

G. Wayne Tu

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EDUCATION

- **University of Michigan** Sep. 2022 – June 2026
Ph.D. in Civil Engineering (Structures, Mechanics & Materials Track) Ann Arbor, MI
 - GPA: 3.95/4.00
 - Advisor: Prof. Evgueni Filipov ([Deployable and Reconfigurable Structures Lab](#))
 - Thesis topic: Functional 3D woven structures and metamaterials
- **Shanghai Jiao Tong University** Sep. 2019 – June 2022
M.S. in Mechanical Engineering Shanghai, CN
- **Chongqing University** Sep. 2015 – June 2019
B.S. in Mechanical Engineering Chongqing, CN

PUBLICATIONS AND PRESENTATIONS

Journal Papers

During Ph.D.

- [J.1] [Tu, G.W. and Filipov, E.T. \(2026\). Three-dimensional load-bearing woven robots: Design, fabrication, and reduced-order modeling.](#) *Advanced Science* (to be submitted). [Videos]
- [J.2] [Krankel, J., Tu, G.W. and Filipov, E.T. \(2026\). Stiffness and buckling behavior of woven columns.](#) *Mechanics Research Communications*, 2026, 155, 104702. [PDF]
- [J.3] [Tu, G.W. and Filipov, E.T. \(2025\). Corner topology makes woven baskets into stiff, yet resilient metamaterials.](#) *Physical Review Research*, 2025, 7, 033193. [PDF] [Videos] [Media Coverage: Michigan News, Tech Xplore, Yahoo!News, Interesting Engineering, EurekAlert!, Engineering Designer, The Conversation]
- [J.4] [Tu, G.W. and Filipov, E.T. \(2025\). Engineering snags for spatial curvature in weaves: Fabrication, mechanics, and inverse design.](#) *Soft Matter*, 2025, 21, 8793-8802. [PDF] (selected as the back cover)
- [J.5] [Tu, G.W. and Filipov, E.T. \(2024\). Origami of multi-layered spaced sheets.](#) *Journal of the Mechanics and Physics of Solids*, p.105730. [PDF]
- [J.6] [Chen, K., Tu, G.W., Dong, X., Huang, Y. and Peng, Z. \(2023\). Multifunctional application of nonlinear metamaterial with two-dimensional bandgap.](#) *Science: Technological Sciences*, 66 (3), 869-880. [PDF]
- [J.7] [Chen, K., Dong, X., Gao, P., Zhang, J., Sun, Y., Tu, G.W. and Peng, Z. \(2023\). Multifunctional applications of topological valley-locked elastic waves.](#) *International Journal of Mechanical Sciences*, 259, p.108589. [PDF]

Before Ph.D.

- [J.8] [Tu, G.W., Dong, X., Chen, S., Zhao, B., Hu, L. and Peng, Z. \(2020\). Iterative nonlinear chirp mode decomposition: A Hilbert-Huang transform-like method in capturing intra-wave modulations of nonlinear responses.](#) *Journal of Sound and Vibration*, 485, p.115571. [PDF]
- [J.9] [Tu, G.W., Dong, X., Qian, C., Chen, S., Hu, L. and Peng, Z. \(2021\). Intra-wave modulations in milling processes.](#) *International Journal of Machine Tools and Manufacture*, 163, p.103705. [PDF]
- [J.10] [Dong, X., Tu, G.W., Hu, L. and Peng, Z. \(2024\). Suppress chatter in milling of thin-walled parts via fixture with active support.](#) *Journal of Vibration and Control*, 30(5-6), pp.1286-1296. [PDF]
- [J.11] [Dong, X., Tu, G.W., Wang, X. and Chen, S. \(2021\). Real-time chatter detection via iterative Vold-Kalman filter and energy entropy.](#) *The International Journal of Advanced Manufacturing Technology*, 116, pp.2003-2019. [PDF]
- [J.12] [Chen, Q., Dong, X., Tu, G.W., Wang, D., Cheng, C., Zhao, B. and Peng, Z. \(2024\). TFN: An interpretable neural network with time-frequency transform embedded for intelligent fault diagnosis.](#) *Mechanical Systems and Signal Processing*, 207, p.110952. [PDF]
- [J.13] [Zhao, B., Cheng, C., Tu, G.W., Peng, Z., He, Q. and Meng, G. \(2021\). An interpretable denoising layer for neural networks based on reproducing kernel Hilbert space and its application in machine fault diagnosis.](#) *Journal of Mechanical Engineering*, 34(1), 1-11. [PDF]

- [J.14] Huangfu, Y., Dong, X., Chen, K., Tu, G.W., Long, X. and Peng, Z. (2022). **A tribo-dynamic based pitting evolution model of planetary gear sets: A topographical updating approach.** *International Journal of Mechanical Sciences*, 220, p.107157. [PDF]

