Chengnan Shentu

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Research interests

I aim to develop robotic systems that integrate physical intelligence and sensorimotor intelligence to perform complex, contact-rich tasks in unstructured environments. As a roboticist, I focus on tendon-driven continuum robots – soft elastic robots that offer unique capabilities for navigating confined spaces. My work spans model-based design, sensing, and control.

Education

2022 – Present	**University of Toronto** Ph.D. in Computer Science Supervisor: Jessica Burgner-Kahrs. Committee: Florian Shkurti, Eitan Grinspun
2017 – 2022	**University of Toronto** B.A.Sc. in Engineering Science (with Honours)

Honors and scholarships

2017 – 2022	Dean's Honour List (UofT, Institutional)
2019	Engineering Science Research Opportunity Program Fellowship (UofT, Institutional)

Publications

2025	**Automating Tension Calibration for Tendon-Driven Continuum Robots: A Low-Cost Approach Towards Consistent Teleoperation** Kyum Lee, Chengnan Shentu, Chloe Pogue, Jessica Burgner-Kahrs. *ICRA 2025.*
2024	**A Non-Linear Model Predictive Task-Space Controller Satisfying Shape Constraints for Tendon-Driven Continuum Robots** Maximilian Hachen, Chengnan Shentu, Sven Lilge, Jessica Burgner-Kahrs. *RA-L.*
2024	**Universal-jointed Tendon-driven Continuum Robot: Design, Kinematic Modeling, and Locomotion in Narrow Tubes** Chengnan Shentu, Jessica Burgner-Kahrs. *Extended Abstract, ICRA@40.*

2024	**Open Continuum Robotics – One Actuation Module to Create Them All**
	Reinhard Grassmann, Chengnan Shentu, Taqi Hamoda, Puspita Dewi, Jessica Burgner-Kahrs.
	Frontiers in Robotics and AI.
2023	**MoSS: Monocular shape sensing for continuum robots**
	Chengnan Shentu*, Enxu Li*, Chaojun Chen, Puspita T Dewi, David B Lindell, Jessica Burgner-Kahrs.
	RA-L.

Research experience

July 2021 – Present	**Robotics Researcher, Continuum Robotics Lab**
	Supervised by Prof. Jessica Burgner-Kahrs, University of Toronto.
	Model-based design and control of tendon-driven continuum robots. Extensive experience in prototyping, embedded systems programming and vision-based 3D shape sensing.
May 2021 – Sept 2021	**Undergraduate Research Assistant, Pervasive HCI Lab**
	Supervised by Prof. Xin Yi, Tsinghua University.
	Investigate the risk of side channel attack on head mounted consumer devices, such as VR headsets and smart-glasses, through inertial measurement unit.
May 2019 – Aug 2019	**Undergraduate Research Assistant, Vehicle Simulation Group**
	Supervised by Prof. Peter Grant, University of Toronto.
	Mixed parameter estimation of a full stall aircraft model for improved pilot training.

Invited Talks

Feb 2025	Beyond Rigid Robots: Continuum Robotics and Their Challenges
	Guest Lecture for CSC148 Introduction to Computer Science, UofT
Oct 2023	Physics- vs. Learning-based Approaches for Continuum Robots
	Workshop on Data vs Model in Medical Robotics, IROS 2023

Teaching

Fall 2023, Fall 2024	**Teaching assistant, CSC376: Fundamentals of Robotics (UofT)**
	Hold tutorials, lab sessions, and office hours.