Wendong Huo

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Education

2019 – 2025 **Ph.D. in Solid Mechanics**, Dalian University of Technology
Title: *Explicit Design and Optimization of Complex Surface Shell Structures.*

2015 – 2019 **B.E. in Engineering mechanics**, Hefei University of Technology
Title: *Isogeometric Boundary Element Method for Solving Steady Heat Conduction Problems.*

Research Interests

- Structure optimization: Size/shape/topology design, mathematical programming
- Solid mechanics: Everything about shell structures (wave motion, instability, metamaterial...)
- Phase field method: Applications in fracture mechanics and manufacturing processes

Honors and Awards

2024 **Golden Prize** (teamwork), "Challenge Cup" Entrepreneurship Competition in Liaoning Province.

2023 **2nd Prize** (teamwork), Open-source Industrial Software Integration Competition.

2019 **Special Prize** (team pursuit, ranked 2nd out of 104 teams), International Engineering Mechanics Contest (Asian Region).

2nd Prize (individual pursuit), International Engineering Mechanics Contest (Asian Region).

2018 **National Scholarship**, Ministry of Education.

1st Prize, "EBSCO Cup" Literature Information Acquisition Competition.

2017 **Special Prize**, Chinese Mechanics Competition (Anhui Province Site).

3rd Prize, Chinese Mechanics Competition in Honor of Zhou Peiyuan.

3rd Prize, Competition of Experimental Mechanics (Anhui Province Site).

Experience

Scientific Research

2019.09-present Explicit design and optimization of complex surface shell structures (dissertation topic).

2024.09-present Improving the fundamental frequency of complex shell structures (ongoing).

Hierarchical shape design of complex shell structures (ongoing).

2024.05-present Concurrent shape and reinforcing ribs optimization of complex shell structures (ongoing).

2023.06-2024.05 Novel treatment of the artificial density in the moving morphable component method (done).

2023.01-present Fracture prediction of shell structures (ongoing).

2022.10-2024.08 Explicit topography design of complex shell structures (done).

2022.06-2023.10 Explicit design of surface lattice structures (done).

Experience (continued)

2022.03-2023.06	Solid embedded components for complex thin-walled structure (done).
2022.03-2022.10	Explicit layout optimization of complex rib-reinforced thin-walled structures (done).
2021.03-2022.01	Explicit topology optimization of shell surfaces (done).
2021.01-2021.05	Substructuring multi-resolution topology optimization with templates (done).
2020.10-2021.03	Texture-guided structure optimization and design.
2020.04-2020.09	Structure design considering EMS and EMI.
2017.10-2019.06	Constructing the underlying algorithm of IGBEM (done).
2017.06-2019.03	Improving the piezoelectric properties of ZnO (done).

Engineering projects

2023.05-2023.12	Industrial software development (topology optimization and rib-reinforced design of thin-walled structures).
2023.04-2023.10	Optimizing rib-reinforced thin-walled structures.
2022.08-2022.11	Topology optimization of bearing structures.
2022.08-2022.10	Optimization of pressure vessels.
2021.07-2021.11	Layout and size optimization of bolt-joint systems.
2021.06-2022.06	Designing loudspeakers considering the SPL response and push-pull compliance.
2021.05-2021.08	Topology optimization of bolt-joint systems.
2021.04-2021.06	Designing fairing structures via explicit topology optimization of shell structures.
2020.07-2020.11	Displacement prediction and structure optimization of radar antennas, considering accuracy control.
2019.10-2020.05	Structure topology optimization of experimental loading devices.

Software development

2023.07-2024.06	Explicit topography design for complex shell structures.
2023.05-2024.05	Solid embedded components for complex thin-walled structures.
2022.10-2023.04	Explicit layout optimization of complex rib-reinforced thin-walled structures.
2022.06-2023.02	Explicit topology optimization of shell structures.

Skills

Software	CAD: SpaceClaim, Siemens NX (UG), AutoCAD
	CAE: Abaqus, Ansys, Hyperworks, Fenics, Comsol
	CG: MeshLab, Blender, UE5
Simulation	Finite Element Method, Boundary Element Method, Isogeometric Analysis.
Coding	Python (rpy), Matlab, Fortran, C, C#, JavaScript, LaTeX, Qt.
Toolkits	trimesh, geomdl, pyvista, cg3lib, BFF, igl.
Misc.	Office, Visio, Origin.

