

ARMITA KAR

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Research Specialization

Transportation, equity, safety and environment, and geospatial data analytics

Professional Experience

Assistant Professor (Tenure-track)

August 2024 -

Department of Geography and Geoinformation Science
George Mason University, VA, USA

Post-Doctoral Research Scientist

August 2023 – June 2024

Center for Injury Research and Policy, Abigail Wexner Research
Institute at Nationwide Children's Hospital (AWRINCH), OH, USA
Project title: *R01-Intervention to improve driving practices among high-risk teen drivers*

PI: Jingzhen (Ginger) Yang

Funded by: National Institutes of Health (NIH) - The Eunice Kennedy
Shriver National Institute of Child Health and Human Development
(NICHD)

Education

Ph.D. in Geography

June 2023

The Ohio State University, OH, USA

Dissertation: *Inclusive accessibility: Integrating person-based hard and soft constraints into transportation planning.*

Committee: Harvey J. Miller (Co-Chair), Huyen T.K. Le (Co-Chair),
Ningchuan Xiao, Andre Carrel, and Srinivasan Parthasarathy

Master of Science in Geography

May 2019

The University of Utah, UT, USA

Thesis: *Vehicular route modeling for safe evacuation during tropical storms and flooding.*

Advisor: Thomas J. Cova

Bachelor of Urban and Regional Planning

September 2015

Bangladesh University of Engineering and Technology, Dhaka,
Bangladesh

Thesis: *Modeling and analyzing land use dynamics: A case study of Dhaka City Corporation.*

Advisor: Sarwar Jahan

Research Experience

Graduate Research Assistant

August 2022 – July 2023

Center for Urban and Regional Analysis (CURA), The Ohio State University, OH, USA

Project title: *Built environment influences on reckless driving behavior*

PI: Harvey J. Miller and Jingzhen (Ginger) Yang

Funded by: Translational Data Analytics Institute (TDAI) at The OSU

Graduate Research Assistant

May 2021 – July 2022

Department of Geography, The Ohio State University, OH, USA

Project: *Estimating exposure and health impacts of traffic-related air pollution during daily travel*

PI: Huyen T.K. Le

Funded by: Sustainability Institute Pilot Grant and Translational Data Analytics Institute Pilot grant.

GIS Research Assistant

May 2018 – July 2018

The DIGIT Lab, University of Utah, UT, USA

Project: *Producing military standard map series for military training around the world*

Supervisor: Phoebe B. Mcneally

Funded by: Rockwell Collins, Inc.

Teaching Experience

Guest Lecturer

Fall 2024

Department of Geography & the Environment, The University of Texas at Austin, TX, USA

Course: Environmental GIS

Instructor

Fall 2024 -

Department of Geography and Geoinformation Science, George Mason University, VA, USA

Course: *Introduction to Geoinformation Technology* ([GGS 110](#)), *Spatial Computing* ([GGS 366](#))

Guest Lecturer

November 2022

Department of Geography, The Ohio State University, OH, USA

Course: *Our Global Environment* ([GEOG 2800](#))

Guest Lecturer

March 2022

Department of Geography, The Ohio State University, OH, USA

Course: *Emerging Topics in GIS* ([GEOG 5229](#))

Graduate Teaching Assistant

January 2021 – May 2021

Department of Geography, The Ohio State University, OH, USA

Courses: *Cartography and Map Design* ([GEOG 5200](#))

Lab Instructor

August 2020 – December 2020

Department of Geography, The Ohio State University, OH, USA

Courses: *Introductory Spatial Data Analysis* ([GEOG 4103](#))

Graduate Teaching Assistant

August 2017 – May 2019

Department of Geography, The University of Utah, UT, USA

Courses: *Intro to GIS* ([GEOG 3100](#)), *Intro to Geo-Programming* ([GEOG 1180](#)), *Geographical Analysis* ([GEOG 3020](#)), and *World Regional Geography* ([GEOG 1300](#))

