

# Gilbert Yang Ye

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## EDUCATION

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### Ph.D. in Civil Engineering

University of Florida

Ph.D.'s degree program; All but dissertation

Sep 2020 – Expected May 2024

- GPA: 4.00/4.00
- Dissertation title: Immersive Human Motor Skill Learning using Haptic Sensation Transfer in Construction
- Supervisor: Dr. Eric Jing Du

### M.Sc. in Applied Computational Science and Engineering

Imperial College London

Master's degree program

Sep 2019 - Sep 2020

- Thesis project: A GNSS Satellite Selection Scheme based on Line-of-Sight and Satellite Geometry with a Machine Learning Approach
- Supervisor: Dr. Anahid Basiri

### B.Sc. in Building Engineering and Management

Hong Kong Polytechnic University

Bachelor's degree program

Sep 2015 - June 2019

- GPA: 3.62/4.00 (Top 3%)
- Capstone project: A Cost-Benefit Analysis of Building Information Modelling's Application in Building's Life Cycle in Hong Kong
- Supervisor: Dr. Patrick S.W. Fong

### Academic Exchange Programs

- University of Maryland: Fall 2017
- University of British Columbia: Summer 2016

## ACADEMIC EXPERIENCE

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### Research Assistant

Sep 2020 - Present

University of Florida

Advisor: Dr. Eric Jing Du

- Established an innovative pipeline integrating robotic and haptic devices with VR, facilitating the transfer of expert motor skills to novices for enhanced motor skill learning. Successfully applied and validated in Exoskeleton training and welding training.
- Presented the theoretical and practical advancement in using EMG and FNIRS to monitor human cognition.
- Spearheaded the development of embodied AI for construction robotics focusing on two applications: situational-aware drone and force-aware robot arm.
- Took charge of the VR development and coordination for a multi-group NSF convergence accelerator project, contributing to its successful execution and outcomes.

- Mentored and guided two undergraduate student research projects in advanced computing and data collection technology, specifically tailored for the construction industry.
- Played a key role in the composition of four funding proposals and one research center proposal, aiding in securing crucial financial support for cutting-edge research initiatives.

**Teaching Assistant**

Aug 2022 - Dec 2022

University of Florida

- Conducted tutorials on BIM, applied machine learning, and VR topics in construction area.

**Research Assistant**

Mar 2020 - Aug 2020

University of College London

Advisor: Dr. Anahid Basiri

- Utilized Python, GNSSLogger, Laika, Scipy, and OS MasterMap to design and implement an advanced GNSS satellite signal collection, analysis, and filtering scheme based on pseudo-range, LOS, and GDOP. The final product significantly optimized positioning accuracy.

**Research Assistant**

Aug 2018 - Mar 2019

Hong Kong Polytechnic University

Advisor: Dr. Shuo Yang

- Spearheaded the data mining and data cleaning efforts for an ECS grant project "Assessing Financial Forecasts in Equity-based Crowdfunding".

**Research Assistant**

Sep 2017 – Dec 2017

University of Maryland

Advisor: Dr. Qingbin Cui

- Conducted comprehensive data collection with World Bank Open Data and executed pilot analysis of the Kuznets Curve Theory, contributing to a deeper understanding of its implications and applications.
- Led a site visit and conducted an extensive literature review to explore the state-of-the-art and state-of-the-practices related to smart city strategy, providing valuable insights for future developments.

**PEER-REVIEWED JOURNAL PAPERS**

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- [1] Wu, J., Ye, Y., & Du, J. (2024). Autonomous Drones in Urban Navigation: Autoencoder Learning Fusion for Aerodynamics. *ASCE Journal of Construction Engineering and Management*. (Impact Factor: 5.8)
- [2] Xia, P., Zhou, T., Ye, Y., & Du, J. (2024). Human Autonomy Teaming for ROV Shared Control. *ASCE Journal of Computing in Civil Engineering*. (Impact Factor: 7.54)
- [3] Wu, J., Ye, Y., & Du, J. (2024). Multi-objective reinforcement learning for autonomous drone navigation in urban areas with wind zones. *ELSEVIER Automation in Construction*, 158, 105253. (Impact Factor: 10.5)
- [4] Ye, Y., Xia, P., Zhou, T., & Du, J. (2023). Spatial Memory of BIM and Virtual Reality: Mental Mapping Study. *ASCE Journal of Construction Engineering and Management*, 149(7), 04023042. (Impact Factor: 5.8)
- [5] Zhou, T., Xia, P., Ye, Y., & Du, J. (2023). Embodied Robot Teleoperation based on High-Fidelity Visual-Haptic Simulator: Pipe Fitting Example. *ASCE Journal of Construction Engineering and Management*. (Impact Factor: 5.8)

