

CURRICULUM VITAE

PERSONAL DETAILS

Full name: QUANG MINH TA (MINH Q. TA)

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BIOGRAPHICAL SKETCH

I am currently a Lecturer and a Postdoctoral Research Associate at the University of Illinois at Urbana-Champaign (UIUC), and will be an Assistant Professor in the ECE Department at the University of West Florida in August 2024. I completed a Doctor of Philosophy in Electrical and Electronic Engineering from Nanyang Technological University (NTU), Singapore with two doctoral research scholarships from NTU and the ASEAN University Network/Southeast Asia Engineering Education Development Network (AUN/SEED-Net) in 2018. My PhD thesis was to propose and develop robotic and automated techniques for manipulation of biological cells and micro-objects by originating micro-hands with laser-driven fingertips. After Ph.D. graduation, I have been working as a technical and research leader for three big projects:

- i. Human-Robot Collaboration: Interactive Manipulation for Industrial Robotics at *University of Illinois Urbana-Champaign (UIUC) USA* focusing on pose estimation, robotic picking and precise assembly of small components.
- ii. Towards Robotic Dexterous and Bimanual Manipulation in Micro-world at *Nanyang Technological University (NTU)* developing dexterous robotic manipulation techniques for objects with arbitrary types in the micro-world.
- iii. Device-free Passive Tracking and Fall Detection for Home-based Rehabilitation at *Rehabilitation Research Institute of Singapore (RRIS)* developing wireless sensor networks for home-based rehabilitative purposes.

While pursuing my PhD in the past at the School of Electrical and Electronic Engineering (EEE), NTU – which ranks 4th in the [QS World University ranking by subject 2022](#), and currently working as a Lecturer and a Postdoctoral Research Associate at the University of Illinois at Urbana-Champaign (UIUC), USA, I have great opportunities to work and collaborate with leading professionals and researchers in the field. I have published eleven top-tier journals, presented/published eighteen papers at international conferences, and co-authored a filed patent, two technology disclosures, two spotlight workshop presentations/papers, and a book chapter. I won the Best Student Paper Award from the 2017 IEEE International Conference on Real-time Computing and Robotics (RCAR) in Japan, a Best Control Paper Award Finalist at RCAR 2020, and a

Best Poster Award Finalist at IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2023. I have also contributed significantly to two research proposals, one of which was granted \$750,000.00 SGD. In terms of professional services, I was invited and served as session chair/co-chair and technical program committee member at many international conferences and am serving as a reviewer for many top-tier journals and flagship conferences in the field. I have also supervised/mentored more than 20 undergraduate/graduate students. Honorably, I have been included on the List of Teachers Ranked as Excellent by Their Students at the University of Illinois at Urbana-Champaign (UIUC), 2023.

EDUCATION

✚ August 2013 – January 2018: Doctor of Philosophy

School of Electrical and Electronic Engineering (EEE), Nanyang Technological University (NTU), Singapore.

Thesis title: Robotic Manipulation of Microscopic Objects using Multiple Laser-driven Fingertips

✚ October 2008 – June 2013: Bachelor of Engineering

Advanced Program, School of Electrical and Electronic Engineering (EEE), Hanoi University of Science and Technology (HUST), Vietnam.

Thesis title: Speed sensorless control of induction motor drives using MRAS technique.

Grade: 3.50/4.0 (9.0/10)

RESEARCH INTERESTS

- Robotic assembly of small components
- Object pose estimation
- Robotic simulation
- Robotic micro-manipulation
- Micro additive manufacturing
- Multi-agent systems
- Grasping
- Cooperative control and motion control
- Wireless sensor network
- Human-robot interaction
- Data-driven learning for robotic manipulation
- Image processing/analysis

PUBLICATIONS

Names underlined are undergraduate/graduate students who worked under my supervision for the publication.

