101)

Responsibilities: I was a member of a small team working to design curriculum for the semester-long required course for Engineering Systems Master's students at a new university MIT co-created (Singapore University of Technology and Design). I participated in planning the course syllabus, and developed materials including teaching notes, lecture slides, recitation slides, and assignments.

Teaching assistant 2011- 2013

Course: Principles and Practices of Drug Development (15.136)

Responsibilities: I supervised student projects including designing guidelines, assignments, and participating in evaluation. I oversaw course logistics. Overall student rating: 6.5/7.0.

Teaching assistant Fall 2011

Course: Introduction to Engineering Systems (ESD.00)

Responsibilities: I designed and supervised the undergraduate project, "Modeling improvements in the stroke care pathway to improve length and quality of life." I planned and led weekly recitations, developed assignments, and participated in student evaluation. Overall student rating: 6.7/7.0.

University of California, Santa Barbara

Course co-developer and co-lecturer (with V. Frankel, supervised by Dr. Mel Manalis) Spring 2007

Course: Introduction to Industrial Ecology (ENV S 118)

Responsibilities: I designed and taught this introductory course on industrial ecology for upper-class undergraduate Environmental Science majors. This included developing curriculum, assignments, and projects; structuring course goals; preparing lectures; and consulting individually with students. I received an award ($2,000) to draft a report on my learnings from teaching industrial ecology to undergraduates.

MENTORSHIP

University of Southern California

Alex DongHyeon Seo, Master of Data Science student 2022-2023

Project: MenuAnalysis: Analyzing Digital Menu Data to Characterize Nutritional Quality of Food Environments in Los Angeles

Brooke Bell, PhD Student Research Assistant, Department of Preventative Medicine 2020-2021

Project: Food Environments and Big Mobility Data

Dr. Bell is a co-author on one submitted manuscript and one manuscript in preparation.

Tao Huang, Master of Science in Biostatistics student 2021

Master's Thesis: Fine-Grained Analysis of Temporal and Spatial Differences of Behavior Patterns and Their Correlation with the Spread of COVID-19 in LA County

Chui Yi (Iris) Liu, Master of Science in Data Science student 2020-current

Project: Big of Food Environment Nutritional Quality Data Analysis to Define Continuous Indicators
I. Liu is a co-author on a peer-reviewed publication and a manuscript in preparation.

Julia Chen, Master of Science in Data Science student — 2021-current
Project: COVID-19 Epidemic Modeling for LA County

5 students, USC Center for Knowledge-Powered Interdisciplinary Data Science (CKIDS); Master of Science in Data Science students — 2020
Project: Tracking Health and Nutrition Signals from Social Media Data

Jack Ralston, HP490 Directed Research — 2019
Project: Using Secondary Sources of Big Data to Study Food Environments

5 students, USC Center for Knowledge-Powered Interdisciplinary Data Science (CKIDS); Master of Science in Data Science students — 2019
Project: Measuring Dietary Behavior From Instagram

Kühne Logistics University

Sandra Rudeloff, PhD in Global Logistics & Supply Chain Management — 2020-current
PhD Thesis: Time-Based Approaches to Identify Sources of Foodborne Disease Outbreaks
I am a member of the PhD Dissertation Committee of S. Rudeloff.

Tim Schlaich, Master of Science in Global Logistics & Supply Chain Management — 2018-2019
Master's Thesis: Gravity Models of the Food Supply System Connecting Food Retailers With Consumers
T. Schlaich is a co-author on two peer-reviewed publications. I was a member of his Masters Thesis Committee.

Massachusetts Institute of Technology (MIT)

Elena Polozova, Undergraduate Research Opportunities Program (UROP) student — 2015-2017
Project: Modeling and Simulation of Network-Based Infectious Disease Diffusion Processes
E. Polozova is a co-author on a submitted manuscript.

