

Curriculum Vitae

PERSONAL DATA

Name: Brenna Claire Kelly
Citizenship: United States

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EDUCATION

- | | |
|-----------|---|
| 2023–2025 | PhD Population Health Sciences
Clinical & Translational Epidemiology Emphasis
University of Utah, Salt Lake City
Committee: Robert Silver (Chair), Michelle Debbink, Jen Doherty,
Simon Brewer, Heidi Hanson
Dissertation: Environmental Exposure and Maternal Health:
Toward Better Solutions Using Data Science
GPA: 4.00 |
| 2021–2023 | MS Geography
University of Utah, Salt Lake City
Committee: Simon Brewer (Chair), Richard Medina, Amanda Bakian
Thesis: A Spatiotemporal Analysis of Disparities
in Industry-Source Water-Based Toxin Exposure Risk
GPA: 3.94 |
| 2017–2021 | BUS Population Health Data Science
University of Utah, Salt Lake City
GPA: 3.65 |
| 2014–2016 | Journalism , No Degree
Utah State University, Logan, UT |

RESEARCH INTERESTS

Methods

- Spatiotemporal data analysis • Deep learning with environmental data • Causal inference
- Multiscale modeling • Interpretable machine learning • Bias and missingness
- Data visualization • NLP • Scalable computing

Applications

- Environmental exposures • Population & maternal health • Air pollution
- Industrial chemical pollution • Health disparities • Climate change, heat, wildfires

GRANTS

2024–	Deep learning to integrate mobile and stationary air pollution and temperature monitoring data; Vice President for Research Incentive Seed Grant; Research Associate (PI: Simon Brewer). \$24,000
2022–2023	A novel approach to visualizing pollution exposure patterns in pregnant women; One Utah Data Science Hub Seed Grant; Research Associate (PI: Michelle Debbink, Simon Brewer). \$33,013

EMPLOYMENT

2023–	Research Assistant Robert Silver & Michelle Debbink (Obstetrics & Gynecology) <ul style="list-style-type: none">Analyze associations between air pollution and perinatal complications in a cohort of Utah women over a 20-year periodUse machine learning, statistical methods, high-performance computing, and data visualization
2024–	Data Science Intern Oak Ridge National Laboratory <ul style="list-style-type: none">Project: use diverse datasets to simulate biothreat scenarios using disease propagation models, agent-based models, and a neural networkAI Summer Institute mentee; completed AI Training Series
2024–	Research Assistant Simon Brewer (Geography) & Daniel Mendoza (Atmospheric Science, Internal Medicine) <ul style="list-style-type: none">Apply spatiotemporal deep learning to systematically integrate air quality data
2021–	Scientific Illustrator Freelance <ul style="list-style-type: none">Design schematics, posters, presentations, visual abstracts, and medical graphics
2022–2023	Research Assistant Amanda Bakian (Psychiatry)
2022	Research Assistant Jim VanDerslice (Public Health)
2018–2022	Research Coordinator Surgical Population Analysis Research Core (SPARC), University of Utah
2018	Data Entry Specialist Department of Surgery, University of Utah
2017–2018	Research Assistant Richard Gurgel (Surgery)
2017–2018	Epidemiology Intern Utah Department of Health
2017–2018	Certified Nursing Assistant University of Utah
2016	PR & Marketing Director Utah State University Student Association
2016	Communications Intern USU College of Education & Human Services
2016	News Intern KUTV 2News
2014–2016	Senior Writer, Copy Editor The Utah Statesman
2015	Intern Reporter Utah Public Radio
2014–2015	News Director, Editor Aggie Radio

