Ye Hong

Institute of Cartography and Geoinformation
Department of Civil, Environmental and Geomatic Engineering
ETH Zurich

hongy@ethz.ch
+41 44 633 28 52
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.**, 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

2023 Martin, H.#, **Hong, Y.#**, Wiedemann, N.#, 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.

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.

2023 Yao, Y.#, Guo, Z.#, 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.

2023 Wiedemann, N.#, Martin, H.#, 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.

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.[#], Liu, Y.[#], 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 12th 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 30th 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 17th International Conference on Location-Based Services*, (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 11th International Conference on Geographic Information Science (GIScience 2021) - Part II*, (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 **Hong, Y.**, Stüdeli, E., and Raubal, M. "Evaluating geospatial context information for travel mode detection." Under review. 10.48550/arXiv.2305.19428

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 **Hong, Y.**, Xin, Y., Dirmeier, S., Perez-Cruz, F., and Raubal, M. "Revealing behavioral impact on mobility prediction networks through causal intervention." In preparation.

2023 Dirmeier, S., **Hong, Y.**, and Perez-Cruz, F. "Uncertainty quantification and out-of-distribution detection using surjective normalizing flows for mobility prediction." In preparation.

CONFERENCE ACTIVITY

Conference Presentations

2022 "How do you go where? Improving next location prediction by learning travel mode information using transformers." 30th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL 2022). Seattle, Washington, USA. Nov 01–04.

2021 "A Clustering-Based Framework for Individual Travel Behaviour Change Detection." 11th International Conference on Geographic Information Science (GIScience 2021). 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

Updated September 2023