

**Mingke Erin Li, Ph.D.**[mingke.li@ucalgary.ca](mailto:mingke.li@ucalgary.ca)**Education**

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- 2023 Ph.D., Geomatics Engineering, University of Calgary, Canada  
2019 M.Sc., Forestry, University of New Brunswick, Canada  
2017 B.Sc., GIScience, Nanjing Forestry University, Nanjing, China

**Research Interests**

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Discrete Global Grid Systems  
Geographic Information Science  
Spatial Databases and Spatial Data Mining  
Digital Earth  
Environmental Modeling

**Peer-reviewed Publications**

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- 2025 **Li, M.**; Liang, S.H.L. Enabling a Digital Earth for Methane Emissions Management with Equal-Area Discrete Global Grids. *International Journal of Digital Earth*. Under review.
- 2025 Liao, C.; Engwirda, D.; Cooper, M.; **Li, M.**; Fang, Y. Discrete Global Grid System-based Flow Routing Datasets in the Amazon and Yukon Basins. *Earth System Science Data*. 17(5), 2035–2062.
- 2024 **Li, M.**; Tousignant, C.; Chaudhuri, C.; Chabbouh, A. Utilizing Serverless Framework for Dynamic Visualization and Operations in Geospatial Applications. *International Journal of Digital Earth*. 17(1), 2392835.
- 2024 Liu, J.; Li, J.; Qiao, L.; **Li, M.**; Stefanakis, E.; Zhao, X.; Huang, Q.; Wang, H.; Zhang, C. QuadGridSIM: A Quadrilateral Grid-based Method for High-performance and Robust Trajectory Similarity Analysis. *Transactions in GIS*. 00, 1–25.
- 2022 **Li, M.**; McGrath, H.; Stefanakis, E. Multi-scale Flood Mapping under Climate Change Scenarios in Hexagonal Discrete Global Grids. *ISPRS International Journal of Geo-Information*. 11(12), 627.
- 2022 **Li, M.**; McGrath, H.; Stefanakis, E. Topographic Operations in Hexagonal Discrete Global Grid Systems. *International Journal of Applied Earth Observation and Geoinformation*. 113, 102985.
- 2022 **Li, M.**; McGrath, H.; Stefanakis, E. Geovisualization of Hydrological Flow in Hexagonal Grid Systems. *Geographies*. 2(2), 227-244.
- 2021 **Li, M.**; McGrath, H.; Stefanakis, E. Integration of Heterogeneous Terrain Data into Discrete Global Grid Systems. *Cartography and Geographic Information Science*. 48(6), 546-564.

- 2020 **Li, M.**; Stefanakis, E. Geospatial Operations of Discrete Global Grid Systems – A Comparison with Traditional GIS. *Journal of Geovisualization and Spatial Analysis*. 4(2), 26.
- 2020 **Li, M.**; Stefanakis, E. Geo-feature Modeling Uncertainties in Discrete Global Grids: A Case Study of Downtown Calgary, Canada. *Geomatica*. 74, 175-195.
- 2020 **Li, M.**; MacLean, D.A.; Hennigar, C.R.; Ogilvie, J. Previous Year Outbreak Conditions and Spring Climate Predict Spruce Budworm Population Changes in the Following Year. *Forest Ecology and Management*. 458, 117737.
- 2019 **Li, M.**; MacLean, D.A.; Hennigar, C.R.; Ogilvie, J. Spatial-Temporal Patterns of Spruce Budworm Defoliation within Plots in Québec. *Forests*. 10, 232.

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### Conference Presentations

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- 2025 **Li, M.E.**; Liang, S.H.L. Standardizing Spatial Intelligence for Gridded Methane Inventories: DGGS Meets EmissionML. Oral presentation at the 132<sup>nd</sup> OGC Member Meeting - EmissionML DWG, Jun. 2025, Online.
- 2025 **Li, M.E.**; Liang, S.H.L. Beyond the Graticule: Spatially Explicit Methane Inventories Using Discrete Global Grids. Oral presentation at the 132<sup>nd</sup> OGC Member Meeting - Discrete Global Grid Systems DWG, Jun. 2025, Online.
- 2025 **Li, M.E.**; Liang, S.H.L. Beyond the Graticule: Spatially Explicit Methane Inventories Using Discrete Global Grids. Oral and poster presentation at CanCH4 Symposium, May 2025, Ottawa, Canada.
- 2024 **Li, M.E.**; Liang, S.H.L. Mapping Methane: A Review of Bottom-up Gridded Inventories. Oral presentation at the 130<sup>th</sup> OGC Member Meeting - EmissionML DWG ad-hoc, Nov. 2024, Online.
- 2023 **Li, M.**; McGrath, H.; Stefanakis, E. Flood susceptibility analysis on hexagonal grid meshes: a case study in southern New Brunswick, Canada. Poster presentation at GIS in Education and Research Conference, Mar. 2023, Toronto, Canada.
- 2022 **Li, M.**; McGrath, H.; Stefanakis, E. Analytical operations for terrain data modeled in Discrete Global Grid Systems. Oral presentation at Canadian Cartographic Association Annual Conference, May 2022, Online.
- 2021 **Li, M.**; McGrath, H.; Stefanakis, E. Integration of multi-source terrain data on Discrete Global Grids in Canada. Oral presentation at Canadian Cartographic Association Annual Conference, May 2021, Online.
- 2020 **Li, M.**; Stefanakis, E.; McGrath, H. National terrain data management on Discrete Global Grids in Canada. Oral presentation at AutoCarto 2020, Oct. 2020, Online.
- 2018 **Li, M.**; MacLean, D.A.; Hennigar, C.R.; Ogilvie, J. Spatial-temporal patterns of spruce budworm defoliation within measured plots in Québec. Oral presentation at the 9<sup>th</sup> Bi-Annual Eastern Canada - USA Forest Science Conference, Oct. 2018, Fredericton, Canada.

