

I am a spatial cognition researcher whose work focuses on Geographic Information Science (GIScience), geovisualization, navigation and wayfinding behavior, the cognition of urban neighborhoods, and social interaction and decision-making. My driving questions include how people use social and spatial cues to guide their behavior in real-world environments, and how people interpret spatial visualizations and representations.

## Academic Appointments

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### The University of Chicago

Assistant Instructional Professor in Geographic Information Science  
Center for Spatial Data Science, Division of the Social Sciences

Chicago, IL  
2021 – present

### University of California, Santa Barbara (UCSB)

Postdoctoral Scholar in Geographic Visualization and Spatial Cognition  
Postdoctoral Advisor: Somayeh Dodge (MOVE Lab), Department of Geography

Santa Barbara, CA  
2020 – 2021

## Education

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### University of California, Santa Barbara (UCSB)

Ph.D. in Geography with an Emphasis in Cognitive Science  
Dissertation: “Paired social wayfinding: Dyadic interaction in real-world navigation”  
Committee: Daniel R. Montello (Chair), Mary Hegarty, Geoffrey Raymond

Santa Barbara, CA  
June 2020

### University of California, Santa Barbara

M.A. in Geography  
Thesis: “Representations of an urban neighborhood: Residents’ cognitive boundaries of Koreatown LA”  
Committee: Daniel R. Montello (Chair), Helen Couclelis, Konstadinos Goulias

Santa Barbara, CA  
June 2015

### The George Washington University

B.A. in English Literature with a Minor in Geographic Information Science  
Graduated *Magna Cum Laude*

Washington, DC  
May 2010

## Publications

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Montello, D. R., Curtin, K. M., Bae, C. J., & Mitchell, P. (*in press*). With a little help from my friends: An overview of Collective Spatial Cognition. Chapter in forthcoming *Collective Spatial Cognition* volume. doi:10.4324/9781003202738-2

Egorova, E. & Bae, C. J. (2023). The image of the city by temporarily displaced children: How place-based citizen science contributes to place discovery. *PLATIAL'23: International Symposium on Platial Information Science*. doi:10.5281/zenodo.8286261

Bae, C. J. & Dodge, S. (2023). Assessing the cognition of movement trajectory visualizations: Interpreting speed and direction. *Cartography and Geographic Information Science*. doi:10.1080/15230406.2022.2157879

Dodge, S., Toka, M., & Bae, C. J. (2021). DynamoVis 1.0: An exploratory data visualization software for mapping movement in relation to internal and external factors. *Movement Ecology*, 9(55): 218–240. doi: 10.1186/s40462-021-00291-5

Bae, C. J. & Montello, D. R. (2019). Dyadic route planning and navigation in collaborative wayfinding. In S. Timpf, C. Schlieder, M. Kattenbeck, B. Ludwig & K. Stewart (Eds.), *Conference on Spatial Information Theory (COSIT 2019)*, LIPIcs, Vol. 142 (pp. 24:1–24:20). Dagstuhl, Germany. doi: 10.4230/LIPIcs.COSIT.2019.24

**Bae, C. J. (2019).** Structures of route suggestions in navigational planning. In K. Stock, C. B. Jones & T. Tenbrink (Eds.), *Speaking of Location 2019: Communicating about Space*. Regensburg, Germany.

**Bae, C. J. & Montello, D. R. (2018).** Representations of an urban ethnic neighbourhood: Residents' cognitive boundaries of Koreatown, Los Angeles. *Built Environment*, 44(2): 218–240. Alexandrine Press. doi: 10.2148/benv.44.2.218

**Bae, C. J., Montello, D. R., & Hegarty, M. (in preparation).** Wayfinding in pairs: Comparing the route planning and navigation performance of stranger dyads, friend dyads, and individuals.

