Ryan Zeyuan Chen

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https://ryan-zeyuan-chen.github.io/ | Toronto, ON, Canada

Education

Toronto, ON, Canada
Sep 2017 – Apr 2022

B.A.Sc in Engineering Science, University of Toronto
Robotics Engineering Major, Artificial Intelligence Engineering Minor, Engineering Business Certificate

Research Experience

Toronto, ON, Canada
May 2021 – Ongoing

Robotics Institute, University of Toronto | Research Assistant
Supervised by Prof. Jessica Burgner-Kahrs, Continuum Robotics Laboratory

- Investigating the approach to solve the forward and inverse kinematics of concentric tube continuum robots (CTCRs) utilizing machine learning, specifically artificial neural networks.

Toronto, ON, Canada
May 2019 – Apr 2020

Robotics Institute, University of Toronto | Research Assistant
Supervised by Prof. Xinyu Liu, Microfluidics and BioMEMS Laboratory

- Development of an antifreezing, ambient-stable and highly stretchable ionic skin with strong surface adhesion for wearable sensing and soft robotics.
- Evaluated existing designs of hydrogel-based ionic skins through literature review.
- Fabricated the ionic skin including elastomer synthesis, material doping, and stretchable device integration.
- Tested the mechanical, electrical, antifreezing and surface adhesion properties of the ionic skin under different working conditions.
- Demonstrated the functionality of the hydrogel-based ionic skin utilizing its piezoresistive property as the input signal to independently control the fingers of a robotic hand via Arudino.
- Published the experimental procedures and results in the *Advanced Functional Materials* journal [3].

Toronto, ON, Canada
May 2018 – Aug 2018

Department of Civil Engineering, University of Toronto | Research Assistant
Supervised by Prof. Evan Bentz and Prof. Michael Collins, Structural Testing Laboratory

- Experimental investigation of reinforced concrete members subjected to combined shear and torsion.
- Testing of Ultra High-Performance Fiber Reinforced Concrete shells under pure shear.
- Assisted in modelling the response of reinforced concrete structures using nonlinear finite element analysis software.

Industry Experience

San Jose, CA, USA
Jun 2020 – May 2021

Wired and Wireless Group, Xilinx | SerDes Application Design Intern (Remote)
FPGA software development, SerDes System Engineering Team

- Development of SDK test cases across different test suites to validate the functionality of APIs designed for the Kintex UltraScale+ FPGA using C++.
- Verification of developed software test cases on both virtual machines and physical hardware prototypes constructed by the hardware team.
- Validation of developed software test cases under various network communication protocols utilizing different network testing devices.
- Regression testing of developed software test cases in response to hardware upgrades to ensure performance consistency.

Publications

2022
1. **Chen, R. Z.**, Grassmann, R. M., Liang, N. & Burgner-Kahrs, J. Learning-Based Differential Inverse Kinematics for Concentric Tube Continuum Robots. *To be submitted* (2022).

2021
2. Grassmann, R. M., **Chen, R. Z.**, Liang, N. & Burgner-Kahrs, J. Shape Representation is All You Need: Learning the Kinematics of Concentric Tube Continuum Robots. *To be submitted* (2021).
3. Ying, B., **Chen, R. Z.**, Zuo, R., Li, J. & Liu, X. An Anti-freezing, Ambient-Stable and Highly Stretchable Ionic Skin with Strong Surface Adhesion for Wearable Sensing and Soft Robotics. *Advanced Functional Materials,* 2104665 (2021).

Honors and Awards

2019 **Undergraduate Summer Research Award**, Natural Sciences and Engineering Research Council of Canada (NSERC)
The Undergraduate Student Research Awards (USRA) are meant to nurture the interest and fully develop the potential for a research career in the natural sciences and engineering. Awards are granted on the basis of academic record and research aptitude.

2017 **Albert and Rose Jong Entrance Scholarship**, University of Toronto
Awarded to a student entering the first year of either Electrical Engineering or Engineering Science who demonstrates leadership in the Chinese-Canadian community.

2017 **Faculty of Applied Science and Engineering Admission Scholarship**, University of Toronto
Awarded to students entering the first year of any Engineering program based on outstanding academic achievement in the prerequisite courses.

2017 **Halton Newcomer Recognition Award**, Halton Newcomer Strategy
Honoured by the Halton Newcomer Strategy Steering Committee to residents who have had a positive impact on the community through their commitment to business, education, youth and volunteering.

Technical Skills

Robotics: ROS, Simulink, Kinematics and Dynamics, Control Theory, Human-Robot Interaction, Machine Learning
Software Development: Python, C, C++, MATLAB, PyTorch, CMake, Git, GitHub, HTML
Hardware Development: Verilog, ModelSim, Assembly Language, ARM Architecture
Electrical Engineering: SPICE, Analog Circuit Design