Lecturer

October 2015 – July 2017

Department of Urban and Regional Planning, Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh

Courses: *GIS*, *Urban Planning Techniques*, *Site and Area Planning*, *Presentation and Communication Techniques Studio*

Publications

Peer-reviewed Journal Articles

- [10] **Kar, A.**, Xiao, N., Miller, H. J. & Le, H. T. (2024). Inclusive Accessibility: Translating person-based mobility perceptions into aggregated accessibility measures. *Computers, Environment and Urban Systems*, 114, 102202. <https://doi.org/10.1016/j.compenvurbsys.2024.102202>
- [9] **Kar, A.**, Ahmed, A., May, A., & Le, H. T. (2024). Spatio-temporal modeling of PM_{2.5} concentration based on land use and human activity pattern. *Atmospheric Environment*, 326, 120486. <https://doi.org/10.1016/j.atmosenv.2024.120486>
- [8] **Kar, A.**, Le, H. T., & Miller, H. J. (2023). Inclusive accessibility: Integrating heterogeneous user mobility perceptions into space-time prisms. *Annals of the American Association of Geographers*. <https://doi.org/10.1080/24694452.2023.2236184>.
- [7] Liu, L., **Kar, A.**, Tokey, A. I., Le, H. T. & Miller, H. J. (2023). Disparities in public transit accessibility and usage by people with mobility disabilities: An evaluation using high-resolution transit data. *Journal of Transport Geography*, 109, 103589. <https://doi.org/10.1016/j.jtrangeo.2023.103589>.
- [6] **Kar, A.**, Carrel, A. L., Miller, H. J., & Le, H. T. (2022). Public transit cuts during COVID-19 compound social vulnerability in 22 US cities. *Transportation Research Part D: Transport and Environment*, 110, 103435. <https://doi.org/10.1016/j.trd.2022.103435>.
- [5] **Kar, A.**, Le, H. T., & Miller, H. J. (2022). What is essential travel? Socioeconomic differences in travel demand in Columbus, Ohio, during the COVID-19 lockdown. *Annals of the American Association of Geographers*, 112:4, 1023-1046. <https://doi.org/10.1080/24694452.2021.1956876>.
- [4] **Kar, A.**, Motoyama, Y., Carrel, A. L., Miller, H. J., & Le, H. T. (2021). COVID-19 exacerbates unequal food access. *Applied Geography*, 134, 102517. <https://doi.org/10.1016/j.apgeog.2021.102517>.
- [3] Stiles, J., **Kar, A.**, Lee, J., Miller, H. J. (2021). Lower volumes, higher speeds: Changes to crash type, timing, and severity on urban roads from COVID-19 stay-at-home policies. *Transportation Research Record*. <https://doi.org/10.1177/03611981211044454>
- [2] **Kar, A.**, Wan, N., Cova, T.J., Wang, H., & Lizotte, S. L. (2021). Using GIS to understand the influence of Hurricane Harvey on spatial access to primary care. *Risk Analysis*. <https://doi.org/10.1111/risa.13806>

- [1] Mahmud, S., Huq, M. E., **Kar, A.**, Mashraky, R., Khatun, F., Islam, I., & Akther, M. S. (2014). Managing development of fringe areas in Dhaka City: Land Readjustment as a technique for sustainable future development ensuring environmental and social justice. *International Journal of Undergraduate Research and Creative Activities*, 6(2), 5.