✦ PEER-REVIEWED JOURNALS

1. Yangfei Dai, Hameed Abdul-Rashid, **Quang Minh Ta**, Timothy Bretl. “Enhancing Instance Segmentation for Sub-Centimeter Industrial Objects using Synthetic Data”. (in preparation)
2. Hameed Abdul-Rashid, Yangfei Dai, **Quang Minh Ta**, Timothy Bretl, “FIT-UIUC Dataset: constrained high mix low volume pose estimation of industrial components”. (in preparation)
3. **Quang Minh Ta**, Gulam Khan, Xiang Li, Chien Chern Cheah. (2023). “[Laser-actuated Multi-fingered Hand for Dexterous Manipulation of Micro-objects](#)”. *IEEE Access* (IF=3.367), vol. 11, pp. 29650-29660.
4. **Quang Minh Ta**, Chien Chern Cheah. (2021). “[Human-machine Interaction Control for Stochastic Cell Manipulation Systems](#)”. *Automatica* (IF=6.15), vol. 131, pp. 109721.
5. **Quang Minh Ta**, Chien Chern Cheah. (2021). “[Robotic Handling of Micro-objects using Stochastic Optically-actuated End-effector](#)”. *IEEE Robotics and Automation Letters* (IF=4.321), vol. 6, no. 2, pp. 2930-2937.
6. **Quang Minh Ta**, Chien Chern Cheah. (2020). “[Multi-agent Control for Stochastic Optical Manipulation Systems](#)”. *IEEE/ASME Transactions on Mechatronics* (IF=5.867), vol. 25, issue 4, pp. 1971-1979, Regular paper.
7. **Quang Minh Ta**, Chien Chern Cheah. (2020). “[Coordinated Optical Tweezing and Manipulation of Multiple Microscopic Objects with Stochastic Perturbations](#)”. *IEEE Robotics and Automation Letters* (IF=4.321), vol. 5, issue. 2, pp. 3169-3175.
8. **Quang Minh Ta**, Chien Chern Cheah. (2019). “[Stochastic Control for Orientation and Transportation of Microscopic Objects using Multiple Optically Driven Robotic Fingertips](#)”. *IEEE Transactions on Robotics* (IF=6.835), vol. 35, issue. 4, pp. 861-872, Regular paper.
9. **Quang Minh Ta**, Chien Chern Cheah. (2018). “[Cooperative and Mobile Manipulation of Multiple Microscopic Objects based on Micro-hands and Laser-Stage Control](#)”. *Automatica* (IF=6.15), vol. 98, pp. 201-214, Regular paper.
10. **Quang Minh Ta**, Chien Chern Cheah. (2018). “[Stochastic control for optical manipulation of multiple microscopic objects](#)”. *Automatica* (IF=6.15), vol. 89, pp. 52-64, Regular paper.

11. Chien Chern Cheah, **Quang Minh Ta**, Reza Haghghi. (2016). “[Grasping and manipulation of a micro-particle using multiple optical traps](#)”. *Automatica* (IF=6.15), vol. 68, pp. 216-227, Regular paper.
12. Xiao Yan, Chien Chern Cheah, **Quang Minh Ta**, Quang Cuong Pham. (2016). “[Stochastic dynamic trapping in robotic manipulation of micro-objects using optical tweezers](#)”. *IEEE Transactions on Robotics* (IF=6.835), vol. 32, issue.3, pp. 499-512, Regular paper.
13. Xiang Li, Chien Chern Cheah, **Quang Minh Ta**. (2016). “[Cooperative Optical Trapping and Manipulation of Multiple Cells with Robot Tweezers](#)”. *IEEE Transactions on Control Systems Technology* (IF=5.312), vol. 25, issue. 5, pp. 1564-1575, Regular paper.

PATENTS

1. Cheah Chien Chern, **Quang Minh Ta** (*Equal contributions*). [Laser-driven micro-fingers and method of micro-manipulation](#). International application number PCT/SG2021/050669. Published under the Patent Cooperation Treaty (PCT) with International Publication Number WO2022108519A1.