TEACHING

2024 Fall	Instructor. Geographic analysis and visualization with R (workshop), DELPHI Biomedical Data Science Initiative, University of Utah, planned Sept. 6, 2024
2024 Summer	Instructor. Introduction to spatial data science with R (workshop), Population Health Sciences Department, University of Utah, Aug. 16, 2024
2024 Summer	Teaching Assistant. GEOG 5680: Introduction to R, University of Utah
2023 Summer	Teaching Assistant. GEOG 5680: Introduction to R, University of Utah
2022 Fall	Instructor. Introduction to R tidycensus (workshop), Department of Geography, University of Utah, Sept. 16, 2022
2022 Summer	Teaching Assistant. GEOG 5680: Introduction to R, University of Utah
2022 Spring	Instructor. Research poster design with Adobe Illustrator (workshop), University of Utah, Feb. 13, 2022
2015 Fall	Tutor. Academic Writing Center, Utah State University
2015 Fall	Teaching Assistant. USU 1300: U.S. Institutions, Utah State University

Mentorship

Undergraduate Students

2024–	Raleigh Gardner, Trinity Whitfield, Celeste Dean — Solutions Scholars, University of Utah, Project title: Text analysis of industrial water pollution in Salt Lake County
2024–	Lola Maldonado — Biology and Environmental Studies, Brown University
2023	Qianxi Xie — Women’s Resource Center Mentorship Program, University of Utah
2020	Nathan Driggs — Surgical Population Analysis Research Core, University of Utah, Project title: Guidelines for ICD Code Mapping

Graduate Students

2024–	Jenna Murray — Peer Mentorship Program, Clinical & Translational Epidemiology, University of Utah
2024	Vinny Jodoin — Biostatistics & Bioinformatics Group, Oak Ridge National Laboratory
2021–2023	Serena Madsen, Taylor Lundquist — Peer Mentorship, Geography, University of Utah

PUBLICATIONS

Peer-reviewed manuscripts:

Kelly BC, Brewer SC, Schwartz JD, Holmes HA, Silver RM, Debbink MP. Linking multiple air quality exposures to pregnancy outcomes with high-dimensional data reduction. (*In prep for PLOS One*).

Kelly BC, Cova TJ, Debbink MP, Onega T, Brewer SC. Racial and ethnic disparities in regulatory air quality monitor locations in the United States. (*In prep for Geographical Analysis*).

Kelly BC, Brewer SC, Medina RM, Bakian AV. Racial and ethnic disparities in health risk from industrial surface water pollution in the United States, 2011–2021. (*Under review at Health & Place*).

Stephens CE, Tay D, Jacob E, Hollingshaus M, Goodwin R, **Kelly B**, Smith K, Ellington L, Utz R, Ornstein K. Family Ties at End-of-Life: Characteristics of Nursing Home Decedents With and Without Family. *Palliat Med Rep*. 2023;4(1):308-315. 2023 Nov 16. DOI:10.1089/pmr.2023.0023

Kelly BC, Hanson HA, Hollingshaus MS, Meeks HD, Tay DL, Stephens CE, Ellington L, Smith KR. Familial and social determinants of place of death: insights from the Utah Population Database, 1998-2016. *Death Stud*. 48(7), 663–675. 2023 Sept 7. DOI: 10.1080/07481187.2023.2255864

Shyr DC, **Kelly B**, Brewer SC. Predicting Relapse In Pediatric Patients with Acute Leukemia Undergoing Stem Cell Transplant Using Interpretable Machine Learning: A Proof-of-Concept Study of Applying Machine Learning. *Pediatr. Blood Cancer*, 69. 2022 June 1.

Kelly BC, Brewer SC, Hanson HA. Disparities in Distance to Abortion Care Without Roe v. Wade. *Utah Women's Health Review*. 2022 May 9. DOI: 10.26054/od-4zt7-ts67

Gurgel RK, Cardon BR, Allen CM, Presson AP, **Kelly BC**, Hopf HW, Choi SS, Miller RH. Evaluating gender parity in operative experience for otolaryngology residencies in the United States. *Laryngoscope*. 2020 Jul;130(7):1651-1656.

