Dr. Yu Han

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RESEARCH

Yu's research mainly deals with human-environment interactions in adaptation planning. It can be broadly classified into three directions:

(i) Risk, vulnerability, and resilience of urban areas to extreme climate events;

(ii) Scenario analysis of climate change adaptation and risk mitigation strategies using agent-based models;

(iii) Emerging concepts, methods and digital tools for urban resilience.

He employs data-driven and agent-based approaches to assess disaster risk, adaptation strategies, and stakeholder interactions in response to climate change, land use changes, and regional development.

✱ means "Representative"
∗ means "Corresponding author"

EDUCATION

Ph.D. in Urban and Regional Planning 2016-2020
University of Florida
Dissertation: Agent-based Modeling of Human-Environment Interactions in Coastal Flood Adaptation

MSc. in Electrical and Computer Engineering 2018-2019
University of Florida

MSc. in Civil and Environmental Engineering 2012-2014
Carnegie Mellon University

BSc. in Environmental Engineering 2008-2012
Beijing Institute of Technology

APPOINTMENT

Research Associate in Department of Land Economy 24.11 - now
University of Cambridge, UK

Research Assistant Professor in Faculty of Geo-information Science and Earth Observation (ITC) 23.06 - 24.06
University of Twente, the Netherlands

Lecturer in Urban Economics and Public Administration 22.08 - 23.05
Capital University of Economics and Business, China

Postdoc Associate in Landscape Arch&Urban Planning 21.10 - 22.04
Taxes A&M University at College Station, US

Postdoc Fellow in Department of Earth and Environment 20.12 - 21.10
Florida International University, US

Research Assistant in Urban and Regional Planning 16.08 - 20.12
University of Florida, US

Research Fellow in Institute of Environment 14.10 - 16.08
Tsinghua University, China

PUBLISHED ARTICLES

1. Zan Wang, Shengwen Qi, **Yu Han**, Bowen Zheng, Yu Zou, Yue Yang. Delimitation of Landslide Areas in Optical Remote Sensing Images across Regions via Deep Transfer Learning. IEEE Access. doi:10.1109/ACCESS.2024.3514216

2. **Yu Han**, Xinyue Ye(*), Chunwu Zhu. (2024) The Unequal Impact of Disasters: Assessing the Interplay Between Social Vulnerability, Public Assistance, Flood Insurance, and Migration in the US. Urban Informatics. 3, 30. https://doi.org/10.1007/s44212-024-00061-9

3. **Yu Han(*)**, Wei Zhai, Pallab Mozumder, Cees van Westen, Changjie Chen. (2024) Modeling evacuation activities amid compound hazards: insights from the case of hurricane Irma in southeast Florida. Travel Behaviour and Society. 38, 100933. https://doi.org/10.1016/j.tbs.2024.100933

4. Wei Zhai, Mengyang Liu, **Yu Han**. (2024) Dynamic neighborhood isolation and resilience during the pandemic in America's 50 largest cities. Cities. 153, 105260. https://doi.org/10.1016/j.cities.2024.105260

5. **Yu Han(*)**, Xinyue Ye(*), Kayode Atoba, Pallab Mozumder, Changjie Chen, Bastian van den Bout, Cees van Westen. (2024). Retreat from flood zones: Simulating land use changes in response to compound flood risk in coastal communities. Cities, 149, 104953. https://doi.org/10.1016/j.cities.2024.104953. (✱)

6. **Yu Han(*)**, Haifeng Jia, Changqing Xu, Marija Bockarjova, Cees van Westen, Luigi Lombardo. (2024). Unveiling spatial inequalities: Exploring county-level disaster damages and social vulnerability on public disaster assistance in contiguous US. Journal of environmental management, 351, 119690. https://doi.org/10.1016/j.jenvman.2023.119690

7. Xinyue Ye(*), Jiaxin Du, **Yu Han**, Galen D. Newman, David Retchless, Lei Zou, Youngjib Ham, Zhenhang Cai, Developing Human-Centered Urban Digital Twins for Community Infrastructure Resilience: A Research Agenda. Journal of Planning Literature. https://doi.org/10.1177/08854122221137861

8. **Yu Han**, Xinyue Ye(*) (2022). Examining the effects of flood damage, federal hazard mitigation assistance, and flood insurance policy on population migration in the conterminous US between 2010 and 2019. Urban Climate. https://doi.org/10.1016/j.uclim.2022.101321

