Gilbert Yang Ye

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AREAS OF INTEREST AND COMPETENCE

Mixed reality, Haptic perception, Human-robot interaction, Construction Automation, Machine learning, Data analysis, Human factors

EDUCATION

Ph.D. in Engineering. Research on VR, HRI, AI, and Ergonomics *University of Florida*
Ph.D.'s degree program *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*

- Final honor: Merit
- 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 (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

SKILLS

Programming languages/tools	C#, C++, Python, R, Matlab, SQL, ROS, LaTeX, 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

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 *Jun 2017 – Aug 2017*
Executive Assistant *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.

RESEARCH POSITIONS AND PROJECTS

University of Florida *Sep 2020 - Present*
Research Assistant *Advisor: Dr. Eric Jing Du*

- Established an innovative pipeline integrating robotic and haptic devices with ROS and Unity, facilitating the transfer of expert motor skills to novices for enhanced motor skill learning.
- Spearheaded the development of various Virtual Reality assets, encompassing whole-body tracking with IK, multiplayer interaction with PUN2, intricate virtual object manipulation, VR interactive UIs, and seamless robot-VR coupled systems with ROS#.
- Presented the theoretical and practical advancement in using EMG and FNIRS to monitor human cognition.
- Took charge of the VR development efforts for an 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 *Aug 2022 - Dec 2022*
Teaching Assistant *Course: CGN 6905 - Advanced Construction Info Tech*

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

University of College London *Mar 2020 - Aug 2020*
Student Assistant *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 *Aug 2018 - Mar 2019*
Research Assistant *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 *Sep 2017 – Dec 2017*
Research Assistant *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 *Air Force Office of Scientific Research (AFOSR)*
Role: Graduate Researcher *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 *National Science Foundation (NSF)*
Role: VR Researcher *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 *National Science Foundation (NSF)*
Role: Graduate Researcher *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

LEADERSHIP AND SERVICE EXPERIENCES

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

AWARDS

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'

Engineering Award - Witters Competition *University of Florida*
Awardee *2021*
Awarded for excellent engineering design in a community development plan

The Identification Game *Kaggle Computer Vision Competition*
Winner *2020*
Awarded for excellent modeling performance

Deans' Honor List *Hong Kong Polytechnic University*
Awardee *2019*

Awarded for excellent academic performance

Outstanding Student Award *Hong Kong Polytechnic University*
Awardee *2018*
Awarded for one outstanding student per department in overall performance

The Elite of the Season *Beijing Institution of Residential Building Design & Research Co. Ltd*
Awardee *2018*
Awarded for leading the innovation project: Automation of Structural Horizontal Joint Design and Regulation Verification

HKSAR Reaching Out Award *HKSAR*
Awardee *2018*
Scholarship for meritorious students who actively participated in global competitions and activities

Global Student Project Fund *Hong Kong Polytechnic University*
Funding winner *2017*
Funding for supporting student project that has an international view and global impact

Global Awareness Award *Hong Kong Polytechnic University*
Awardee *2017*
Awarded for participating in and organizing international events

Knowledge and Action Cup Debate Competition *Dongguan Department of Education*
Championship *2013*

PEER-REVIEWED JOURNAL PAPERS

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

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.