

LIANG MAO

Department of Geography
University of Florida
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RESEARCH INTERESTS

- Medical/Health Geography
- Agent-based modeling and simulation
- Geospatial network analysis
- Spatial accessibility and disparities in health

EDUCATION

2010	PhD, Geography	University at Buffalo, State University of New York
2005	MS, GIScience	Nanjing University
2002	BS, Geography	Nanjing University

POSITIONS AND EMPLOYMENT

2016 – Present	Associate Professor , Department of Geography, University of Florida
2010 – 2016	Assistant Professor , Department of Geography, University of Florida

PEER-REVIEWED PUBLICATIONS**JOURNAL ARTICLES (* indicates Corresponding Author)**

1. Du, F., Wang, J., **Mao, L.**, & Kang, J. (2024). Daily rhythm of urban space usage: insights from the nexus of urban functions and human mobility. *Humanities and Social Sciences Communications*, 11(1), 1-10. <https://doi.org/10.1057/s41599-023-02577-y>
2. da Paixão Sevá A, **Mao L**, Ovallos FG, Oliveira KM, Oliveira FB, Albuquerque GR. (2023) Spatio-temporal distribution and contributing factors of tegumentary and visceral leishmaniasis: a comparative study in bahia, brazil. *Spatial and Spatio-temporal Epidemiology*. 100615. <https://doi.org/10.1016/j.sste.2023.100615>
3. Glover, B., **Mao, L.*** Hu, Y., & Zhang, J. (2022). Enhancing the Retail Food Environment Index (RFEI) with Neighborhood Commuting Patterns: A Hybrid Human– Environment Measure. *International Journal of Environmental Research and Public Health*, 19(17), 10798. <https://doi.org/10.3390/ijerph191710798>
4. Fu, H.Y., Wang, Y., **Mao, L.**, Hong, N., Wang, Z, Zhao, S.C., Liao, C. (2022) The spatial pattern and governance of Zhongyuan Urban-Rural System in its development trajectory. *Journal of Geographical Sciences*, 32(7): 1261-1280. <https://doi.org/10.1007/s11442-022-1996-3>
5. Zhang, H., Yin, L., **Mao, L.**, Mei, S., Chen, T., Liu, K., & Feng, S. (2022). Combinational Recommendation of Vaccinations, Mask-Wearing, and Home-Quarantine to Control Influenza in Megacities: An Agent-Based Modeling Study with Large-Scale Trajectory Data. *Frontiers in public health*, 10. <https://doi.org/10.3389/fpubh.2022.883624>
6. Han, Y., **Mao, L.**, Chen, X., Zhai, W., Peng, Z. R., & Mozumder, P. (2021). Agent-based Modeling to Evaluate Human-Environment Interactions in Community Flood Risk Mitigation. *Risk Analysis*. <https://doi.org/10.1111/risa.13854>
7. Yin, L.*, Zhang, H., Li, Y., Liu, K., Chen, T., Luo, W., ..., **Mao, L.*** & Mei, S*. (2021). A data driven agent-based model that recommends non-pharmaceutical interventions to suppress Coronavirus disease 2019 resurgence in megacities. *Journal of the Royal Society Interface*, 18(181), 20210112. [10.1098/rsif.2021.0112](https://doi.org/10.1098/rsif.2021.0112)