## Fellowships and Awards

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<b>Urban Innovation Grant (Collaborative Project with E. Talen and L. Wileden)</b> <i>Mansueto Institute for Urban Innovation, \$40,000 total</i>	<b>2023 to 2024</b>
<b>Core Conversation Innovation Grant</b> <i>Chicago Center for Teaching and Learning (CCTL), \$3,750</i>	<b>2023 to 2024</b>
<b>Training and Retaining Leaders in STEM - Geospatial Sciences (TRELIS-GS) Fellow</b> <i>University Consortium for Geographic Information Science (UCGIS), Workshop &amp; symposium</i>	<b>2022</b>
<b>Early Career Collaboration Enhancement Award from Diverse Intelligences</b> <i>Collaborative project with H. Davis, K. Mayer, &amp; O. Mattias, \$5,000</i>	<b>2020</b>
<b>UCSB Graduate Opportunity Fellowship</b> <i>Central Campus Fellowship (university-wide competition), Tuition &amp; stipend</i>	<b>2019 to 2020</b>
<b>Diverse Intelligences Summer Institute (DISI) Fellowship</b> <i>University of St Andrews, Scotland, \$3,400 honorarium</i>	<b>2019</b>
<b>American Association of Geographers (AAG) Travel Award</b> <i>Environmental Perception and Behavioral Geography Specialty Group, \$100</i>	<b>2019</b>
<b>The Jack and Laura Dangermond Travel Award</b> <i>UCSB Department of Geography, \$4,000 total</i>	<b>2017 to 2020</b>
<b>Doctoral Student Travel Grant</b> <i>UCSB Academic Senate, \$1,350</i>	<b>2017</b>
<b>University of California Transportation Center Fellowship</b> <i>UC Transportation Center (UCTC), \$10,000</i>	<b>2014</b>

## Conferences and Talks

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<b>Conference Presentations</b> .....	
<b>American Association of Geographers (AAG) Annual Meeting in Denver, CO</b> <i>"Assessing the Cognition of Movement Trajectory Visualizations"</i>	<b>2023</b>
<b>American Association of Geographers (AAG) Annual Meeting in NYC (Virtual)</b> <i>"Uncovering Cognitive Biases and Blindspots to Teach Critical Spatial Thinking"</i>	<b>2022</b>
<b>International Cartographic Conference (ICC) in Florence, Italy (Hybrid)</b> <i>"Evaluation of Geovisualization Designs for the Cognition of Movement in Space and Time"</i>	<b>2021</b>
<b>Big Ten Academic Alliance (BTAA) GIS Conference (Virtual)</b> <i>"Exploring Movement Data in Context with the DynamoVis Software for Research and Education"</i>	<b>2021</b>
<b>ICA Commission on Cognitive Visualization (Virtual)</b> <i>"Designing a Web Study to Evaluate the Cognition of Movement Parameters using Static versus Dynamic Visualizations of GPS Tracks"</i>	<b>2021</b>

<b>Conference on Spatial Information Theory (COSIT) in Regensburg, Germany</b> <i>"Dyadic Route Planning and Navigation in Collaborative Wayfinding" (full paper) and "Suggestion Sequences during Route Planning" (workshop paper)</i>	<b>2019</b>
<b>American Association of Geographers (AAG) Annual Meeting in Washington DC</b> <i>"Characterizing Spatial and Social Strategies during Collaborative Situated Navigation"</i>	<b>2019</b>
<b>Spatial Cognition Conference in Tübingen, Germany</b> <i>"Route Planning and Situated Navigation in a Collaborative Wayfinding Task"</i>	<b>2018</b>
<b>Interdisciplinary Navigation Symposium (iNAV) in Mont Tremblant, Canada</b> <i>"Collaborative Route Planning and Navigation in a Novel Environment"</i>	<b>2018</b>
<b>Conference on Spatial Information Theory (COSIT) in L'Aquila, Italy</b> <i>"Paired Social Wayfinding: Dyadic Interaction in Coordinating Real-World Navigation Behavior"</i>	<b>2017</b>
<b>Poster Sessions</b> .....	
<b>Spatial Cognition Conference in Tübingen, Germany</b> <i>"Route Planning and Situated Navigation in a Collaborative Wayfinding Task"</i>	<b>2018</b>
<b>spatial@ucsb.local Conference in Santa Barbara, CA</b> <i>"Route Planning and Situated Navigation in Collaborative Wayfinding"</i>	<b>2018</b>
<b>spatial@ucsb.local Conference in Santa Barbara, CA</b> <i>"Neighborhood Boundary Representations: Koreatown, Los Angeles"</i>	<b>2015</b>
<b>Invited Talks</b> .....	
<b>Guest Speaker, University of Wisconsin–Madison</b> <i>"Spatial Cognition &amp; Movement Behavior: An Interdisciplinary GIScience Approach"</i>	<b>March 2022</b>
<b>Guest Speaker at the International Business Engineering Seminar, Universitas Kristen Petra, Surabaya, Indonesia</b> <i>"Introduction to Spatial Data Science"</i>	<b>October 2021</b>
<b>Speaker at the Diverse Intelligences Summer Institute (DISI) Alum Club</b> <i>"Maps and Distortion"</i>	<b>July 2021</b>
<b>Guest Speaker, Department of Urban and Regional Planning, San Jose State University</b> <i>"Urban Spatial Cognition &amp; Behavior: A Community-Based GIScience Approach"</i>	<b>April 2021</b>
<b>Speaker at UCSB Cognitive Science Research Symposium</b> <i>"Paired Social Wayfinding: Dyadic Interaction in Coordinating Real-World Navigation Behavior"</i>	<b>May 2020</b>
<b>Panelist for Experienced TA Panel at the UCSB TA Orientation</b> <i>One of 5 panelists selected from Teaching Assistants university-wide</i>	<b>September 2019</b>
<b>Speaker at Language, Interaction, and Social Organization Seminar</b> <i>"Collaborative Route Planning and Situated Navigation in a New Environment"</i>	<b>April 2018</b>
<b>Speaker at UCSB Geography Department Colloquium</b> <i>"Representations of the Urban Neighborhood: Residents' Cognitive Boundaries of Koreatown, Los Angeles"</i>	<b>November 2014</b>