Vinati Kaul, Undergraduate Research Opportunities Program (UROP) student — 2012-2014
Project: Risk Assessment for Foodborne Disease Outbreaks

SERVICE

University Service

Associate Director, AI Research for Health (AI4Health) Center — 2022-current
USC Information Sciences Institute

Invited Member, Provost's Research Working Group, Project Restart — 2020-2021
USC Office of Research

Co-Organizer, DataFest 2021-current
USC Center for Knowledge-Powered Interdisciplinary Data Science

Mathematical modeler and data scientist, COVID-19 Epidemic Modeling for LA County 2020-current
USC Division of Biostatistics, Dept. of Population and Public Health Sciences

Member, Data Science Group, COVID-19 Pandemic Research Center 2021-current
USC Dept. of Population and Public Health Sciences

Data Science Senior Fellow & Student Advisor 2019-current
USC Center for Knowledge-Powered Interdisciplinary Data Science

Member, Center for Applied Network Analysis 2019-current
USC Dept. of Population and Public Health Sciences

Mathematical modeler, USC Student Health COVID-19 Testing Strategy 2020-current
USC Keck School of Medicine

Co-Chair of Academic Track Programing; Keck Post-doctoral Advisory Council 2019-2020
USC Keck School of Medicine

2015-2016
Member, Student Task Force*
MIT Engineering Systems Division
** For the creation of a new academic unit in the fields of socio-technical systems, information, decision systems and statistics*

Co-Chair of Weekly Research Forum, ESD Student Society 2013-2015
MIT Engineering Systems Division

Professional Service

Member, Program Committee 2021-2022
Data-driven Humanitarian Mapping Symposium, ACM Conference on Knowledge Discovery and Data Mining

Member, Program Committee 2019-2021
International Conference on Computational Social Science (IC2S2)

Organizer, Networks in Food Systems and Nutrition (FoodNutri) Satellite 2020
International School and Conference on Network Science (NetSci)

Member, Food Chain Labs 2017-2018
German Federal Institute for Risk Assessment (BfR), Unit of Epidemiology, Zoonoses and Antimicrobial Resistance

Selected Community Service and Leadership

Smart and Connected Food System Working Group Member 2022-2023
Los Angeles County Food Equity Roundtable, Chief Sustainability Office

- Sharing expertise on most important areas for improvement and initiatives that involve innovative and new uses of data, technology and smart tools, to help

modernize LA County's food system so that it more effectively provides healthy, sustainable food for all people

Epidemological Modeler 2020-2021

Los Angeles County Department of Public Health (LACDPH)

- Providing estimates of COVID-19 epidemic parameters for LA County and other model-based analyses as requested by LACDPH's Chief Science Officer

Multimedia Lesson Developer 2013-2014

BLOSSOMS Open Source Math and Science Video Lessons for High School Classes, Massachusetts Institute of Technology

- Developed in-class video lesson, accompanying math teaching materials, and computer animation tool based on the "Tragedy of the Commons" concept. Available at https://blossoms.mit.edu/videos/lessons/tragedy_commons

Co-Chair, Environmental Affairs Board 2005-2007

University of California, Santa Barbara

- Led weekly officer and general membership meetings (to an audience 50+), established and developed long-term campaigns and drafted legislative documents.

Manuscript Review

Scientific Reports *Ad hoc*
BMJ
PNAS
Social Networks
Nature Food
PLOS Computational Biology
Transactions in GIS
Proceedings of the KDD Workshop on Data-driven Humanitarian Mapping

PROFESSIONAL MEMBERSHIPS AND AFFILIATIONS

2018-current	*Network Science Society*
2019-2020	*Society for Behavioral Medicine*
2019-2020	*International Network for Social Network Analysis*
2016-2020	*International Association for Food Protection*
2016-2018	*Complex Systems Society*
2013-2016	*Institute for Operations Research and the Management Sciences*
2012-2014	*Northeast Food and Drug Officials Association*

SOFTWARE

R, Matlab, Latex