8. Du, F.Y., **Mao, L.**, Wang, J.E. (2021). Determinants of travel mode choice for seeking healthcare: A comparison between elderly and non-elderly patients. *Journal of Transport Geography*. 92: 103023. <https://doi.org/10.1016/j.jtrangeo.2021.103023>
9. Yuan, F.X., Liu, R., **Mao, L.**, Li, M. (2021). Internet of People Enabled Framework for Evaluating Performance Loss and Resilience of Urban Critical Infrastructures. *Safety Science*. 134:105079. <https://doi.org/10.1016/j.ssci.2020.105079>
10. Fu, H.Y., Zhang, Y., Liao, C., **Mao, L.**, Wang, Z., Hong, N. (2020). Investigating PM_{2.5} responses to other air pollutants and meteorological factors across multiple temporal scales. *Scientific Reports*. 10: 15639. <https://doi.org/10.1038/s41598-020-72722-z>
11. Yang, Y., Metcalf, S., **Mao, L.*** (2020). Modeling transit-assisted hurricane evacuation through socio-spatial networks. *International Journal of Geographical Information Science*. <https://doi.org/10.1080/13658816.2020.1828590>
12. Du, F.Y., **Mao, L.**, Wang, J.E., Jin, H. (2020). Inferring transit-based health seeking patterns from smart card data - A case study in Beijing, China. *Health & Place*, 65:102405. <https://doi.org/10.1016/j.healthplace.2020.102405>
13. Han, Y., Ash, K., **Mao, L.**, & Peng, Z. R. (2020). An agent-based model for community flood adaptation under uncertain sea-level rise. *Climatic Change*, 1-20. <https://doi.org/10.1007/s10584-020-02802-6>
14. Lippi, C.A., **Mao, L.**, Stewart-Ibarra, A.M. et al. (2020). A network analysis framework to improve the delivery of mosquito abatement services in Machala, Ecuador. *International Journal of Health Geographies* 19, 3. <https://doi.org/10.1186/s12942-020-0196-6>
15. Yin, L., Lin, N., Song, X.Q., Mei, S.J., Shaw, S.L., Fang, Z.X., Li, Q.L. **Mao, L.***. (2020). Space-Time Personalized Short Message Service (SMS) for Infectious Disease Control – Policies for Precise Public Health. *Applied Geography* 114. 102103. <https://doi.org/10.1016/j.apgeog.2019.102103>
16. Yaghyyan, L., Cogle, C.R., Deng, G.R., Yang, J., Jackson, P., Hardt, N., **Mao, L.***. (2019). Continuous Rural-Urban Coding for Cancer Disparity Studies: Is It Appropriate for Statistical Analysis? *International Journal of Environmental Research and Public Health*. 16(6).1076, <https://doi.org/10.3390/ijerph16061076>
17. Wu, C.Y., Mossa, J., **Mao, L.** Almulla, M. (2019). Comparison of different spatial interpolation methods for historical hydrographic data of the Lowermost Mississippi River. *Annals of GIS*. doi.org/10.1080/19475683.2019.1588781
18. Zhang, J. W., **Mao, L.*** (2019). Integrating multi-modal transportation into measures of spatial food accessibility. *Journal of Transport & Health*. 13:1-11. <https://doi.org/10.1016/j.jth.2019.03.001>
19. Yang, Y., **Mao, L.**, Metcalf, S., (2019). Diffusion of hurricane evacuation behavior through a home-workplace social network: A spatially explicit agent-based simulation model. *Computers, Environment and Urban Systems*. 74: 13-22
20. Mollalo, A., **Mao, L.**, Rashidi, P., Glass, G. (2019) A GIS-based Artificial Neural Network Model for Spatial Distribution of Tuberculosis across the Continental United States. *International Journal of Environmental Research and Public Health*, 16, 157; doi:10.3390/ijerph16010157
21. Gomez, J.P., Nekorchuk, D., **Mao, L.**, Ryan S. J., Ponciano, J.M., Blackburn K.J. (2018). Compartmental Model for Environmentally-mediated Indirect Disease Transmission. *PLoS ONE* 13 (12), e0208621.
22. Deng, G.R., **Mao, L.*** (2018). Spatially explicit age segregation index and self-rated health of older adults in U.S. cities. *ISPRS International Journal of Geo-Information*, 7, 351; <https://doi.org/10.3390/ijgi7090351>
23. Stacciarini, J.M., Vacca, R., **Mao, L.*** (2018) Who and Where: A socio-spatial analytic approach for community-based health research. *International Journal of Environmental Research and Public Health* 2018, 15(7), 1375; <https://doi.org/10.3390/ijerph15071375>
24. Yaghyyan, L., Rich, S., **Mao, L.**, Mai, V., Egan, K.M. (2018). Interactions of coffee consumption and postmenopausal hormone use in relation to breast cancer risk in UK Biobank. *Cancer Causes & Control*, 29(6):519-525. <https://doi.org/10.1007/s10552-018-1028-x>
25. **Mao, L.***, Yang, J., Deng, G.R. (2018). Mapping rural–urban disparities in late-stage cancer with space-time rurality index and GWR. *Spatial and spatio-temporal epidemiology*, 26: 15-23. <https://doi.org/10.1016/j.sste.2018.04.001>
26. Wang, L.H., Liu, Y.X., **Mao, L.**, Sun, C. (2018). Evaluating impacts of the proposed China 2030 high-

