

# Ye Hong

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Homepage

## EDUCATION

- 2020–     Candidate Doctor of Sciences, ETH Zurich, Switzerland  
2018–20   M.S. ETH in Geomatic, ETH Zurich, Switzerland  
2014–18   B.S. Geographical Information Science and Remote Sensing, Sun Yat-sen University, China

## RESEARCH AREAS

**Human mobility:** modeling and prediction, inter- and intra-person variability

**Sustainable transportation:** traffic prediction, smart charging, impact analysis

**Geographical Information Science:** spatial analysis, urban simulation, street network and functional zone analysis

## PUBLICATIONS

### Journal Articles

(# Equal Contribution)

- 2023     **Hong, Y.**, Stüdeli, E., and Raubal, M. “Evaluating geospatial context information for travel mode detection.” *Journal of Transport Geography*, 113, 103736. [10.1016/j.jtrangeo.2023.103736](https://doi.org/10.1016/j.jtrangeo.2023.103736)
- 2023     **Hong, Y.**, Zhang, Y., Schindler, K., and Raubal, M. “Context-aware multi-head self-attentional neural network model for next location prediction.” *Transportation Research Part C: Emerging Technologies*, 156, 104315. [10.1016/j.trc.2023.104315](https://doi.org/10.1016/j.trc.2023.104315)
- 2023     Martin, H.<sup>#</sup>, **Hong, Y.**<sup>#</sup>, Wiedemann, N.<sup>#</sup>, Bucher, D., and Raubal, M. “Trackintel: An open-source Python library for human mobility analysis.” *Computers, Environment and Urban Systems*, 101, 101938. [10.1016/j.compenvurbsys.2023.101938](https://doi.org/10.1016/j.compenvurbsys.2023.101938).
- 2023     **Hong, Y.**, Martin, H., Xin, Y., Bucher, D., Reck, D. J., Axhausen, K. W., and Raubal, M. “Conserved quantities in human mobility: from locations to trips.” *Transportation Research Part C: Emerging Technologies*, 146, 103979. [10.1016/j.trc.2022.103979](https://doi.org/10.1016/j.trc.2022.103979).
- 2023     Yao, Y.<sup>#</sup>, Guo, Z.<sup>#</sup>, Dou, C., Jia, N., **Hong, Y.**, Guan, Q., and Luo, P. “Predicting mobile users’ next location using the semantically enriched geo-embedding model and the multilayer attention mechanism.” *Computers, Environment and Urban Systems*, 104, 102009. [10.1016/j.compenvurbsys.2023.102009](https://doi.org/10.1016/j.compenvurbsys.2023.102009).
- 2023     Wiedemann, N.<sup>#</sup>, Martin, H.<sup>#</sup>, Suel, E., **Hong, Y.**, and Xin, Y. “Influence of tracking duration on the privacy of individual mobility graphs.” *Journal of Location Based Services*, [10.1080/17489725.2023.2239190](https://doi.org/10.1080/17489725.2023.2239190).