TECHNOLOGY DISCLOSURES

1. Chien Chern Cheah, **Quang Minh Ta** (*Equal contributions*). Multi-mode Control System for Optical Manipulation of Micro-objects, filed.
2. Chien Chern Cheah, [JiuYun Li](#), **Quang Minh Ta**. Adaptative Grasp Planning for Manipulation of Micro-Objects, filed.

BOOK CHAPTERS

1. Chien Chern Cheah, **Quang Minh Ta**. (2020). [Adaptive control](#). In: Ang M., Khatib O., Siciliano B. (eds) *Encyclopedia of Robotics*. Springer, Berlin, Heidelberg.

INTERNATIONAL PEER-REVIEWED CONFERENCE PAPERS AND PRESENTATIONS

1. Gulam Khan, **Quang Minh Ta** (*co-first author*), Chien Chern Cheah. “Human multi-agent interaction for optical manipulation of micro-objects”. *IEEE Conference on Decision and Control, CDC*, Singapore, 2023 (accepted for presentation).

2. **Quang Minh Ta**, Holly Dinkel, [Hameed Abdul-Rashid](#), [Yangfei Dai](#), Jessica Myers, Tan Chen, Junyi Geng, Timothy Bretl. “[The Impact of Time Step Frequency on the Realism of Robotic Manipulation Simulation for Objects of Different Scales](#)”. *Workshop on Robotics & AI in Future Factory, IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS, USA, 2023. (Best Poster Award Finalist)*
3. Tan Chen, Zhe Huang, James Motes, Junyi Geng, **Quang Minh Ta**, Holly Dinkel, Hameed Abdul-Rashid, Jessica Myers, Ye-Ji Mun, Wei-che Lin, Yuan-yung Huang, Sizhe Liu, Marco Morales, Nancy M Amato, Katherine Driggs-Campbell, Timothy Bretl. “[Insights from an Industrial Collaborative Assembly Project: Lessons in Research and Collaboration](#)”. Spotlight presentation at *Workshop on Collaborative Robots and the Work of the Future, IEEE International Conference on Robotics and Automation, ICRA, USA, 2022.*
4. **Quang Minh Ta**, Chien Chern Cheah. “[Robotic Handling of Micro-objects using Stochastic Optically-actuated End-effector](#)”. Presented at *IEEE International Conference on Robotics and Automation, ICRA, Xian, China, 2021.*
5. [Jiuyun Li](#), **Quang Minh Ta**, Chao Liu, Chien Chern Cheah. “[Human-assisted Grasping for Manipulation of Biological Cells](#)”. *The 47th Annual Conference of the IEEE Industrial Electronics Society, IECON, pp. 1-6, Toronto, Canada, 2021.*
6. **Quang Minh Ta**, Chien Chern Cheah. “[Caging and Transportation of Biological Cells using Optical Tweezers](#)”. *IEEE International Conference on Real-time Computing and Robotics, RCAR, pp. 363-368, Japan, 2020. (Best Paper in Control Award Finalist).*
7. **Quang Minh Ta**, Chien Chern Cheah. “[Multi-agent Control for Stochastic Optical Manipulation Systems](#)”. Presented at *IEEE/ASME International Conference on Advanced Intelligent Mechatronics, AIM, Boston, USA, 2020.*
8. **Quang Minh Ta**, Chien Chern Cheah. “[Autonomous Grasping using Flexible Micro-hands](#)”. *The 46th Annual Conference of the IEEE Industrial Electronics Society, IECON, pp. 112-117, Singapore, 2020.*
9. **Quang Minh Ta**, Chien Chern Cheah. “[A Shared Control Approach for Optical Cell Manipulation](#)”. *The 46th Annual Conference of the IEEE Industrial Electronics Society, IECON, pp. 59-64, Singapore, 2020.*
10. **Quang Minh Ta**, Huu-Thiet Nguyen, Chien Chern Cheah. “[Data-driven learning for approximation of nonlinear functions with stochastic perturbations](#)”. *IEEE International*

Conference on Industrial Engineering and Engineering Management, IEEM, pp. 794-798, Singapore, 2020.

