

Boyang Zhang

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EDUCATION	Ph.D., Civil and Environmental Engineering	Aug 2023 (expected)
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M.S., Electrical and Computer Engineering
Certificate in College Teaching
Certificate of Accomplishment in Teaching Writing in the Disciplines
Duke University, Durham, United States

- Dissertation topic: Synthesis of a novel nonlinear feedback control via constraints
- Advisor: [Henri P. Gavin, Ph.D](#)

M.Eng., Ocean and Naval Architectural Engineering Oct 2017

Memorial University (MUN), St. John's, Canada

- GPA: 4.0/4.0
- Thesis: Improving time-domain prediction of vortex-induced vibration for marine risers
- Advisor: Wei Qiu, Ph.D

B.Eng., Ocean and Naval Engineering July 2013

Tianjin University (TJU), Tianjin, China

RESEARCH **Research Assistant** June 2018 – Present

EXPERIENCE *Duke University, Durham, United States*

- Developed centralized and decentralized frameworks for the navigation and control of hundreds of double integrators based on extensions of Gauss's principle of least constraint (GPLC).
- Resolved the deadlocks naturally among double integrators by a constraint reformulation.
- Developed computationally simple, centralized and decentralized control methods for single/multiple nonholonomic wheeled mobile robots based on extensions of GPLC.
- Developed computationally simple, centralized and decentralized control methods for single/multiple nonlinear quadrotors based on generalizations of GPLC.
- Derived the input-output stability of nonlinear dynamical systems based on conic sectors.

Research Assistant June 2014 – June 2017

Memorial University, St. John's, Canada

- Improved a time-domain model to predict vortex-induced vibration (VIV).
- Re-developed an in-house finite-element program in Fortran for mooring line analysis.
- Designed a model test of two cylinders under VIV interaction at high Reynolds numbers.

Undergraduate Research Student Mar 2012 – June 2013

Tianjin University, Tianjin, China

- Analyzed extreme loading scenarios for an offshore jack-up platform in ANSYS.
- Assisted in coupling the hull heave-moonpool fluid motion for a SPAR platform.
- Conducted ship resistance/propulsion tests at Tianjin University Towing Tank.

JOURNAL
PUBLICATIONS

1. **Zhang, B.** and Gavin, H.P. Gauss's Principle with Inequality Constraints for Multi-agent Navigation and Control. *IEEE Transactions on Automatic Control*, vol. 67, no. 2, pp. 810-823, 2022, doi: [10.1109/TAC.2021.3059677](https://doi.org/10.1109/TAC.2021.3059677).

2. **Zhang, B.** and Gavin, H.P. Decentralized Control of Multiagent Navigation Systems. *IEEE/CAA Journal of Automatica Sinica (JAS)*, vol. 9, no. 5, pp. 922-925, 2022, doi: [10.1109/JAS.2022.105569](https://doi.org/10.1109/JAS.2022.105569).
3. **Zhang, B.** and Qiu, W. Improving Time-Domain Prediction of Vortex-Induced Vibration for Marine Risers. *Marine Systems & Ocean Technology*, vol. 13, no. 1, pp. 13-25, 2018, doi: [10.1007/s40868-017-0041-3](https://doi.org/10.1007/s40868-017-0041-3).

CONFERENCE
PUBLICATIONS

1. **Zhang, B.** and Gavin, H.P. Decentralized Unified Position-Attitude Control of Nonlinear UAVs. *Proceedings of the 61st IEEE Conference on Decision and Control (CDC)*, 2022, accepted.
2. **Zhang, B.** and Gavin, H.P. Unified Position-Attitude Control of A Nonlinear Quadrotor Swarm. *Proceedings of the 2022 American Control Conference (ACC)*, pp. 4030-4035, 2022, doi: [10.23919/ACC53348.2022.9867205](https://doi.org/10.23919/ACC53348.2022.9867205).
3. **Zhang, B.** and Gavin, H.P. Natural Deadlock Resolution for Multi-agent Multi-swarm Navigation. *Proceedings of the 60th IEEE Conference on Decision and Control (CDC)*, pp. 5958-5963, 2021, doi: [10.1109/CDC45484.2021.9683102](https://doi.org/10.1109/CDC45484.2021.9683102).
4. **Zhang, B.** and Gavin, H.P. Unified Position and Attitude Control of a Fully Nonlinear Quadrotor. *Proceedings of the 2021 American Control Conference (ACC)*, pp. 1064-1069, 2021, doi: [10.23919/ACC50511.2021.9483358](https://doi.org/10.23919/ACC50511.2021.9483358).

ACADEMIC

PRESENTATIONS

- 2022 American Control Conference, Atlanta, GA June 2021
- IEEE/CAA JAS Symposium Series 1 (virtual) Feb 2022
- 60th IEEE Conference on Decision and Control, Austin, TX Dec 2021
- Southeast Control Conference 2021, Blacksburg, VA Oct 2021
- 2021 American Control Conference, New Orleans, LA May 2021

TEACHING

AND

PROFESSIONAL

EXPERIENCE

Instructor of Robust Control (ME592)

Spring 2018

Duke University, Durham, United States

- Prepared lecture materials.
- Gave lectures to 7 students.

