

Quan Khanh Luu

Postdoctoral Research Associate at Purdue University Mobile: +1 (765)-694-9480 Address: 101 Andrew Place, West Lafayette, IN 47906, US Email: luu15@purdue.edu Website: quan-luu.github.io

Profile

I have been engaged in multiple funded research projects on soft robotics, ranging from bio-inspired robotic systems to advanced soft sensing technologies. My dedication to research has led to publications in top-ranked conferences (RSS, IEEE/RSJ IROS), journals (IEEE T-RO), and patents applied for in Japan.

I am a recipient of the prestigious JSPS Research Fellowship for Young Scientists (DC2) and have been selected as a member of the 2024 RSS Pioneers cohort. I was also a recipient of the 2024 IEEE/SICE SII Best Paper Award Finalist. Additionally, I actively contribute to the academic community as a reviewer for leading robotics conferences and journals, and I served as a member of the workshop organizing committee at IEEE/RSJ IROS 2022.

Employment

Postdoctoral Research Associate Purdue University, West Lafayette, United States	10/2024 – present Advisor: Dr. Yu She
Student Visiting Researcher Carnegie Mellon University (CMU), Pittsburgh, United States	09/2023 – 12/2023 Advisor: Dr. Yorie Nakahira
Software Engineer Bosch Vietnam Co., Ltd., Ho Chi Minh, Vietnam	04/2019 - 07/2019
Education	
Ph. D. in Materials Science Soft Robotics Japan Advanced Institute of Science and Technology (JAIST), Ishikawa, Ja	10/2021 – 09/2024 pan
Dissertation: Large-area Multimodal Soft Sensing Skin for Huma	an-Robot Interaction
Advisor: Dr. Ho Anh Van	
Master of Science in Materials Science <i>Soft Robotics</i> Japan Advanced Institute of Science and Technology (JAIST), Ishikawa, Ja	10/2019 — 09/2021 pan
Thesis: 3-D Printing Structured Models on Complex Substrates	using Robot Arm
Advisor: Dr. Ho Anh Van	
Classification: Excellent (Honor of Best Graduate Student)	
Bachelor of Mechanical Engineering <i>Mechatronics Engineering</i> Ho Chi Minh City University of Technology, Ho Chi Minh, Vietnam	09/2014 - 08/2018
Thesis: Calibration Methods and Off-line Programming for Indus	strial Robot Arms
Advisor: Dr. Doan The Thao	
 Classification: Very Good (summa cum laude) 	

Honors and Awards

2024 JSPS Research Fellowship for Young Scientists (DC2)

- 2024 RSS Pioneers Cohort
- 2024 Finalist of 2024 IEEE/SICE SII Best Paper Award
- 2021 Outstanding Graduate Student Award, School of Materials Science, JAIST
- 2021 MEXT Scholarship for Ph.D. course
- 2019 MEXT Scholarship for Master course

Publications

Under review and in-preparation articles (* equal contributions)

- [R1] Quan K. Luu, D. Q. Nguyen, N. H. Nguyen and V. A. Ho, "Vision-based Proximity and Tactile Sensing for Robot Arms: Design, Perception, and Control". Under review for IEEE Transactions on Robotics, 2025 (conditionally accept).
- [R2] Xiyu Deng, Quan K. Luu, V. A. Ho, Y. Nakahira, "Context-aware LLM-based Safe Control Against Latent Risks", 2025 (preprint: https://arxiv.org/pdf/2403.11863).
- [R3] V. Belcamino, N. M. D. Le, Quan K. Luu, A. Carfì, V. A. Ho, F. Mastrogiovanni, "A Comparative Study of Human Activity Recognition: Motion, Tactile, and multi-modal Approaches", *under review*, 2025 (preprint: https://arxiv.org/pdf/2505.08657).
- [R4] Quan K. Luu*, Pokuang Zhou*, Zhengtong Xu*, Zhiyuan Zhang, Qiang Qiu, Yu She, "ManiFeel: Benchmarking and Understanding Visuotactile Manipulation Policy Learning", *under review*, 2025 (preprint: https://www.arxiv.org/pdf/2505.18472).