9. **Yu Han**, Xiao Huang, Xinyue Ye(*), Bahar Dadashova(2022). Adaptation planning and hazard mitigation for interdependent infrastructure systems to enhance urban resilience under climate change. Landscape Architecture Frontiers. DOI:10.15302/J-LAF-1-030031

10. Zhengsong Lin, Yuting Wang, Xinyue Ye, Yuxi Wan, Tianjun Lu, **Yu Han** (2022). Effects of Low-Carbon Visualizations in Landscape Design Based on Virtual Eye-Movement Behavior Preference. Land. DOI: 10.3390/land11060782

11. Changqing Xu, Xinmei Shi, Mingyi Jia, **Yu Han**, Rongrong Zhang, Shakeel Ahmad, Haifeng Jia(*) (2022), China Sponge City database development and urban runoff source control facility configuration comparison between China and the US, Journal of Environmental Management. https://doi.org/10.1016/j.jenvman.2021.114241

12. **Yu Han(*)**, Liang Mao, Xuqi Chen, Wei Zhai, Zhong-Ren Peng, Pallab Mozumder (2022), An agent-based model to simulate human-environment interactions in community flood adaptation. Risk Analysis. https://doi.org/10.1111/risa.13854. (✱)

13. **Yu Han(*)**, Pallab Mozumder (2022), Risk-based flood adaptation assessment for coastal buildings based on cloud computing. Sustainable Cities and Society, https://doi.org/10.1016/j.scs.2021.103415.

14. **Yu Han(*)**, Pallab Mozumder (2021), Building-level Adaptation Analysis under uncertain Sea-Level Rise. Climate Risk Management, https://doi.org/10.1016/j.crm.2021.100305

15. **Yu Han**, Changjie Chen, Zhong-Ren Peng(*), Pallab Mozumder (2021), Evaluating impacts of coastal flooding on the transportation system using an activity-based travel demand model: a case study in Miami-Dade County, FL. Transportation, https://doi.org/10.1007/s11116-021-10172-w. (✱)

16. **Yu Han**, Kevin Ash, Liang Mao, Zhong-Ren Peng(*) (2020). An agent-based model for community flood adaptation under uncertain sea-level rise. Climatic Change, https://doi.org/10.1007/s10584-020-02802-6

17. **Yu Han**, Zhong-Ren Peng(*) (2019). The integration of local government, residents, and insurance in coastal adaptation: An agent-based modeling approach. Computers, Environment and Urban Systems, https://doi.org/10.1016/j.compenvurbsys.2019.04.001. (✱)

18. Wei Zhai, Xueyin Bai, Yu Shi, **Yu Han**, Zhong-Ren Peng(*), Chaolin Gu (2019). Beyond Word2vec: An approach for urban functional region extraction and identification by combining Place2vec and POIs. Computers, Environment and Urban Systems, https://doi.org/10.1016/j.compenvurbsys.2018.11.008.

19. **Yu Han**, Haifeng Jia(*) (2017). Simulating the spatial dynamics of urban growth with an integrated modeling approach: A case study of Foshan, China. Ecological modelling, https://doi.org/10.1016/j.ecolmodel.2016.04.005.

ARTICLES UNDER REVIEW

1. Changjie Chen, **Yu Han**, Andrea Galinski, Christian Calle, Jeffery Carney, Xinyue Ye, Cees van Westen. Integrating urban digital twins with cloud-based geospatial dashboards for coastal resilience planning: A case study in Florida. Journal of Planning Education and Research. (under review after revision)

2. Xinmeng Shan, **Yu Han**, Jiahong Wen, Hengzhi Hu, Jiao Wang, Guotao Zhang, Paolo Scussolini, Qian Ke, Mengya Li, Jun Wang. Integrating Nature-based Solutions for Compound Flood Risk Mitigation in China: A Case Study of Shanghai. Journal of Environmental Management (under revision)

WORKING PAPERS

1. **Yu Han**, Jiao Wang, Zan Wang, Cees van Westen, Peng Cui, Towards a Systemic Risk Assessment for Compound and Cascading Hazards: A Framework.

2. **Yu Han**, Pallab Mozumder, Developing a Composite Social Disparity Index to Measure Health Disparity to Hydroclimatic Disasters: A Case Study of Hurricane Harvey.