Manuscripts under Review

- [4] **Kar, A.**, Miller, H. J., Alshaikh, E., Hall, N., Recker, R. & Yang, J. (submitted). Road design and visual environment induce the risky speeding behaviors of teen drivers. *Journal of Safety Research*.
- [3] Chen, Y., Nelson, J., Zhou, B., Zhou, R.Z., Ye, S., Liu, H., Gu, Z., **Kar, A.**, Kwon, H., & Kang, Y. (Revised and resubmitted). Where are GIScience Faculty Hired from? Analyzing Faculty Mobility and Research Themes Through Hiring Networks. *Cartography and Geographic Information Science*.
- [2] **Kar, A.** & Motoyama, Y. (submitted). Spatial Heterogeneities in Healthcare Visits and their Socio-economic Determinants: A Comprehensive Analysis Using Traffic Flow Data. *Transportation Research Record*.
- [1] **Kar, A.**, Zhang, F., Wheeler, K., Miller, H. J., & Yang, J. (Received 1st revision). Analyzing Teen Drivers' Exposure to Crash: An Activity Space-based Approach. *Urban Studies*.

Manuscripts in Progress

- [7] **Kar, A.**, Le, H. T., Miller, H. J. & Xiao, N. Inclusive sidewalk planning with perceived constraints: A multi-objective optimization approach. (*Scheduled submission: April 2025 to International Journal of Geographical Information Science. Draft available upon request*).
- [6] Csizmadia, E. & **Kar, A.** Gendered and Social Differences in Transit Travel Preferences and Access to Opportunities. (*Analysis in progress*).
- [5] **Kar, A.**, Ahmed, N., Liu, L., & Lee, J. How well realized risk exposures can approximate perceived risks: A case study on Columbus, OH. (*Analysis in progress*).
- [4] Guan, X., **Kar, A.**, Lee, J., & Liu, L. Leveraging large language models (LLMs) in capturing perceived safety. (*Analysis in progress*).
- [3] **Kar, A.** & Ermagun, A. Built-environment impacts on perceived safety and walking willingness using Google Street Views. (*Scheduled for Summer*).
- [2] Shabab, M., Mora, D.O., & **Kar, A.** GeoAI methods examining realized and perceived crime safety around transit stations: A literature review. (*Scheduled for Summer*).
- [1] Soukhov, A., Kang, Y., & **Kar, A.** Spatial heterogeneities in maternal healthcare travel: A spatial interaction approach using data from Florida, USA. (*Scheduled for Summer*).

Non-peer Reviewed Articles

- [3] **Kar, A.**, Liu, L., Lin, Y. & Xiao, N. (July 23, 2020). Exploring the spatio-temporal dynamics of socio-economic dimensions of the COVID-19 pandemic: An interactive dashboard approach. URL: <https://u.osu.edu/geographyblog/2020/07/23/exploring-spatio-temporal-dynamics/>
- [2] **Kar, A.**, Mashraky, R., Khatun, F., Huq, M. E., Mahmud, S., Islam, I., & Akther, M. S. (2016). Prospects of urban regeneration in Motijheel commercial area of Dhaka City. *Imperial Journal of Interdisciplinary Research (IJIR)*, Vol-2, Issue-10, pg 1435-1444.

- [1] **Kar, A.** & Mashraky, R. (2016). Trends in pro-poor growth and inequality from the perspective of Bangladesh. *Nogor Shoilee, Vol-7*, ISBN-978984-333-9806-2.