## Teaching

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<b>Teaching Certifications and Recognition</b> .....	
<b>Certificate in College and University Teaching (CCUT)</b> , completed Winter 2020	
<b>Designed ArcGIS Online labs for Urban Geography course at UCSB</b> , published in <i>ArcUser</i> as "ArcGIS Online Simplifies Lab Lessons" [link] in Winter 2020	
<b>UCSB Department of Geography Excellence in Teaching Award</b> , awarded Spring 2016	
<b>Summer Teaching Institute for Associates (STIA) Certificate</b> , completed Summer 2015	
<b>Assistant Instructional Professor at UChicago</b> .....	
<b>GISC 27104/37104. Movement Data and Analysis</b>	<b>2023</b>
<i>Special topics course in movement data analysis.</i>	
<b>SOSC 13320. Social Science Inquiry: Spatial Analysis III</b>	<b>2023</b>
<i>Project-based coursework in advanced spatial analysis methods.</i>	
<b>GISC 28200/38200. Geographic Information Science II</b>	<b>2023</b>
<i>Advanced GIScience project work and methods taught with command-line GIS.</i>	
<b>GISC 28100/38100. Geographic Information Science I</b>	<b>2021, 2022</b>
<i>Applied introduction to the study of Geographic Information Systems (GIS).</i>	
<b>GISC 27102/37102. Spatial Cognition</b>	<b>2022</b>
<i>Overview of spatial cognition, spatial behavior, and environmental perception.</i>	
<b>GISC 28702/38702. Introduction to GIS &amp; Spatial Analysis</b>	<b>2022, 2023</b>
<i>Introduction to spatial thinking and spatial analytic methods.</i>	
<b>GISC 27100/37100. Cartographic Design and Geovisualization</b>	<b>2022, 2023</b>
<i>Core principles and techniques of cartography and geographic visualization of data.</i>	
<b>SOSC 13220. Social Science Inquiry: Spatial Analysis II</b>	<b>2022, 2023</b>
<i>Principles of spatial analysis, geographic information science, and spatial statistics.</i>	
<b>Teaching Associate (Instructor of Record) at UCSB</b> .....	
<b>GEOG 108. Urban Geography</b>	<b>2016</b>
<i>Upper-division course on the structure and development of cities and their regions.</i>	
<b>GEOG 5. People, Places, and Environment</b>	<b>2015</b>
<i>Survey course covering fundamental concepts of human geography.</i>	
<b>GEOG 153A. Behavioral Geography</b>	<b>2015</b>
<i>Upper-division course in behavioral and cognitive geography.</i>	
<b>Teaching Assistant at UCSB</b> .....	
<b>GEOG W12. Maps and Spatial Reasoning</b>	<b>2018</b>
<i>Online course open to students across all UC campuses.</i>	
<b>GEOG 117. Scientific Research Methods in Geography</b>	<b>2014, 2016, 2018</b>
<i>Upper-division course in research methods.</i>	
<b>GEOG 108. Urban Geography</b>	<b>2014, 2018</b>
<i>Upper-division course in urban geography.</i>	
<b>GEOG 5. People, Places, and Environment</b>	<b>2013, 2017</b>
<i>Survey course covering fundamental concepts of human geography.</i>	

<b>GEOG 150. Geography of the United States</b> <i>Regional geographic approach to the study of the U.S.</i>	<b>2015, 2016</b>
<b>GEOG 153C. Environmental Perception and Cognition</b> <i>Upper-division course in the specialized study of cognitive geography.</i>	<b>2015</b>
<b>GEOG 176B. Technical Issues in Geographic Information Systems</b> <i>Technical lab-based course in GIS.</i>	<b>2014</b>

## Prior Employment

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### **Program Manager for UCSB Cognitive Science Program (2016–2020)**

Served as main point of communication for affiliated faculty and participating students in the Cognitive Science Interdisciplinary Ph.D. emphasis. Hosted talks and maintained the mailing lists and the website.

