

# LARISA YEN CHIN LOKE

+1(773) 564-0933 ♦ [larisaycl@u.northwestern.edu](mailto:larisaycl@u.northwestern.edu) ♦ [larisaycl.github.io](https://github.com/larisaycl) ♦ Chicago, IL

## EDUCATION

---

**PhD in Mechanical Engineering**, Northwestern University, Evanston, IL Sep 2020 - Present (Expected Jun 2026)

- **Expected Thesis Topic:** Human signal interpretation towards real-world deployment in assistive robotics
- **Research Areas:** Human-Robot Interaction, control interface signal interpretation, assistive robotics, machine learning
- **Relevant Courses:** Machine learning and artificial intelligence for robotics, Robotic manipulation, Engineering optimization for product design, Active learning for robotics, Embedded systems, Mechatronics
- **Awards:** Walter P. Murphy Fellowship (2020-2021)

**BEng in Mechanical Engineering**, Nanyang Technological University (NTU), Singapore Aug 2016 - Jul 2020

- Honours with Highest Distinction, Robotics and Mechatronics Specialization
- **Awards:** Nanyang Scholarship (2016-2020), CN Yang Scholars Programme (2016-2020), School of Mechanical and Aerospace Engineering Dean's List (2017, 2018)

## RESEARCH EXPERIENCE

---

**Graduate Researcher / PhD Candidate** Sep 2020 - Present

Northwestern University & Shirley Ryan AbilityLab, Chicago, IL

Supervisor: Dr Brenna D. Argall

- Designed, developed, and evaluated methods and algorithms for shared control and teleoperation assistance.
- Designed and conducted virtual and physical human-robot interaction experiments with motor-impaired populations to evaluate these algorithms. Analyzed the data and communicated the results in published papers.
- Led key aspects of human subjects studies, including applying for IRB approval, preparing study protocols and ensuring ethical compliance, de-identifying and securely managing participant data, as well as recruiting, scheduling, and communicating with research participants.
- Collaborated with lab members on various research projects and mentored junior PhD students, master's students, and undergraduates, providing guidance on their research and project development.
- **Mobility and independence through accelerated wheelchair intelligence**
  - Developed a ROS codebase to interface with a commercial powered wheelchair equipped with LUCI assistive drive technology. Codebase includes packages for handling human input control interfacing, shared control, command arbitration, sensor stream processing, odometry, and navigation using the ROS Nav Stack.
  - Developed a reactive assistance control scheme for local guidance around obstacles during wheelchair driving.
  - Designed a large scale user study to test the effectiveness of the reactive assistance control scheme in aiding wheelchair driving, to be conducted in the coming months.
- **Interface-aware assistance for 7-DoF robot arm teleoperation**
  - Developed an algorithm for providing user-customized task-agnostic assistance during high-DoF robot teleoperation (Kinova Jaco robotic arm) using a low-dimensional control interface (Sip/Puff device), based on user intent estimation using LSTMs and GRUs.
  - Implemented this algorithm on hardware in an end-to-end (data collection → model training → rollout of assistance) pipeline and evaluated in a preliminary human subjects case study with 3 participants.
  - Refined the initial algorithm and implementation to enhance practicality in task- and environment-agnostic applications, allowing for use in changing environments. Conducted a larger-scale human subjects experiment to evaluate the improved system's performance and usability. Manuscript currently under review.
- **Characterizing eye gaze for assistive device control**
  - Developed and evaluated a method for collecting reactionary and control eye gaze signals for individualized characterization of eye gaze interface use. ROS and Unity package available at [https://github.com/argallab/eyegaze\\_characterization\\_tasks](https://github.com/argallab/eyegaze_characterization_tasks).
  - Analyzed eye movement data and identified metrics to be used for customization of eye gaze interfaces, and differentiating between reactionary and intentional gaze signals.
  - Analyzed pupil diameter data and showed the feasibility of this data for mental workload estimation during concurrent use of the eyes for control.

## • Control interface remapping for bias-aware assistive teleoperation

- Developed and evaluated an algorithm for user-customized assistive device control using a joystick based on modelling individual end users' upper extremity physical bias profiles due to stroke or spinal cord injury.