Presentations and Seminars

Presentations

2024.08.29 Explicit design of complex shell structures based on the computational conformal mapping technique and the moving morphable component approach, ICTAM, Daegu, Korea.

2024.05.22 Explicit design framework of shell structures based on the moving morphable component mcethod and the dimensionality reduction mapping technique, ACSMO, Zhengzhou, China.

2023.09.15 Explicit designs of complex surface structures based on the MMC method and computational conformal mapping, ICASD (International Conference on Aerospace Structural Dynamics), Xi'an, China.

2023.06.06 Topology optimization on complex surfaces based on the moving morphable component method and computational conformal mapping, WCSMO-15, Cork, Ireland.

2023.02.24 Explicit design software for complex thin-walled structures, the 1st contest on open-source industrial software integration, virtual.

2023.01.07 Explicit topology optimization for complex thin-walled structures based on the moving morphable component method and computational conformal mapping technique, the 3rd doctoral academic forum of the Chinese Society of Theoretical and Applied Mechanics, virtual.

2022.05.24 Topology optimization on complex surfaces based on the moving morphable component method and computational conformal mapping, ACSMO-2022, Virtual.

Seminars

2022.03.24 2nd seminar on explicit topology optimization and software usage, Dalian.

2021.05.04 1st seminar on explicit topology optimization and software usage, Dalian.

Services

Reviewer

2023.05-present Engineering Structures (2), Thin-Walled Structures, Structural and Multidisciplinary Optimization (2).

Social

2019.01-2019.06 Student assistance ambassador, Hefei University of Technology.

2015.09-2016.06 Center of Learning and Development, Hefei University of Technology.

Publications

** represents the corresponding authors, and # represents the co-first authors*

Main contribution

1. **W. Huo**, C. Liu*, Y. Guo, Z. Du, W. Zhang, and X. Guo*, "Explicit topography design for complex shell structures based on embedded spline components," *Submitted to Journal of the Mechanics of Physics and Mechanics and received positive reviews*, 2024.

2. **W. Huo**, C. Liu*, Y. Liu, Z. Du, W. Zhang, and X. Guo*, "A novel explicit design method for complex thin-walled structures based on embedded solid moving morphable components," *Computer Methods in Applied Mechanics and Engineering*, vol. 417, 2023.

3. X. Jiang, **W. Huo***, C. Liu*, Z. Du, X. Zhang, and X. Guo*, "Explicit layout optimization of complex rib-reinforced thin-walled structures via computational conformal mapping (ccm)," *Computer Methods in Applied Mechanics and Engineering*, vol. 404, 2023.

4. **W. Huo**, C. Liu*, Z. Du, X. Jiang, Z. Liu, and X. Guo*, "Topology optimization on complex surfaces based on the moving morphable component method and computational conformal mapping," *ASME Journal of Applied Mechanics*, vol. 89, 2022.
5. M. Huang#, **W. Huo#**, C. Liu*, D. Yang, Z. Du, and X. Guo, "Substructuring multi-resolution topology optimization with template," *Advances in Mechanics*, vol. 51, 2021.
6. B. Yu, G. Cao, **W. Huo**, H. Zhou, and E. Atroshchenko, "Isogeometric dual reciprocity boundary element method for solving transient heat conduction problems with heat sources, journal of computational and applied mathematics," *Journal of Computational and Applied Mathematics*, vol. 385, 2021.

As assistance

1. Z. Du, W. Hao, X. Chen, *et al., Artificial intelligence-enhanced bioinspiration: Design of optimized mechanical lattices beyond deep-sea sponges, extreme mechanics letters*, 2023.
2. X. Jiang, C. Liu, Z. Du, *et al., A unified framework for explicit layout/topology optimization of thin-walled structures based on moving morphable components (mmc) method and adaptive ground structure approach, computer methods in applied mechanics and engineering*, 2022.