- 2023 Yao, Y., Zhou, J., Sun, Z., Guan, Q., Guo, Z., Xu, Y., Zhang, J., **Hong, Y.**, Cai, Y., and Wang, R. “Estimating China’s poverty reduction efficiency by integrating multi-source geospatial data and deep learning techniques.” *Geo-Spatial Information Science*, 1-17. 10.1080/10095020.2023.2165975.
- 2022 Guan, Q., Yao, Y., Ma, T., **Hong, Y.**, Bie, Y., and Lyu, J. “Under the Dome: A 3D Urban Texture Model and Its Relationship with Urban Land Surface Temperature.” *Annals of the American Association of Geographers*, 112(5), 1369-1389. 10.1080/24694452.2021.1972790
- 2021 Yao, Y., Wang, J., **Hong, Y.**, Qian, C., Guan, Q., Liang, X., Dai, L. and Zhang, J. “Discovering the homogeneous geographic domain of human perceptions from street view images.” *Landscape and Urban Planning*, 212, 104125. 10.1016/j.landurbplan.2021.104125
- 2021 Yao, Y.<sup>#</sup>, Liu, Y.<sup>#</sup>, Guan, Q., **Hong, Y.**, Wang, R., Wang, R., and Liang, X. “Spatiotemporal distribution of human trafficking in China and predicting the locations of missing persons.” *Computers, Environment and Urban Systems*, 85, 101567. 10.1016/j.compenvurbsys.2020.101567
- 2021 Zhang, J., Li, X., Yao, Y., **Hong, Y.**, He, J., Jiang, Z., and Sun, J. “The Traj2Vec model to quantify residents’ spatial trajectories and estimate the proportions of urban land-use types.” *International Journal of Geographical Information Science*, 35(1), 193-211. 10.1080/13658816.2020.1726923
- 2020 Yao, Y., Wu, D., **Hong, Y.**, Chen, D., Liang, Z., Guan, Q., Xun, L. and Dai, L. “Analyzing the Effects of Rainfall on Urban Traffic-Congestion Bottlenecks.” *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 13, 504-512. 10.1109/JSTARS.2020.2966591
- 2019 Chen, D., Zhang, Y., Yao, Y., **Hong, Y.**, and Guan, Q. “Exploring the spatial differentiation of urbanization on two sides of the Hu Huanyong Line – based on nighttime light data and cellular automata.” *Applied Geography*, 112, 102081. 10.1016/j.apgeog.2019.102081
- 2019 Yao, Y., Liu, P., **Hong, Y.**, Liang, Z., Wang, R., Guan, Q., and Chen, J. “Fine-scale intra- and intercity commercial store site recommendations via multisource big data.” *Transactions in GIS*, 23(5), 1029-1047. 10.1111/tgis.12553
- 2019 **Hong, Y.**, and Yao, Y. “Hierarchical community detection and functional area identification with OSM roads and complex graph theory.” *International Journal of Geographical Information Science*, 33(8), 1569-1587. 10.1080/13658816.2019.1584806
- 2018 He, J., Li, X., Yao, Y., **Hong, Y.**, and Zhang, J. “Mining transition rules of cellular automata for simulating urban expansion by using the deep learning techniques.” *International Journal of Geographical Information Science*, 32(10), 2076-2097. 10.1080/13658816.2018.1480783
- 2018 Yao, Y., **Hong, Y.**, Wu, D., Zhang, Y., and Guan, Q. “Estimating the effects of “community opening” policy on alleviating traffic congestion in large Chinese cities by integrating ant colony optimization and complex network analyses.” *Computers, Environment and Urban Systems*, 70, 163-174. 10.1016/j.compenvurbsys.2018.03.005
- 2018 Yao, Y., Zhang, J., **Hong, Y.**, Liang, H., and He, J. “Mapping fine-scale urban housing prices by fusing remotely sensed imagery and social media data.” *Transactions in GIS*, 22(2), 561-581. 10.1111/tgis.12330
- 2017 Liu, X., He, J., Yao, Y., Zhang, J., Liang, H., Wang, H., and **Hong, Y.** “Classifying urban land use by integrating remote sensing and social medias data.” *International Journal of Geographical Information Science*, 31(8), 1675-1696. 10.1080/13658816.2017.1324976
- 2017 Yao, Y., Liu, X., Li, X., Liu, P., **Hong, Y.**, Zhang, Y., and Mai, K. “Simulating urban land-use

changes at a large scale by integrating dynamic land parcel subdivision and vector-based cellular automata.” *International Journal of Geographical Information Science*, 31(12), 2452-2479.  
10.1080/13658816.2017.1360494

## Conference Proceedings

- 2023 Wiedemann, N., **Hong, Y.**, and Raubal, M. “Predicting visit frequencies to new places.” In *Proceedings of the 12<sup>th</sup> International Conference on Geographic Information Science (GIScience 2023)*, (pp.84:1–84:6). Leeds, UK. Schloss Dagstuhl – Leibniz-Zentrum für Informatik. 10.4230/LIPIcs.GIScience.2023.84.
- 2022 **Hong, Y.**, Martin, H., and Raubal, M. “How do you go where? improving next location prediction by learning travel mode information using transformers.” In *Proceedings of the 30<sup>th</sup> International Conference on Advances in Geographic Information Systems (SIGSPATIAL ’22)*, (pp. 1-10). Seattle, USA. Association for Computing Machinery. 10.1145/3557915.3560996
- 2022 Martin, H., Wiedemann, N., Suel, E., **Hong, Y.**, and Xin, Y. “Influence of tracking duration on the privacy of individual mobility graphs.” In *Proceedings of the 17<sup>th</sup> International Conference on Location-Based Services (LBS ’22)*, (pp.78–88). Munich, Germany. Technical University of Munich. 10.3929/ethz-b-000572753
- 2021 **Hong, Y.**, Xin, Y., Martin, H., Bucher, D., and Raubal, M. “A clustering-based framework for individual travel behaviour change detection.” In *Proceedings of the 11<sup>th</sup> International Conference on Geographic Information Science - Part II (GIScience ’21)*, (pp.4:1–4:15). Online. Schloss Dagstuhl – Leibniz-Zentrum für Informatik. 10.4230/LIPIcs.GIScience.2021.II.4
- 2020 Martin, H., Bucher, D., **Hong, Y.**, Buffat, R., Rupprecht, C., and Raubal, M. “Graph-resnets for short-term traffic forecasts in almost unknown cities.” In *Proceedings of the NeurIPS 2019 Competition and Demonstration Track*, (pp.153–163). Vancouver, Canada. PMLR. 10.3929/ethz-b-000437682