- [6] Xia, P., You, H., **Ye, Y.**, & Du, J. (2023). ROV teleoperation via human body motion mapping: Design and experiment. *ELSEVIER Computers in Industry*, 150, 103959. (Impact Factor: 11.245)
- [7] **Ye, Y.**, You, H., & Du, J. (2023). Improved trust in human-robot collaboration with ChatGPT. *IEEE Access*. (Impact Factor: 3.6)
- [8] Zhou, T., Zhu, Q., **Ye, Y.**, & Du, J. (2023). Humanlike Inverse Kinematics for Improved Spatial Awareness in Construction Robot Teleoperation: Design and Experiment. *ASCE Journal of Construction Engineering and Management*, 149(7), 04023044. (Impact Factor: 5.8)
- [9] **Ye, Y.**, Zhou, T., & Du, J. (2023). Robot-assisted immersive kinematic experience transfer for welding training. *ASCE Journal of Computing in Civil Engineering*, 37(2), 04023002. (Impact Factor: 7.54)
- [10] You, H., **Ye, Y.**, Zhou, T., Zhu, Q., & Du, J. (2023). Robot-Enabled Construction Assembly with Automated Sequence Planning Based on ChatGPT: RoboGPT. *Buildings*, 13(7), 1772. (Impact Factor: 4.3)
- [11] **Ye, Y.**, Shi, Y., Srinivasan, D., & Du, J. (2022). Sensation transfer for immersive exoskeleton motor training: Implications of haptics and viewpoints. *ELSEVIER Automation in Construction*, 141, 104411. (Impact Factor: 10.5)
- [12] **Ye, Y.**, Shi, Y., Xia, P., Kang, J., Tyagi, O., Mehta, R. K., & Du, J. (2022). Cognitive characteristics in firefighter wayfinding Tasks: An Eye-Tracking analysis. *ELSEVIER Advanced Engineering Informatics*, 53, 101668. (Impact Factor: 8.8)

#### **PEER-REVIEWED CONFERENCE PROCEEDINGS**

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- [13] Ransing, V., Park, J., **Ye, Y.**, Kim, S., Du, J., and Srinivasan, D. How does perceived usefulness of an exoskeleton change with virtual reality training? In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*. (Accepted)
- [14] **Ye, Y.**, Uthai, T., Xia, P., Zhou, T., and Du, J. User Experience and Workload Evaluation in Robot-Assisted Virtual Reality Welding Training. *2024 ASCE Construction Research Congress (CRC 2024)*. (Accepted)
- [15] Xu, F., Zhou, T., **Ye, Y.**, and Du, J. Telepresence Robotic Operating System with Mixed Reality. *2024 ASCE Construction Research Congress (CRC 2024)*. (Accepted)
- [16] Wu, J., **Ye, Y.**, and Du, J. Multi-Objective Reinforcement Learning for Autonomous Drone Navigation in Urban Area. *2024 ASCE Construction Research Congress (CRC 2024)*. (Accepted)
- [17] You, H., **Ye, Y.**, Xu, F., and Du, J. Improved Stacked Object Detection with RGB and LiDAR. *2024 ASCE Construction Research Congress (CRC 2024)*. (Accepted)
- [18] Zhou, T., Xia, P., **Ye, Y.**, and Du, J. Multisensory Augmentation System for Human-Robot Interaction in Construction. *2024 ASCE Construction Research Congress (CRC 2024)*. (Accepted)
- [19] **Ye, Y.**, Xu, F., and Du, J. Collaborative Virtual Training with Embodied Physics and Haptic Feedback: Construction Material Handling as an Example. *The 2023 ASCE International Conference on Computing in Civil Engineering (i3CE)*.
- [20] Zhou, T., Xia, P., **Ye, Y.**, and Du, J. Haptic Augmentation System for Construction Robot Teleoperation. *The 2023 ASCE International Conference on Computing in Civil Engineering (i3CE)*.

