Vivian W. H. Wong

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Engineering Informatics Group
Civil and Environmental Engineering
Stanford University, Stanford, CA, USA

EDUCATION

Stanford University, Stanford, CA — Expected 06/2024
Ph.D. in Civil Engineering
Advisor: Kincho H. Law
Minor in Computer Science

Stanford University, Stanford, CA — 2019
Master of Science in Civil Engineering
Emphasis in Structural Engineering & Mechanics

University of Illinois at Urbana-Champaign, Champaign, IL — 2017
Bachelor of Science in Civil Engineering

RESEARCH APPOINTMENTS

Graduate Researcher, **Stanford Center at the Incheon Global Campus (SCIGC)** & **Engineering Informatics Group**, Stanford — 2019 - Present
Advisor: Kincho H. Law

Pedestrian Mobility (Ph.D. Dissertation Research): Applied machine learning on pedestrians for safer planning and management of the urban built environment under crowded scenarios

- Tracking, modeling and predicting crowd flow with CCTV videos and building floor plans
- Spatiotemporal pedestrian data acquisition and label generation

Smart Manufacturing Systems: Automated part quality control; adaptive production scheduling

- Defect localization, segmentation, classification in 3D printing parts
- Learning dispatching rules for the job shop scheduling problem to handle unexpected interruptions

Methodology: Deep learning (e.g. graph neural networks, convolutional neural networks), tracking algorithms, spatiotemporal data analysis, image and video analysis

Undergraduate Research Assistant **Smart Structures Technology Laboratory,** University of Illinois at Urbana-Champaign 2015 - 2017
Advisor: Billie F. Spencer

PUBLICATIONS

Under Preparation

J5 **V. W. H. Wong** and K. H. Law, "CMGraphs: Dynamic Graphs Constructed with Spatial Prior to Enable Spatiotemporal Crowd Flow Forecasting in Complex Built Environments".

J4 M. Sato, **V. W. H. Wong**, H. Yeung, P. Witherell and K. H. Law, "Identification and Interpretation of Melt Pool Shapes in Laser Powder Bed Fusion with Machine Learning", Submitted to *Smart and Sustainable Manufacturing Systems*.

Peer-Reviewed Journal Articles

J3 **V. W. H. Wong**, S. H. Kim, J. Park, J. Park and K. H. Law, "Generating Dispatching Rules for the Interrupting Swap-Allowed Blocking Job Shop Problem Using Graph Neural Network and Reinforcement Learning", *ASME Journal of Manufacturing Science and Engineering*, Jan 2024; 146(1): 011009. https://doi.org/10.1115/1.4063652

J2 **V. W. H. Wong** and K. H. Law, "Fusion of CCTV Video and Spatial Information for Automated Crowd Congestion Monitoring in Public Urban Spaces". *Algorithms*, Mar 2023; 16(3):154. https://doi.org/10.3390/a16030154

J1 **V. W. H. Wong**, M. Ferguson, K. H. Law, Y. T. Lee and P. Witherell, "Segmentation of Additive Manufacturing Defects Using U-Net". *ASME Journal of Computing and Information Science in Engineering*, June 2022; 22(3):031005. https://doi.org/10.1115/1.4053078

Peer-Reviewed Conference Proceedings

C7 M. Sato, **V. W. H. Wong**, K. H. Law, H. Yeung and P. Witherell, "Explainability of Laser Powder Bed Fusion Melt Pool Classification Using Deep Learning", *ASME Computers and Information in Engineering Conference (CIE)*. Aug. 20-23, 2023.

C6 **V. W. H. Wong** and K. H. Law, "Modeling Crowd Data and Spatial Connectivity as Graphs for Crowd Flow Forecasting in Public Urban Space", ASCE International Conference on Computing in Civil Engineering, Corvallis, OR, Jun. 25-28, 2023.

C5 **V. W. H. Wong**, S. H. Kim, J. Park, J. Park and K. H. Law, "Generating Dispatching Rules for the Interrupting Swap-Allowed Blocking Job Shop Problem

Using Graph Neural Network and Reinforcement Learning", ASME Manufacturing Science and Engineering Conference (MSEC), New Brunswick, NJ, Jun. 12-16, 2023.

C4 M. Sato, **V. W. H. Wong**, K. H. Law, H. Yeung, Z. Yang, B. Lane and P. Witherell, "Anomaly Detection of Laser Powder Bed Fusion Melt Pool Images", International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, St. Louis, MO, Aug. 14-17, 2022.

C3 **V. W. H. Wong**, M. Ferguson, K. H. Law, Y. T. Lee and P. Witherell, "Segmentation of Additive Manufacturing Defects Using U-Net", *ASME Computers and Information in Engineering Conference (CIE)*. Aug. 17-20, 2021.