### Visiting Student Researcher

Jun 2019 - Dec 2019

Robotics Institute, Carnegie Mellon University, Pittsburgh, PA

Supervisors: Dr John M. Dolan, Dr Christoph Mertz

- Trained and evaluated deep convolutional neural networks for offline detection and classification of rare traffic signs using Faster R-CNN and PyTorch.
- Produced synthetic training images by inserting prototype traffic signs onto real background scenes, and artificially inflated training datasets using image augmentation techniques.

### Undergraduate Researcher

Aug 2017 - Apr 2018

Nanyang Technological University (NTU), Singapore

Supervisor: Associate Professor Wei Tech Ang

- Worked towards developing a system for measuring lateral forces exerted by a patient during the wipe table task, an activity in task-oriented training for upper limb rehabilitation. Explored and tested various sensors for force measurement, and developed a preliminary design in SolidWorks for a force-measuring platform equipped with load cells.
- Re-engineered the Pro-Balance, an unstable balance board which serves as a balance assessment and training tool. Installed and tested a wireless tilt angle data collection system to provide real-time feedback for evaluation of balance ability.

## PUBLICATIONS

---

Larisa YC Loke, Demiana R. Barsoum, Todd D. Murphey, and Brenna D. Argall. "Characterizing Eye Gaze and Mental Workload for Assistive Device Control." *Wearable Technologies* 6, e(13). Cambridge University Press, 2025.

Mahdieh Nejati Javaremi, Larisa YC Loke, Brenna D. Argall. "Interface-Aware Assistance for 7-DoF Robot Arm Teleoperation: Case Studies on Feasibility." In 18th International Symposium on Experimental Robotics (ISER), 2023. (Journal extension under review)

Larisa YC Loke, Demiana R. Barsoum, Todd D. Murphey, and Brenna D. Argall. "Characterizing Eye Gaze for Assistive Device Control." In 2023 International Conference on Rehabilitation Robotics (ICORR), pp. 1-6. IEEE, 2023.

Andrew Thompson\*, Larisa YC Loke\*, and Brenna D. Argall. "Control Interface Remapping for Bias-aware Assistive Teleoperation." In 2022 International Conference on Rehabilitation Robotics (ICORR), pp. 1-6. IEEE, 2022. \**Equal contribution*.

## PRESENTATIONS

---

Larisa YC Loke, Joel Xin Jie Goh, Kyle Puckett, Nicole Zaino, Brenna D. Argall. "REACT + LUCI: Reactive Driver Assistance for Powered Wheelchairs." Late Breaking Abstract Poster to be presented at the 2025 International Conference on Rehabilitation Robotics (ICORR).

Andrew Thompson, Michele Lee, Larisa YC Loke, Brian Martinez, Mahdieh Nejati Javaremi, and Brenna D. Argall. "Identifying Accessibility Barriers to Robotics Research." Presented at Robotics: Science and Systems (RSS) 2023 Workshop — Lowering Barriers for Robotics Research.

## TEACHING EXPERIENCE

---

### Grader, Northwestern University

- Hosted lab sessions and office hours to assist students with code and hardware. Graded student assignments and final exams, and provided written feedback on reports. Gave lectures.
- Courses:
  - CS/ME 469 Machine Learning and Artificial Intelligence for Robotics Sep 2023 - Dec 2023
  - CS/ME 301 Introduction To Robotics Laboratory Jan 2022 - Mar 2022, Jan 2023 - Mar 2023
  - ME 449 Robotic Manipulation Sep 2021 - Dec 2021

## SKILLS

---

### Programming Languages

### Robotics & Software Development

### Tools

### Languages

Python, C++, Arduino, Matlab

Linux, Robot Operating System (ROS), PyTorch, Solidworks, Unity (2D, basic knowledge), Pyglet (2D), Point Cloud Library (PCL)

Git/GitHub, Docker, LaTeX, Microsoft Office, Qualtrics

English (Native), Mandarin Chinese (Proficient)