

# Winston Yap

PhD Candidate at NUS Urban Analytics Lab | Incoming Postdoc at MIT Senseable  
Last Updated 2025-09-08 | winstonnym@u.nus.edu | <https://www.winstonnym.com> | +65 8128 6350

## RESEARCH AREAS

---

- Urban Complexity
- Geographic Data Science and Spatial Programming
- Urban Health and Sustainability
- Network Science and Graph Machine Learning
- City Semantics, Human Mobility, and Socio-Spatial Inequality
- Open Source Software and Dataset Development
- Human-In-The-Loop Machine Learning for Humanitarian Response

## EDUCATION

---

**National University of Singapore, Singapore**

Ph.D. in Urban Analytics

Expected. Oct 2025

- Cumulative GPA: 4.75/5.00
- Advisor: Prof. Filip Biljecki
- Thesis title: Urban Graph Analytics - Connecting Cities, Data, and People

**National University of Singapore, Singapore**

Master of Urban Planning

Apr 2018

- 95th Percentile

**National University of Singapore, Singapore**

Bachelor of Science in Real Estate (Hons.)

Apr 2017

- Specialisation in Urban Planning

## RESEARCH EXPERIENCES

---

**Visiting Scholar**

Jul 2024 – Feb 2025

*Senseable City Laboratory, Massachusetts Institute of Technology, Cambridge, MA, USA*

Advisors: Prof. Carlo Ratti and Dr. Fábio Duarte

- Quantifying Health Inequities with Large-Scale Urban Data and GeoAI
- Assessing Spatio-Temporal Network Growth in Chinese Cities
- Generative Geospatial Visualization and Narrative Generation with LLMs

**PhD Industry Intern, ML Engineer**

Jan 2024 – Jul 2024

*Map IV, Inc., Spatial Technology Team, Nagoya, Japan*

- High Definition Mapping with 3D Deep Learning

**Graduate Research Associate**

Apr 2018 – Aug 2021

*Lee Kuan Yew Centre for Innovative Cities, Singapore*

Advisors: Prof. Chan Heng Chee, Prof. Harvey Neo, Prof. Belinda Yuen

- Planning and Design of Age-Friendly Neighbourhoods in Singapore
- Comparative Analysis of Urbanization in Southeast Asian Megacities
- Investigating Socio-spatial Reconfiguration of Urban Cores Post-COVID

**Graduate Research Assistant**

Apr 2017 – Aug 2017

*Deguchi Lab, University of Tokyo, Kashiwanoha, Japan*

- Urban Revitalization Planning with Local Communities

## Summer Research Intern

April 2016 – Aug 2016

Housing and Development Board, Ministry of National Development, Singapore

- Study of Industrial Planning Strategies and Design Criteria

## ACADEMIC HONORS & AWARDS

---

<b>Department Travel Award</b> for Attending CUPUM 2025 at London Department of Architecture, National University of Singapore	2025
<b>Global Young Leader</b> (Nominated from diverse partners and networks) World Cities Summit, Ministry of National Development, Singapore	2024
<b>Young Ambassador</b> (Nominated by executive committee) International Forum on Urbanism	2024
<b>NUS Overseas Research Immersion Award</b> (Merit-based, fund MIT exchange) College of Design and Engineering, National University of Singapore	2024
<b>NUS Overseas College Programme</b> (1 of 2 PhD students selected from NUS) NUS Enterprise, National University of Singapore	2023
<b>PhD Dissertation Research Fellowship</b> (National Top 10 Data Science PhD) Singapore Data Science Consortium, National Research Foundation	2023
<b>Asia Travel Award</b> for Attending FOSS4G Asia Conference at Seoul, South Korea Open Source Geospatial Foundation	2023
<b>NUS PhD Research Scholarship</b> (Merit-based, support 4-year PhD study) College of Design and Engineering, National University of Singapore	2021
<b>Asian Masters of Urbanism Certificate</b> (1 of 2 Master's students from cohort) Department of Architecture, National University of Singapore	2017

## PUBLICATIONS

---

### UNDER REVIEW / IN PREPARATION

[19] **Yap, W.**, Duarte, F., Zheng, Y., Jang, K.M., Luo, P., Ratti, C., Biljecki, F. Disentangling Human-Environment Pathways to General, Physical, and Mental Health in the US, (2025). Under Revision, *Nature Communications*.

