Jessica Embury

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Education

Expected 2027   PhD Geography, Joint Doctoral Program
San Diego State University and University of California, Santa Barbara
Committee: Atsushi Nara, Somayeh Dodge, Piotr Jankowski, Trisalyn Nelson

2023   MS Geographic Information Science
San Diego State University
Thesis: *Independent Data Validation to Detect Biases in Synthetic Populations*
Committee: Atsushi Nara, Sergio Rey, Ming-Hsiang Tsou, Sahar Ghanipoor Machiani

2021   BS Geography, with Distinction *summa cum laude*
San Diego State University

Publications

Google Scholar: https://scholar.google.com/citations?user=S9T9YvEAAAAJ&hl=en&oi=ao

Peer-Refereed Publications

1. **Embury, J.**, Dodge, S., Nara, A. (In preparation). Bias in Motion: Unpacking the Sociodemographic Gaps in Mobile Location Data. [journal article]

2. **Embury, J.**, Nara, A., León, K., Herman, T., Rey, S., Solem, M. (2025). Assessing the effects of geocomputation lessons on secondary school students' perceptions of geography and computer science. *Annals of the American Association of Geographers,* 1-25. https://doi.org/10.1080/24694452.2025.2569516 [journal article]

3. **Embury, J.**, Nara, A., Rey, S., Tsou, M. H., & Ghanipoor Machiani, S. (2024). Detecting synthetic population bias using a spatially-oriented framework and independent validation data. *International Journal of Geographical Information Science*, 38(9), 1912–1938. https://doi.org/10.1080/13658816.2024.2358399 [journal article]

4. Nara, A., **Embury, J.**, Velasco, M., Russell, R., Magdy, A., & Dony, C. C. (2024). Preparing for a Career at the Intersection of Geography and Computing: Availability and Access to Training Along Geocomputational Career Pathways. *The Professional Geographer*, 1–29. https://doi.org/10.1080/00330124.2024.2404911 [journal article]

5. Tsou, M. H., Xu, J., Lin, C. D., Daniels, M., **Embury, J.**, Park, J., … Gibbons, J. (2023). Analyzing Spatial-Temporal Impacts of Neighborhood Socioeconomic Status Variables on COVID-19 Outbreaks as Potential Social Determinants of Health. *Annals of the American Association of Geographers*, 113(4), 891–912. https://doi.org/10.1080/24694452.2022.2149460 [journal article]

6. **Embury, J.**, Tsou, M.-H., Nara, A., Oren, E. (2022). A Spatio-Demographic Perspective on the Role of Social Determinants of Health and Chronic Disease in Determining a Population's Vulnerability to COVID-19. *Preventing Chronic Disease*, 19, 210414. http://dx.doi.org/10.5888/pcd19.210414 [journal article]

7. Lowery, B. C., Swayne, M. R., Castro, I., **Embury, J**. (2022). Mapping EBT Store Closures During the COVID-19 Pandemic in a Low-Income, Food-Insecure Community in San Diego. *Preventing Chronic Disease*, 19, 210410. http://dx.doi.org/10.5888/pcd19.210410 [journal article]

8. **Embury, J.**, Nara, A., Jin, C. (2022, November 1). Spatially weighted structural similarity index: A multiscale comparison tool for diverse sources of mobility data. In HANIMOB'22: The 2nd ACM SIGSPATIAL International Workshop on Animal Movement Ecology and Human Mobility Proceedings, 19-22. Seattle, WA. https://doi.org/10.1145/3557921.3565542 [conference paper]

Non-Refereed Publications

1. **Embury, J.**, and Nara, A. (2022, November 10). Closing the Gap between Curriculum and the Professional Realities of the Geospatial Technology Industry. *American Association of Geographers*. https://doi.org/10.14433/2017.0122 [online article]
2. **Embury, J.** (2021). Identification of High-Risk Dry Cleaning Sites in San Diego County: Spatial Analysis. *The Sage Project at San Diego State University*. Available at: https://digitallibrary.sdsu.edu/islandora/object/sdsu%3A139137 [technical report]
3. Tsou, M.-H., Xu, J., Lin, C.-D., Daniels, M., **Embury, J.**, Ko, E., Gibbons, J. (2021). Analyzing Socioeconomic Factors and Health Disparity of COVID-19 Spatiotemporal Spread Patterns at Neighborhood Levels in San Diego County. *medRxiv*. https://doi.org/10.1101/2021.02.22.21251757 [pre-print]

