Mr Di Lin

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Education

Wuhan University of Technology, Wuhan, China Sep. 2020- Jun. 2024

- BSc in Mechanical Design & Manufacture & Its Automation; GPA:3.987/89.87% (Overall), Ranked Top 15%

Publications

- TPMS_Scaffold_Generator: A Scaffold-Structure Generator Based on Triply Periodic Minimal Surfaces, **Di Lin**, Cong Zhang, Xiyong Chen, Nannan Wang, Lei Yang, Additive Manufacturing Frontiers 2023
- Triply periodic minimal surface multi-cell interlacing metamaterials to achieve superior vibrational **isolation (My signature work), Di Lin**, Lei Yang, Yunlong Ren, Mengying Chen, Siqi Wu, Hui Qiao, Hejiang Xu, Chunze Yan and Yusheng Shi., **Submitted to Additive Manufacturing**
- Triply periodic minimal surface multi-cell interlacing metamaterials to achieve superior vibrational isolation, **Mengying Chen[1], Di Lin[1]**, Hui Qiao, Lei Yang, To be submitted
- The mechanical properties of Ni-Ti Gyroid TPMS lattice structures with varying orientations and their influence on crack propagation control Yunlong Ren[1], **Di Lin[1]**, Lei Yang, Hejiang Xu, Dianyu Tang, and Siqi Wu, To be submitted
- Fully automated trasporter for yard bridges, **Di Lin**, Kang Xia, Ruihan Sun, Haotian Wang. CN202321806345.7, 2023

Projects

TPMS_Scaffold_Generator: A Scaffold-Structure Generator Based on Triply Periodic Minimal Surfaces Mar. 2022 - Mar. 2024

Supervisor: Prof. Lei Yang

- Developed and implemented functionalities for uniform, multisymmetrical and gradient TPMS structures, including linear, cosine, unit cell size, and mixed-structure gradients.
- Solved typical pinch-off problem of TPMS scaffolds, gaining ultra-light lattice structures, facilitating modelling of multi-cell interlacing and multi-topology TPMS superstructures.
- Conducted compressive experiments of functionally graded Fischer-Koch TPMS scaffolds, revealing influence of gradient orientations on mechanical properties.

Exceptional shape memory effect and superelasticity of ultra-light Gyroid TPMS lattice structures fabricated by laser powder bed fusion Dec. 2022 - Present

Supervisor: Prof. Lei Yang

- Designed and fabricated ultra-light Ni-Ti Gyroid TPMS lattice structures with varying volume fractions from 1% to 4%, following a printing quality and manufacturing accuracy analysis using a 3D reconstruction method.
- Performed cyclic loading-unloading experiments, whose results demonstrated outstanding superelasticity of ultra-light Ni-Ti Gyroid scaffolds, with a recoverable rate of 93.65%.
- Conducted cyclic loading-unloading-heating experiments, whose results illustrated exceptional shape memory effect of ultra-light Ni-Ti Gyroid scaffolds, with recoverable rates ranging from 98.99% to 99.80%
- Utilized finite element method to reveal the deformation mechanics of Gyroid TPMS structures.
- **Current Status: Additive Manufacturing (IF 10.3) Under Review**

Mechanical properties and mass transport characteristic of laser powder bed fused multicell interlacing Gyroid TPMS metallic biomaterials for bone scaffolds May. 2024 - Present

Supervisor: Prof. Lei Yang

- Designed and fabricated multicell interlacing Gyroid TPMS lattice structures inspired by Chinese Taichi.
- Adopted finite element analysis to analyse the influence of interlacing number and volume fractions on mechanical properties (especially Young's modulus) of the structures.
- Expected to utilize computational fluid dynamics (CFD) to analyze the permeality properties of the structures.
- Expected to conduct uniaxial compressive tests and permeality tests to verify the analysis in the finite element and CFD analysis.

Triply Periodic Minimal Surface Multicell Interlacing Metamaterials for Achieving Superior Vibrational Isolation (Independent work with colleagues) Jun. 2023 - Present

- Conceptualized innovative lattice structures with non-overlapping rods in different orientations, achieving cohesive multi-lattice designs with equal volumetric fractions.
- Performed uniaxial compressive tests and adopted finite element method to analysize mechanical properties of the structures.
- Assisted seniors to utilize advanced design software to optimize lattice structures for improved mechanical strength and vibrational properties.

The Mechanical Properties and Crack Propagation Control of Ni-Ti Gyroid TPMS Lattice Structures with Varying Orientations (Independent work with colleagues) Jun. 2022 - Present

- Designed innovative multi-symmetrical TPMS lattice structures with different orientations to explore the fatigue and fracture mechanics of structural orientations.
- Utilized uniaxial compression tests and finite element methods to analyze mechanical properties, including stress-strain curves and energy absorption rates.
- Assisted in conducting fatigue tests and analyzing fatigue test data.

Skills

- **MATLAB** for programming and modelling; Data analysis using **Origin** software; Materialize **Magics** for model analysis
- **SLM** (Selective Laser Melting) equipment for printing **TPMS** lattice structures
- **VGStudio MAX** Analysis of CT Model Data; **Abaqus**: Quasi-Static Compression Simulation

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Work Experience

Great Bay University, China Aug. 2024 - Present

- Role: Research Assistant (Supervisor: Michael Yu Wang; Chair Professor & Dean)

Wuhan University of Technology, Wuhan, China Mar. 2022 - Jul. 2024

- Role: Research Assistant (Supervisor: Prof Lei Yang)

Scholarship and Awards

- 2021-2022: Second-class Scholarship, Wuhan University of Technology. Awarded to the top 6% of students based on academic performance.
- 2021-2022: Sanhao Student, Wuhan University of Technology. Recognized for ranking in the top 12% in academic performance and overall evaluation.
- 2022-2023: Second-class Scholarship, Wuhan University of Technology. Awarded to the top 6% of students based on academic performance.
- 2022-2023: Sanhao Student, Wuhan University of Technology. Recognized for ranking in the top 12% in academic performance and overall evaluation.
- August 30, 2023: First Prize in the "2023 Chinese University Students Mechanical Engineering Innovation and Creativity Competition - Mining Cup in Logistics Technology (Cranes)." Awarded by the Chinese Mechanical Engineering Society with an award rate below 6.7%.
- May, 2024: Top Graduates of the Class of 2024, WHUT. Awarded by Wuhan University of Technology.