Conference Presentations

- [C.1] Tu, G.W. and Filipov, E.T. (2025). **Corner topology of woven baskets inspires stiff, yet resilient metamaterials.** In *ASME International Mechanical Engineering Congress and Exposition (IMECE)*, November 16–20, Memphis, TN. (*Won ASME Student Travel Award*)
- [C.2] Filipov, E.T. and Tu, G.W. (2025). **Basket weaving provides remarkable stiffness and resilience for functional structures.** In *European Solid Mechanics Conference*, July 7–11, Lyon, France.
- [C.3] Tu, G.W. and Filipov, E.T. (2025). **How corner topology makes woven baskets ultra-stiff, yet ultra-resilient.** In *American Physical Society (APS) March Meeting*, March 16–21, Anaheim, CA. (*Won APS DMP Ovshinsky Travel Award*)
- [C.4] Tu, G.W. and Filipov, E.T. (2024). **Origami of multi-layered spaced sheets.** In *ASCE Engineering Mechanics Institute Conference and Probabilistic Mechanics & Reliability Conference (EMI/PMC)*, May 28–31, Chicago, IL. (*Won Best Elasticity Student Paper Award*)
- [C.5] Tu, G.W. and Filipov, E.T. (2023). **Kinematics of spaced origami sheets.** In *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC-CIE)*, August 20–23, Boston, MA.

Poster Presentations

- [P.1] Tu, G.W. and Filipov, E.T. (2025). **How corner topology of woven baskets inspires stiff, yet resilient metamaterials.** In *ASME International Mechanical Engineering Congress and Exposition (IMECE)*, November 16–20, Memphis, TN. (*Won ASME Poster Award*)
- [P.2] Tu, G.W. and Filipov, E.T. (2025). **Corner topology makes woven baskets into stiff, yet resilient metamaterials.** In *Michigan Materials Research Institute Annual Summit*, June 3–4, Ann Arbor, MI.
- [P.3] Tu, G.W., Yi Z. and Filipov, E.T. (2024). **Design of modular origami structures for multifunctional cloaking and protection.** In *Automotive Research Center Annual Program Review*, June 5–7, Ann Arbor, MI.

RESEARCH EXPERIENCE

- **Research Assistant at Deployable and Reconfigurable Structures Lab** Sep 2022 – June 2026
University of Michigan | Advisor: Prof. Evgueni Filipov
 - Integrated active materials into 3D woven structures to create load-bearing robotic textiles.
 - Proposed a general woven corner platform to modularly build ultra-stiff yet ultra-resilient woven metamaterials.
 - Designed meter-scale deployable acoustic cloaks and thermal shields based on multi-layered origami.
- **Research Assistant at Smart Materials and Structures Lab** Sep. 2019 – June 2022
Shanghai Jiao Tong University | Advisors: Prof. Xingjian Dong & Prof. Zhike Peng
 - Designed a novel metastructure inspired by ancient window lattices to isolate low-frequency vibration.
 - Developed an actively controlled smart spindle system to suppress chatter instability in milling.
 - Proposed a new algorithm to quantify the nonlinearity of dynamical systems.

MENTORING AND TEACHING EXPERIENCE

- **Graduate Student Mentor for Summer Undergraduate Research Program (SURE 2025)** Summer 2025
University of Michigan | Mentee: Jaimie Krankel
 - Codeveloped a theoretical model for predicting stiffness and buckling loads of woven columns.
 - Coauthored a paper published in *Mechanics Research Communications*.
- **Graduate Student Instructor for Civil Engineering Materials (CEE 351)** Fall 2023
University of Michigan | Instructor: Dr. Mengjun Hou
 - Taught labs on experimental testing of engineering materials including concrete, steel, and wood.
 - Received 4.5/5.0 in graduate student instructor evaluation from students.
 - Course topic: Discussion of basic mechanical and physical properties of a variety of important civil and environmental engineering materials such as concrete, steel, plastic, asphalt, wood and fiber composites.

HONORS AND AWARDS

- **IMECE Poster Award (Runner-Up Grad Student, 2nd Place Mechanics, and People's Choice Awards)** 2025
American Society of Mechanical Engineers (ASME)
- **IMECE Student Travel Award** 2025
American Society of Mechanical Engineers (ASME) Applied Mechanics Division
- **Rackham Graduate School International Student Fellowship** 2025
University of Michigan
- **Stanford R. Ovshinsky Student Travel Award** 2025
American Physical Society (APS) Division of Materials Physics
- **Richard and Eleanor Towner Prize for Outstanding Ph.D. Research** 2025
University of Michigan
- **Best Elasticity Student Paper Award** 2024
American Society of Civil Engineers (ASCE) Engineering Mechanics Institute
- **Michigan Institute of Computational Discovery & Engineering (MICDE) Fellowship** 2022
University of Michigan
- **Outstanding Graduate Award (Top 1%)** 2022
Shanghai Jiao Tong University
- **Best Master Thesis Award (20 out of 5,000+)** 2022
Shanghai Jiao Tong University
- **National Scholarship (Awarded Twice, Top 0.1%)** 2020, 2019
Chinese Government

SERVICES AND MEMBERSHIPS

- **Peer Reviewer for Journals**
Science Robotics, Scientific Reports, International Journal of Mechanical Sciences, International Journal of Solids and Structures, Mechanics Research Communications, Extreme Mechanics Letters, ASME Journal of Applied Mechanics
- **Member of Michigan Scientific Computing Club (SC²)**
- **Member of American Society of Mechanical Engineers (ASME)**
- **Member of American Society of Civil Engineers (ASCE)**
- **Member of American Physical Society (APS)**