

Qixu Wang

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Education

San Diego State University & University of California San Diego <i>Ph.D. in Engineering Science (Mechanical Engineering) – GPA: 3.6/4.0</i>	San Diego, CA <i>Sep 2022 – Present</i>
Northeastern University <i>Master of Science in Mechanical Engineering – GPA: 3.7/4.0</i>	Boston, MA <i>Sep 2019 – May 2021</i>
Dalian University of Technology <i>Bachelor of Engineering in Process Equipment & Control Engineering – GPA: 3.0/4.0</i>	Liaoning, China <i>Sep 2015 – June 2019</i>
Columbia University <i>Summer Exchange Program</i>	New York, NY <i>July 2016 – Aug 2016</i>

Publications

- F. Ahuraka, P. Mcnamee, **Q. Wang**, Z. N. Ahmadabadi and J. Hudack, “Chaotic Motion Planning for Mobile Robots: Progress, Challenges, and Opportunities,” in *IEEE Access*, vol. 11, pp. 134917-134939, 2023, [\[DOI\]](#).
- Q. Wang**, P. Mcnamee, M. Krstic and Z. N. Ahmadabadi. “Lyapunov Constructions for System Interconnections Arising from Adaptation in Some Optimization Methods.” *Under review at IEEE Transactions on Automatic Control (TAC)*, Jan 2026.
- D. J. Kavanaugh*, P. Mcnamee*, **Q. Wang** and Z. N. Ahmadabadi. “Servos for Local Map Exploration Onboard Nonholonomic Vehicles for Extremum Seeking.” *Under revision for IEEE Transactions on Control Systems Technology*, Jan 2026.
- Q. Wang**, P. Mcnamee, M. Krstic and Z. N. Ahmadabadi. “Time-Varying Source Seeking for Unicycle Model Using Extremum Seeking Control.” *Ready to submit to IEEE Transactions on Automatic Control (TAC)*.
- Q. Wang**, M. Krstic and Z. N. Ahmadabadi. “Extremum Seeking Control with Logarithmic Barrier Functions for Source Seeking Applications.” *Ready to submit to IEEE CDC*.
- Q. Wang** and Y. Liu, “Optimal Design of the High Speed Blend Machine Control System,” *2021 4th World Conference on Mechanical Engineering and Intelligent Manufacturing (WCMEIM)*, Shanghai, 2021, pp. 511-515, [\[DOI\]](#).
- Q. Wang**, K. Zhang, K. Zhao and M. Liao, “Smart Seeing Eye Dog Wheeled Assistive Robotics,” *2021 3rd International Symposium on Robotics & Intelligent Manufacturing Technology (ISRIMT)*, Changzhou, 2021, pp. 104-108, [\[DOI\]](#).

Patents

- Q. Wang**, G. Li, C. Wang, C. Li. *A travel switch touch mechanism for scraper conveyors*. Chinese Invention Patent Application Publication, Publication No. CN109006500A, Dec. 2018.
- Q. Wang**, G. Li, C. Wang, C. Li. *A receiving hopper with a feeding wheel*. Chinese Utility Model, Patent No. CN208715969U, Apr. 2019.
- Q. Wang**, C. Wang, C. Bai, Y. Ye, C. Li. *A free-access feeder assembly*. Chinese Utility Model, Patent No. CN208159743U, Nov. 2018.

Academic Projects

- Lyapunov Constructions for System Interconnections Arising from Adaptation** *Jan 2025 – Feb 2026*
- Constructed novel Lyapunov functions to analyze and guarantee the stability of interconnected systems arising from adaptive gradient methods.
 - Proved global asymptotic stability (GAS) for adaptive gradient optimizers by modeling the dynamic interplay between parameter updates and derivative estimation.
 - Established robust analytical frameworks to certify algorithmic convergence, demonstrating advanced proficiency in nonlinear control theory and system stability.
- Time-Varying Source Seeking for Unicycle Model Using Extremum Seeking Control** *Jan 2024 – Present*
- Developed and analyzed a time-varying source-seeking control strategy for unicycle robots.
 - Conducted hardware testing with TurtleBot3 to validate theoretical models in dynamic environments.

- Designed and simulated experiments using ROS and DSIM lab to support theoretical analysis and benchmarking.

ESC with Logarithmic Barrier Functions for Source Seeking Applications

Jan 2025 – Present

- Developed a safe extremum seeking control (ESC) framework using Logarithmic Barrier Functions (LBF) to achieve real-time optimization while enforcing strict safety constraints without chattering.
- Conducted rigorous theoretical analysis using averaging theory and singular perturbation to prove semiglobal practical safety and stability within the equilibrium set.
- Demonstrated the algorithm's effectiveness in simultaneous performance optimization and safety assurance through numerical simulations and deployment on a nonholonomic unicycle robot.

Optimal Design of the High Speed Blend Machine Control System

Jan 2021 – Aug 2021

- Defined the domain and membership functions and established fuzzy control rules.
- Carried out fuzzy self-adaptive PID subroutine processing, and realized the control of the system speed.
- Identified different materials using the minimum mean error method and established a discriminant equation.

Smart Seeing Eye Dog Wheeled Assistive Robotics

Sep 2020 – Dec 2020

- Built a Seeing Eye Dog in the form of a cane and performed a stress analysis with SolidWorks.
- Designed a traffic light detection function based on CNN, and finished motion simulation using ROS.
- Designed human-machine interaction modules to help blind people make good decisions.

Internships

Siemens Ltd., China, Beijing, China

June 2020 – Dec 2020

- Took charge of introducing the product *Digital Twin* in English, and analyzed its features and advantages
- Visited the digital factory and learned the automated process from product customization to completion

Skills & Additional Information

Technical Skills: AutoCAD, PRO/E, ANSYS, MATLAB, SolidWorks, Python, CarSim, ROS, Vicon, LaTeX, Gazebo

Awards: Successful Participant, 2018 Interdisciplinary Contest in Modeling (ICM); Outstanding Graduation Thesis Award (2019)

Interests: Ping-Pong, Calligraphy, Basketball, Football, Swimming, Traveling