- [21] Hayes, J., Dwivedi, S., Karthikeyan, R., Abujelala, M., Kang, J., **Ye, Y.**, ... & Mehta, R. K. (2022, September). Identifying early predictors of learning in VR-based drone training. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 66, No. 1, pp. 1872-1876). **BEST PAPER AWARD**
- [22] **Ye, Y.**, Shi, Y., Lee, Y., Burks, G., Srinivasan, D., & Du, J. (2022). Exoskeleton training through haptic sensation transfer in immersive virtual environment. *2022 ASCE Construction Research Congress (CRC 2022)* (pp. 560-569)
- [23] Burks, G., Lee, Y., Kim, S., **Ye, Y.**, Beiter, B., Herron, C., ... & Srinivasan, D. (2021, September). A framework for virtual reality-based motor skills training for the use of exoskeletons. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 65, No. 1, pp. 277-278). Sage CA: Los Angeles, CA: SAGE Publications.
- [24] **Ye, Y.**, Shi, Y., & Du, J. (2021). Spatial memory of building layout via 2D, 3D, and virtual reality. *The 2021 ASCE International Conference on Computing in Civil Engineering (i3CE)* (pp. 1293-1301).

#### ***JOURNAL PAPERS UNDER REVIEW***

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- [25] **Ye, Y.**, Zhou, T., Zhu, Q., Vann, W., & Du, J. (2024). Brain Functional Connectivity under Teleoperation Latency: a fNIRS Study. *SAGE Human Factors*. (Impact Factor: 2.37) (Under review)
- [26] Zhou, T., **Ye, Y.**, Zhu, Q., Vann, W., & Du, J. (2024). Neural Dynamics of Delayed Feedback in Robot Teleoperation: Insights from fNIRS Analysis. *Frontiers in Human Neuroscience*. (Impact Factor: 2.9) (Under review)
- [27] Du, J., Vann, W., Zhou, T., **Ye, Y.**, & Zhu, Q. (2023). Sensory Manipulation as a Countermeasure to Robot Teleoperation Delays: System and Evidence. *Nature Scientific Reports*. (Impact Factor: 4.6) (Under review)
- [28] **Ye, Y.**, Xia, P., Xu, F., & Du, J. (2023). Enhance Kinesthetic Experience in Welding Motor Training with Virtual Reality and Robotic Arms. *IEEE Transactions on Human-Machine Systems*. (Impact Factor: 3.6) (Under review)
- [29] You, H., Xu, F., **Ye, Y.**, Xia, P., & Du, J. (2023). Adaptive LiDAR Scanning based on RGB Information. *ELSEVIER Automation in Construction*. (Impact Factor: 10.5) (Under review)
- [30] You, H., **Ye, Y.**, Zhou, T., & Du, J. (2023). : Force-Based Robotic Imitation Learning: A Dual-Loop Approach for Construction Tasks. *ELSEVIER Automation in Construction*. (Impact Factor: 10.5) (Under review)
- [31] Park, J., **Ye, Y.**, Du, J., & Srinivasan D. (2023). Virtual reality simulation of exoskeleton-assisted manual material handling. *IEEE Access*. (Impact Factor: 3.6) (Under review)
- [32] You, H., Zhou, T., Qi, Z., **Ye, Y.**, & Du, J. (2023). Embodied AI for Dexterity-Capable Construction Robots: DEXBOT Framework. *IEEE Transactions on Cognitive and Developmental Systems*. (Impact Factor: 4.4) (Under review)
- [33] Wu, J., **Ye, Y.**, & Du, J. (2023). Enhancing Drone Navigation in Urban Environments with Multi-Objective Reinforcement Learning and Convolutional Autoencoder-Generated Wind Simulations. *ASCE Journal of Computing in Civil Engineering*. (Impact Factor: 7.54) (Under review)