Journal Articles

- [J1] N. H. Nguyen, N. M. D. Le, Quan K. Luu, T. T. Nguyen and V. A. Ho, Vi2TaP: A Cross-Polarization Based Mechanism for Perception Transition in Tactile-Proximity Sensing with Applications to Soft Grippers, IEEE Robotics and Automation Letters, vol. 10, no. 6, pp. 6288-6295, June 2025.
- [J2] H. T. Pham, Q. N. Pham, Quan K. Luu, G. Loianno and V. A. Ho, Collision Detection and Reaction for Quadrotors Using Encoder-Integrated Tombo Propellers, *IEEE Access*, vol. 13, pp. 90389-90401, 2025.
- [J3] Quan K. Luu, N. H. Nguyen and V. A. Ho, Simulation, Learning, and Application of Vision-Based Tactile Sensing at Large Scale, IEEE Transactions on Robotics, vol. 39, no. 3, pp. 2003-2019, June 2023.
- [J4] S. T. Bui, Quan K. Luu, D. Q. Nguyen, N. D. M. Le, G. Loianno and V. A. Ho, Tombo Propeller: Bioinspired Deformable Structure Toward Collision-Accommodated Control for Drones, IEEE Transactions on Robotics, vol. 39, no. 1, pp. 521-538, Feb. 2023.

Conference Papers

- [C1] Quan K. Luu, A. Albini, P. Maiolino and V. A. Ho, TacLink-Integrated Robot Arm toward Safe Human-Robot Interaction, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Abu Dhabi, United Arab Emirates, 2024.
- [C2] T. T. Nguyen, Quan K. Luu et al., ConTac: Continuum-Emulated Soft Skinned Arm with Visionbased Shape Sensing and Contact-aware Manipulation, Robotics: Science and Systems (RSS), Delft, Netherlands, 2024.
- [C3] Quan K. Luu, D. Q. Nguyen, N. H. Nguyen and V. A. Ho, Soft Robotic Link with Controllable Transparency for Vision-based Tactile and Proximity Sensing, *IEEE International Conference on Soft Robotics*, Singapore, Singapore, 2023.

- [C4] Y. Osawa, Quan K. Luu, L. V. Nguyen and V. A. Ho, Integration of Soft Tactile Sensing Skin with Controllable Thermal Display toward Pleasant Human-Robot Interaction, *IEEE/SICE International Symposium on System Integration* (SII), Ha Long, Vietnam, 2024.
- [C5] N. M. D. Le, T. T. Nguyen, Quan K. Luu et al., Integration of Web of Tactile Things for Soft Vision-Based Tactile Sensor Toward Immersive Human-Robot Interaction, IEEE/SICE International Symposium on System Integration (SII), Ha Long, Vietnam, 2024.
- [C6] Quan K. Luu, H. M. La and V. A. Ho, A 3-Dimensional Printing System Using an Industrial Robotic Arm, IEEE/SICE International Symposium on System Integration (SII), Iwaki, Fukushima, Japan, 2021, pp. 443-448.
- [C7] P. Van Nguyen, Quan K. Luu, Y. Takamura and V. A. Ho, Wet Adhesion of Micro-patterned Interfaces for Stable Grasping of Deformable Objects, *IEEE/RSJ International Conference on Intelli*gent Robots and Systems (IROS), Las Vegas, NV, USA, 2020.

Patents

- [P1] Van A. Ho, Quan K. Luu, N. H. Nguyen, Contact-Proximity Detection Device, and Contact-Proximity Detection Method, Japanese Patent Application No. 2022-118796.
- [P2] Van A. Ho, Quan K. Luu et al., Drone and drone control device, Japanese Patent Application No. 2021-147818.

Research and Project Experience

Japan Advanced Institute of Science and Technology | Soft Haptics Lab

Large-area Multimodal Soft Sensing Skin | Doctoral dissertation10/2021 - presentRole: Ph.D. StudentAdvisor: Dr. Ho Anh Van

- Designed a novel soft sensing skin with tactile-proximity sensing modalities, which relies on embedded cameras and a soft function skin capable of switching its optical properties.
- Developed a vision-based tactile sensing skin with integrated thermal display capability, which has no interference between the two modalities.
- Developed a simulation and learning platform for vision-based tactile sensing, which features a realistic simulation of the soft skin's physical properties.
- Showcased the use of the proposed sensing technology for multimodal/tactile-driven robot control.