Research Experience

Research Labs

2020-present	Center for Human Dynamics in the Mobile Age (HDMA), San Diego State University Director: Ming-Hsiang Tsou
2024-2025	Movement Data Science Lab, University of California, Santa Barbara Director: Somayeh Dodge

Funded Research Assistantships

2022-2023 National Science Foundation, Award No. 2228419
CIVIC-PG Track B Walk to Healthy Foods: Modeling Community-Based Assets to Increase Healthy Food Access in Underserved Communities
- Assisted with community outreach to food system stakeholders.
- Developed a community-informed hierarchical decision support model to identify sites where new food access would impact the most residents.

2021-2024 National Science Foundation, Award No. 2031407
Collaborative Research: Encoding Geography - Scaling up an RPP to achieve inclusive geocomputational education
- Developed IRB protocols for 3 online Qualtrics surveys designed for professionals, educators, and students.
- Conducted 6 interviews with geospatial industry professionals.
- Coordinated survey administration to more than 200 secondary school students.
- Delivered 1 first-author paper, 1 coauthored paper, 1 online article, and 3 conference presentations.

2021 National Science Foundation, Award No. 2348836
EAGER: Innovation in Society Study Group
- Assisted with the identification of linkages between origin-destination mobility flows and nighttime light remote sensing imagery.
- Conducted an analysis of SafeGraph mobile location data in six major metropolitan areas over a two-year period.

2020-2021   National Institutes of Health, Award No. 3U54CA132384-10S1
             RADx-UP Initiative: Communities Fighting COVID!
             ● Provided location decision support to an interdisciplinary team placing mobile
               vaccination sites in underserved neighborhoods.
             ● Collected, processed, and mapped daily COVID-19 data in San Diego County.
             ● Developed public dashboards using Esri applications for information sharing.

Teaching Experience

2022-present Department of Geography, San Diego State University
              Teaching Assistant
              Course(s): Data Management for GIS, GIS Programming with Python, GIS Scripting
                     Fundamentals
2019   Earth Sciences Department, Grossmont College
              Geography Tutor
              Course(s): Introduction to Geographic Information Science, Physical Geography, Physical
                     Geography Lab, Human and Cultural Geography

Grants and Awards

Competitive Grants and Fellowships

2022-2023   University Graduate Research Fellowship
             College of Graduate Studies, San Diego State University
2022-2023   Completion of Research and Creative Activity Fellowship
             College of Graduate Studies, San Diego State University

Awards and Recognition

2024   Thomas C. Strand Endowed Scholarship in Geography
             Department of Geography, San Diego State University
2024   Student Travel Grant
             86th Annual Conference of the Association of Pacific Coast Geographers
2023   Geography Scholarship
             Department of Geography, San Diego State University
2023   George and Evelyn Parrott Memorial Endowed Scholarship in Geography
             Department of Geography, San Diego State University
2022   ACM SIGSPATIAL Travel Grant
             *30th ACM SIGSPATIAL International Conference on Advances in Geographic Information
                     Systems (ACM SIGSPATIAL 2022)*
2021, 2022   Richard Wright Cartography Award Scholarship
             Department of Geography, San Diego State University
2021-2022   Master's Research Scholarship
             College of Graduate Studies, San Diego State University
2021   Marble-Boyle Undergraduate Achievement Award in Geographic Science
             American Association of Geographers (AAG)
2021   Geosystems Applied Geography and Earth Systems Paper Award
             Association of Pacific Coast Geographers Annual Conference (APCG)
2021   Alvena Storm Memorial Scholarship
             Department of Geography, San Diego State University
2021   Undergraduate Research Excellence Award
             Student Research Symposium at San Diego State University

2020-2021	Esri Innovation Program Student-of-the-Year Award
	Esri Innovation Program (EIP) at San Diego State University
2020-2021	Outstanding Graduating Senior
	Department of Geography, San Diego State University
2019, 2020	McFarland Geography Scholarship
	Department of Geography, San Diego State University