2018 **Li, M.**; MacLean, D.A. GIS analyses of factors influencing spruce budworm outbreak initiation in northern New Brunswick. Oral presentation at SERG International Workshop, Feb. 2018, Edmonton, Canada.

### **Other Invited Talks**

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- 2025 Discrete Global Grid Systems (DGGS) and Their Role in Methane Emission Inventories. Presented at the Monthly Lunch and Learn at SensorUp Inc., May 2025, Online.
- 2022 Flood Susceptibility Modeling in Discrete Global Grids under Climate Change Scenarios. Presented at the Canada Centre for Mapping and Earth Observation, Natural Resources Canada, Oct. 2022, Online.
- 2022 Geospatial Data Analysis in Discrete Global Grid Systems – Progress and Perspectives. Presented at the China Agricultural University, May 2022, Online.
- 2022 Quantization, Analysis, and Application of Terrain Data Modeled in Discrete Global Grid Systems. Presented at the International Society for Photogrammetry and Remote Sensing Working Group IV/7 (Geo-Data Management) Webinar, Jan. 2022, Online.
- 2021 Integration Platform for Canadian Terrain Data: A DGGS Perspective. Presented at the Canada Centre for Mapping and Earth Observation, Natural Resources Canada, Apr. 2021, Online.

### **Work Experience**

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2024-present *Postdoctoral Associate, University of Calgary*

- Enhance the quality of gridded methane emission inventories in the oil and gas sectors by Discrete Global Grid Systems.
- Development of the Emission Event Modeling Language, an emerging OGC standard that has the potential for global impact in leveraging geospatial sensing data for emissions reduction.
- Development of a scalable geospatial intelligence framework that integrates DGGS and generative AI to enable dynamic, location-aware querying and interpretation of methane emissions data.

2023-2024 *GIS Scientist, Geosapiens Inc.*

- Large-scale DEM modeling with forests and buildings removed using XGBoost.
- On-the-fly operations and visualization on serverless AWS Lambda powered by Discrete Global Grid Systems.
- Coastal flood model development and fluvial flood model calibration based on Height Above the Nearest Drainage model.
- Flood defense model development using feature identification in 2D geospatial fields.

2020-2023 *Lab Instructor, Department of Geomatics Engineering, University of Calgary*

- ENGO 351 Introduction to Geospatial Information Systems.
- ENGO 451 Design and Implementation of Geospatial Information Systems.

- 2022      *Research Internship, Canada Centre for Mapping and Earth Observation, Natural Resources Canada*
- Flood susceptibility mapping under climate change – a part of the National Flood Hazard Identification and Mapping Program.
- 2020-2022    *Research Assistant, Department of Geomatics Engineering, University of Calgary*
- Large network analysis component in the project evaluating the impact of gasoline station infrastructure contraction on stranded assets.
  - Flood susceptibility modeling by machine learning in hexagonal grid systems.
  - Automating geospatial data extraction via web services and multi-format data integration.
- 2017-2018    *Teaching Assistant, Faculty of Forestry and Environmental Management, University of New Brunswick*
- ENVS 6008 Management of Natural Systems.
  - FOR 2281 Introduction to GIS with Applications in Environmental Management I.
  - FOR 2282 Introduction to GIS with Applications in Environmental Management II.
  - GIS Training for Natural Resource Professionals Workshop.

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### Awards & Honors

- 2022      Canadian Cartographic Association Best Presentation Award
- 2022      Esri Young Scholars Award – First Runner-up
- 2021-2022   CRSNG-CREATE DOTS Program Award
- 2021      Esri Canada Centre of Excellence App Challenge – First Runner-up
- 2020-2021   Geomatics Engineering Department FGS Award at the University of Calgary
- 2018      SERG International Graduate Student Award

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### Memberships

- 2025-present   OGC EmissionML SWG
- 2024-present   ISPRS WG IV/12 Grid Modelling for Full-space Integration and Calculation
- 2024-present   OGC Discrete Global Grid Systems DWG & SWG
- 2022-2023   Canadian Cartographic Association
- 2022-2023   Association of Canadian Map Librarians and Archivists
- 2021-2022   ISPRS WG IV/4 Data Management for Spatial Scenarios
- 2019-2023   Esri Canada Centre of Excellence