GUANRUI LI

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EDUCATION

Ph.D. candidate Electrical and Computer Engineering Aug.2019 - present
New York University, GPA: 3.93/4.00

M.S.E. Robotics Sept.2016 - May.2018
GRASP Lab, University of Pennsylvania, GPA: 4.00/4.00

B.E. Theoretical and Applied Mechanics Sept.2012 - June.2016
Sun Yat-sen University, GPA: 3.93/4.00

RELATED EXPERIENCE

Research Associate, AirLab, Field Robotics Center Dec.2018 - May.2019
Robotics Institute, Carnegie Mellon University, Pittsburgh, supervised by Sebastian Scherer

Graduate Research Assistant, ModLab, GRASP lab Aug.2018 - Dec.2018
Mechanical Engineering and Applied Mechanics, Univ. of Pennsylvania, Philadelphia, supervised by Mark Yim

Exchange Undergraduate Jan.2015 - May.2015
College of Engineering, University of Hong Kong

PUBLICATIONS

1. Vaibhav Viswanathan, Eric Dexheimer, **Guanrui Li**, Giuseppe Loianno, Michael Kaess, and Sebastian Scherer, "Efficient Trajectory Library Filtering for Quadrotor Flight in Unknown Environments", ***proceedings of the 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2020**
2. Christoph Bohm, **Guanrui Li**, Giuseppe Loianno, and Stephan Weiss, "Observabilty-Aware Trajectories for Geometric and Inertial Self-Calibration", ***Power-On-and-Go Robots: Out-of-the-Box Systems for Real-World Applications Workshop, Robotics: Science and Systems (RSS) Conference*, 2020**
3. Bruno Gabrich, **Guanrui Li** and Mark Yim, "ModQuad-DoF: A Novel Yaw Actuation for Modular Quadrotors", ***proceedings of the 2020 IEEE International Conference on Robotics and Automation (ICRA)*, 2020**
4. **Guanrui Li**, Bruno Gabrich, David Saldaña, Jnaneshwar Das ,Vijay Kumar and Mark Yim, "ModQuad-Vi: A Vision-Based Self-Assembling Modular Quadrotor", ***proceedings of the 2019 IEEE International Conference on Robotics and Automation (ICRA)*, 2019**
5. David Saldaña, Bruno Gabrich, **Guanrui Li**, Mark Yim, and Vijay Kumar, "ModQuad: The Flying Modular Structure that Self-Assembles in Midair", ***proceedings of the 2018 IEEE International Conference on Robotics and Automation (ICRA)*, 2018**

RESEARCH

Efficient Trajectory Library Filtering in Unknown Environments July 2017 - Sept 2018
Supervisor: Dr. Sebastian Scherer

· Developed ROS benchmark package examining the performance of planning algorithm.
· Implemented trajectory library, including minimum snap trajectory, constant velocity trajectory.

Vision-Based Self-Assembling Modular Quadrotor(ModQuad-Vi) July 2017 - Sept 2018
Supervisor: Prof.Vijay Kumar and Prof.Mark Yim

· Designed a customized quadrotor platform with a mvBlueFOX-MLC200wG camera and Odroid XU4 computer.
· Developed and implemented geometric control for cooperatively flying structure, validated with experiments.

· Developed visual servo method for docking between modules, validated with successful docking experiments.

Design, Dynamics and Control of Modular Quadrotors(ModQuad) Aug.2016 - Sept.2017
Supervisor: Prof.Vijay Kumar and Prof.Mark Yim

· Designed and manufactured over 30 carbon fiber modular frames for the modular quadrotor robots.
· Designed a series of assembling methods and MDF jigs for the accurate manufacture of modular frames.
· Participated in developing the dynamics and control of cooperative flying of the flying structure and experiments.

Variable Topology Truss(VTT) Aug.2016 - Sept.2017
Supervisor: Prof.Mark Yim

· Built Kinematic simulation of rolling locomotion of octahedron truss robot in MATLAB.
· Used A* algorithm to generate the shortest path for the rolling locomotion on the ground.

AWARDS AND HONORS

Dean's Scholarship, NYU Aug. 2019
Honors Graduates (Top 1%), SYSU May.2016
Outstanding Undergraduate Thesis paper, SYSU May.2016
High dimensional model and nonlinear dynamical analysis of wind turbine blades under complex excitation
Fung's Scholarship, SYSU 2015
Meritorious Winner in The Mathematical Contest in Modeling (MCM), US May.2014
Why not change the lane: a mathematical model analyzing and simulating dynamic traffic under different rules
China National Scholarship (Top 1%), SYSU 2014
1st Prize Outstanding Student Scholarship (Top 5%), SYSU 2014
China National Scholarship (Top 1%), SYSU 2013
1st Prize Outstanding Student Scholarship (Top 5%), SYSU 2013

TEACHING EXPERIENCE

Guest Lecturer, Foundations of Robotics Aug.2019 - present
ROB 6003, Tandon School of Engineering, New York University

· 60 graduate students, Instructor: Prof. Giuseppe Loianno.
· Gave 1-2 lectures on dynamic model of a manipulator, using Lagrange approach and Newton-Euler approach.

Teaching Assistant, Design of Mechatronic Systems Aug.2017 - Dec.2017
MEAM 510, School of Engineering and Applied Science, University of Pennsylvania

· 86 graduate/undergraduate students, Instructor: Prof. Mark Yim and Dr. Paul Stegall.
· Held regular office hour and answered students questions on basic electronics and microprocessor.
· Modified a radio-controlled toy excavator to a WiFi-controlled robot for final project prototyping.
· Coached a 16-student team to win the first robot MOBA competition in the course.

Graduate Teaching Assistant, Robotics: Dynamics and control July.2017 - Sept.2017
edX learning platform, University of Pennsylvania

· Over 5,000 students, Instructor: Prof. Ani Heish and Prof. Vijay Kumar.
· Moderated discussion forums and answered students questions on the lab assignments.
· Checked and fixed the course slides on linear and nonlinear control.

LEADERSHIP

President of Tennis Association of East Campus Sept.2013 - Sept.2014
Sun Yat-sen University

· Coordinated 4 departments in the association to hold annual campus-wide tennis championship contest, cross-three-campus tennis association friendlies, weekly tennis coaching for over 100 students.

SKILLS AND INTERESTS

Program Language	C, C++, Python, Fortran, LaTeX, MATLAB
Research Interests	Multi-Robot Systems, Autonomous UAV, Dynamics and Control, Design of Mechanical and Mechatronic System
Software and Platforms	ROS, Linux, Solidworks, AutoCAD, Ansys