Presentations

Conference Activity

1. **Embury, J.**, Dodge, S., Nara, A. *Understanding demographic data bias in mobile location datasets*. Paper presented at the American Association of Geographers (AAG) Annual Meeting, Detroit, MI, 2025.
2. **Embury, J.**, Nara, A. *Evaluating The Impact Of Geocomputation Lessons On Secondary School Students' Perceptions Of Geography And Computer Science*. Paper presented at 86th Annual Conference of the Association of Pacific Coast Geographers, Arcata, CA, 2024.
3. Dony, C., Nara, A., León, K., **Embury, J.**, Herman, T., Velasco, M. *Partnering on education research with teachers and with funding to measure aspirations of students*. Paper presented at the 109th Annual Conference of the National Council for Geographic Education, Tempe, AZ, 2024.
4. León, K., Herman, T., Nara, A., **Embury, J.**, Dony, C. *Encoding Geography: Integrating Computer Science into Geography Instruction*. Paper presented at the 109th Annual Conference of the National Council for Geographic Education, Tempe, AZ, 2024.
5. **Embury, J.** *Detecting biased mobility patterns in a synthetic population*. Paper presented at the American Association of Geographers (AAG) Annual Meeting, Honolulu, HI, 2024.
6. **Embury, J.**, Jankowski, P., Castro, I., Nara, A. *Community Asset-Based Approach for Optimizing the Selection of Fresh Produce Access Points*. Paper presented at The 70th North American Meetings of the Regional Science Association International & the XVII Spatial Econometrics Association World Conference, San Diego, CA, 2023.
7. **Embury, J.**, Nara, A. *A Framework for the Comparative Analysis of Diverse Mobility Data*. Paper presented at the American Association of Geographers (AAG) Annual Meeting, Denver, CO, 2023.
8. **Embury, J.**, Nara, A. *Spatially-explicit validation of an agent-based model of human activity and mobility*. Paper presented at the 30th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems, Seattle, WA, 2022.
9. **Embury, J.**, Tsou, M.-H., Nara, A., Oren, E. *The dynamic roles of chronic disease, socioeconomic factors, and mobility on population vulnerability during the COVID 19 pandemic*. Paper presented at the American Association of Geographers (AAG) Annual Meeting, 2022.
10. **Embury, J.**, Castro, I. *Tackling Food Insecurity in the San Diego Promise Zone: A Spatial Demographic Approach*. Paper presented at the 83rd Annual Conference of the Association of Pacific Coast Geographers, San Diego, CA, 2021.
11. **Embury, J.**, Tsou, M.-H. *Mapping COVID-19 in Local Communities: A San Diego Case Study*. Paper presented at the American Association of Geographers (AAG) Annual Meeting, 2021.
12. **Embury, J.**, Tsou, M.-H. *COVID-19 and Population Vulnerability in San Diego County*. Paper presented at the 14th Annual Student Research Symposium at San Diego State University, 2021.
13. **Embury, J.**, Nara, A. *Associations between Temperature Variables and Heat-Related Deaths in the Contiguous United States*. Poster presented at the 13th Annual Student Research Symposium at San Diego State University, San Diego, CA, 2020.
14. **Embury, J.**, Tsou, M.-H. *Bars, Major Restaurants, and Food Chains in San Diego County: COVID 19 Reopening Risk*. Map presented at the 40th Annual Conference of the North American Cartographic Information Society (NACIS), 2020.

15. **Embury, J.**, Tsou, M.-H. *2017 Hospitalizations of Seniors in San Diego County*. Map presented at the Esri User Conference, 2020.

Invited Talks
1. Castro, I., **Embury, J.** *BrightSide Produce – Tackling Food and Nutrition Security*. Invited talk at the Healthy Communities Working Group, Economic Development Department, City of San Diego meeting, April 21, 2022.
2. Alo, T., Barlow, J., Graves, C., **Embury, J.**, Dykstra, C. *An SDSU-Water Board Partnership to Identify Historical Dry Cleaner Sites*. Invited talk at the San Diego Regional Water Quality Control Board, State of California quarterly meeting, June 9, 2021.