## CONFERENCE PRESENTATIONS

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- [1] “Collaborative Virtual Training with Embodied Physics and Haptic Feedback: Construction Material Handling as an Example.” 2023 ASCE *International Conference on Computing in Civil Engineering (i3CE)*, Corvallis, Oregon, June 25-28, 2023.
- [2] “Robot-Based Real-Time Point Cloud Digital Twin Modeling in Augmented Reality” *Transforming Construction with Reality Capture Technologies (TCRC) conference 2022*, Fredericton, New Brunswick, Canada, August 23 - 25, 2022.
- [3] “Exoskeleton training through haptic sensation transfer in immersive virtual environment.” 2022 ASCE *Construction Research Congress (CRC 2022)*, Arlington, Virginia, March 9–12, 2022.
- [4] “Spatial memory of building layout via 2D, 3D, and virtual reality.” 2021 ASCE *International Conference on Computing in Civil Engineering (i3CE)*, Orlando, Florida, September 12-14, 2023.

## PATENTS

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- [1] Du, J., Ye, Y. “Systems and Methods Remote Transferring of Sensation for Physical Motor Training”. U.S. Patent Application No.63/371,016. Filed on August 10, 2022.

## INVOLVED RESEARCH PROJECTS

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**Human-Robot Sensory Sharing for Swift Trust in Autonomy** *Air Force Office of Scientific Research (AFOSR)*

Role: Graduate Research Assistant

Dec 2022 - Nov 2025

- Funded amount: \$599,322

**B2: Human-Robot Sensory Transfer for Worker Productivity, Training, and Quality of Life in Remote Undersea Inspection and Construction Tasks** *National Science Foundation (NSF)*

Role: Graduate Research Assistant

Sept 2021 - Aug 2025

- Funded amount: \$2,090,000

**ForceBot: Customizable Robotic Platform for Body-Scale Physical Interaction Simulation in Virtual Reality** *National Science Foundation (NSF)*

Role: Graduate Research Assistant

Sept 2020- Aug 2024

- Funded amount: \$312,985

**Learning Environments with Augmentation and Robotics for Next-gen Emergency Responders** *National Science Foundation (NSF)*

Role: Graduate Research Assistant

Nov 2020- Aug 2022

- Funded amount: \$4,998,274

## AWARDS

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**HFES Best Paper Award**

*Human Factors and Ergonomics Society*

Awardee

2022

Awarded for the paper ‘Identifying early predictors of learning in VR-based drone training’

<b>Engineering Award - Witters Competition</b>	<i>University of Florida</i>
<i>Awardee</i>	<i>2021</i>
Awarded for excellent engineering design in a community development plan	
<b>The Identification Game</b>	<i>Kaggle Computer Vision Competition</i>
<i>Winner</i>	<i>2020</i>
Awarded for excellent modeling performance	
<b>Deans' Honor List</b>	<i>Hong Kong Polytechnic University</i>
<i>Awardee</i>	<i>2019</i>
Awarded for excellent academic performance	
<b>Outstanding Student Award</b>	<i>Hong Kong Polytechnic University</i>
<i>Awardee</i>	<i>2018</i>
Awarded for one outstanding student per department in overall performance	
<b>The Elite of the Season</b>	<i>Beijing Institution of Residential Building Design &amp; Research Co. Ltd</i>
<i>Awardee</i>	<i>2018</i>
Awarded for leading the innovation project: Automation of Structural Horizontal Joint Design and Regulation Verification	
<b>HKSAR Reaching Out Award</b>	<i>HKSAR</i>
<i>Awardee</i>	<i>2018</i>
Scholarship for meritorious students who actively participated in global competitions and activities	
<b>Global Student Project Fund</b>	<i>Hong Kong Polytechnic University</i>
<i>Funding winner</i>	<i>2017</i>
Funding for supporting student project that has an international view and global impact	
<b>Global Awareness Award</b>	<i>Hong Kong Polytechnic University</i>
<i>Awardee</i>	<i>2017</i>
Awarded for participating in and organizing international events	
<b>Knowledge and Action Cup Debate Competition</b>	<i>Dongguan Department of Education</i>
<i>Championship</i>	<i>2013</i>

## **INDUSTRY EXPERIENCE**

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<b>Ho &amp; Partners Architects Engineers &amp; Development Consultants Ltd</b>	<i>Oct 2018 – Jul 2019</i>
<i>Assistant Surveyor</i>	<i>Hong Kong, China</i>

- Conducted thorough building inspections and generated detailed conditional surveys for Architectural Services Department (ArchSD) Properties under Agreement No. 5VF106, utilizing tools including AutoCAD and Revit.
- Identified and quantified structural risks using OpenCV and Python for informed decision-making and report drafting.
- Demonstrated proficient project coordination skills through seamless communication between government stakeholders, contractors, and consultants, leading to streamlined project execution.
- Prepared comprehensive bidding documents, contributing to successful contract procurement.

