Tzu-Hsin Karen Chen, Ph.D.
Donnelley Postdoctoral Associate
Yale School of the Environment, Yale University
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RESEARCH INTERESTS

Karen Chen focuses on land use change and its impacts on the environment and human well-being. She has developed several machine learning methods using time-series satellite data to characterize human environments. Currently, her research projects include 1) urban form's impacts on mental health and 2) climate-related hazards.

EDUCATION

2020	Ph.D., Environmental Science, Aarhus University
2016	M.S., Geography, National Taiwan University
2014	B.S., Geography, National Taiwan University

PROFESSIONAL APPOINTMENTS

Expected 2023	Incoming assistant professor, University of Washington
2021-present	Donnelley Postdoctoral Associate, Yale University
2019-2020	Co-teaching lecturer, Dept. of Geosciences and Natural Resource Management, University of Copenhagen (UCPH)

RESEARCH INTERESTS

Urbanization and sustainable development
Urban health
GIS and remote sensing
Machine learning

GRANTS AND FELLOWSHIPS

2022-2024	**NASA Land-Cover and Land-Use Change Program (LCLUC) Award,** Stokes C.E., Reba M., **Chen, T.H.K. (Co-I)**, A multi-faceted, pan-Mediterranean assessment of urban land change for the evaluation of interconnected climate risks. ($466,709)
2021-2023	**Gaylord Donnelley Environmental Postdoctoral Fellowship**. Yale Institute for Biospheric Studies. ($134,000)
2020	**Young Scholars Grant**. International Geographical Union Urban Geography Commission. ($150)
2018-2020	**PhD Fellowship** for environmental health studies, Novo Nordisk Foundation Challenge Programme. ($58,000)
2017-2020	**PhD Fellowship**, School of Science and Technology, Aarhus University. ($83,000)
2017-2019	**PhD Scholarship** in the field of climate change and disaster adaptation technology, Ministry of Education, Taiwan. ($126,000)
2015	**Infectious Diseases Research Scholarship**, Ministry of Health and Welfare, Taiwan. ($700)

AWARDS AND HONORS

2022	**Leading Women in Machine Learning for Earth Observation,** Radiant Earth Foundation.
2020	**Distinguished Contribution** to cutting-edge research, Ladies of Landsat.

2020	**LAND Travel Award**. Travel scholarship for outstanding PhD project in land science.
2018	**First Place, Best Paper Award**, Global Land Program Asia Conference.
2017	**Outstanding Master Thesis**, Taiwan Geographic Information Society.
2015 & 2016	**Awards for Excellence in Teaching**, National Taiwan University.
2014	**The Dean's Award**, College of Science, National Taiwan University.
2013	**Winner of Proposal Competition**, Environmental Remote Sensing Workshop.
2011 & 2013	**President's Award**, Dept. of Geography, National Taiwan University.

PUBLICATIONS (Google Scholar citations > 250, h-index 8 as of 05/2023, * indicates corresponding author)

Peer-reviewed articles

Chen, T.H.K.*, Horsdal, T.H., Samuelsson, K., Closter, A.M., Davies, M., Barthel, S., Pedersen, C.B., Prishchepov, A.V., and Sabel, C.E. (2023) Higher depression risks in medium- than high-density urban form across Denmark. *Science Advances,* 9 (21). (SSCI/SCIE, Impact Factor: 14.14) https://doi.org/10.1126/sciadv.adf3760

Chen, T.H.K.*, Pandey, B., Seto, K.C. (2023) Detecting subpixel human settlements in mountains using deep learning: A case of the Hindu Kush Himalaya 1990-2020, *Remote Sensing of Environment*, 294, 113625. (SCI, Impact Factor: 10.164) https://doi.org/10.1016/j.rse.2023.113625

Chen, T.H.K.* and Seto, K.C. (2022) Gender and authorship patterns in urban land science. *Journal of Land Use Science.* (Impact Factor: 2.885) https://doi.org/10.1080/1747423X.2021.2018515

Rusk, J., Maharjan, A., Tiwari, P., **Chen, T. H. K.**, Shneiderman, S., Turin, M., and Seto, K. C. (2022) Multi-hazard susceptibility and exposure assessment of the Hindu Kush Himalaya. *Science of the Total Environment*, 804, 150039. (SCIE, Impact Factor: 7.963) https://doi.org/10.1016/j.scitotenv.2021.150039

Perez-Sindin, X. S., **Chen, T. H. K.**, and Prishchepov, A. (2021) Are night-time lights a good proxy of economic activity in rural areas in middle and low-income countries? Examining the empirical evidence from Colombia. *Remote Sensing Applications: Society and Environment*, 24, 100647. (**ESCI**, Impact Factor: 4.93) https://doi.org/10.1016/j.rsase.2021.100647