3. **Yu Han**, Changjie Chen, A Digital Twin Approach to Measure Community Vulnerability to Coastal Hazards.

4. Yao Li, Luoyang Wang, **Yu Han**, Haifeng Jia, Pin Wang, Tangao Hu, Impact of three-dimensional landscape pattern on urban waterlogging process: A case study in Haining, China

PROFESSIONAL REPORTS

1. Zhong-Ren Peng, Yu Han, Life Cycle Costs and Benefits Analysis of Freight Transportation Projects, BDV31 977-119, Florida Department of Transportation(FDOT)

DEVELOPED SOFTWARE

- *Yu Han, Haifeng Jia, Weize Song. A land use change simulation system based on multi-criteria evaluation. Tsinghua University. 2015*
- *Yu Han, Zhong-Ren Peng. Life Cycle Cost and Benefit Analysis of Freight Transportation, FreighTEC 2.0. Florida Department of Transportation (FDOT). 2020*

WRITTEN PROPOSALS

- *Focused CoPe: Climate Change, Coastal Hazards, and Human Health (C3H3) Hub. PI: Pallab Mozumder. National Science Foundation Coastlines and People (CoPe). 2021. Budget:*
- *Impact of Flood Risk and Adaptation Approaches on Future Property Values in Houston. PI: Xinyue Ye. Lincoln Institute of Land Policy. 2022. Budget: $50000*

CONFERENCES

- **Yu Han**, Cees van Western. 2024. Modeling Evacuation Strategies in Response to Compound Hazards: Lessons Learned from a Major Hurricane Event in the US. EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-9975, https://doi.org/10.5194/egusphere-egu24-9975, 2024.
- Cees Van Westen, Bastian van den Bout, Rabina Twayana, Massimiliano Pittore, Ashok Dahal, Manzul Hazarika, **Yu Han**. A web-based multi-hazard risk simulation service based on impact chains, EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-15139, https://doi.org/10.5194/egusphere-egu24-15139, 2024.
- Wang Zan, Shengwen Qi, Youshan Liu, Bowen Zheng, Peng Sun, **Yu Han**. Unsupervised Deep Learning for Rapid Subsurface Interface Identification using Geophysical Measurements, EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-19107, https://doi.org/10.5194/egusphere-egu24-19107, 2024.
- **Yu Han**, Xinyue Ye. Symposium on Human Dynamics Research: Geospatial modeling of climate risk and community resilience. AAG 2022 Annual Meeting (virtual), https://aag-annualmeeting.secure-platform.com/a/solicitations/19/sessiongallery/2893, 2022
- **Yu Han**, Xinyue Ye. Agent-based modeling to evaluate community flood adaptation strategies using cloud computing. AAG 2022 Annual Meeting (virtual), https://aag-annualmeeting.secure-platform.com/a/solicitations/19/sessiongallery/2893/application/8136, 2022

- **Yu Han**. 2021. Examining Social and Institutional Barriers on Flood Resilience in the US. ACSP 2021 Annual Conference (virtual)

- **Yu Han**, Changjie Chen, Ruth L. Steiner, Zhong-Ren Peng. Evaluating Impacts of Coastal Flooding on the Transportation System Using Activity-based Modeling: a Case Study in Miami-Dade County, FL. Proceedings of the Transportation Research Board (TRB) 100th Annual Meeting, Washington, D.C., USA, https://trid.trb.org/view/1918925, 2021

- **Yu Han**. 2020. Probabilistic Assessment of Community Flood Adaptation based on Cost-Benefit Analysis under Sea-Level Rise. Virtual SRA 2020 Annual Meeting (Presentation video available: https://youtu.be/wmfGi6H2Y_Q).

- **Yu Han**, Zhong-Ren Peng. 2019. Agent-based Modeling of Individual Behavior Dynamics on Flood Disaster Risk Assessment, A case study in Miami Beach. The 2018 ACSP 58th Annual Conference, Buffalo, New York

- **Yu Han**, Zhong-Ren Peng. 2019. Evaluating the Accessibility of Highway Network and Community Cost from the Damage of Coastal Storms. Proceedings of the Transportation Research Board (TRB) 98th Annual Meeting, Washington, D.C., USA

- **Yu Han**, Zhong-Ren Peng. 2018. Agent-based Modeling of the Evolution of Attitudes on Flooding Risk in Coastal Areas in Miami. The 2017 American Association of Geographers (AAG) annual meeting, New Orleans, Louisiana