**Beijing Institution of Residential Building Design & Research Co. Ltd***May 2018 – Jul 2018**Assistant Structure Engineer**Beijing, China*

- Played a key role in the structural design phase of the Beijing Liulihe Residential District Development Design Project utilizing AutoCAD and PKPM.
- Initiated and led a pilot project focused on automating Structural Horizontal Joint Design and Regulation Compliance Verification utilizing Python and Regex. The project's success improved accuracy and reduced a recurring 3-day workload to a single mouse click.

**C&H Properties***Jun 2017 – Aug 2017**IT Assistant**Singapore*

- Initiated and led a pilot innovation project to streamline the annual database maintenance and update workflow.
- Employed powerful tools including BeautifulSoup4 and regex, integrated within the Python programming environment, to automate intricate web-scraping and data processing tasks.
- Successfully achieved exceptional results by transforming a recurring, time-intensive 6-week process into a simple one-click operation.

**LEADERSHIP AND SERVICE EXPERIENCES**

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**Care for the Elderly***Feb 2018 - Aug 2018**Volunteer**Hong Kong, China*

- Collaborated with the Salvation Army in a service project, regularly visiting elderly individuals living alone in a low-rental public community to understand their living conditions and provide care.
- Led the design and implementation of a comprehensive age-friendly community project, addressing challenges faced by the elderly in Hong Kong and advocating for an inclusive and supportive environment.

**Food For Thought: Towards a No-Food-Waste Society***June 2016 - April 2017**Co-founder and Event Organizer**HK & UK*

- Initiated and led a project team to raise awareness and address Hong Kong's food waste problem among students.
- Successfully secured funding from the Hong Kong Polytechnic University's student project fund to support the initiative.
- Coordinated diverse activities, including volunteer events and global promotion sessions, achieving impactful outcomes and leaving a lasting impression on the local community and a global audience.
- Demonstrated strong leadership skills, problem-solving capabilities, and resilience throughout the project's execution.

**Meet the underprivileged***Jan 2017 - Apr 2017**Volunteer**Hong Kong, China*

- Visited and connected with vulnerable communities and engaged in meaningful conversations to understand their challenges and aspirations.
- Fostered a safe and open space for the youth to share their stories, hopes, and dreams.

**Mandarin Debate Team***Nov 2015 - May 2019**Elite**Hong Kong, China*

- Led and represented the Hong Kong Polytechnic University in debating competitions, including the World Mandarin Debating Championship 2018 (Global), RTHK University Debate Competition 2017 (Hong Kong), and Ten-Parties' Debate Competition 2016.
- Demonstrated exceptional communication skills, critical thinking, and teamwork throughout these competitions.

**Chinese Mainland Student Association***Nov 2015 - May 2017**Chief Secretary**Hong Kong, China*

- Proposed and organized the "Sharing Forum," a platform for students to exchange academic and career experiences, featuring diverse speakers to expand horizons and build connections.
- Showcased emcee skills during the association's soiree, engaging the audience and ensuring a memorable and lively event for all attendees.

**SKILLS**


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<b>Programming languages/tools</b>	C#, C++, Python, R, Matlab, SQL, ROS, L <sup>A</sup> T <sub>E</sub> X, git, Pytorch, Tensorflow, openMP, HPC
<b>Design and simulation</b>	Unity, Unreal Engine, Blender, SketchUp, AutoCAD, Revit, CostX
<b>Industrial knowledge</b>	Mixed Reality; Reinforcement Learning; Embodied AI; Data analysis; Building Information Modelling
<b>Interpersonal skills</b>	Communication; Team player; Leadership; Critical thinking