Chen, T.H.K.*, Qiu, C., Schmitt, M., Zhu, X.X., Sabel, C.E., and Prishchepov, A.V. (2020) Mapping horizontal and vertical urban densification in Denmark with Landsat time-series from 1985 to 2018: a semantic segmentation solution. *Remote Sensing of Environment*, 251, 112096. (SCI, Impact Factor: 10.164) https://doi.org/10.1016/j.rse.2020.112096

Samuelsson, K., **Chen, T.H.K.**, Antonsen, S., Brandt, S.A., Sabel, C.E., and Barthel, S. (2020) Residential environments across Denmark have become both denser and greener over 20 years. *Environmental Research Letters*, 16(1). (SCI, Impact Factor: 6.096) https://doi.org/10.1088/1748-9326/abcf7a

Qiu, C., Schmitt, M., Geiß, C., **Chen, T.H.K.**, and Zhu, X.X.* (2020) A framework for large-scale mapping of human settlement extent from Sentinel-2 images via fully convolutional neural networks. *ISPRS Journal of Photogrammetry and Remote Sensing*, 163, 152-170. (EI, Impact Factor: 7.319) https://doi.org/10.1016/j.isprsjprs.2020.01.028

Oehmcke, S., **Chen, T.H.K.**, Prishchepov, A.V., Gieseke, F. (2020) Towards creating cloud-free satellite imagery with deep learning. *9th ACM SIGSPATIAL International Workshop on Analytics for Big Geospatial Data*. https://doi.org/10.1145/3423336.3429345

Chen, T.H.K.*, Prishchepov, A.V., Fensholt, R., and Sabel, C.E. (2019) Detecting and monitoring long-term landslides in urbanized areas with nighttime light data and multi-seasonal Landsat imagery across Taiwan from 1998 to 2017. *Remote Sensing of Environment*, 225, 317-327. (SCI, Impact Factor: 10.164) https://doi.org/10.1016/j.rse.2019.03.013

Chen, T.H.K., Chen V.Y.J., and Wen, T.H. (2018) Revisiting the role of rainfall variability and its interactive effects with the built environment in urban dengue outbreaks. *Applied Geography*, 101, 14-22. (SSCI, Impact Factor: 5.04) https://doi.org/10.1080/17565529.2019.1596063

Chen, T.H.K., and Lin, K.H. (2018) Distinguishing windthrow and hydrogeological effects of typhoon impacts on agricultural lands: an integrative OBIA and PPGIS approach. *International Journal of Remote Sensing*, 39(1), 131-148. (SCI, Impact Factor: 3.151) https://doi.org/10.1080/01431161.2017.1382741

Chen, T.H.K., Wen Z.H., Fang C.T., and Chan P.C. (2017) Assessing infection risk of Tuberculosis (TB) contacts in different case-contact contexts. *Taiwan Journal of Public Health*. 36(2), 107-122. (TSSCI)

Book chapters

Chen, T.H.K, Prishchepov, A.V., and Sabel, C.E. (2023). Detecting urban form using remote sensing: spatiotemporal research gaps for sustainable environment and human health. In Ed., Wen Z.H., Chuang T.W., Tipayamongkholgul M.: Earth Data Analytics for Planetary Health. Heidelberg: Springer.

Sabel, C.E., Amegbor, P.M., Zhang, Z., **Chen, T.H.K.**, Poulsen, M.B., Hertel, O., Sigsgaard, T., Horsdal, H.T., Pedersen, C.B., Khan, J. (2021). Health and Wellbeing. In Ed., Shi, W., Goodchild, M., Batty, M., Kwan, M.P., Zhang, A: Urban Informatics. Heidelberg: Springer.

Wen, T.H., Liao, H.Y., Yang, K.L., **Chen, T.H.K.** (2021) Characterizing after-rain standing waters in urban built environments through a multilevel image analysis. In Ed., Yang. X: Urban Remote Sensing: Monitoring, Synthesis and Modeling in the Urban Environment (2nd Edition). Hoboken: Wiley-Blackwell.

Wen, T.H., **Chen, T.H.K.** (2016). Risk assessment and adaptation to dengue fever under climate change. In Ed., Chou, K.T., Lin, J.C.: Sustainable development under climate change in Taiwan. Taipei: NTU.

Submitted/in preparation

Chen, T.H.K., Rusk, J., and Seto, K.C. Increasing vulnerability to landslides driven by small-scale urbanization in the Hindu Kush Himalaya. (In preparation)

Fong, K., **Chen, T.H.K.**, and Bell, M. How do remote sensing methods potentially cause biased interpretations of greenness effects in environmental epidemiology studies? (In preparation).

Selected conference papers and invited talks

Chen, T.H.K., Pandey, B., Seto, K.C. (2022) Deep learning or conventional machine learning: Which method is better at characterizing small-scale urban change? ESA Living Planet Symposium. Bonn, 23-27 May.

Chen, T.H.K. (2021) From pixels to people: 3-D urban form and mental well-being. UW Data Science Seminar Series, online, 10 Feb.