Tonna JE, Hanson HA, Cohan JN, McCrum ML, Horns JJ, Brooke BS, Das R, **Kelly BC**, Campbell AJ, Hotaling J. Balancing revenue generation with capacity generation: case distribution, financial impact and hospital capacity changes from cancelling or resuming elective surgeries in the US during COVID-19. *BMC Health Serv Res*. 2020 Dec 3;20(1):1119.

Conference presentations:

Kelly BC (poster), Brewer SC, Mendoza D, Jacques A, Johnson CM, Whelan P, Horel JD. “Integrating Mobile and Stationary Air Quality Data with Spatiotemporal Machine Learning.” Air Quality: Science for Solutions, Annual Utah Division Air Quality Conference. March 28, 2024; Ogden, UT

Kelly BC (poster), Brewer SC, Schwartz JD, Holmes HA, Silver RM, Debbink MP. “Visualizing relationships between air pollution exposure and pregnancy outcomes.” 71st Annual Meeting of the Society for Reproductive Investigation. March 15, 2024; Vancouver, BC

Kelly BC (speaker), Brewer SC, Debbink MP. “Visualization of trajectories of air pollution exposures during pregnancy.” Data Exploration and Learning for Precision Health Intelligence (DELPHI) Symposium. Oct 20, 2023; Salt Lake City, UT

Kelly BC (poster), Brewer SC, Bakian AV, Medina RM. “Downstream risks of climate change events and industrial surface water pollution.” USA-European Exposome Symposium: Exposomic Approaches to Prevent the Health Impacts of Climate Change. Apr 29, 2023; Brescia, IT

Kelly BC (speaker, session chair), Cova TJ, Brewer SC. Industrial Pollution and Hazards [session]. “Point pattern analysis of inequity in air quality monitor locations.” 2023 Annual Scientific Meeting American Association of Geographers. Mar 25, 2023; Denver, CO

Kelly BC (poster), Brewer SC, Bakian AV, Medina RM. “Disparities in industrial carcinogenic pollution in surface water: a spatiotemporal Bayesian analysis.” Oncological Data Science Symposium; Feb 28, 2023; Salt Lake City, UT

Kelly BC (speaker), Hanson HA, Hollingshaus MS, Meeks HD, Tay DL, Stephens CE, Ellington L, Smith KR. “Family relationships and social determinants of place of death: insights from the Utah Population Database, 1998-2016.” Gerontological Society of America 2022 Annual Scientific Meeting; Nov 5, 2022; Indianapolis, IN

Invited talks:

- 2024 “Integrating mobile and stationary air quality data with spatiotemporal machine learning.” Air and Waste Management Association (Great Basin Chapter). June 25, 2024; Salt Lake City, UT and remote
- “Analyzing air pollution mixtures with a self-organizing map: deep learning and visualization.” National Air Quality Action Seminar Series. Jan 12, 2024; Salt Lake City, UT and remote

White papers:

- 2020 Horns JJ, Driggs N, **Kelly BC**. Guidelines for Comorbidity Calculation with ICD-10. Surgical Population Analysis Research Core. 2020.
- Kelly BC**, Horns JJ, Driggs N. Guidelines for ICD Code Mapping. Surgical Population Analysis Research Core. 2020.

Published visualizations:

- 2024 Schaeffer A, Eldridge M, Haddad E, et al. Attaining urinary continence for bladder exstrophy patients in Uganda – a framework for patient assessment and for the selection of individualized urinary continence procedure options. Society for Pediatric Urology Annual Congress. **[Figures 1, 2]**
- 2023 Hanson HA. DOE-NCI Collaboration: MOSSAIC for Advancing Computational Models for Cancer Research. Cancer Moonshot Seminar Series. January 26, 2023 **[schematics]**
- 2022 Wright RJ, Hanson HA. A tipping point in cancer epidemiology: embracing a life course exposomic framework. *Trends Cancer*. 2022;8(4):280-282. doi:10.1016/j.trecan.2022.01.016 **[Figure 1]**
- Tonna JE, Selzman CH, Girotra S, et al. Resuscitation Using ECPR During In-Hospital Cardiac Arrest (RESCUE-IHCA) Mortality Prediction Score and External Validation. *JACC Cardiovasc Interv*. 2022;15(3):237-247. doi:10.1016/j.jcin.2021.09.032 **[Central Illustration]**
- 2021 Brecha FS, Ozanne EM, Esplin J, et al. Patient Willingness to Accept Antibiotic Side Effects to Reduce Surgical Site Infection After Colorectal Surgery. *J Surg Res*. 2021;261:417-422. doi:10.1016/j.jss.2020.07.083 **[Cover Design]**
- Patel DP, Punjani N, Guo J, Alukal JP, Li PS, Hotaling JM. The impact of SARS-CoV-2 and COVID-19 on male reproduction and men's health. *Fertil Steril*. 2021;115(4):813-823. doi:10.1016/j.fertnstert.2020.12.033 **[Figures 1, 2]**