RESEARCH EXPERIENCE

University of Twente, Assistant Professor 2023 - 2024
Developing Tools to Measure Indirect Impacts from Compound Hazards in the EU-Horizon project PARATUS
Project Amount: $4701636

1. Developing methodologies to measure indirect impacts from compound and cascading hazards using open data
2. Measuring cascading impacts from compounding natural hazards relying on impact chains
3. Participating design web-based stakeholder support tool to measure the systemic risk of compounding disasters

Texas A&M University, Postdoc 2021 - 2022
Developing Human-centered Digital Twin Techniques for Coastal Communities in the NSF project
Project Amount: $298982

1. Fusion high-performance delivery techniques for social-centered infrastructural datasets to support design and planning simulation

2. Integrating multi-source of information to support adaptation in coastal communities

3. Integrates different modeling perspectives to support analytics and visualization of adaptation scenarios

Florida International University, Postdoc 2020 - 2021
Organizing Decentralized Resilience in Critical Interdependent-infrastructure systems and Processes (NSF project, Role: participant)
Project Amount: $958649

1. Developed a risk-based flood damage model to estimate the long-term infrastructure damage to storm surges

2. Utilized multi-threaded programming to analyze flood risk of large-scale coastal buildings using cloud computing

3. Conducted scenario analysis to incorporate social vulnerability and public adaptation policies in adaptation analysis

4. Evaluated parameter uncertainties using global sensitivity analysis based on Monte Carlo simulation

University of Florida, Research assistant 2019 - 2020
Life Cycle Costs and Benefits Analysis of Freight Transportation Projects (FDOT project, Role: Co-PI)

1. Developed methodology to measure life-cycle costs of transportation projects based on FWHA's LCCA guide

2. Implemented software interface (based on Python) to calculate life-cycle cost and benefit of transportation projects

3. Conducted case studies for FDOT to measure costs and benefits of transportation investments

4. Prepared reports and presentations

TEACHING EXPERIENCE

Global Challenge & Local Actions Spring 2024
Project Tutor

Modeling Multi-Hazard & Risks Fall 2023
Instructor

Introduction of Urban Data Science Fall 2022
Co-teaching

URP6821: Transportation and Land Use Modeling Spring 2020
Teaching Assistant

SUPERVISION EXPERIENCE

Analysing risk of compounding events under climate change scenarios in Pakistan PhD thesis
Daily supervisor

Indirect Risk Assessment of Multi-Hazards on Transportation Systems in Caribbean MS thesis
Co-supervisor

TECHNICAL SKILLS

- *Programming* **Java**, **Python**, **R**, **Matlab**, C, C++, **Linux**, etc.
- *Methods* Agent-based Model, Bayesian Statistics, Machine/Deep Learning, etc.
- *Databases* PostGIS, MySQL
- *Software & Packages* GIS, MATSim, *LaTex*, PyTorch, etc.

LANGUANGE SKILLS

- *English* Speaking(fluent), Reading(fluent), Writing(fluent)
- *Chinese* Speaking(native), Reading(native), Writing(native)

REVIEWER FOR INTERNATIONAL JOURNALS AND CONFERENCES

- *Journal of Planning Education and Research*
- *Travel Behaviour & Society*
- *Natural hazards review*
- *Scientific Reports*
- *Climate Resilience and Sustainability*
- *Sustainable Cities & Society*
- *Computers, Environment, and Urban System*
- *The Transportation Research Board (TRB)*
- *Ecological Modeling*
- *Nature Climate Change*
- *Nature Sustainability*

AWARDS

1. 2016-2020, University of Florida Graduate Research Assistant Scholarship
2. 2020, Urban and regional planning, University of Florida Paul and Malea Zwick Graduate Student Award ($550)
3. 2019, The Institute of Transportation Engineers, University of Florida Travel Award ($700) for the TRB Annual Meeting 2019 in Washington DC
4. 2018, Urban and regional planning, University of Florida Travel Award ($200) for the 2018 ACSP 58th Annual Conference, Buffalo, New York
5. 2017, Urban and regional planning, University of Florida Travel Award ($400) for the AAG annual meeting, New Orleans, Louisiana
6. 2012-2013, Carnegie Mellon University Partial Graduate Tuition Waiver
7. 2009-2010, Beijing Institute of Technology University Undergraduate Scholarship