Chen, T.H.K. (2021) From pixels to people: 3-D urban form and human well-being. Yale Institute of Biospheric Studies, New Haven, 19 Nov.

Chen, T.H.K., Samuelsson, K., Prishchepov, A.V., and Sabel, C.E. (2020) Linking migration trajectory and urban dynamics: densification impacts on mental health. IGU Urban Geography Commission Annual Meeting, Online, 24-27 Aug. (**Young Scholars Grant**)

Chen, T.H.K., Sabel, C., and Prishchepov, A. (2019) A lifecourse exposure to urban density and high-rise building: empirical findings for psychiatric disorders. International Conference on Urban Health. Xiamen, 4-8 Nov.

Chen, T.H.K., Sabel, C., and Prishchepov, A. (2019) Changing urban density of Denmark in the past 20 years over horizontal and vertical scales. Nordic Remote Sensing Conference. Aarhus, 17-19 Sep.

Chen, T.H.K., Sabel, C., and Prishchepov, A. (2019) Detecting time-series horizontal and vertical building density at neighborhood scales with open access remote sensing data. esa Living Planet Symposium, Milan, 13-17 May.

Chen, T.H.K., Sabel, C., and Prishchepov, A. (2018) From pixel to people: satellite imagery in support of urban health studies. Urban Transitions, Sitges, 25-27, Nov.

Chen, T.H.K., Prishchepov, A., Fensholt, R., and Sabel, C. (2018) Combining open source time-series satellite data sets to automatically map landslide land cover across Taiwan 1998-2017. Global Land Programme Asia Conference, Taipei, 3-5, Sep. **(First Place Best Paper Award)**

Wen, T.H. and **Chen, T.H.K.** (2017) Integrating high spatial resolution weather radar data and urban imagery for modeling micro-scale dengue risk. European Geosciences Union General Assembly, Vienna, 8-13 Apr.

Chen, T.H.K. and Wen, T.H. (2016) Exploring the Variability of Most Suitable Temperature Range for Epidemiological Characteristics of Dengue Dynamics: A Multi-level Growth Modeling Analysis. Annual Meeting of the Association of American Geographers, San Francisco, 29 Mar. – 2 Apr.

TEACHING

Master's level
- Guest Lecturer, ENV57101 Advanced Remote Sensing of Urban Land Change, School of the Environment, Yale University. 2022.
- Lecturer, NIGK17012U Remote Sensing in Land Science Studies, Department of Geosciences and Natural Resource Management (IGN), University of Copenhagen 2019-20.
- Guest Lecturer, 30530 Geographic Information Systems, National Space Institute, Danish Technical University. 2017.

Bachelor's level
- Teaching assistant, Geog2005 Cartography and Lab, Department of Geography, National Taiwan University. 2014-16.
- Teaching assistant, Geog4007 Research Methods in Geography, Department of Geography, National Taiwan University. 2014-16.
- Teaching assistant, Geog2014 Local and Regional Development, Department of Geography, National Taiwan University. 2014-15.
- Teaching assistant, Geog3007 Quantitative Geography and Lab, Department of Geography, National Taiwan University. 2013-14.

ACADEMIC SERVICES

Journal reviewer

International Journal of Digital Earth: 2022 (1); Science of the Total Environment 2021 (1); Journal of Land Use Science: 2021 (2); Natural Hazards: 2020 (1) 2021 (1); Plos One: 2020 (3); Cities: 2018.

Mentoring
- MSc publication: Jack Rusk. Multi-hazard susceptibility and exposure assessment of the Hindu Kush Himalaya (2022).
- MSc thesis: Jeffrey Blay. Informal development and 3-D urban growth in Ghana and Botswana (working title). Expected graduation: 2023.
- BSc publication: Ben Christensen. Urban form and wealth level in dense American cities (working title).
- MSc thesis: Vasiliki Kotoglou. The spatial analysis of urban design and mental health. Danish Technical University. Graduation year: 2019.

University/departmental committees
- Member of Ph.D. Student Committee, Department of Environmental Science, Aarhus University, 2018-19
- President of Graduate Student Association, Department of Geography, National Taiwan University, 2015-16
- Head of Academic Section, Undergraduate Student Association, Department of Geography, National Taiwan University, 2012-13

Teaching training service
- Consultant for Teaching Assistants, Center for Teaching and Learning Development, National Taiwan University, 2015-16
- Originator of Teaching Assistant Training Workshop, Department of Geography, National Taiwan University, 2015

PROFESSIONAL SKILLS

Computer skills

GIS	QGIS, ArcGIS, R, Python, GeoDa, CrimeStat
Programming	R (proficient), Python (proficient), JavaScript (proficient), Java (intermediate)
Statistics	R
Remote Sensing	Google Earth Engine, R, Python, IDL, ENVI, eCognition

Languages
Proficient in English and Mandarin (native)