Conference Presentations

- [18] **Kar, A.** & Motoyama, Y. (2025). Spatial Heterogeneities in Healthcare Visits and their Socio-economic Determinants: A Comprehensive Analysis Using Traffic Flow Data. Annual Meeting of Transportation Research Board (TRB).
- [17] **Kar, A.** & Motoyama, Y. (2024). How many miles do people go to see doctors? And are they different by income and racial groups? International conference on urban affairs.
- [16] **Kar, A.**, Miller, H. J., Alshaikh, E., Hall, N., Recker, R. & Yang, J. (2024). Road design and visual environment induce the risky speeding behaviors of teen drivers. *Symposium on GeoAI and Deep Learning for Geospatial Research: Human-centered Geospatial Data Science*. Annual Meeting of the American Association of Geographers (AAG).
- [15] **Kar, A.**, Xiao, N., Le, H. T., & Miller, H. J. (2024). Inclusive sidewalk planning with perceived constraints: A multi-objective optimization approach. *Geospatial Data Science for Sustainability: Harnessing Mobility Data for Spatial Knowledge Discovery*. Annual Meeting of the American Association of Geographers (AAG).
- [14] **Kar, A.**, Xiao, N., Miller, H. J. & Le, H. T. (2024). Inclusive accessibility: Translating person-based mobility perceptions into aggregated accessibility measures. Annual Meeting of Transportation Research Board (TRB).
- [13] **Kar, A.**, Miller, H. J., Alshaikh, E., Hall, N., Recker, R. & Yang, J. (2023). Road design and visual environment induce the risky speeding behaviors of teen drivers. Research Retreat at Abigail Wexner Research Institute (AWRI).
- [12] **Kar, A.**, Le, H. T., Miller, H. J. & Xiao, N. (2023). An equity-oriented sidewalk planning approach using a non-dominated sorting genetic algorithm. I-GUIDE Forum 2023 - Harnessing the Geospatial Data Revolution for Sustainability Solutions.
- [11] **Kar, A.**, Le, H. T. & Miller, H. J. (2023). Inclusive accessibility: Redefining urban mobility from the users' perspectives. Annual Meeting of Transportation Research Board (TRB).
- [10] Liu, L., **Kar, A.**, Tokey, A. I., Le, H. T. & Miller, H. J. (2023). Disparities in public transit accessibility and usage by people with mobility disabilities: An evaluation using high-resolution transit data. Annual Meeting of Transportation Research Board (TRB).
- [9] **Kar, A.** (2022). Inclusive accessibility: Understanding the users' perspectives on public transit. Ohio Public Transit Association Conference (OPTA).
- [8] **Kar, A.**, Le, H. T. & Miller, H. J. (2022). Inclusive accessibility: A space-time framework integrating person-based hard and soft constraints. *Student lightning talks*. The University Consortium of Geographic Information Science (UCGIS) Symposium.
- [7] **Kar, A.**, Le, H. T. & Miller, H. J. (2022). Inclusive accessibility: A deep learning-based space-time framework integrating person-based hard and soft constraints. *GeoAI - Intelligent geospatial analytics*. Annual Meeting of the American Association of Geographers (AAG).
- [6] **Kar, A.**, Carrel, A. L., Miller, H. J., & Le, H. T. (2022). Reducing public transit compounds social vulnerabilities during COVID-19. *Transit, accessibility & vulnerability during the COVID-19 pandemic*. Annual Meeting of Transportation Research Board (TRB).

- [5] **Kar, A.**, Carrel, A. L., Miller, H. J., & Le, H. T. (2021). Reducing public transit compounds social vulnerabilities during COVID-19. The OSU Translational Data Analytics Institute (TDAI) fall forum.
- [4] **Kar, A.**, Carrel, A. L., Miller, H. J., & Le, H. T. (2021). Impacts of COVID-19 on public transit service and accessibility to food and health care in US cities. The University Consortium of Geographic Information Science (UCGIS) Symposium.
- [3] **Kar, A.**, Motoyama, Y., Carrel, A. L., Miller, H. J., & Le, H. T. (2021). Impact of COVID-19 on food shopping: A spatio-temporal analysis of changes in travel to supermarket and grocery stores. *Mobility changes and community impacts of COVID-19*. Annual Meeting of Transportation Research Board (TRB).
- [2] **Kar, A.**, Cova, T. (2020). Vehicular route modeling for safe evacuation during tropical storms and flooding. *Jeanne X. Kasperson student paper award*. Annual Meeting of the American Association of Geographers (AAG).
- [1] **Kar, A.**, Cova, T. (2019). Vehicular route modeling for safe evacuation during Tropical Storms and Flooding. *GIScience and hazards in the era of big data*. Annual Meeting of the American Association of Geographers (AAG).