[18] Moser, M., Resch, B., Zeile, P., Keskin, M., Schmidt, S., **Yap, W.**, Graf, D., Heinke, M., Gandhi, S. Understanding the Influence of Urban Characteristics on Cyclists' Stress Measured through Wearable Sensors: A Quantitative Open Data Approach, (2025). Under Review, *Environment and Planning B: Urban Analytics and City Science*.

[17] Fujiwara, K., Tsurumi, R., Kiyono, T., Fan, Z., ... **Yap, W.**, Biljecki, F. VoxCity: A Seamless Framework for Open Geospatial Data Integration, Grid-Based Semantic 3D City Model Generation, and Urban Environment Simulation, (2025). Under Review, *Computers, Environment, and Urban Systems*.

[16] Liu, P., **Yap, W.**, Hou, Y., Lei, B., Stouffs, R., Biljecki, F. A Graph-Based Human-Centred GeoAI for Understanding Street-Level Environment and Traffic Accident Frequency with Street View Imagery, (2025). Under Review, *Journal of Urban Technology*.

[15] Ma, R., Cao, B., **Yap, W.**, Cao, N., Ratti, C., Duarte, F. GeoNarrative - Transforming Geospatial Textual Data into Narrative Storytelling Visualization, (2025). Submitted to *Association of Computing Machinery Computer-Human Interaction 2026*.

[14] Liang, X., **Yap, W.**, Biljecki, F. Predicting Building Objective Characteristics with Urban Graphs for Multiple Cities, (2025). Submitted to *ISPRS Journal of Photogrammetry and Remote Sensing*.

[13] Luo, P., **Yap, W.**, Ratti, C., Santi, P., Duarte, F. Spatio-Temporal Topological Change in Chinese Cities, (2025).

In preparation.

[12] **Yap, W.**, Strobel, L., Pruckner, M. Mapping Urban Structure and Inequality Through Semantic Mobility Patterns in Multiple Cities, (2025). In preparation.

#### PEER-REVIEWED JOURNAL PAPERS

[11] **Yap, W.**, Wu, A. N., Miller, C., Biljecki, F. Revealing building operating carbon dynamics for multiple cities. *Nature Sustainability*, 1-12, (2025). <https://doi.org/10.1038/s41893-025-01615-8>.

[10] Gu, Y., Quintana, M., Liang, X., Ito, K., **Yap, W.**, Biljecki, F. Designing effective image-based surveys for urban visual perception. *Landscape and Urban Planning*, 260, 105368, (2025).

[9] Fujiwara, K., Khomiakov, M., **Yap, W.**, Ignatius, M., Biljecki, F. Microclimate Vision: Multimodal prediction of climatic parameters using street-level and satellite imagery. *Sustainable Cities and Society*, 114, 105733, (2024).

[8] Hou, Y., Quintana, M., Khomiakov, M., **Yap, W.**, Ouyang, J., Ito, K., ... Biljecki, F. Global Streetscapes—A comprehensive dataset of 10 million street-level images across 688 cities for urban science and analytics. *ISPRS Journal of Photogrammetry and Remote Sensing*, 215, 216-238, (2024).

[7] Wang, S., Huang, X., Liu, P., Zhang, M., ..., **Yap, W.**, Bao, S. Mapping the landscape and roadmap of geospatial artificial intelligence (GeoAI) in quantitative human geography: An extensive systematic review. *International Journal of Applied Earth Observation and Geoinformation*, 128, 103734, (2024).

[6] **Yap, W.** Biljecki, F. A Global Feature-Rich Network Dataset of Cities and Dashboard for Comprehensive Urban Analyses. *Scientific Data*, 10, 667, (2023). <https://doi.org/10.1038/s41597-023-02578>

[5] **Yap, W.**, Stouffs, R. Biljecki, F. Urbanity: automated modelling and analysis of multidimensional networks in cities. *npj Urban Sustainability*, 3, 45, (2023). <https://doi.org/10.1038/s42949-023-00125-w>

[4] **Yap, W.**, Chang, J. H., Biljecki, F. Incorporating networks in semantic understanding of streetscapes: Contextualising active mobility decisions. *Environment and Planning B: Urban Analytics and City Science*, 50, 1416-1437, (2022). <https://doi.org/10.1177/2399808322113883>

[3] **Yap, W.**, Janssen, P., Biljecki, F. Free and open source urbanism: software for urban planning practice. *Computers, Environment and Urban Systems*, 96, 101825, (2022). <https://doi.org/10.1016/j.compenvurbsys.2022.10182>

[2] Hou, Y., **Yap, W.**, Chua, R., Song, S., Yuen, B. The associations between older adults' daily travel pattern and objective and perceived built environment: A study of three neighbourhoods in Singapore. *Transport Policy*, 99, 314-328, (2020).