11. **Quang Minh Ta**, Chien Chern Cheah. Coordinated Optical Tweezing and Manipulation of Multiple Microscopic Objects with Stochastic Perturbations. Presented at *IEEE International Conference on Robotics and Automation, ICRA*, Paris, France, 2020.
12. **Quang Minh Ta**, Chien Chern Cheah. Stochastic Control for Orientation and Transportation of Microscopic Objects using Multiple Optically Driven Robotic Fingertips. Presented at *IEEE International Conference on Robotics and Automation, ICRA*, Paris, France, 2020.
13. **Quang Minh Ta**, Shangke Lyu, Chien Chern Cheah. “[Human-guided optical manipulation of multiple microscopic objects](#)”. *IEEE International Conference on Robotics and Automation, ICRA*, pp. 1-5, Brisbane, Australia, 2018.
14. Oo Oo Khin, **Quang Minh Ta**, Chien Chern Cheah. “[Development of a wireless sensor network for human fall detection](#)”. *IEEE International Conference on Real-time Computing and Robotics, RCAR*, pp. 273-278, Japan, 2017.
15. **Quang Minh Ta**, Chien Chern Cheah. “[Human-guided micro-manipulation of biological cells using optical tweezers](#)”. *IEEE International Conference on Real-time Computing and Robotics, RCAR*, pp. 188-193, Japan, 2017. (Best Student Paper Award).
16. **Quang Minh Ta**, Chien Chern Cheah. “[Coordinative optical manipulation of multiple microscopic objects using micro-hands with multiple fingertips](#)”. *IEEE International Conference on Robotics and Automation, ICRA*, pp. 5870-5875, Singapore, 2017.
17. **Quang Minh Ta**, Chien Chern Cheah. “[Simultaneous orientation and positioning control of a microscopic object using robotic tweezers](#)”. *IEEE International Conference on Robotics and Automation, ICRA*, pp. 5864-5869, Singapore, 2017.
18. **Quang Minh Ta**, Chien Chern Cheah. “[Optical manipulation of multiple microscopic objects with Brownian perturbations](#)”. *IEEE International Conference on Robotics and Automation, ICRA*, pp. 3994-3999, Stockholm, Sweden, 2016.
19. Chien Chern Cheah, **Quang Minh Ta**, Reza Haghighi. “[Robotic manipulation of a biological cell using multiple optical traps](#)”. *IEEE International Conference on Robotics and Automation, ICRA*, pp. 803-808, Seattle, WA, USA, 2015.

✦ INVITED TALKS

1. University of Illinois at Urbana-Champaign, 2023.

EMPLOYMENT

- ✦ **August 2023 – On going:** Lecturer at the Department of Bioengineering, Grainger College of Engineering, University of Illinois at Urbana-Champaign (UIUC), USA. Courses taught:
 - BIOE484 - Statistical Analysis of Biomedical Images
 - BIOE485 - Computational Mathematics for Machine Learning and Imaging.
 - BIOE486 - Applied Deep Learning for Biomedical Imaging

- ✦ **January 2022 – On going:** Postdoctoral Research Associate at Coordinated Science Lab, University of Illinois at Urbana-Champaign (UIUC), USA.
 - Working with [Prof. Timothy Bretl](#) on pose estimation, vision-based picking, and precision assembly of small components. Also working on robot control/manipulation and simulation using ROS/ROS2.
 - Working with [Prof. Minh Do](#) on smart metrology and image processing/analysis.
 - Collaborating with [Prof. Nancy Amato](#) and [Prof. Katie Driggs-Campbell](#) on motion planning and human-robot interaction.
 - Supervising/mentoring six graduate students.

- ✦ **September 2018 – January 2022:** Research Fellow at Nanyang Technological University (NTU), Singapore.
 - Working with [Prof. Chien Chern Cheah](#) on robotics and automation at micro-scale, 3D micro-fabrication/printing.