- speed rail network on ground transportation accessibility. *Sustainability*, 10(4): 1270.
27. Yang, J., **Mao, L.*** (2018). Understanding temporal changes of spatial accessibility to healthcare: an analytic framework for local factor impacts. *Health and Place* 51, 118-124
 28. Rojas, A., Patarroyo, P., **Mao, L.**, and Kowalewski, M. (2017). Global biogeography of Albian ammonoids: A network-based approach. *Geology*. 45 (7): 659-662. DOI: 10.1130/G38944.1
 29. da Paixão Sevá, A., **Mao, L.**, Galvis-Ovallos, F., Lima, J. M. T., & Valle, D. (2017). Risk analysis and prediction of visceral leishmaniasis dispersion in São Paulo State, Brazil. *PLOS Neglected Tropical Diseases*, 11(2), e0005353.
 30. **Mao, L.***, Yin, L., Song, X.Q., Mei, S.J. (2016). Mapping intra-urban transmission risks of dengue fever with big hourly cellphone tracking data. *Acta Tropica* 162: 188-915 (<http://dx.doi.org/10.1016/j.actatropica.2016.06.029>)
 31. Schiaffino K. M., Nara A., **Mao, L.** (2016) Where are the hospital language services? Geographic trends in language services and met and unmet service areas need among U. S. hospitals. *Health Affairs* 35(8): 1399-1403.(DOI: 10.1377/hlthaff.2015.0955)
 32. Ha S., Hu, H., **Mao, L.**, Roussors-Ross, D., Roth, J., Xu, X.H. (2016) Potential Selection Bias of Using Geocoded Birth Records for Epidemiological Research. *Annals of Epidemiology* 26(3): 204-211 (<http://dx.doi.org/10.1016/j.annepidem.2016.01.002>)
 33. **Mao, L.***, Stacciarini, J.M., Smith R., Wiens, B. (2015) An individual-based rurality measure and its health application: A case study of Latino immigrants in North Florida, USA. *Social Science and Medicine* 147: 300-308 (doi:10.1016/j.socscimed.2015.10.064)
 34. **Mao, L** (2015) Predicting self-initiated preventive behavior against epidemics with an agent-based relative agreement model. *Journal of Artificial Societies and Social Simulation* 18(4):6 (DOI: 10.185642892).
 35. **Mao, L.***, Wu, X., Huang, Z.J., Tatem, A. (2015) Modeling monthly flows of global air travel passengers: an open-access data resource. *Journal of Transport Geography* 48: 52-60. (doi:10.1016/j.jtrangeo.2015.08.017)
 36. Wang, Y., Waylen, P., **Mao, L.** (2014) Modeling Properties of Influenza-Like Illness Peak Events with Crossing Theory. *ISPRS International Journal of Geo-Information*. 3:764-780. (doi:10.3390/ijgi3020764)
 37. **Mao, L.***, (2014). Modeling Triple-Diffusions of Infectious Diseases, Information, and Preventive Behaviors through a Metropolitan Social Network—An Agent-based Simulation. *Applied Geography*. 50: 31-39. (DOI: 10.1016/j.apgeog.2014.02.005)
 38. **Mao, L.**, (2014). Ranking Academic Impact of GIS Research Organizations in the United States: A Bibliographic Network Analysis over 20 years. *GIScience and Remote Sensing*. 51(1):51-62. (DOI:10.1080/15481603.2014.883211)
 39. **Mao, L.***, Nekorchuk, D. (2013). Measuring Spatial Accessibility to Healthcare for Populations with Multiple Transportation Modes. *Health & Place* 24: 115-122 (<http://dx.doi.org/10.1016/j.healthplace.2013.08.008>)
 40. **Mao, L.**, (2013). Geography, Structure, and Evolution of GIS Research Community in the United States: A Network Analysis from 1992-2011. *Transactions in GIS*, 18(5), 704-717 (doi: 10.1111/tgis.12054)
 41. Liu, Y. X., Li, M. C., **Mao, L.**, Chen, L., Chen K. F. (2013). Seasonal Pattern of Tidal-Flat Topography along the Jiangsu Middle Coast, China, Using HJ-1 Optical Images. *Wetlands* 33: 871-886
 42. Liu, Y. X., Li, M.C., Zhou, M. X., Yang, K, **Mao, L.** (2013). Quantitative Analysis of the Waterline Method for Topographical Mapping of Tidal Flats: A Case Study in the Dongsha Sandbank, China. *Remote Sensing*. 5(11):6138-6158.
 43. **Mao, L.***, Yang, Y., Qiu, Y. L., Yang, Y., (2012). Annual economic impacts of seasonal influenza on US counties: Spatial heterogeneity and patterns. *International Journal of Health Geographies* 11:16 doi:10.1186/1476-072X-11-16
 44. Liu, Y. X., Li, M. C., **Mao, L.**, Cheng L., Hu W., Li, F. X., (2012). Toward a Method of Constructing Tidal Flat Digital Elevation Models with MODIS and Medium-Resolution Satellite Images. *Journal of Coastal Research* 29(2): 438-448. DOI: 10.2112/JCOASTRES-D-12-00088.1

