ARMITA KAR

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Research Specialization

Transportation, equity and resilience, public health, and geospatial data analytics

Professional Experience

Post-Doctoral Research Scientist   August 2023 -
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   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

[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

[1] **Kar, A.**, Xiao, N., Miller, H. J. & Le, H. T. (under review). Inclusive Accessibility: Translating person-based mobility perceptions into aggregated accessibility measures. *Computers, Environment and Urban Systems.*

Manuscripts in Progress

[3] **Kar, A.**, Le, H. T., Miller, H. J. & Xiao, N. Inclusive sidewalk planning with perceived constraints: A multi-objective optimization approach. *(Scheduled submission: November 2023 to International Journal of Geographical Information Science. Draft available upon request).*

[2] **Kar, A.**, Ahmed, A., May, A., & Le, H. T. Spatio-temporal modeling of $PM_{2.5}$ concentration based on land use and human activity pattern. *(Scheduled submission: November 2023 to Environmental Science & Technology. Draft available upon request).*

[1] **Kar, A.**, Miller, H. J., Alshaikh, E., Hall, N., Recker, R. & Yang, J. Road design and visual environment induce the risky speeding behaviors of teen drivers. *(Scheduled submission: November 2023 to Accident Analysis & Prevention).*

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

[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 Interviews

[5] Kejin, W. (Host) and **Kar, A.** (Co-host) (September 14, 2023). Career development in GIScience. Co-hosted the webinar organized by GISalon International and GISphere Guide.

[4] **Kar, A.** (September 30, 2022). Online surveys and mobility tracking: Pros and cons of using the web. Talk presented at *Reports from the field*, Department of Geography, The Ohio State University.

[3] **Kar, A.** (February 28, 2022). Socio-economic differences in travel demand in Columbus during COVID-19 lockdown. Talk presented at *Ohio - StreetLight User Group (SLUG)* meeting. https://www.youtube.com/watch?v=DSiebgLo98k&t=326s

[2] **Kar, A.** (September 1, 2021). Pandemic made unequal access to food even worse, study suggests. Interview by *Spotlight on poverty & opportunity*. https://spotlightonpoverty.org/spotlight-exclusives/pandemic-made-unequal-access-to-food-even-worse-study-suggests/

[1] **Kar, A.** Le, H. T. & Miller, H. J. (July 19, 2021). COVID heightened disparities in food access, Ohio State study finds. Radio interview 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

The Rayner Scholarship for Fieldwork Spring 2022
Department of Geography, The Ohio State University
Amount received $3,500

The E. Willard and Ruby S. Miller Scholarship Spring 2022
Department of Geography, The Ohio State University
Amount received $4,000

Student Dissertation Award Spring 2021
Sustainability Institute, The Ohio State University
Amount received $5,000

One-year Graduate Student Fellowship Award   2019 - 2020
Graduate School, The Ohio State University
Amount received $26,000

Grant Writing Experiences

Principal Investigator   2024
Project title (Tentative): *Promoting health equity through urban*   (In progress)
transportation: Assessing the impact of built environment interventions on
safety, mobility, and health for Diverse Communities
Preparing for: K99/R00 award to National Institute of Health (NIH)

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   2022
Information Science (UCGIS) Symposium, Syracuse, New York

Jeanne X. Kasperson Student Paper Award, Hazards, Risks, and Disasters 2020
Specialty Group, American Association of Geographers (AAG).

Prime Minister Gold Medal, the University Grant Commission of Bangladesh. 2015

Best Undergrad Thesis Award, Department of Urban and Regional Planning, 2015
Bangladesh University of Engineering and Technology (BUET)

Dean's List Award for securing 1st position in the class, Bangladesh University 2012 - 2015
of Engineering and Technology (BUET).

Service

Associate Editor, Computational Urban Science   November 2023
Journal Reviewer   2020 -
-      Annals of the American Association of Geographers
-      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	**Machine learning:** Random forest, support vector machine, logistic regression, neural networks, and ensemble learning.
	Statistical models: Bayesian hierarchical logistic regression model, multilevel binary logistic model, and Hurdle model.
	Spatial and space-time analytics: Spatially weighted interaction models, Space-time regression kriging, Space-time accessibility.
	Network analytics and Optimization.
	Data collection methods: Online and smartphone app-based survey, GPS tracking, big data.