Professional Service Activities
Disciplinary

2026	Conference session co-organizer
	American Association of Geographers Annual Meeting
	Title: *Geographies of Care in the Age of AI: Mapping and Modeling Homelessness and Public Health with Big Data*
2025-2027	Student representative (elected)
	Spatial Analysis and Modeling Specialty Group, American Association of Geographers
2024-2025	Student representative (ad hoc)
	Spatial Analysis and Modeling Specialty Group, American Association of Geographers
2024-2025	Article reviewer
	Discover Social Science and Health, Springer Nature
2024	Conference session co-organizer
	American Association of Geographers Annual Meeting
	Title: *Exploring Geospatial Methods and Human Dynamics to Address Challenges of the Sustainable Development Goals (SDGs)*

University and Departmental

2025-present	Grants planning committee member
	Geography Graduate Student Association, San Diego State University
2022-2023	Computing Committee student representative (elected)
	Department of Geography, San Diego State University
2021-2023	Website administrator and records manager
	Geography Graduate Student Association, San Diego State University
2021-2022	Diversity Committee student representative
	Department of Geography, San Diego State University

Certificates & Certifications

Expected 2026	Certificate in Inclusive Teaching (CIT)
	Office of Teaching and Learning, University of California, Santa Barbara
	● Applied the Universal Design for Learning (UDL) to make accessible lesson plans.
	● Identified methods for building a digital classroom community.
2025	Community Through Conflict Badge
	Center for Inclusive Excellence, San Diego State University
	● Established and practiced methods of empathy-building and inquiry-based conflict resolution intended to strengthen relationships

2025	Identity and Allyship Awareness Badge

Center for Inclusive Excellence, San Diego State University
- Participated in a series of 4 workshops about implicit bias, microaggressions, and inequity.
- Practiced disrupting bias in academic and professional environments.

2025   The Brave Project

Women's Resource Center, San Diego State University
- Engaged in a series of interactive meetings about sexual and gender-based violence prevention, supporting survivors, deconstructing rape culture, and creating change.

2025   Pathway to Professional Development Badge

Office for Graduate Life and Diversity, San Diego State University
- Completed a 4-workshop series focused on career and self-development, leadership, communication, professionalism, critical thinking, teamwork, equity and inclusion, and technology.

2025   Academic Applications of AI (AAAI) Micro-credential

Information Technology Division, San Diego State University
- Demonstrated proficiency in efficient, effective, and ethical generative AI (GenAI) usage through 5 skill-based learning modules.
- Constructed a customized GenAI toolkit for my academic workflow: Microsoft Copilot, Google NotebookLM, and Notion AI.
- Used Copilot and iterative refinement to craft a personal productivity statement and an undergraduate-level assignment using geospatial data science to explore food accessibility.

2021   Certificate of Geographic Information Science (GIScience)

Department of Geography, San Diego State University
- Computer Science coursework: Introduction to programming (Java), Intermediate programming (Java) and data structures.
- Geography coursework: Geographic Information Systems (GIS) applications, Computerized map design, GIS scripting fundamentals, GIS programming with Python, Data management for GIS, GIS for business location decisions.

Exp. 08/2028   Institutional Review Board (IRB) Research Training Certificates

CITI Program
- Human Subjects Research (HSR)
- Information Privacy Security (IPS)
- Research Security Training (Combined)

Related Professional Experience

2019-2020   GIS and Biological Monitoring Intern

Open Space Division, Department of Parks and Recreation, City of San Diego
- Maintained spatial data bases related to maintenance assessment districts and the brush management program.
- Collaborated with park rangers to develop map products for hiking trails and the Junior Ranger program.

Skills

Research Skills	Software and Platforms	Scripting Languages
Spatial analysis	ArcGIS Pro, ArcGIS Online	Python (Django, Anvil)
Quantitative/statistical analysis	Esri Applications	SQL
	PyCharm	HTML and CSS
Project management	Visual Studio Code	JavaScript (Bootstrap)
IRB protocol development	PostgreSQL, PostGIS	Familiarity with R, Java
Survey development and administration	Git, GitHub	
	Dewey Data	
Interview techniques	Microsoft Copilot, ChatGPT	
API data collection	NotebookLM	
Database management	Nectir	
Cartography	Canvas	
Data visualization	Qualtrics	
Scientific writing	Zotero	
Technical writing	LINGO	