45. Bian, L., Huang, Y. X., **Mao, L.**, Lim, E. J., Lee, G. J., Yang, Y., Wilson, D., & Cohen M., (2012). Modeling Individual Vulnerability to Communicable Diseases – A Framework and Design. *The Annals of the Association of American Geographers*, 102(5): 1016-1025.
46. **Mao, L.***, & Yang, Y. (2012). Coupling infectious disease, human preventive behavior, and social networks --A conceptual model for simulation. *Social Science & Medicine*, 74(2):167-175
47. **Mao, L.**, Qiu, Y. L., Kusano, C., Xu, X.H. (2012). Predicting regional space-time variation of PM2.5 with land use regression model and MODIS data. *Environmental Science and Pollution Research*, 19(1):128-138.
48. **Mao, L.**, (2011). Agent-based simulation for weekend-extension strategies to mitigate influenza outbreaks. *BMC Public Health*, 11(1): 522 (doi:10.1186/1471-2458-11-522).
49. **Mao, L.**, (2011). Evaluating the combined effectiveness of influenza control strategies and human preventive behavior. *PLoS ONE*, 6(10): e24706 (doi:10.1371/journal.pone.0024706).
50. **Mao, L.***, & Bian, L. (2011). Agent-based simulation for a dual-diffusion process of influenza and human preventive behavior. *International Journal of Geographical Information Science*, 25(9): 1371-1388
51. **Mao, L.***, & Bian, L. (2010). Spatial-temporal transmission of influenza and its health risks in an urbanized area. *Computers, Environment and Urban Systems*, 34(2):204-215
52. **Mao, L.***, & Bian, L. (2010). A dynamic social network with individual mobility for designing vaccination strategies. *Transactions in GIS*, 14(4):533-545
53. Guo, W., Li S.H., **Mao, L.**, Yin Y., & Zhu D. K. (2007). A Model for Environmental Impact Assessment of Land Reclamation. *China Ocean Engineering*, 9(2): 343-354
54. Fu, H.Y., Li, M.C., **Mao, L.**, & Liu, Y. X. (2007). An Ecological Footprint Analysis on the Impacts of General Land Use Planning - A Case Study in Langfang City. *Journal of Natural Resources*, 22(2): 225-235
55. Wu, Y., Li, M.C., **Mao, L.** (2006). Quantitative Analysis on the Spatial Structure of Town System in County-Scope Supported by GIS: A Case Study in Lin'an County, Zhejiang Province. *Geography and Geo-Information Science*, 2:17-19
56. Liu, Y.X., Li, M.C., & **Mao, L.** (2006). An Algorithm of Multi-spectral Remote Sensing Image Segmentation Based on Edge Information. *Journal of Remote Sensing*, 10(3): 350-356
57. Liu, Y.X., Li, M.C., **Mao, L.**, & Xu F. (2006). Review of Remotely Sensed Imagery Classification Patterns based on the Object-Oriented Approach. *Chinese Geographical Science*, 16(3): 282-288
58. **Mao, L.**, Li, M.C., Xu, J.G. (2006). Study on the Integration of Database Establishment and Mapping in Land Use Planning. *Journal of Jiangxi Normal University (Natural Sciences Edition)*, 29(4)
59. **Mao, L.**, Li, M.C., Liu, Y.X., & Liu G.H.(2005). A Two-Dimensional Shape Index based on Area Compactness and Its Applications. *Geography and Geo-information Science*, 21(5): 11-14
60. **Mao, L.**, Li, M.C., & Liu, Y.X. (2005). Quantitative Analysis of Spatial Adjacency based on Entitative Data Model. *Application Research of Computer*, 22(4): 203-204