HONORS and AWARDS

- 2024 **Mark of Excellence, Research Poster**, Air Quality: Science for Solutions, Utah Department of Environmental Quality annual conference, March 28, 2024, \$100
- 1st Place Poster**, Student Division, 2024 Women’s Health Symposium, University of Utah, May 16, 2024, \$100
- 2023 **Summer Institute in Statistics and Modeling in Infectious Diseases Scholarship**, awarded by the University of Washington to support attendance at a short course on causal inference, \$500
- 1st Place People’s Choice Poster**, Graduate Division, 2023 Wilkes Climate Summit, May 14, 2023, \$500

Geography Travel Grant Award, to support presentation at 2023 Annual Scientific Meeting American Association of Geographers, \$500

- 2022 **Summer Institute in Statistics and Modeling in Infectious Diseases Scholarship**, awarded by the University of Washington to support attendance at a short course on spatial statistics in epidemiology and public health, \$500
- Herbert W. Gustafson Endowed Graduate Fellowship**, College of Social and Behavioral Sciences, University of Utah, \$5000
- Sorenson Legacy Foundation Scholarship**, Women's Resource Center, \$2000
- 1st Place Poster, Graduate Division**, College of Social and Behavioral Sciences Student Research Day Poster Competition, April 26, 2022, \$250
- 2018 **Sean and Catherine Slatter Scholarship**, College of Social and Behavioral Sciences, \$2000
- 2017 **2nd Place Spot News**, Society of Professional Journalists
- 2016 **1st Place Spot News**, Society of Professional Journalists
- Best News Story**, The Utah Statesman
- Mark of Excellence, Breaking News Reporting**, Society of Professional Journalists
- Most Prolific Writer**, The Utah Statesman
- Outstanding Personal Contribution**, Utah State University Student Association
- Wilford D. Porter Memorial Scholarship**, Department of Journalism and Communication, Utah State University
- 2015 **Rookie of the Year**, The Utah Statesman
- 2014 **Rookie of the Year**, Aggie Radio
- Service Scholarship**, Val R. Christensen Service Center, Utah State University

OTHER ACTIVITIES

- 2024– Leadership Committee | Spatial Utah Data Science (SUDS) Group
- 2022 Student Advisory Committee | Department of Geography, University of Utah
- 2022 Visual Arts Guest Lecturer | Hawthorne Elementary School, Salt Lake City
- 2021– Lab Member | Hate, Aggression, Terror and Extremism Research (HATER), University of Utah
- 2021– Member | American Association of Geographers
- 2018 Clinical Research Certificate | University of Utah Research Education
- 2018 Hospice Aid | The Inn Between, Hospice for Homeless
- 2017–2018 Member | Excellent Patience Experience Committee, Inpatient Medical Rehabilitation, University of Utah

MEDIA ENGAGEMENT

Alvey, Rebekah. Texas women to travel farther, spend more for abortions after fall of Roe v. Wade. Dallas Morning News. June 11, 2022. www.dallasnews.com/news/politics/2022/07/11/texas-women-to-travel-farther-spend-more-for-abortion-following-fall-of-ro-v-wade/