[1] Song, S., **Yap, W.**, Hou, Y., Yuen, B. Neighbourhood built Environment, physical activity, and physical health among older adults in Singapore: A simultaneous equations approach. *Journal of Transport & Health*, 18, 100881, (2020).

#### CONFERENCE AND WORKSHOP PAPERS

[4] **Yap, W.** Biljecki, F. Leveraging Urban Graphs for Multi-Scalar Urban Analytics. *In Proceedings of the 19th International Conference on Computational Urban Planning and Urban Management*, (2025, June).

[3] Miller, C., Quintana, M., Frei, M., ... **Yap, W.**, Biljecki, F. Introducing the cool, quiet city competition: predicting smartwatch-reported heat and noise with digital twin metrics. *In Proceedings of the 10th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, 298-299, (2023, November).

[2] **Yap, W.** Biljecki, F. Global Tool for Open Urban Network Analysis. *UN-Habitat Urban Thinkers Campus Workshop for FOSS4G Asia*, (2023, December).

[1] **Yap, W.** Neo, H. Drivers and Challenges of Digital Citizen Participation: Experiential Evidence from Southeast Asian Cities. *RC21 Conference on Sensing the City*, (2021, July).

## CASE STUDY REPORTS

[1] Chan, H. C. **Yap, W.** Housing and the city: The Singapore case. *Council of Urban Initiatives, UN-Habitat, UCL IIPP and LSE Cities*, (2023).

## BOOKS AND BOOK CHAPTERS

[7] Nicholas, S. **Yap, W.** Is the City Center Hollowing Out?, In Chan, H. C., Neo, H., Joyce, S (Eds), *Socio-spatial Reconfiguration of the City Post-Covid*, *World Scientific*, (2024).

[6] Chan, H. C., **Yap, W.**, Nicholas, S. The Magic of Modernity, In Chan, H. C., Neo, H., Joyce, S (Eds), *Socio-spatial Reconfiguration of the City Post-Covid*, *World Scientific*, (2024).

[5] Yuen, B., Močnik, Š., Moogoor, A., Dieterich, A., **Yap, W.**, Bhuyan, M. R. Age-friendly Neighbourhood Environmental Audit Toolkit, *World Scientific*, (2022).

[4] Yuen, B., Bhuyan, M. R., Dieterich, A., **Yap, W.**, Chua, R. Age-friendly Neighbourhood Post-implementation Toolkit, *World Scientific*, (2022).

[3] Yuen, B., Bhuyan, M. R., Song, S., Moogoor, A., **Yap, W.**, Močnik, Š., Chua, R. Age-friendly Neighbourhood Planning and Design Guidelines: A Singapore Case Study, *World Scientific*, (2022).

[2] **Yap, W.** Norakmal, H. Tokyo - Pushing Frontiers, Planning for Society 5.0., In Arturo, B., Christos, C., Bruno, L., Chan, H. C. (Eds), *Cities in a Time of Global Emergencies*. *IMD Business School*, (2021).

[1] Yuen, B., Močnik, Š., Yu, C. F., **Yap, W.** Ageing-friendly neighbourhoods in Singapore, Asia-Pacific, Europe and North America: An Annotated Bibliography, *Springer Briefs in Aging*, (2020).

## OPEN-SOURCE SOFTWARE

[1] **Yap, W.** (Lead Developer). Urbanity: Open-Source Python library for Urban Graph Analytics. (164 stars). *GitHub* 2022. <https://github.com/winstonyym/urbanity>

## OPEN-ACCESS DATASETS

[2] **Yap, W.** Biljecki, F. A Global Feature-Rich Network Dataset of Cities and Dashboard for Comprehensive Urban Analyses. *Figshare* 2023. <https://doi.org/10.6084/m9.figshare.22124219>

[1] Hou, Y., Quintana, M., Khomiakov, M., **Yap, W.**, Ouyang, J., Ito, K., ... Biljecki, F. Global Streetscapes-A comprehensive dataset of 10 million street-level images across 688 cities for urban science and analytics. *Hugging Face* 2024. <https://huggingface.co/datasets/NUS-UAL/global-streetscapes>

## PRESENTATION AND SESSIONS

---

### DEPARTMENT AND LAB SEMINARS

[4] “Leveraging Urban Graphs for Multiscalar Urban Analytics”, at the *Sustainable Design Group*, University of Cambridge, July 2025.

