Wendong Huo, Ph.D. (2024 expected)

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Education

2019 – 2024 📕 **Ph.D., Dalian University of Technology** in Solid Mechanics.
Thesis title: *Explicit design methods for complex surface structures.*

2015 – 2019 📕 **B.E., Hefei University of Technology** in Engineering Mechanics.
Thesis title: *Isogeometric boundary element for solving 2D steady heat conduction problems.*

Research Area

Structure optimization 📕 Size/shape/topology design, mathematical programming

Surface structures 📕 Wave motion, cloaking, metamaterial, homogenization, FEA, design

Phase field 📕 Fracture mechanics and computational manufacturing processes

Honors and Awards

2023 📕 **2nd Prize (teamwork)**, Open-Source Industrial Software Integration Contest.

📕 **1st class scholarship**, Dalian University of Technology.

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

📕 **2nd Prize (personal)**, International Engineering Mechanics Contest (Asian Region).

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

📕 **Merit Student**, Hefei University of Technology.

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

📕 **3rd Prize**, Chinese Mechanics Competition (Anhui Province Site).

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 designs of complex surface structures (doctoral dissertation topic).

2023.06-present 📕 Novel formulation of the moving morphable component method (ongoing).

2023.05-present 📕 Surface heat sink optimization (in preparation).

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

2022.10-present 📕 Explicit design of complex sheet metal structures (ongoing).

2022.06-present 📕 Explicit design of surface lattice structures (ongoing).

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).

Experience (continued)

2021.01-2021.05	▉	Substructuring multi-resolution topology optimization with templates (done).
2020.10-2021.03	▉	Texture-guided structure optimization and design (to be continued).
2020.04-2020.09	▉	Structure design considering EMS and EMI (to be continued).
2017.10-2019.06	▉	Constructing the underlying algorithm of IGBEM (done).
2017.06-2019.03	▉	On improvement of piezoelectric properties of ZnO (done).

Engineering projects

Huawei	▉	Designing loudspeakers considering the SPL response and push-pull compliance.
CAST-1	▉	Structure topology optimization of experimental loading devices.
	▉	Layout and size optimization of bolt-joint systems (5 times).
CAST-5	▉	Optimizing rib-reinforced thin-walled structures (4 times).
CAST-3	▉	Designing fairing structures via explicit topology optimization of shell structures.
CAST-6	▉	Optimization of pressure vessels.
611	▉	Topology optimization of bearing structures.
	▉	Industrial software development (topology optimization and rib-reinforced design of thin-walled structures).
HTJG	▉	Topology optimization of bolt-joint systems.
Xidian Univ.	▉	Displacement prediction and structure optimization of radar antennas, considering accuracy control.

Software development

2023.07-present	▉	Explicit design for complex sheet metal structures.
2023.05-present	▉	Solid embedded components for complex thin-walled structures.
2023.02-present	▉	Explicit layout optimization of complex rib-reinforced thin-walled structures (this product has been purchased by 611).
2022.06-present	▉	Explicit topology optimization of shell structures (this product has been purchased by 611).

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.
Languages	▉	Strong reading, writing, and speaking competencies in English, and Mandarin Chinese.
Misc.	▉	Arduino, Office, Visio, Origin.

Presentations and Seminars

Presentations

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 Chinese Society of 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

Academic

2023.04-2023.06	■	Reviewer for Engineering Structures (2 times).

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. 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.

2   X. Jiang, **W. Huo***, C. Liu*, *et al.*, "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.

3   **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.

4   M. Huang#, **W. Huo#**, C. Liu*, *et al.*, "Substructuring multi-resolution topology optimization with template," *Advances in Mechanics*, vol. 51, 2021.

5   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.