

Wendong Huo, Ph.D. (2024 expected)

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🌐 <https://wendong-huo.github.io/>



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.
- 2019 📖 **Special Prize (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).
- 2021.01-2021.05 📖 Substructuring multi-resolution topology optimization with template (done).

Experience (continued)

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, structure 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, and industrial software development.
611	■	Topology optimization of bearing 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 for 611.).
2022.06-present	■	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, L ^A T _E X.
Toolkits	■	trimesh, geomdl, pyvista, cg3lib, BFF, igl.
Languages	■	Strong reading, writing, and speaking competencies in English, and Mandarin Chinese.
Misc.	■	Arduino, academic research, teaching, training, consultation, and communication.

Presentations and Seminars



Presentations

2023.09.15	■	Topology optimization on complex surfaces based on the moving morphable component 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.

Presentations and Seminars (continued)


- 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 corresponding author, and # represents co-first author

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," *arXiv (submitted to CMAME, minor revision)*, 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.