[3] “Modeling Complex Urban Systems with Open Source Software”, at the *City Form Lab*, Massachusetts Institute of Technology, October 2024.

[2] “Multi-scalar Urban Analytics with Graphs” at the *London-Singapore Urban Analytics Seminar for Liveable Cities*, August 2025.

[1] “Urban Network Modelling and Analytics” at the *Department of Architecture and Building Engineering*, Tokyo Institute of Technology, April 2024.

### INVITED TALKS

- [5] "Revealing the Power of Connections in Cities: Urban Graphs for Scalable, Data-Driven Planning and Design", at *Lee Kuan Yew Centre for Innovative Cities Seminar Series*, September 2025.
- [4] "Open Source Software Urban Network Analytics", at *Takenaka Corporation Tokyo Headquarters*, April 2024.
- [3] "Unlocking Urban Insights: How Technology Shapes City Planning and Management". *Singapore Management University Integrative Fiesta*, September, 2023.
- [2] "Multidimensional Network Modelling with Urbanity". *127th OGC Member Meeting: Digital Twins Special Session*, September 2023.
- [1] "Free and Open Source Digital Planning Tools". *Planning Institute of Australia, PlanTech Series*, July 2023.

## CONFERENCE PRESENTATIONS

- [4] "Leveraging Urban Graphs for Multi-Scalar Urban Analytics" *19th International Conference on Computational Urban Planning and Urban Management*, June 2025.
- [3] "Science-based Approach to Future Scenario Planning" *Urban Solutions and Sustainability R&D Conference*, October 2023.
- [2] "Free and Open Source Urbanism: Software for Urban Planning" at the *NUS-SUTD PhD Symposium*, May 2022.
- [1] "Drivers and Challenges of Digital Citizen Participation: Experiential Evidence from Southeast Asian Cities" at the *RC21 Conference: Sensing the City*, July 2021.

## ORGANIZED SESSIONS

- [2] "Decarbonizing Cities" in *International Forum of Urbanism Global Seminar*, October 2024.
- [1] "Street view imagery: Have we answered all the questions with it What's left to do" in *4th Spatial Data Science Symposium*, September 2023.

## TEACHING EXPERIENCES

---

### National University of Singapore

#### Research Advisor

Fall 2023

Master Thesis (VU Amsterdam Visiting Program)

Faculty: Professor Filip Biljecki

- Held weekly research discussion
- Mentored master student in research projects.

#### Guest Lecturer

Spring 2023

Course: Introduction to Geographic Information System

Faculty: Professor Rudi Stouffs

- Design and deliver lecture to postgraduate students

#### Teaching Assistant

Fall 2023

Course Title: Artificial Intelligence for Design

Teaching Faculty: Professor Rudi Stouffs

- Led programming tutorial lecture
- Mentored undergraduate students in open-ended projects.

#### Teaching Assistant

Spring 2022

Course Title: Planning Technologies and Spatial Programming

Teaching Faculty: Professor Filip Biljecki

- Help code troubleshooting during lectures
- Mentored graduate students in open-ended projects

- Project evaluation and grading

## **Singapore University of Technology and Design**

### **Guest Lecturer**

Spring 2023

- Helped design the course, including lectures, homework, and project
- Led programming workshop and lecture

## **STUDENTS MENTORED**

---

### **National University of Singapore**

- Master Student in Spatial, Transport and Environmental Economics: Brian van Laar (cross-registered from VU Amsterdam)
- Master Student in Urban Planning: Gu Youlong

### **Singapore University of Technology and Design**

- Bachelor of Engineering in Computer Science: Joshua Tay
- Bachelor of Social Sciences in Geography: Anniesa Foo

## **PROFESSIONAL SERVICES & LEADERSHIP**

---

### **Organizing Committee**

- College Representative, NUS Heart of Leadership Programme, 2025
- Singapore Representative, United Nations Industrial Development Organization Bridge for Cities Dialogue, 2025
- Young Leader, World Cities Summit Young Leaders Symposium, 2024 and 2025
- Singapore Representative, Japanese Education Ministerial Roundtable Dialogue, 2024
- Session Chair, International Forum of Urbanism Global Seminar, 2024
- Workshop Chair, UN-Habitat Urban Thinker Campus Workshop, 2023
- Lead Representative, NUS Cities Panel of Advisors Showcase, 2023
- Session Chair, 4th Spatial Data Science Symposium, 2023
- Executive Committee, NUS-SUTD PhD Symposium, 2022
- College Representative, National University of Singapore Graduate Education Virtual Open House, 2022