C2 **V. W. H. Wong**, M. Ferguson, K. H. Law, Y. T. Lee and P. Witherell, "Automatic Volumetric Segmentation of Additive Manufacturing Defects with 3D U-Net", *AAAI 2020 Spring Symposia*, Stanford, CA, USA, Mar. 23-25, 2020.

C1 **V. W. H. Wong**, M. Ferguson, K. H. Law and Y. T. Lee, "An Assistive Learning Workflow on Annotating Images for Object Detection", *2019 IEEE International Conference on Big Data*, Los Angeles, CA, USA, Dec. 9-12, 2019. Acceptance rate = 18.7%

Teaching Appointments

Teaching Assistant - Graduate-level

Optimization in Structural Engineering (CEE 380)	Spring 2023
Finite Element Methods in Structural Dynamics (CEE 284)	Autumn 2019, 2021, 2022
Structural Dynamics (CEE 283)	Winter 2020, 2022

Co-Instructor - Undergraduate-level

Engineering Orientation (UIUC ENG 100)	Fall 2016

Teaching Assistant - Undergraduate-level

Engineering First-Year Experience Seminars (UIUC ENG 177)	Fall 2016

Academic Service

Paper Reviewer

IEEE Transactions on Neural Networks and Learning System	2023
Optimization Letters	2022
Automation in Construction	2022
IEEE Big Data Conference	2019

Affiliations

Society of Women Engineers (SWE)
Women in Science and Engineering (WISE) Group
Someone Like Me (SLM) Mentorship Program
Womens Community Center (WCC) STEM Mentorship Program

Broadening Participation Activities

Mentor 2023
Stanford Womens Community Center (WCC) STEM mentorship program
Mentees: Lauren Williams, Jayna Huang

Coordinator 2023
Stanford Someone Like Me (SLM) mentorship program

Residence Community Associate 2018-2019
Stanford Kennedy Graduate Residence / Graduate Life Office

Always Connecting Representative 2017
Society of Women Engineers annual conference [link to media coverage]

Volunteer Instructor 2017
Shakes and Quakes outreach at Sangamon Elementary School

Co-Founder, President and Project Manager 2016 - 2017
Engineers In Action (EIA) UIUC for suspension bridge construction in underdeveloped communities in Guatemala and Panama

Field Representative 2016
Saha Global for delivering electricity and entrepreneurial opportunities for women in Ghana

Officer and Nominating Committee 2015 - 2017
Society of Women Engineers at UIUC

Awards & Honors

Blume Fellowship, Stanford University 2019
James Scholar, UIUC 2014 - 2017
Earle J. Wheeler Scholarship, UIUC 2016
Fred S. Bailey International Service Scholarship for Cause-Driven Leaders, UIUC 2016
International Engineering Fellowship, UIUC 2016
Wayne C. Teng Scholarship, UIUC 2015

Industry Appointments

Amazon, Seattle, WA Summer 2022

Applied Scientist Summer Intern, Amazon Softlines Discovery
Mentor & Manager: Michael Matheny

Alibaba Cloud, Hangzhou, China — Summer 2018
Summer Research Intern, City Brain project
Host: Liang Yu

PRESENTATIONS

Conference Presentations

Modeling Crowd Data and Spatial Connectivity as Graphs for Crowd Flow Forecasting in Public Urban Space — 06/2023
ASCE International Conference on Computing in Civil Engineering (I3CE 2023), Corvallis, OR, USA

Generating Dispatching Rules for the Interrupting Swap-Allowed Blocking Job Shop Problem Using Graph Neural Network and Reinforcement Learning — 06/2023
ASME International Manufacturing Science and Engineering Conference (MSEC 2023), New Brunswick, NJ, USA

Segmentation of Additive Manufacturing Defects Using U-Net — 08/2021
ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC-CIE 2021), Online

Automatic Volumetric Segmentation of Additive Manufacturing Defects with 3D U-Net — 03/2020
AAAI 2020 Spring Symposia, Stanford, CA, USA

An Assistive Learning Workflow on Annotating Images for Object Detection — 12/2019
IEEE Big Data 2019, Los Angeles, CA, USA

Invited Talks

Spatiotemporal Data to Understand Human Behavior and Mobility in Urban Systems — 05/2023
TU Delft–Stanford: Designing for Future Mobility Workshop, Stanford, CA

Understanding Human Behaviors in Smart Building and Urban Environments — 06/2021
Stanford Center at the Incheon Global Campus First International Symposium, Online

MISCELLANEOUS

Player on Stanford Table Tennis Team — 2022 - Present