

TIANYU WANG

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Address: 5000 Forbes Avenue, Pittsburgh, PA 15232

EDUCATION

Carnegie Mellon University (CMU), Pittsburgh, PA

2018 - Present

- Master of Science in Mechanical Engineering
- Advisor: Prof. Howie Choset

GPA: 4.0/4.0

Shanghai Jiao Tong University (SJTU), Shanghai, China

2014 - 2018

- Bachelor of Science in Electrical and Computer Engineering

GPA: 3.61/4.0

RESEARCH INTERESTS

Multiple topics in robotics: dynamic locomotion, motion planning, classical control, practical optimal control, modern reinforcement learning, etc.

PUBLICATIONS

Journal/Conference Papers

- [4] **T. Wang**, J. Whitman, M. Travers, and H. Choset. Directional compliance in obstacle-aided navigation for snake robots. *American Control Conference*, 2020. (accepted)
- [3] **T. Wang***, L. Ge*, and G. Gu. Programmable design of soft pneu-net actuators with oblique chambers can generate coupled bending and twisting motions. *Sensors and Actuators A: Physical*, 2018. (*equal contribution)
- [2] L. Ge*, **T. Wang***, N. Zhang, and G. Gu. Fabrication of soft pneumatic network actuators with oblique chambers. *Journal of Visualized Experiments*, 2018.
- [1] S. Wei, **T. Wang**, and G. Gu. Design of a soft pneumatic robotic gripper based on fiber-reinforced actuator. *Chinese Journal of Mechanical Engineering*, 2017.

Abstracts/Patents

- [4] **T. Wang**, J. Whitman, M. Travers, and H. Choset. Directional compliance in snake robot obstacle-aided locomotion. *Bulletin of the American Physical Society*, 2020.
- [3] K. Diaz, B. Chong, **T. Wang**, K. Bates, J. Ding, G. Sartoretti, H. Lu, H. Choset, D. Goldman. Steering and turning control of C. elegans. *Bulletin of the American Physical Society*, 2020.
- [2] K. Diaz, **T. Wang**, B. Chong, J. Ding, H. Lu, G. Sartoretti, H. Choset, D. Goldman. Steering behaviors of C. elegans locomotion in heterogeneous environments. *SICB Annual Meeting*, 2020.
- [1] G. Gu, L. Dong, **T. Wang**, and X. Zhu, Force feedback apparatus in bottom-up DLP 3D printers for soft materials. *China Patent, CN108081596A*, 2017.

RESEARCH EXPERIENCE AND SELECTED PROJECTS

Biorobotics Lab, CMU

Graduate Research Assistant

Sep 2018 - Present

Advisor: Prof. Howie Choset

Directional Compliance in Snake Robot Obstacle-Aided Navigation

- Developed a reactive control strategy that enables the robot to exploit unmodelled terrain irregularities for necessary propulsion
- Developed an estimator to infer the presence of the obstacles using proprioceptive joint torque information

- Developed a controller to dynamically select the robot's locomotion mode for consistent locomotion in obstacle-rich environments

Snake Robot 3D Compliant Shape Control and Motion Planning

- Developed a method that cancels unexpected torsion caused by the non-commutativity property when coupling pitch and yaw curvatures to form a three-dimensional curve
- Developed tools that optimize the robot configuration to reproduce the desired curve in three-dimensional space, for snake robots to conform to and exploit three-dimensional obstacle features in environments

Biologically Inspired Snake Robot Turn-in-Place Control (with CRAB Lab at GaTech)

- Developed a novel turning strategy for snake robots inspired by the “omega-shape” turning motion of *C. elegans*
- Investigated contributions of different key parameters in the controller to the robot turning motion
- Tested performances of different turning strategies on the snake robot and compared with simulation results

Soft Robotics and Biodesign Lab, SJTU

Undergraduate Research Assistant

Oct 2016 - Aug 2018

Advisor: Prof. Guoying Gu

Programmable Soft Pneumatic Actuator

- Designed a novel structure of multi-chamber soft pneumatic actuator for coupled 3D bending-twisting motion
- Developed a programmable design method of modular soft pneumatic actuator that allows users to design single actuators for simple motion and assemble actuators up to achieve desired dexterous motion

Autonomous Robot Lab, SJTU

Undergraduate Research Assistant

Mar 2016 - Sep 2016

Advisor: Prof. Jingchuan Wang

TEACHING EXPERIENCE

SJTU VM467 Introduction to Robotics

Teaching Assistant

Spring 2018

Instructor: Prof. Yu Zheng

SJTU VE216 Signal and System

Teaching Assistant

Spring 2017

Instructor: Prof. Mohamed Atef

AWARDS AND HONORS

- China National Scholarship 2018
- SJTU Academic Excellence Scholarship 2015, 2016, 2017
- Silver Medal in Advanced Vision Challenge, RoboCup China Open 2016
- Covidien Fellowship 2014

MEDIA

These Search and Rescue Robots Could Save Your Life (by *freethink*)

November 12, 2019

SKILLS

Programming

Simulator/Physics Engine

OS

Mechanical

Electronics

C++, C, Python, Matlab, Assembly language for micro-controllers

Simulink, MuJoCo, PyBullet

Linux, ROS

Solidworks, AutoCAD, UG, Catia

STM32, Arduino, FPGA, PLC

Last updated on Jan 18, 2020