### **Reviewer**

- *Cities* (Elsevier)
- *Computers, Environment and Urban Systems* (Elsevier)
- *Environment and Planning B: Urban Analytics and City Science* (SAGE)
- *Geographical Analysis* (Wiley)
- *Geoforum* (Elsevier)
- *International Journal of Applied Earth Observation and Geoinformation* (Elsevier)
- *International Journal of Digital Earth* (Taylor & Francis)
- *International Journal of Geographical Information Science* (Taylor & Francis)
- *Journal of Open Source Software*
- *Scientific Data* (Springer Nature)
- *Scientific Reports* (Springer Nature)
- *Sustainable Cities and Society* (Elsevier)
- *Transactions in GIS* (Wiley)
- *Transportation Research Part D: Transport and Environment* (Elsevier)
- *Urban Informatics* (Springer Nature)

## OUTREACH ACTIVITIES

---

<b>Singapore-Nagoya Overseas Partnership</b> <a href="https://www.nuglobalcampus.org/">https://www.nuglobalcampus.org/</a> <ul style="list-style-type: none"><li>• Led and organize research exchange with postgraduate students and staff</li></ul>	2025
<b>NUS Public Events Series</b> <a href="https://cde.nus.edu.sg/arch/news_and_events/events_ay2526_public_lecture_convo_260825/">https://cde.nus.edu.sg/arch/news_and_events/events_ay2526_public_lecture_convo_260825/</a> <ul style="list-style-type: none"><li>• Led and organize lab visit with Professor Perry Yang (Georgia Tech) and Professor Miho Mazereeuw (MIT)</li></ul>	2025
<b>London-Singapore Urban Analytics Joint Seminar for Liveable Cities</b> <a href="https://ual.sg/seminars/">https://ual.sg/seminars/</a> <ul style="list-style-type: none"><li>• Coordinate exchange and research presentation</li></ul>	2025
<b>Cambridge-NUS Joint Seminar</b> <a href="https://www.sustainabledesign.arct.cam.ac.uk/news/joint-seminar-day-nus-urban-analytics-lab-27th-june-2025">https://www.sustainabledesign.arct.cam.ac.uk/news/joint-seminar-day-nus-urban-analytics-lab-27th-june-2025</a> <ul style="list-style-type: none"><li>• Led and organize research exchange with postgraduate students and staff</li></ul>	2025
<b>Singapore-Chulalongkorn Collaboration</b> <a href="https://ual.sg/post/2023/07/28/visit-by-udc-from-chulalongkorn-university/">https://ual.sg/post/2023/07/28/visit-by-udc-from-chulalongkorn-university/</a> <ul style="list-style-type: none"><li>• Facilitate research exchange with postgraduate students and staff</li></ul>	2023
<b>Singapore Institute of Planners Mentorship Programme</b> <a href="https://www.planning.org.sg/nw/20250106/SIP-Mentor-Program2.pdf">https://www.planning.org.sg/nw/20250106/SIP-Mentor-Program2.pdf</a> <ul style="list-style-type: none"><li>• Experience sharing and engagement with young planners</li></ul>	2023
<b>NUS Real Estate Ambassador Programme</b> <a href="https://studylib.net/doc/13142814/nus-real-estate-news">https://studylib.net/doc/13142814/nus-real-estate-news</a> <ul style="list-style-type: none"><li>• Lead highschool outreach activities on urban planning and the built environment</li><li>• Organize campus open house booth and activities</li></ul>	2016

## MEDIA COVERAGE

---

<b>College of Design and Engineering Research</b> "AI model maps building emissions to drive smarter, fairer climate solutions   CDE Research" <a href="https://www.youtube.com/watch?v=rushehhq_iI">https://www.youtube.com/watch?v=rushehhq_iI</a>	2025
<b>College of Design and Engineering Research</b> "AI model maps building emissions to drive smarter, fairer climate solutions   CDE Research" <a href="https://www.youtube.com/watch?v=rushehhq_iI">https://www.youtube.com/watch?v=rushehhq_iI</a>	2025
<b>Urban Analytics Lab</b> "Building smarter, more sustainable, liveable cities: The Urban Analytics Lab" <a href="https://vimeo.com/764033095">https://vimeo.com/764033095</a>	2025
<b>ASHRAE Insights Newsletter</b> "AI model maps building emissions to support fairer climate policies"	2025
<b>Mapillary Blog</b> "How Crowdsourced Street-Level Imagery is Powering Urban Sustainability Research"	2025