BOOK CHAPTERS

1. **Mao, L.**, (2016). Promoting social contagion of preventive behaviors during influenza epidemics: An agent-based simulation. Chapter 2 (pp: 68-83), In Zachary Neal (Eds.), *Handbook of Applied System Science*, Routledge, New York.

CONFERENCE PAPERS

1. Wan, Q., Yin, L., **Mao, L.**, Wang, L., Mei, S., Li, Q., & Liu, K. (2019). Simulating Human Host Interventions to Control Intra-urban Dengue Outbreaks with a Spatially Individual-based Model. In *2019 IEEE International Conference on Real-time Computing and Robotics (RCAR)* (pp. 537-542). August 4-9, Irkutsk, Russia. DOI: <http://10.1109/RCAR47638.2019.9044118>
2. Xie J., Yin, L., **Mao, L.** (2018). A Modeling Framework for Individual-Based Urban Mobility Based on Data Fusion. *26th International Conference on Geoinformatics*. June 28-30, Kunming, China. DOI: 10.1109/GEOINFORMATICS.2018.8557098

3. **Mao, L.** (2013). Cost-Effectiveness of Workplace Closure and Travel Restriction for Mitigating Influenza Outbreaks: A Network-based Simulation. *Proceedings of 21st ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (Health GIS 2013)*. November 5-8, Orlando, FL. Page: 77-84 (<http://dx.doi.org/10.1145/2535708.2535709>).
4. Falkner M., Linthicum K.J., Britch S.C., **Mao L.**, Tatem A. Spatio-temporal dispersion of *Aedes taeniorhynchus* in Florida (2012). *The 15th International Congress on Infectious Diseases (15th ICID)*. June 13-16, Bangkok, Thailand. <http://dx.doi.org/10.1016/j.ijid.2012.05.285>
5. Liang, J., Li, F. X., **Mao, L.** (2010), Review of the methods of delimitation for the spatial scope of urban agglomeration. *Proceedings of Geoinformatics, 18th International Conference*. June 18-20, Beijing, China: IEEE press. (DOI:10.1109/GEOINFORMATICS.2010.5567776).
6. Bian, L., Wilson, D., Whalen T., Cohen M., Huang Y. X. , Lee G.J., Lim E., **Mao L.**, & Yan Y. (2008). Explicit Spatial-Temporal Simulation of a Rare Disease. *Proceedings of the 11th Joint Conference on Information Sciences*. December 15-20, Shenzhen, China. Atlantis Press (DOI:10.2991/jcis.2008.13)
7. Chen, Z., Li, M., **Mao, L.**, Liu, Y., & Xu, J. (2008). Study on decision-making flow model of high-quality prime farmland planning. In *Geoinformatics 2008 and Joint Conference on GIS and Built Environment: Monitoring and Assessment of Natural Resources and Environments* (pp. 714518-714518). International Society for Optics and Photonics (doi:10.1117/12.813022).

FUNDED RESEARCH

- | | |
|-----------|---|
| 2019-2021 | Co-Investigator. UF research opportunity seed fund. <i>Familial, geographic, and social deterrents of mental wellbeing in rural LGBTQ+ adolescents</i> (\$85,000) |
| 2018-2021 | Co-Investigator. National Natural Science Foundation of China. <i>Individual-based epidemic modeling at a city scale with multi-source trajectory data</i> (¥770,000 as \$114,925); |
| 2017-2020 | Co-Investigator. National Natural Science Foundation of China. <i>Modeling individual's decision-making dynamic and its collective effects on urban sprawl using micro-simulation</i> . (¥650,000 as \$97,320) |
| 2016-2017 | Principal Investigator. UF Informatics Institute Seed Fund. <i>Developing temporally comparable high resolution rurality maps for social and health sciences</i> . (\$45,120); |
| 2015-2018 | Co-Investigator. Guangdong science and technology collaborative platform special funds. <i>Agent-based modeling and mobile-phone tracking data for controlling dengue fever in Shenzhen city</i> (¥500,000 as \$80,645); |
| 2013-2017 | Principal Investigator. National Research Council Transportation Research Board: <i>The role of air travel in the transmission and spread of insect-borne diseases</i> (\$249,955); |