Invited Talks and Organized Workshops

- [8] **Primary session organizer and co-host** (April 19, 2024). GISphere: Facilitating global connections in Geographic Information Science (GIScience) education, research, and practice. Annual Meeting of the American Association of Geographers (AAG).
- [7] **Invited talk** (April 7, 2024). Inclusive access in promoting transportation equity. Presentation at *Equity in Action, Student Sustainability Summit*. <https://www.studentsustainabilitysummit.org/>
- [6] **Webinar organizer and co-host** (December 11, 2023). Recruiting and mentoring graduate students in GIScience, *GISalon International by GISphere Guide*.
- [5] **Webinar organizer and co-host** (September 14, 2023). Career development in GIScience, *GISalon International by GISphere Guide*.
- [4] **Invited talk** (September 30, 2022). Online surveys and mobility tracking: Pros and cons of using the web. Presented at *Reports from the field*, Department of Geography, The Ohio State University.
- [3] **Invited talk** (February 28, 2022). Socio-economic differences in travel demand in Columbus during COVID-19 lockdown. Presented at *Ohio - StreetLight User Group (SLUG) meeting*. <https://www.youtube.com/watch?v=DSiebgLo98k&t=326s>
- [2] **Interview** (September 1, 2021). Pandemic made unequal access to food even worse, study suggests. Interviewed by *Spotlight on poverty & opportunity*. <https://spotlightonpoverty.org/spotlight-exclusives/pandemic-made-unequal-access-to-food-even-worse-study-suggests/>
- [1] **Radio interview** (July 19, 2021). COVID heightened disparities in food access, Ohio State study finds. Interviewed by Evans, N. *WOSU 89.7 NPR News*. <https://news.wosu.org/coronavirus/2021-07-19/covid-heightened-disparities-in-food-access-ohio-state-study-finds>

Media Coverage and Highlights

- [7] Ohio State News (2021): [COVID-19 made unequal access to food worse, study suggests](#)

- [6] Ohio State News (2021): [Low-income people saw smallest drop in travel during COVID-19](#)
- [5] EurekAlert (2021): [Low-income people saw smallest drop in travel during COVID-19](#)
- [4] News Medical (2021): [Study finds more deadly auto crashes during pandemic lockdown](#)
- [3] WebMD (2021): [Pandemic Changed Grocery Shopping for Rich and Poor](#)
- [2] Science Daily (2021): [Deadly auto crashes more likely during pandemic lockdown](#)
- [1] Prothom Alo (2021): [People with low income saw smallest drop in travel during pandemic](#)

Grants and Fellowships

2024 Postdoc Idea Awards

Office of Trainee Affairs, NCH Abigail Wexner Research Institute

Project: Human-centered Sidewalk Planning for a Safe Child-friendly Walking Space

Spring 2024

Amount received: \$20,000

The Rayner Scholarship for Fieldwork

Department of Geography, The Ohio State University

Spring 2022

Amount received \$3,500

The E. Willard and Ruby S. Miller Scholarship

Department of Geography, The Ohio State University

Spring 2022

Amount received \$4,000

Student Dissertation Award

Sustainability Institute, The Ohio State University

Spring 2021

Amount received \$5,000

One-year Graduate Student Fellowship Award

Graduate School, The Ohio State University

2019 - 2020

Amount received \$26,000

Grant Writing Experiences

Principal Investigator

2021

Project title: *Inclusive accessibility: Integrating person-based hard and soft constraints into multimodal transportation planning*

Submitted for: Human-Environment and Geographical Sciences Program - Doctoral Dissertation Research Improvement (HEGS-DDRI) proposal to the National Science Foundation (NSF) (unsuccessful)

Research Team Member

2021

Project title: *Public Engagement for Resilient Communities (PERC) - Building inclusive evidence for sustainability science and planning via community knowledge co-production*

