Zechen XIONG

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EDUCATION

2018-Pres. **Columbia University, GSAS** | New York, NY
Ph.D., Earth and Environmental Engineering, Soft Robotics, Compliant Mechanisms

2015-2018 **Tsinghua University, School of Civil Eng.** | Beijing, China
Master's in Civil Engineering
Thesis: "Analysis for Heat Transfer and Multi-field Coupling of Energy Geo-structures."

2012-2015 **Tsinghua University, School of Economics and Management** | Beijing, China
Second Bachelor's in Economics

2010-2015 **Tsinghua University, School of Civil Engineering** | Beijing, China
Bachelor's in Civil Engineering

RESEARCHING

2021-Pres **Columbia University** | New York, NY
Ph.D. Candidate, Soft Robotics, Advisor: Hod Lipson
- Inventing novel compliant mechanism for soft robotics.
- Leading, organizing, and managing.

2018-2021 **Columbia University Earth Engineering Center** | New York, NY
Ph.D. Candidate, Deployable Mechanisms, Advisor: Xi Chen
- Beam structure analysis, deployable mechanisms, soft robotics
- Leading, organizing, and managing.

2014-2018 **Tsinghua Univ. Institute for Underground Engineering** | Beijing, China
Master's student, Energy Geo-structure, Advisor: Hongxian Guo, Xiaohui Cheng
- Duhamel's integral analysis, COMSOL 3D modelling
- Leading, organizing, and managing.

2015.6-9 **Dong Fureng Economic and Social Development Institute** | Beijing, China
Researcher, Advisor: Sheng Hua
- Macro economic researching, leading, and organizing.

PUBLICATIONS

2018.9-Pres **Zechen Xiong**, Liqi Chen, Hod Lipson. "Pre-stressed Bi-stable Hair Clip Mechanism for Faster Swimming Robots" (Nature Machine Intelligence, **Under Review**), arxiv.org/abs/2206.14867

Zechen Xiong, Hod Lipson. "CarbonFish: A Bistable Underactuated Compliant Fish Robot capable of High-Frequency Undulation" (Advanced Materials, **Under Review**), arxiv.org/abs/2311.03223

Zechen Xiong, , Hod Lipson. "Designing a Hair-Clip Inspired Bistable Mechanism for Soft Fish Robots" (RoboSoft 2023, **Under Review**), arxiv.org/abs/2311.03212

Zechen Xiong, , Hod Lipson. "Accelerating Aquatic Soft Robots with Elastic Instability Effects" (ICRA 2024, **Under Review**), arxiv.org/abs/2310.14119

McClintock Hayley, **Zechen Xiong**, Bruno Rergis, and Hod Lipson. "Design and Fabrication of Carbon Fiber Lattices Using 3D Weaving." Scientific Reports 13, no. 1 (September 10, 2023): 14919. https://doi.org/10.1038/s41598-023-40962-4

Zechen Xiong, Zihan Guo, Li Yuan, Yufeng Su, Yitong Liu, and Hod Lipson. "Rapid Grasping of Fabric Using Bionic Soft Grippers with Elastic Instability." arXiv, January 26, 2023. (IROS 2023, **Accepted**) arXiv.2301.09688

Zechen Xiong, Yufeng Su, and Hod Lipson. "Fast Untethered Soft Robotic Crawler with Elastic Instability." IEEE International Conference on Robotics and Automation (ICRA), 2023 2606–12. Video: youtube/2vxqgBPo9S8

Tianwei Jin, Yirui Ma, **Zechen Xiong**, Xiaoyu Fan, Yu Luo, Zeyu Hui, Xi Chen, and Yuan Yang. "Bioinspired, Tree-Root-Like Interfacial Designs for Structural Batteries with Enhanced Mechanical Properties." *Advanced Energy Materials* 11, no. 25 (2021): 2100997, DOI: 10.1002/aenm.202100997

Zechen Xiong, Hang Xiao, and Xi Chen. "Fractal-Inspired Soft Deployable Structure: A Theoretical Study." *Soft Matter* 17, no. 18 (May 12, 2021): 4834–41, DOI: 10.1039/D1SM00006C

2017-2018 **Zechen Xiong**, Tianlin Wang, and Hongxian Guo, and Xiaohui Cheng. "Feasibility Study of Insulation and Anti-Rreezing for Drainage Ditch in Cold Region Runnels Based on Shallow Geothermal Energy." *Journal of Disaster Prevention and Mitigation Engineering* 4 (2019): 556-563. DOI: 10.13409/j.cnki.jdpme.2019.04.003

Zechen Xiong, Hongxian Guo, Xiaohui Cheng, "Finite Element Analysis of Thermal-Hydraulic Coupled Centrifuge Test for Saturated Sand." *Journal of Disaster Prevention and Mitigation Engineering* 4 (2017): 604-610+696. DOI: 10.13409/j.cnki.jdpme.2017.04.015

Zechen Xiong, Hongxian Guo, Xiaohui Cheng, "A simplified analysis method for long-term stability of ground source heat exchanging pipes." *Proceedings of the 26th National Conference on Structural Engineering 3* (2017): 656-661. https://cpfd.cnki.com.cn/Article/CPFDTOTAL-LXFY201710003103.htm

PATENT

2022 **Zechen Xiong** and Hod Lipson. "Novel Deformable Mechanism for Robotic Propulsion, Manipulation and Other Devices." United States Provisional Application No. 63/443,017

TEACHING

2022.7-8 **Columbia University Academic Success Program** | New York, NY
Physics Instructor

2018.9-2021.9 **Columbia University Environmental Engineering Dept.** | New York, NY
Teaching Assistant
EAEE3200 – ***Hydraulics***
EAEE4257 – ***Environmental Data Analysis & Modeling***
EAEE4001 – ***Industry Ecology-Earth Resources***

2011-2015.7 **Tsinghua University Red Cross** | Beijing, China
First-aid Trainer

MENTORING

Master's Students

2023 Jiong Lin, Mechanical Engineering, Columbia University

Master's Students

2022 Yitong Liu, Mechanical Engineering, Columbia University

2022 Zihan Guo, Mechanical Engineering, Columbia University

2021-2022 Yufeng Su, Mechanical Engineering, Columbia University

2021 Xiangyi Ren, Mechanical Engineering, Columbia University

2021 Liqi Chen, Mechanical Engineering, Columbia University

2021 Wenxiong Hao, Mechanical Engineering, Columbia University

2016-2018 Tianlin Wang, Civil Engineering, Tsinghua University

Undergraduate Students

2021 Nipun Poddar, Mechanical Engineering, Columbia University

2021 Sarah Li Wilkinson, Mechanical Engineering, Columbia University

2016-2018 Xingbang Wu, Civil Engineering, Tsinghua University