ARMITA KAR

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Research Interests

1. Human mobility (multimodal accessibility and travel behavior), 2. Social equity, resilience, and public health 3. Geospatial data science and space-time modeling.

Education

Ph.D. in Geography July 2023 (Expected)
The Ohio State University, OH, United States
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, United States
Thesis: *Vehicular Route Modelling 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: *Modelling and Analyzing Land Use Dynamics: A Case Study of Dhaka City Corporation.*
Advisor: Sarwar Jahan

Research Experience

Graduate Research Assistant August 2022 -
Center for Urban and Regional Analysis, The Ohio State University, OH, United States
Project title: *Built environment influences reckless driving behavior*
Supervisor/PI: Harvey J. Miller and Ginger Yang (Nationwide Children's Hospital, Columbus, Ohio)
Funded by: Translational Data Analytics Institute at The OSU

Graduate Research Assistant May 2021 – August 2022
Department of Geography, The Ohio State University, OH, United States
Project: *Estimating exposure and health impacts of traffic-related air pollution during daily travel*
Supervisor/PI: Huyen TK Le and Joseph Bayer
Funded by: Sustainability Institute seed grant award

GIS Research Assistant May 2018 – July 2018
The DIGIT Lab, University of Utah, UT, United States
Project: *Producing military standard map series for military training around the world*
Supervisor: Phoebe B. Mcneally
Funded by: Rockwell Collins, Inc.

Teaching and Professional Experience

Guest Lecturer March 2022
Department of Geography, The Ohio State University, OH, United States
Courses: Emerging Topics in GIS (GEOG 5229)

Graduate Teaching Assistant August 2020 – May 2021
Department of Geography, The Ohio State University, OH, United States
Courses: Introductory Spatial Data Analysis (GEOG 4103), Cartography and Map Design (GEOG 5200)

Graduate Teaching Assistant August 2017 – May 2019
Department of Geography, The University of Utah, UT, United States
Courses: Intro to GIS (GEOG 3100), Intro to Geo-Programming (GEOG 1180), Geographical Analysis (GEOG 3020), World Regional Geography (GEOG 1300)

Lecturer October 2015 – August 2017
Department of Urban and Regional Planning, Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh
Courses: GIS and Remote Sensing, Urban Planning Techniques, Site and Area Planning, Presentation and Communication Techniques Studio, Project Evaluation and Management

Publications

Peer-reviewed Journal Articles

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.

Kar, A., Le, H. T., & Miller, H. J. (2021). 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. DOI: 10.1080/24694452.2021.1956876.

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.

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

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

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.

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.

Works under Review

Liu, L., **Kar, A.,** Tokey, A. I., Le, H. T. & Miller, H. J. (2022). Disparities in Public Transit Accessibility and Usage by People with Mobility Disabilities: An Evaluation using High-Resolution Transit Data. *Journal of Transport Geography.* (Under Review).

Manuscripts in Progress

Kar, A., Le, H. T., & Miller, H. J. Inclusive Accessibility: Redefining Urban Mobility from the Users' Perspectives. *(Scheduled submission: October 2022 to Annals of the American Association of Geographers. Draft available upon request).*

Kar, A., May, A., Ahmed, A. & Le, H. T. Spatio-temporal modelling of PM2.5 concentration based on land use and human activity pattern. *(Scheduled submission: December 2022).*

Non-peer Reviewed Articles

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/

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

Kar, A., Inclusive Accessibility: Understanding the user's perspectives on public transit. Paper to be presented at the *Ohio Public Transit Association Conference (OPTA)* in October 2022.

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*. University Consortium of Geographic Information Science (UCGIS) Symposium.

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).

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), 2022.

Kar, A., Carrel, A. L., Miller, H. J., & Le, H. T. (2021). Reducing public transit compounds social vulnerabilities during COVID-19. Poster presented in the OSU Translational Data Analytics Institute (TDAI) fall forum.

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. Poster presented in the University Consortium of Geographic Information Science (UCGIS) 2021 Symposium.

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).

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).

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

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

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/

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

News Coverage and Highlights (Selected)

- Ohio State News (2021): *COVID-19 made unequal access to food worse, study suggests*
- Ohio State News (2021): Low-income people saw smallest drop in travel during COVID-19
- EurekAlert (2021): *Low-income people saw smallest drop in travel during COVID-19*
- News Medical (2021): Study finds more deadly auto crashes during pandemic lockdown
- WebMD (2021): Pandemic Changed Grocery Shopping for Rich and Poor
- Science Daily (2021): Deadly auto crashes more likely during pandemic lockdown
- 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 Grant for partial dissertation fund — Spring 2021
Sustainability Institute, The Ohio State University
Amount received $5,000

One-year Graduate Fellowship — 2019 - 2020
Graduate School, The Ohio State University

Awards

Best student lightning talk at University Consortium for Geographic Information Science (UCGIS) Symposium — 2022

Jeanne X. Kasperson Student Paper Award from Hazards, Risks, and Disasters Specialty Group. — 2020

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

Best Undergrad Thesis Award — 2015

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

Service

Journal Reviewer, Cities, Transportation Safety and Environment, Health and Place, Transportation Research Board (TRB), International Journal of Digital Earth, Bridging Transportation Research (BTR) conference, Journal of Bangladesh Institute of Planners. — 2020 -

Graduate Student Representative, Climate justice cluster hire, The Ohio State University — 2022 -

Member, Women graduate students' group for professional development at OSU Geography - Women Are Creating Knowledge (WACK), Geography, OSU. — 2019 -

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)
- Transportation Research Board (TRB)
- University Consortium for Geographic Information science (UCGIS)
- 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 few-shot learning techniques 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 smart-phone app-based survey, GPS tracking, big data