

XIAOJIAO CHEN

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EDUCATION

The University of Hong Kong, Hong Kong Ph.D. in Mechanical Engineering	<i>October 2015 - September 2019</i>
The University of Hong Kong, Hong Kong M.S. in Mechanical Engineering	<i>September 2014 - August 2015</i>
Huazhong University of Science and Technology, China B.S. in Mechanical Engineering	<i>September 2008 - June 2012</i>

RESEARCH INTERESTS

Soft Pneumatic Actuator; Soft Manipulator; Variable Stiffness; Human-Robot Interaction

RESEARCH EXPERIENCE

The University of Hong Kong <i>Graduate Researcher</i>	October 2015 - September 2019 <i>Hong Kong</i>
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- Designed and built a 6-DoF robotic arm with antagonistic bellows and tendon-sheath mechanism.
- Designed and built a 4-DoF robotic arm based on novel modular hybrid robotic joints using cable-pulley mechanisms, realizing simultaneous position tracking and variable stiffness.
- Controlled a 3D-printed soft origamic rotary joint, achieving controllable collision behaviors by adjusting passive and active stiffness.
- Designed and built an extensible soft continuum arm capable of bending, rotation and elongation; derived a novel model relating the pressure and the posture, realizing position prediction and external load sensation.
- Controlled a 26-chambered soft anthropomorphic robotic hand intuitively with motion capture devices, realizing real-time teleoperation on gesture-mimicking, grasping and in-hand manipulation tasks.
- Systematically studied the pressure control performance of various soft pneumatic robots under different control scenarios, including large and small chambers, proportional and solenoid valves, long and short tubes, pressure and mass feedback, advanced sliding mode and simple PID control algorithms.
- Developed a scalable high-performance embedded control platform "PneuDrive" for general soft pneumatic robotics. The platform combines user-friendly interface with advanced features, including high-frequency control loop, real-time communications and hardware-accelerated algorithms for multi-channelled soft pneumatic robots. "PneuDrive" has been open-sourced online.

The University of Hong Kong <i>Graduate Researcher</i>	September 2014 - August 2015 <i>Hong Kong</i>
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- Controlled the balancing and walking of the Atlas humanoid robot in simulation, including deriving the analytical inverse kinematics, maintaining landing balance, and accomplishing primitive walking.

Huazhong University of Science and Technology <i>Undergraduate Researcher</i>	September 2008 - June 2012 <i>China</i>
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- Developed a monitoring GUI for machine tools on an ARM-Linux platform using Qt.
- Developed a people number monitoring system for the school study rooms.
- Participated in the school line-following car competition, in charge of mechanical design and PID tuning.

PUBLICATIONS

Journals:

1. **Xiaojiao Chen**, Yaoxin Guo, Dehao Duanmu, Jianshu Zhou, Wei Zhang and Zheng Wang, "Design and Modeling of an Extensible Soft Robotic Arm," in *IEEE Robotics and Automation Letters*, vol. PP, no. c, pp. 1–1, 2019.
2. **Xiaojiao Chen**, Juan Yi, Jing Li, Jianshu Zhou and Zheng Wang, "Soft-Actuator-Based Robotic Joint for Safe and Forceful Interaction With Controllable Impact Response," in *IEEE Robotics and Automation Letters*, vol. 3, no. 4, pp. 3505–3512, Oct. 2018.
3. Juan Yi, **Xiaojiao Chen**(Co-first author), Chaoyang Song, Jianshu Zhou, Yujia Liu, Sicong Liu, Zheng Wang, "Customizable Three-Dimensional-Printed Origami Soft Robotic Joint With Effective Behavior Shaping for Safe Interactions," in *IEEE Transactions on Robotics*, vol. 35, no. 1, pp. 114–123, Feb. 2019.
4. Juan Yi, **Xiaojiao Chen**, Chaoyang Song and Zheng Wang. "Fiber-Reinforced Origamic Robotic Actuator," in *Soft Robotics*, vol. 5, no. 1, pp. 81–92, Feb. 2017.
5. Juan Yi, **Xiaojiao Chen** and Zheng Wang, "A Three-Dimensional-Printed Soft Robotic Glove With Enhanced Ergonomics and Force Capability," in *IEEE Robotics and Automation Letters*, vol. 3, no. 1, pp. 242–248, Jan. 2018.
6. Jianshu Zhou, **Xiaojiao Chen**(Co-first author), Ukyoung Chang, Jui-Ting Lu, Lcarisse Ching Yau Leung, Yonghua Chen, Yong Hu, Zheng Wang, "A Soft-robotic Approach to Anthropomorphic Robotic Hand Dexterity," in *IEEE Access*, vol. 7, pp. 101483–101495, 2019.
7. Jianshu Zhou, Juan Yi, **Xiaojiao Chen**, Z. Liu and Zheng Wang, "BCL-13: A 13-DOF Soft Robotic Hand for Dexterous Grasping and In-Hand Manipulation," in *IEEE Robotics and Automation Letters*, vol. 3, no. 4, pp. 3379–3386, Oct. 2018.

Conferences:

1. **Xiaojiao Chen**, Jing Peng, Jianshu Zhou, Yonghua Chen, Michael Yu Wang and Zheng Wang, "A robotic manipulator design with novel soft actuators," *2017 IEEE International Conference on Robotics and Automation (ICRA)*, Singapore, 2017, pp. 1878–1884.
2. **Xiaojiao Chen**, Tommy Hu, Chaoyang Song and Zheng Wang, "Analytical Solution to Global Dynamic Balance Control of the Acrobot," *2018 IEEE International Conference on Real-time Computing and Robotics (RCAR)*, Kandima, Maldives, 2018, pp. 405–410.
3. Jianshu Zhou, **Xiaojiao Chen**, Jing Li, Yinan Tian and Zheng Wang, "A soft robotic approach to robust and dexterous grasping," *2018 IEEE International Conference on Soft Robotics (RoboSoft)*, Livorno, 2018, pp. 412–417.
4. Jianshu Zhou, **Xiaojiao Chen**, Ukyoung Chang, Jia Pan, Wenping Wang and Zheng Wang, "Intuitive Control of Humanoid Soft-Robotic Hand BCL-13," *2018 IEEE-RAS 18th International Conference on Humanoid Robots (Humanoids)*, Beijing, China, 2018, pp. 314–319.
5. Jianshu Zhou, **Xiaojiao Chen**, Ukyoung Chang, Yunhui Liu, Yonghua Chen and Zheng Wang, "A Grasping Component Mapping Approach for Soft Robotic End-Effector Control," *2019 2nd IEEE International Conference on Soft Robotics (RoboSoft)*, Seoul, Korea (South), 2019, pp. 650–655.