

Gilbert Yang Ye

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EDUCATION

Ph.D. in Civil Engineering

Ph.D.'s degree program

University of Florida

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

Master's degree program

Imperial College London

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

Bachelor's degree program

Hong Kong Polytechnic University

Sep 2015 - June 2019

- GPA: 3.62/4.00 (Top 3%)
- Capstone project: A Cost-Benefit Analysis of Building Information Modelling's (BIM) Application in Building's Life Cycle in Hong Kong
- Supervisor: Dr. Patrick S.W. Fong
- Academic exchange at the University of Maryland
- Summer school at the University of British Columbia

RESEARCH POSITIONS AND PROJECTS

University of Florida

Research Assistant

Sep 2020 - Present

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 in 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 an 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.

University of Florida

Teaching Assistant

Aug 2022 - Dec 2022

Course: CGN 6905 - Advanced Construction Info Tech

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

University of College London

Student Assistant

Mar 2020 - Aug 2020

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.

Hong Kong Polytechnic University

Research Assistant

Aug 2018 - Mar 2019

Advisor: Dr. Shuo Yang

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

University of Maryland

Research Assistant

Sep 2017 - Dec 2017

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.

Human-Robot Sensory Sharing for Swift Trust in Autonomy *Research (AFOSR)*

Role: Graduate Researcher

Air Force Office of Scientific

Dec 2022 - Nov 2025

- Collaborated in drafting the funding proposal for the project
- Took charge of the initial project architecture design and software development
- Applied deep reinforcement learning to design advanced drone navigation algorithms

Learning Environments with Augmentation and Robotics for Next-gen Emergency Responders

Role: VR Researcher

National Science Foundation (NSF)

Nov 2020- Jul 2023

- Led the design of training protocols for emergency responders, collaborating with universities and industrial partners
- Developed VR systems, virtual environments, and algorithms for immersive training experiences
- Conducted experiments to validate the systems and methods, resulting in a minimum viable product for efficient and effective training

ForceBot: Customizable Robotic Platform for Body-Scale Physical Interaction Simulation in Virtual Reality

Role: Graduate Researcher

National Science Foundation (NSF)

Sept 2020- Aug 2024

- Spearheaded the design of a cutting-edge VR-robotics coupled system and advanced algorithms with HaptX, creating an immersive environment with haptic force feedback
- Conducted human-subject experiments to validate and assess the performance of the designed system thoroughly

- 2023** (Under review) **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*
- 2023** (Under review) 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*.
- 2023** (Under review) Wu, J., **Ye, Y.**, & Du, J. (2023). Multi-Objective Reinforcement Learning for Autonomous Drone Navigation in Urban Areas with Wind Zones. *Automation in Construction*.
- 2023** (Accepted) Zhou, T., Xia, P., **Ye, Y.**, & Du, J. (2023). Embodied Robot Teleoperation based on High-Fidelity Visual-Haptic Simulator: Pipe Fitting Example. *Journal of Construction Engineering and Management*.
- 2023** 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.
- 2023** Xia, P., You, H., **Ye, Y.**, & Du, J. (2023). ROV teleoperation via human body motion mapping: Design and experiment. *Computers in Industry*, 150, 103959.
- 2023** **Ye, Y.**, Xia, P., Zhou, T., & Du, J. (2023). Spatial Memory of BIM and Virtual Reality: Mental Mapping Study. *Journal of Construction Engineering and Management*, 149(7), 04023042.
- 2023** Zhou, T., Zhu, Q., **Ye, Y.**, & Du, J. (2023). Humanlike Inverse Kinematics for Improved Spatial Awareness in Construction Robot Teleoperation: Design and Experiment. *Journal of Construction Engineering and Management*, 149(7), 04023044.
- 2023** **Ye, Y.**, You, H., & Du, J. (2023). Improved trust in human-robot collaboration with ChatGPT. *IEEE Access*.
- 2023** **Ye, Y.**, Zhou, T., & Du, J. (2023). Robot-assisted immersive kinematic experience transfer for welding training. *Journal of Computing in Civil Engineering*, 37(2), 04023002.
- 2022** **Ye, Y.**, Shi, Y., Srinivasan, D., & Du, J. (2022). Sensation transfer for immersive exoskeleton motor training: Implications of haptics and viewpoints. *Automation in Construction*, 141, 104411.
- 2022** **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. *Advanced Engineering Informatics*, 53, 101668.