Teaching Assistant

Aug 2021 – Present

Duke University, Durham, United States

- Gave three tutorial labs to 51 students.
- Held office hours.
- Graded the assignments and lab reports.

Mechanics of Solids (EGR201L)

Fall 2021

Undergraduate course, 54 students, instructor Dr. David Schaad

Risk and Resilience in Engineering (CEE690.06)

Fall 2021

Graduate course, 15 students, instructor Dr. Mark Borsuk

Teaching Assistant

Jan 2014 – Dec 2015

Memorial University, St. John's, Canada

- Gave tutorial lectures and labs to 344 students.
- Generated the solutions to assignments and exams.
- Graded the assignments and lab reports.

Mechanical Vibrations (EN6933)

Fall 2014/2015

Undergraduate course, 106/105 students, instructor Dr. Geoff Rideout
Fluid Mechanics (EN4961) Spring 2015

Undergraduate course, 91 students, instructor Dr. Xili Duan
Dynamics and Maneuvering of Ocean Vehicles (EN7035) Spring 2014

Undergraduate course, 20 students, instructor Dr. Wei Qiu
Marine Propulsion (EN5020) Winter 2014

Undergraduate course, 22 students, instructor Dr. Wei Qiu
Technology Intern Jan 2015 – May 2015

American Bureau of Shipping, Houston, United States

- Researched the rules and regulations from seven classification societies: ABS, DNV-GL, LR, BV, NK, CCS, and KR.
- Upgraded the ABS notation comparison database with 371 modifications.

GRANTS,
AWARDS, AND
HONORS

Provincial/Conference Level:

- 2022 CDC Student Travel Award and Workshop Support (\$758) Sept 2022
61st IEEE Conference on Decision and Control (CDC)
- 2022 ACC Student Travel Grant (\$445) Apr 2022
2022 American Control Conference (ACC)
- Selected student oral presenter Oct 2021
Southeast Control Conference 2021
- 60th IEEE CDC Student Travel Support (\$125) Sept 2021
60th IEEE Conference on Decision and Control (CDC)
- 2021 ACC Student Registration Grant (\$100) Apr 2021
- Short-Term Innovative Research Grant (\$60,000) Sept 2019
U.S. Army Research Office
- Mitacs Accelerate Award (\$10,000) Jan 2015
Mitacs Canada
- NSERC CREATE Offshore Technology Research Fellowship (\$42,000) Sept 2013/14
Natural Sciences and Engineering Research Council of Canada (NSERC)
- Excellent Volunteer Sept 2012
World Economic Forum (Tianjin Summer Davos)
- Triple-A Student Mar 2009
Department of Education, Hebei Province, China

University Level:

- Preparing Future Faculty Fellowship July 2022
- Duke Graduate School Conference Travel Award (\$750) May 2022
- Summer Research Fellowship (\$12,561) Jan 2022
- Bass Instructional Fellowship (\$29,770) Dec 2021
- Selected Auburn Preparing Future Faculty Fellow (200 out of 800+) Sept 2021
- Senol Utku Award with Highest Distinction (1st place) (\$350) Apr 2021
- The only student participant & speaker at Duke Libraries fundraising event Apr 2019
- Fellow of the MUN School of Graduate Studies Nov 2017
- Duke Graduate School Fellowship (\$85,479) Aug 2017
- McGill Engineering Doctoral Award (\$96,000) Mar 2017
- MUN Outstanding Teaching Assistant Award Nominee May 2016
- MUN School of Graduate Studies Scholarship (\$2,000) Sept 2013/14
- TJU Excellent Student Leadership Scholarship Dec 2011/12
- TJU Advanced Student in Volunteer Service Dec 2011/12

CERTIFICATIONS	• Offshore Systems for Oil & Gas Production and Renewable Energy	Mar 2016
	<i>University of Maine, Orono, United States</i>	
	• Arctic/Subarctic Offshore Engineering	May 2015
	<i>American Society of Mechanical Engineers (ASME)</i>	
	• Fundamentals of Riser & Flexible Pipe Engineering	May 2015
	<i>American Society of Mechanical Engineers (ASME)</i>	
	• The Fundamentals of Project Management	May 2015
	<i>Memorial University, St. John's, Canada</i>	
	• Design and Analysis of Floating Platforms	Oct 2014
	<i>John Halkyard Associates, Houston, United States</i>	
LANGUAGES AND SKILLS	Computer:	
	• LaTeX, MATLAB, Fortran, Linux, SolidWorks, Gnuplot, AutoCAD, ANSYS	
	Language:	
	• Proficient in English and Chinese (Simplified and Traditional), basic in Spanish.	
REVIEWERSHIP	IEEE/CAA Journal of Automatica Sinica	
	IEEE Control Systems Letters	
	IEEE Conference on Decision and Control	
	American Control Conference	
PROFESSIONAL SOCIETIES	Student Member of IEEE	
	Student Member of IEEE Control Systems Society	
VOLUNTEER SERVICE	ASME International Conference on Ocean, Offshore and Arctic Engineering	June 2015
	The Fall Career Fairs at Memorial University	Sept 2013/2014
	Led a group of city volunteers for the World Economic Forum.	Sept 2012
	Mentored high school students on Mathematics and Physics.	Jan 2011