- ✦ **September 2017 – September 2018:** Research Fellow at the Rehabilitation Research Institute of Singapore (RRIS), Singapore.
 - Working with [Prof. Chien Chern Cheah](#) on wireless sensor networks and data analytics.

- ✦ **August 2015 – January 2022:** Teaching Assistant at Nanyang Technological University (NTU), Singapore 639798.
 - Conducting lectures and lab experiments to undergraduate students.
 - Preparing exams for undergraduate courses.
 - Supervising/mentoring 18 graduate students and final year students in support of their research.

AWARDS, MERITS, AND HONOURS

- ✦ List of Teachers Ranked as Excellent by Their Students, University of Illinois at Urbana-Champaign (UIUC), 2023.
- ✦ Best Poster Award Finalist at the Workshop on Robotics & AI in Future Factory, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), USA, 2023.
- ✦ Best Paper in Control Award Finalist at the IEEE International Conference on Real-time Computing and Robotics, Japan, 2020.
- ✦ The annual performances for Research Staff were assessed to be “Far Exceeds Expectations” (the highest level) for two consecutive years 2019 & 2020.
- ✦ Awarded the Best Student Paper Award at the IEEE International Conference on Real-time Computing and Robotics, Japan, 2017.
- ✦ Certificate for completion of the University Teaching for Teaching Assistants from Nanyang Technological University (NTU), Singapore, 2015.
- ✦ Awarded Nanyang Engineering Doctoral Scholarship (NEDS) from Nanyang Technological University (NTU), 2013 – 2014.
- ✦ Awarded as a sole candidate from Hanoi University of Science and Technology (HUST) to be awarded a Full-time Scholarship for Doctoral Degree Program from ASEAN University Network / Southeast Asia Engineering Education Development Network (AUN/SEED-Net) to pursue a PhD Degree at Nanyang Technological University (NTU), Singapore, 2013 – 2017.
- ✦ Awarded a Full-time Doctoral Research Scholarship to pursue a PhD Degree in Electrical and Electronic Engineering from Nanyang Technological University (NTU), Singapore, 2013 – 2017.
- ✦ Placed at the first rank of the class of 17 students in the department of Automation and Control, Faculty of Electrical Engineering at Hanoi University of Science and Technology (HUST), 2008 – 2013.
- ✦ Awarded the Outstanding Student Award by Sumi Vietnam, Sumitomo Group, Japan, 2012.

PROFESSIONAL SERVICES

- ✦ **TPC Member**
 - IEEE International Conference on Industrial Engineering and Engineering Management, 2021, 2002, & 2023.

- IEEE International Conference on Control, Robotics and Informatics (ICCRI), 2022.

✚ **Conference Chair/Co-Chair**

- Chair of the session “*Control Applications P*”. The 46th Annual Conference of the IEEE Industrial Electronics Society (IES), 2020.
- Co-chair of the session “*Adaptive Control*”. The 46th Annual Conference of the IEEE Industrial Electronics Society (IES), 2020.
- Co-chair of the session “*Micro and nano manipulation*”. IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), USA, 2020.

✚ **Reviewer**

- Transactions/Journals: IEEE Transactions on Robotics, Automatica, IEEE Transactions on Systems, Man, and Cybernetics: Systems, IEEE Transactions on Human-machine Systems, Robotica, Micron, Advanced Science, Robotic and Automation Letters.
- International Conferences: ICRA 2023 & 2024, RSS 2022, IEEE IEEM 2021 & 2022, IEEE ICCRI 2022, IEEE ICRA 2019, 2020, & 2021, IEEE ICCA 2018 & 2020, and IEEE IROS 2017.

SUPERVISING/MENTORING EXPERIENCES

✚ **University of Illinois at Urbana-Champaign**

- 2022 - Present: Six graduate students.

✚ **Nanyang Technological University**

- 2015 - 2021: 18 graduate/undergraduate students.

REFEREES

✚ **Professor Timothy Bretl**

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✚ **Professor Nancy Amato**

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✦ **Associate Professor Hoang Thai Dinh**

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