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PROFESSIONAL EXPERIENCE

2025-02 — present **Department of Civil & Environmental Engineering, UIUC**
Postdoc Research Associate (PI: Xiaojia Shelly Zhang)

2024-05 — 2025-02 **Department of Mechanical Engineering, Tsinghua University**
Postdoc Research Assistant (PI: Peng Wen) Shuimu Tsinghua Scholar

2018-09 — 2024-06 **School of Mechanical Engineering, Shanghai Jiao Tong University**
MS and PhD joint program in ME (Advisor: Ping Zhu) GPA: 3.69 Rank: 3/108

2014-09 — 2018-06 **School of Mechanical Engineering, Shanghai Jiao Tong University**
Bachelor in Mechanical Engineering GPA: 3.95 Rank: 1/27

RESEARCH PUBLICATIONS

Journal Articles

1. **Xu W Y**, Zhou C, Zhang H Y, Liu Z, Zhu P. A flexible design framework for lattice-based chiral mechanical metamaterials considering dynamic energy absorption[J]. ***Thin-Walled Structures***, 2024, 203:112108.
2. **Xu W Y**, Wang L W, Liu Z, Zhu P. General assembly rules for metamaterials with scalable twist effects[J]. ***International Journal of Mechanical Sciences***, 2023, 259: 108579.
3. **Xu W Y**, Zhang L, Zhang B Q, Zhang H Y, Liu Z, Zhu P. Crushing behavior of contact-aided AlSi10Mg sandwich structure based on chiral mechanical metamaterials[J]. ***International Journal of Mechanical Sciences***, 2023, 260: 108636.
4. **Xu W Y**, Liu Z, Wang L W, Zhu P. 3D chiral metamaterial modular design with highly-tunable tension-twisting properties[J]. ***Materials Today Communications***, 2022, 30: 103006.
5. **Xu W Y**, Zhang H Y, Liu Z, Zhu P. Aperiodic design framework of chiral mechanical metamaterials considering crashworthiness[J]. ***Journal of Mechanical Engineering***. 2024. (In Chinese) **(Accept)**
6. Zhang L, **Xu W Y**, Qiu R Y, Xu D K, Zhang H Y, Zhu P. Multiscale-based multiaxial fatigue model of short fiber reinforced polymer composites under high-cycle proportional loading[J]. ***Composites Part B-Engineering***, 2024, 275:111308.
7. Song Z Z, **Xu W Y**, Valdebenito M A, Faes M G R. Efficient forward and inverse uncertainty quantification for dynamical systems based on dimension reduction and Kriging surrogate modeling in functional space[J]. ***Mechanical Systems and Signal Processing***, 2025, 235: 112898.
8. **Xu W Y***, Pang H L*, Xu H J, Liu J G, Wen P. Tuning biodegradation kinetics of 3D-printed magnesium alloy scaffolds through hierarchical structure design[J]. ***Additive Manufacturing***, 2025, submitted.
9. Pei Z J*, Xu H J*, Guo M Z*, **Xu W Y**, Wen Y, Sun F P, Zhang T Y, Peng B, Zhao P Q, Huang L K, Wang M Y, He Z S, Liu J Z, Yang Z C, Zhang Z, Wen P, Wen L Y. A soft-hard hybrid scaffold for osteochondral regeneration through integration of composite hydrogel and biodegradable magnesium[J]. ***Biomaterials***, 2025, major revision submitted.

Conference Proceedings/Oral Presentations

1. **Xu W Y**, Zhang H Y, Liu Z, Zhu P. On the crashworthiness of aperiodic chiral mechanical metamaterials: design and modeling method[C]//***Journal of Physics: Conference Series***, 2639: 012029, Chinese Materials Conference 2022-2023 07/07/2023 - 10/07/2023 Shenzhen, China.
2. **Xu W Y**, Wang W J, Zhu P. GNN-based inverse design of three-dimensional aperiodic metamaterials enabling programmable shapes[C]. ***APS March Meeting 2024***, Minneapolis, MN, USA, March 3-8, 2024.
3. **Xu W Y**, Peng B, Wen P. SD-DAL: Structure discovery of elastic metamaterials via deep active learning[C]. ***APS Global Physics Summit 2025***, Anaheim, CA, USA, March 17-21, 2025.
4. **Xu W Y**. High temperature oxidation treatment of magnesium alloys in additive manufacturing[C]. ***2024 Chinese Society for Biomaterials (CSBM) Annual Symposium***, Weihai, China, October 11-13, 2024.