### **Research Associate for the Collective Spatial Cognition Project (2018–2019)**

Co-organized specialist meeting on Collective Spatial Cognition in April 2019, funded by a multi-university grant from the Army Research Institute for the Behavioral and Social Sciences.

### **Facilitator for UCSB Summer Teaching Institute for Associates (STIA) (2018–2019)**

Prepared graduate students for their first time teaching as instructors of record by hosting workshops, seminars, and providing additional mentorship in various aspects of teaching at the university level.

### **Research Associate at UCSB Center for Spatial Studies (2015–2018)**

Scheduled and hosted events including Tech Lunches and the annual Spatial Lightning Talks. Maintained mailing list and web communications across departments and community members.

### **Internet Marketing Associate at MicroStrategy (2010–2013)**

Conducted research into consumer mobile application concepts integrating social network data and large public datasets, managed weekly reporting, and led online marketing for a major B2B analytics company.

### **Partnership and Data Services Intern at the U.S. Census Bureau (2009–2010)**

Worked on the Census 2010 Road Tour campaign, creating vehicle routing maps in ArcGIS, organizing travel itineraries, and coordinating progress reports with regional offices across the United States.

## Service and Community

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### Research Mentorship.....

- Faculty advisor for *UCGEO* Student Organization at UChicago (2023–present).
- Faculty advisor for *Tobler Society* OpenStreetMap YouthMappers Chapter at UChicago (2022–present).
- Research mentor in the Illinois Mathematics and Science Academy (IMSA) *Student Inquiry and Research* research experience program (2022–present).
- Faculty supervisor for research assistants in the UChicago Summer Institute in Social Research Methods Program (Summer 2022, 2023).
- Participation in the Alda Center Women in STEM Leadership Program (Oct–Nov 2021).
- Supervision of research assistants in the Movement Data Science Lab at UCSB (2020–2022).
- Participation in the American Association of Geographers (AAG) Geography Faculty Development Alliance (GFDA) Early Career Workshop (June 2021).
- Participation in the Academic Lab Management & Leadership Symposium by Torrey Pines (Feb–March 2021).
- Direct supervision of research assistants (2014–2020), including mentorship in research design, behavioral experiments, programming, statistics, and quantitative and qualitative analysis.
- Nominated and served as UCSB Graduate Scholars Program Mentor to early graduate students (2019–2020).
- Mentor for high school students in the UCSB Research Mentorship Program (Summer 2016).

## Conference Organization and Professional Service.....

- Organizing committee and Themed Sessions chair for the Conference on Spatial Information Theory (COSIT) 2022 in Kobe, Japan (2021–2022).
- Ad-hoc reviewer: *Spatial Cognition and Computation*; *International Journal of Geographical Information Science (IJGIS)*; *AACSRE Interdisciplinary Journal of Signage and Wayfinding*; *Environment and Planning B: Urban Analytics and City Science*; *Journal of Experimental Psychology; Memory*.
- Organizer for Collective Spatial Cognition specialist meeting, jointly hosted by UCSB & University of Alabama (2018–2019).
- Organizer for UCSB Center for Spatial Studies specialist meetings (2016–2018), including 'Universals and Variation in Spatial Referencing across Cultures and Languages.'
- Graduate representative to the UCSB Geography hiring search committee (2015–2016).
- Departmental representative to the UCSB Graduate Student Association (2014–2016).
- Organizing committee for the UCONNECT Student Transportation Conference (2014–2015).

## Professional Memberships and Affiliations.....

- Training and Retaining Leaders in STEM - Geospatial Sciences (TRELIS-GS), UCGIS
- Unlearning Racism in the Geosciences (URGE), UCSB Geography Department Pod
- Spatial Intelligence & Learning Center (SILC) Research Network
- ICA Commission on Cognitive Issues in Geographic Information Visualization
- Cognitive Navigation (CogNav) Research Group
- American Association of Geographers (AAG)
- Cognitive Science Society

## Technical and Analytic Skills.....

- **Geographic Information Systems:** QGIS, ArcGIS, GeoDa, OpenStreetMap, GPS field data collection
- **Programming, Database Management, & Web Design:** R, Python, MATLAB, SQL, SPSS, STATA, Github, HTML/CSS/JavaScript
- **Research Management and Analysis:** Behavioral study design, user testing and evaluation, grant writing, project management, IRB Human Subjects management and protocols, Qualtrics survey design and administration, transcription and coding
- **Design and Modeling:** Data visualization, 3D modeling (SketchUp), video editing, Adobe Creative Suite (Photoshop, Illustrator, Premiere Pro)