Submitted for: Smart and Connected Communities (S&CC) proposal to the National Science Foundation (NSF), led by an interdisciplinary team of investigators from the OSU Geography, Civil Engineering, Computer Science, and Integrated Systems Engineering (unsuccessful)

Awards

Best student lightning talk , University Consortium for Geographic Information Science (UCGIS) Symposium, Syracuse, New York	2022
Jeanne X. Kasperson Student Paper Award , Hazards, Risks, and Disasters Specialty Group, American Association of Geographers (AAG).	2020
Prime Minister Gold Medal , the University Grant Commission of Bangladesh.	2015
Best Undergrad Thesis Award , Department of Urban and Regional Planning, Bangladesh University of Engineering and Technology (BUET)	2015
Dean's List Award for securing 1 st position in the class, Bangladesh University of Engineering and Technology (BUET).	2012 - 2015

Service

Youth Editorial Board Member , Computational Urban Science	November 2023 -
Guest Editor , Special issue – “ <i>Spatial Science Applications in Promoting Urban Safety, Well-Being, and Health</i> ” in Computational Urban Science	July 2024 -
Journal Reviewer	2020 -
<ul style="list-style-type: none"> - Annals of the American Association of Geographers - Transportation research. Part D, Transport and environment - Journal of Transport Geography - Journal of Public Transportation - Scientific data - Cities - Environment and Planning B: Urban Analytics and City Science - Transportation Safety and Environment - Health and Place - BMC Public Health - Computational Urban Science - Humanities and Social Sciences Communications - Transportation Research Board (TRB), - International Journal of Digital Earth - Bridging Transportation Research (BTR) conference - Journal of Bangladesh Institute of Planners. 	
Event Organizer , GISalon International webinars, a platform for knowledge sharing and networking, hosted by GISphere, and supported by AAG Geographic Information Science and Systems Specialty Group (GISS), Cartography and Geographic Information Society (CaGIS), and Chinese Professional in Geographic Information Systems (CPGIS)	2023 -
Volunteer , Project Sidewalk, A community for identifying and mapping sidewalk accessibility issues in Columbus using Google Street View images.	2021- 2022
Contributor , An interactive COVID-19 dashboard, a voluntary project led by Dr. Ningchuan Xiao on behalf of the OSU Department of Geography https://geog-gis.asc.ohio-state.edu/COVID19-Dashboard/	2020

Member , Women Are Creating Knowledge (WACK) (women graduate student professional development organization), Department of Geography, The Ohio State University	2019 - 2023
Vice President , Bangladesh Student Association, University of Utah (BSAUU).	2018 - 2019
Cultural Secretary , Urban and Regional Planning (URP) Students Association of BUET (USAB).	2014-2015

Professional Affiliations

- American Association of Geographers (AAG)
- Association of Collegiate Schools of Planning (ACSP)
- Transportation Research Board (TRB)
- AAG Transportation Geography Specialty Group
- AAG Geographic Information Science and Systems Specialty Group
- University Consortium for Geographic Information Science (UCGIS)
- Cartography and Geographic Information Society (CaGIS)
- GISphere Guide
- Bangladesh Institute of Planners (BIP)

Technical Skills

Programming Skills	Python, R Programming, NetLogo, HTML, Javascript
GIS Skills	ArcGIS Desktop, ArcGIS Pro, ArcGIS Online, WebGIS, IDRISI, Erdas Imagine
Other Software Skill	Autocad, SPSS, MS Project, Adobe Illustrator
Methods	<p>Machine learning: Random forest, support vector machine, logistic regression, neural networks, and ensemble learning.</p> <p>Statistical models: Bayesian hierarchical logistic regression model, multilevel binary logistic model, and Hurdle model.</p> <p>Spatial and space-time analytics: Spatially weighted interaction models, Space-time regression kriging, Space-time accessibility.</p> <p>Network analytics and Optimization.</p> <p>Data collection methods: Online and smartphone app-based survey, GPS tracking, big data.</p>