Tangible Sensing Enabler for Tactile Internet | JST/PRESTO project12/2020 - 12/2024Role: Graduate Research AssistantAdvisor: Dr. Ho Anh Van

- Developed a standardized framework to exchange haptic information over the Internet, which is extended from a standardized WoT web technology.
- Proposed haptic vocabularies to generate the WoT Thing Description for vision-based tactile sensing devices.
- Implemented mechanisms to connect, update, and exchange tactile information efficiently with a proof of concept on a large-area vision-based tactile sensor.
- Project page: https://sites.google.com/view/iotouch/home

Drone Propellers Inspired by Dragonfly's Wing | JST/SCORE project04/2020 - 03/2022Role: Graduate Research AssistantAdvisor: Dr. Ho Anh Van

- Developed and implemented a recovery control strategy for a drone equipped with deformable propellers, enabling the drone to recover from mid-air collisions without crashing to the ground.
- Project page: https://sites.google.com/view/scoredeformablepropeller/home

3-D Printing on Complex Substrates using Robot Arm | Master's thesis10/2019 - 09/2021Role: Master StudentAdvisor: Dr. Ho Anh Van

- Studied motion planning and control for 3D printing on curved surfaces with a robot arm.
- Developed a platform, with hardware and software design for 3D printing based on a robot arm.

LLM-based Safety Control for Robotics

Role: Visiting Researcher

09/2023 – 12/2023

10/2017 - 07/2018

Advisor: Dr. Doan The Thao

Advisor: Dr. Yorie Nakahira

• Developed a framework for efficient learning of robot tasks with latent-risk awareness, which relies on LLMs, numerical optimization, and a physics-based simulator.

Ho Chi Minh City University of Technology

 $\label{eq:calibration} \begin{array}{l} \mbox{Calibration and Programming for Robot Arms} \mid \mbox{Bachelor's thesis} \\ \mbox{Role: Undergraduate Student} \end{array}$

• Skilled in simulating and operating industrial robots.

• Implemented vision-based localization systems.

Proposal Experience

JSPS DC2: Proximity-Tactile Soft Sensing Skin for Human-robot Interaction04/2024PI: Quan K. Luu[Funded, ¥1.5M (~ \$9.5K)]Japan Advanced Institute of Science and Technology

Professional Service

Reviewer for

- IEEE Transactions on Robotics (T-RO)
- IEEE Robotics and Automation Letters (RA-L)
- · Advanced Robotics (AR)
- The Robotics: Science and Systems (RSS) RSS Pioneers
- · IEEE International Conference on Robotics and Automation (ICRA)
- · IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE/SICE International Symposium on System Integration (SII)

Leadership

• Assistant of Organizing Committee, Workshop of Large-scale Robotic Skin: Perception, Interaction, and Control (2022 IEEE/RSJ IROS)

Teaching and Mentoring Experience

Minor Research Advisor

Japan Advanced Institute of Science and Technology

• Advised a Master's student on a research topic related to aerial vehicle simulation.

Teaching Assistant

Japan Advanced Institute of Science and Technology

Assisted lectures of an Analytical Mechanics course.

Professional Skills

- Languages: Vietnamese (Native), English (Advanced), Japanese (Intermediate)
- **Research Skills**: training and implementation of deep learning and machine learning models, image processing, computer vision, industrial robot arm programming and control with ROS, (soft) material/system modeling, mechanical prototyping including laser cutting and 3D printing
- Software and Computer Languages: ROS (Robot Operating System), Python, C/C++, MATLAB, SOFA Framework, Arduino IDE, SolidWorks, JavaScript, HTML, Node, LaTeX, Microsoft Office

04/2022 - 12/2022

10/2021 - 12/2021

References

Dr. Ho Anh Van

Associate Professor Japan Advanced Institute of Science and Technology (JAIST), Ishikawa, Japan Email: van-ho@jaist.ac.jp

Dr. Yu She

Assistant Professor Purdue University, West Lafayette, United States Email: shey@purdue.edu

Dr. Yorie Nakahira

Assistant Professor Carnegie Mellon University (CMU), Pittsburgh, United States Email: ynakahir@andrew.cmu.edu

Dr. Yukiko Osawa

Senior Assistant Professor Keio University, Yokohama, Japan Email: yukiko.osawa@appi.keio.ac.jp