COURSES TAUGHT

2010 – Present **University of Florida**

- GEO 3452/6451: Intro. Medical Geography
- GEO 4930: Senior Seminar
- GIS 3043/5107C: Foundations of Geographic Information Systems
- GIS 3420C/6425C: GIS Models for Public Health
- GIS 4113/6104: Spatial Networks
- GIS 4115/6117: Applied Geo-statistics

HONORS AND AWARDS

- | | |
|-----------|--|
| 2021-2024 | University of Florida Term Professorships |
| 2016-2019 | University of Florida Term Professorships |
| 2009-2010 | Research Fellowship , Frontline Healthcare Workers Safety Foundation, Ltd., Atlanta, GA |

- 2009 **Best Paper and Travel Award for Graduate Student Presentation**, University Consortium for Geographic Information Science (UCGIS), Summer Assembly, June 22-23, Santa Fe, NM
- 2009 **Hugh Calkins Applied GIS Award**, State University of New York at Buffalo
- 2008 **Travel Award for Graduate Student Presentation**, UCGIS Summer Assembly, June 23-24, Minneapolis, MN
- 2005 – 2009 **Presidential Fellowship**, College of Art and Science, State University of New York at Buffalo

PROFESSIONAL SERVICE

SUPERVISORY COMMITTEES as chair (or co-chair)

PhD Dissertations

- 2017 **Dawn Nekorchuk**, Modeling indirect transmission disease risk: Anthrax in bison in southwestern Montana
- 2014 **Ying Wang**, Spatio-temporal modeling for peak events of seasonal influenza: a case study in Florida

Master Thesis

- 2019 **Jiawen Zhang**, integrating multiple transportation modes into measures of spatial food accessibility
- 2018 **Jue Yang**, Understanding spatial-temporal changes of access to healthcare: an analytic framework for local factor impacts
- 2018 **Gurangran Deng**, Spatially explicit age segregation index and self-rated health of older adults in U.S. cities
- 2014 **Sheldon Waugh**, Geospatial risk modeling for west Nile virus in Tarrant county, TX using environmental and demographic data
- 2013 **Mike Falkner**, Spatio-temporal dynamics of Aedes Taeniorhynchus mosquito in Sarasota county, Florida
- 2013 **Nirav Patel**, Measuring spatial accessibility to HIV-TB treatments in Ahmedabad city, India—A GIS-based approach

Undergraduate Honor Thesis

- 2022 **Lilianna Thomas**, Colonoscopy Uptake and Area-Level Disparities in North Central Florida: Does Geography Matter?
- 2016 **Benjamin Shever**, Using GIS analysis to determine factors that influence pipe breaks in central Brevard County, Florida
- 2015 **Kaysie Salvatore**, Identifying spatial clusters and risk factors of HIV/AIDS in Florida metropolitan areas with zip-code level data

GRANT PROPOSAL REVIEWER

- 2020 UF Informatics Institute COVID 19 Seed Opportunity
- 2020 UF Research Opportunity Fund Social/Behavioral Sciences Committee
- 2016 NSF Geography and Spatial Sciences Program
- 2016 NIBIB/NIH "Predictive Multiscale Models for Biomedical, Biological, Behavioral, Environmental and Clinical Research (U01)"
- 2015 EPA Science to Achieve Results (STAR) Graduate Fellowship Program
- 2014 NSF Geography and Spatial Sciences Program
- 2013 NSF Geography and Spatial Sciences Program

ADMINISTRATIVE SERVICE

- Department of Geography, University of Florida
- 2016-Present Undergraduate Coordinator
- 2015-Present Department Curriculum committee

PROFESSIONAL AFFILIATIONS

Association of American Geographers

International Society for Photogrammetry and Remote Sensing Working Group VIII/2: Health

Chinese Professionals in Geographic Information Sciences (CPGIS)