Patents (Chinese Patents)

1. **Xu W Y**, Zhu P, Liu Z, Li Y F. Chiral mechanical metamaterial sandwich structures with size-effect-free twist and the applications: CN115691719A[P]. 2023-02-03.
2. **Xu W Y**, Zhu P, Guo W Z. Foldable multi-form electric vehicle: CN109178180B[P]. 2020-05-05.
3. Zhang H Y, **Xu W Y**, Liu Z, Zhu P. Implementation method for aperiodic chiral mechanical metamaterial: 202410393312.7[P]. 2024-04-02.
4. Liu Z, **Xu W Y**, Zhu P. Twist angle measurement fixture for compression-torsional testing of chiral mechanical metamaterial: CN116026678A[P]. 2023-04-28.
5. Zhu P, **Xu W Y**, Liu Z, Li M S. Mesoscopic structural optimization methods: CN110362912B[P]. 2022-11-08.
6. Zhu P, **Xu W Y**, Liu Z, Wang L W, Zhang L. Automatic simulation system and method for strut-based metamaterial under multiple working conditions: CN114297877B[P]. 2024-11-05.
7. Zhu P, Zhang L, Liu Z, **Xu W Y**, Song Z Z. Stiffness-based mixed rapid prediction method for fatigue life of SFRP: CN116305990A[P]. 2023-06-28.

Book and Chapter

1. Zhu P. Advanced design theory and methodology[M]. Beijing: China Machine Press, 2023, ISBN: 978-7-111-71470-5. (in Chinese) **(Chapter 3 and 7)**

MISCELLANEOUS EXPERIENCE

Research Projects (Principal Contributor)

- **National Natural Science Foundation of China (Grant No. 12472119)** 2025-01 — 2028-12
  Energy absorption mechanism and design of 3D chiral mechanical metamaterials based on PINN
- **Shanghai Natural Science Foundation (Grant No. 23ZR1431600)** 2023-04 — 2026-03
  Research on energy absorption mechanism and optimization design method of 3D chiral metamaterials
- **Shanghai Natural Science Foundation (Grant No. 21ZR1431500)** 2021-04 — 2024-03
  Research on data-driven multi-scale optimization design method of mechanical metamaterial
- **Personal Urban Mobility Access Program (PACE) of GM** 2018-06 — 2018-06
  Won 1st Place in Road Test Competition of PACE by General Motors (North America) Ltd.

Awards and Achievements

2017/2019/2023	**National Scholarship** (1%), Ministry of Education of P. R. China
2016	**National Inspirational Scholarship**, Ministry of Education of P. R. China
2017	**Merit Student Award**, Shanghai Jiao Tong University
2018	**Outstanding Graduate Award**, Shanghai Jiao Tong University
2018	**Excellent Graduation Design Award**, School of Mechanical Engineering, SJTU
2019	**2nd Place of 30th International Design Contest ROBOCON,** Held in MIT
2020	**Inspirational Individual Award**, Shanghai Jiao Tong University
2020	**Excellence Teaching Assistant Award**, Shanghai Jiao Tong University
2024	**Shanghai PhD Outstanding Graduate Award**, Shanghai Jiao Tong University
2024	**APS DMP Ovshinsky Travel Award**, APS Division of Materials Physics
2024	**APS FGSA Graduate Research Excellence Travel Award**, APS FGSA
2024	**Class D Municipal High-level Talent**, Ganzhou, Jiangxi Province, P. R. China
2024	**Shuimu Tsinghua Scholar**, Tsinghua University
2025	**Excellent PhD Dissertation**, School of Mechanical Engineering, SJTU

Certification

2020	Student President of Graduate Union, Shanghai Jiao Tong University
2016	Certified Volunteer in Shanghai International Marathon

Teaching Assistant

2021-2022	Undergraduate Courses *Open Source and Modeling*
2019-2023	Undergraduate Courses *Fundamentals of Manufacturing Processes*
2015-2016	Undergraduate Courses *The Way To Success*