PEER-REVIEWED CONFERENCE PROCEEDINGS

- 2023** (Under review) 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
- 2023** (Accepted) **Ye, Y.**, Uthai, T., Xia, P., Zhou, T., and Du, J. User Experience and Workload Evaluation in Robot-Assisted Virtual Reality Welding Training. Construction Research Congress 2024, Conference Proceedings
- 2023** (Accepted) Xu, F., Zhou, T., **Ye, Y.**, and Du, J. Telepresence Robotic Operating System with Mixed Reality. Construction Research Congress 2024, Conference Proceedings
- 2023** (Accepted) Wu, J., **Ye, Y.**, and Du, J. Multi-Objective Reinforcement Learning for Autonomous Drone Navigation in Urban Area. Construction Research Congress 2024, Conference Proceedings
- 2023** (Accepted) **Ye, Y.**, Xu, F., and Du, J. Collaborative Virtual Training with Embodied Physics and Haptic Feedback: Construction Material Handling as an Example. i3CE 2023 Conference Proceedings
- 2023** (Accepted) Zhou, T., Xia, P., **Ye, Y.**, and Du, J. Haptic Augmentation System for Construction Robot Teleoperation. i3CE 2023 Conference Proceedings
- 2022** 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)
- 2022** **Ye, Y.**, Shi, Y., Lee, Y., Burks, G., Srinivasan, D., & Du, J. (2022). Exoskeleton training through haptic sensation transfer in immersive virtual environment. In Construction Research Congress 2022 (pp. 560-569)
- 2021** 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.
- 2021** **Ye, Y.**, Shi, Y., & Du, J. (2021). Spatial memory of building layout via 2D, 3D, and virtual reality. In Computing in Civil Engineering 2021 (pp. 1293-1301).

PATENTS

- 2022** 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.

INDUSTRY EXPERIENCE

Ho & Partners Architects Engineers & Development Consultants Ltd *Oct 2018 – Jul 2019*
Assistant Surveyor *Hong Kong, China*

- 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 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 utilized Python and Regex. The project's success improved accuracy and reduced a recurring 3-day workload to a single mouse click.

C&H Properties

Executive Assistant

Jun 2017 – Aug 2017

Singapore

- Initiated and led a pilot innovation project focused on streamlining 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.

SKILLS

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

LEADERSHIP AND SERVICE EXPERIENCES

Care for the Elderly

Volunteer

Feb 2018 - Aug 2018

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

Co-founder and Event Organizer

June 2016 - April 2017

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

Volunteer

Jan 2017 - Apr 2017

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

Elite

Nov 2015 - May 2019

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

Chief Secretary

Nov 2015 - May 2017

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

AWARDS

HFES Best Paper Award

Awardee

Human Factors and Ergonomics Society

2022

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

Engineering Award - Witters Competition

Awardee

University of Florida

2021

Awarded for excellent engineering design in a community development plan

The Identification Game

Winner

Kaggle Computer Vision Competition

2020

Awarded for excellent modeling performance

Deans' Honor List

Awardee

Hong Kong Polytechnic University

2019

Awarded for excellent academic performance

Outstanding Student Award

Awardee

Hong Kong Polytechnic University

2018

Awarded for one outstanding student per department in overall performance

The Elite of the Season

Awardee

Beijing Institution of Residential Building Design & Research Co. Ltd

2018

Awarded for leading the innovation project: Automation of Structural Horizontal Joint Design and Regulation Verification

HKSAR Reaching Out Award

Awardee

HKSAR

2018

Scholarship for meritorious students who actively participated in global competitions and activities

Global Student Project Fund

Funding winner

Hong Kong Polytechnic University

2017

Funding for supporting student project that has an international view and global impact

Global Awareness Award

Awardee

Hong Kong Polytechnic University

2017

Awarded for participating in and organizing international events

Knowledge and Action Cup Debate Competition
Championship

Dongguan Department of Education
2013