## Preprints and Working Papers

- 2023 Li, J., Xin, Y., **Hong, Y.**, and Raubal, M. “Interpreting Deep Learning Models for Traffic Forecast: A Case Study of UNet.” Under review. 10.2139/ssrn.4370154
- 2023 Timans, A., Wiedemann, N., Kumar, N., **Hong, Y.**, and Raubal, M. “Uncertainty Quantification for Image-based Traffic Prediction across Cities.” Under review. 10.48550/arXiv.2308.06129
- 2023 Dirmeier, S., **Hong, Y.**, Xin, Y., and Perez-Cruz, F. “Uncertainty quantification and out-of-distribution detection using surjective normalizing flows.” Under review. 10.48550/arXiv.2311.00377
- 2023 Dirmeier, S., **Hong, Y.**, and Perez-Cruz, F. “Synthetic location trajectory generation using categorical diffusion models.” Under review.
- 2023 **Hong, Y.**, Xin, Y., Dirmeier, S., Perez-Cruz, F., and Raubal, M. “Revealing behavioral impact on mobility prediction networks through causal intervention.” In preparation.

## CONFERENCE ACTIVITY

### Conference Presentations

- 2022 “How do you go where? Improving next location prediction by learning travel mode information using transformers.” 30<sup>th</sup> ACM SIGSPATIAL International Conference on

- Advances in Geographic Information Systems (SIGSPATIAL '22). Seattle, Washington, USA. Nov 01–04.
- 2021 “A Clustering-Based Framework for Individual Travel Behaviour Change Detection.” 11<sup>th</sup> International Conference on Geographic Information Science (GIScience '21). Online. Sep 27–30.
- 2021 “Trackintel An open-source python library for human mobility modeling and analysis.” GeoPython 2021. Online. Apr 22–23.

## **AWARDS**

### **Awards and Honors**

- 2020 Culmann-funds for outstanding master thesis, ETH Zurich
- 2019 Traffic4cast 2nd Place, NeurIPS 2019 challenge
- 2018 Outstanding graduate thesis, Sun Yat-sen University
- 2018 Excellent national undergraduate's creative project award, Ministry of Education of China
- 2017 Excellent student scholarship, Sun Yat-sen University

## **TEACHING**

### **Teaching Assistants**

- Advanced GIS (2023, 2024)
- Geoinformationstechnologien und -analysen (2022, 2023)
- GIS III (2020, 2021)
- Geomatics Seminar (2021)
- Projekt GIS and Kartografie (2021)

### **Student Project and Thesis Supervision**

- 2023 Mühlematter, D. J. “A Reinforcement Learning Environment for Vehicle-to-Grid Charging Strategies in Car-Sharing” Geomatics Master Project. ETH Zurich.
- 2023 Vuadens, E. “Heuristic Optimization of Smart Charging and Vehicle-to-Grid for an Electric Car-sharing Fleet” Master thesis. ETH Zurich.
- 2023 Li, J. “Robust Cross-Domain Traffic Prediction Through Invariant Causal Mechanisms” Master thesis. ETH Zurich.
- 2022 Stüdeli, E. “Evaluating Geospatial Context Information for Transport Mode Detection.” Bachelor thesis. ETH Zurich.
- 2022 Timans, A. “Uncertainty Quantification for Image-based Traffic Prediction.” Master thesis. ETH Zurich.
- 2021 Li, J. “Enhancing the Interpretability of Deep Learning Models for Traffic Forecast Through Visual Analytics.” Interdisciplinary Project. ETH Zurich.

## **SERVICE**

### **Academic Journal Peer Review**

*Artificial Intelligence Review*

*Cities*

*IEEE Access*

*International Journal of Geographical Information Science*

*ISPRS International Journal of Geo-Information*

*Journal of Transport Geography*

*PLOS One*

*Sustainability*

*Transactions in GIS*

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