

Zhichao Liu

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EDUCATION

University of California, Riverside, Riverside, California, USA

Sep 2018 – Present

- Ph.D. in Electrical Engineering,
 - Adviser: Dr. Konstantinos Karydis
 - Cumulative GPA: 3.95 / 4.0
 - Focus: Legged Robots, Soft Robotics, UAV Collision Detection and Recovery, Robot-Environment Interactions

University of Pennsylvania, Philadelphia, Pennsylvania, USA

Aug 2016 – May 2018

- M.S.E in Systems Engineering
 - Cumulative GPA: 3.95 / 4.0

Beijing University of Posts and Telecommunications, Beijing, China

Sep 2010 – Jun 2014

- B.E. in Measuring and Controlling Technologies and Instruments
 - Cumulative GPA: 90 / 100, Rank: 3 / 54

PUBLICATIONS

JOURNAL ARTICLES

- (1) E. Kokkoni, Z. Liu, and K. Karydis, “Development of a Soft Robotic Wearable Device to Assist Infant Reaching,” in *The ASME Journal of Engineering and Science in Medical Diagnostics and Therapy*, 2020, vol. 3, pp. 021109-1–9 [\[DOI\]](#)

CONFERENCE PROCEEDINGS

- (1) Z. Liu and K. Karydis, “Position Control and Variable-Height Trajectory Tracking of a Soft Pneumatic Legged Robot,” in *IEEE/RSJ International Conference on Intelligent Robots and Systems [IROS]*, 2021 (Under review)
- (2) Z. Lu, Z. Liu, and K. Karydis, “Deformation Recovery Control and Post-impact Trajectory Replanning for Collision-resilient Mobile Robots,” in *IEEE/RSJ International Conference on Intelligent Robots and Systems [IROS]*, 2021 (Under review)
- (3) Z. Liu and K. Karydis, “Toward Impact-resilient Quadrotor Design, Collision Characterization and Recovery Control to Sustain Flight after Collisions,” in *IEEE International Conference on Robotics and Automation [ICRA]*, 2021 (In press)
- (4) Z. Lu, Z. Liu, G. Correa and K. Karydis, “Motion Planning for Collision-resilient Mobile Robots in Obstacle-cluttered Unknown Environments with Risk Reward Trade-offs,” in *IEEE/RSJ International Conference on Intelligent Robots and Systems [IROS]*, 2020, pp. 7064-7070 [\[DOI\]](#)
- (5) Z. Liu, Z. Lu and K. Karydis, “SoRX: A Soft Pneumatic Hexapedal Robot to Traverse Rough, Steep, and Unstable Terrain,” in *IEEE International Conference on Robotics and Automation [ICRA]*, 2020, pp. 420-426 [\[DOI\]](#)

PROJECTS

Design and Control for an Actively Collision-resilient Quadrotor

Jan 2020 – Jun 2020

- Designed and built a quadrotor based on off-the-shelf components and custom 3D-printed parts.
- Implemented nonlinear geometric controller based on PX4 flight control in ROS using C++.
- Proposed a collision detection and characterization method based on Hall sensors and a recovery control method that generates and tracks a smooth trajectory after colliding.
- Investigated experimentally the robot’s collision-resilient capabilities on collisions with walls, poles, and unstructured surfaces, as well as passive collisions (i.e. being hit).

Design and Control for a Soft Pneumatic Hexapedal Robot

Apr 2019 – Sep 2019

- Designed and fabricated a novel soft pneumatic actuator and a novel six-legged soft robot.
- Designed and tested gait patterns in simulations with finite element analysis and physical experiments.
- Designed and implemented an air source control unit with four pressurization/depressurization channels.
- Investigated experimentally the robot’s locomotion over rough, steep and unstable terrain.

AWARDS & SCHOLARSHIPS

- UCR Dean’s Distinguished Fellowship

2018

- China National Undergraduate Electronic Design Contest (First Prize, Beijing) 2013
- China National Undergraduate Intelligent Car Racing (Second Prize) 2013
- **China National Scholarship (Top %1)** 2011

SKILLS

ROS, C++, Python, MATLAB, EAGLE PCB, SolidWorks, Fusion 360.