Ningna Wang

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Research Interests

My research interests broadly lie in **computer graphics**, **geometry processing**, and **3D shape analysis**. My current research direction focuses on **3D medial axis** computation and its applications, **3D reconstruction** and **3D meshing**. Additionally, I am also interested in exploring **aerial path planning** for 3D urban scene reconstruction and **generative 3D shape synthesis**. I am honored to have received the **SIGGRAPH Best Paper Award** in 2023.

Education

Ph.D. in Computer Science	**University of Texas at Dallas** | *Dallas, Texas, USA*	*2019 - 2025 (Expected)*
M.S. in Computer Science	**Carnegie Mellon University** | *Pittsburgh, PA, USA*	*2014 - 2016*
B.S. in Computationl Mathematics	**Jilin University** | *Changchun, Jilin, China*	*2010 - 2014*

Awards

2023	**SIGGRAPH Technical Best Paper Award**	SIGGRAPH 2023	*USA*
2024	**First Place CAST STAR Award (1/16 teams)**	CAST-STEM Bridge Summer Camp	*USA*
2013	**Honorable Mention**	Mathematical Contest in Modeling (MCM)	*USA*
2011	**First Prize Scholarship & Outstanding Student**	Jilin University (2011-2013)	*China*
2010	**Second Prize Scholarship & Outstanding Student**	Jilin University	*China*

Publications

[Journal Articles] * denotes equal contributions

MATTopo: Topology-preserving Medial Axis Transform with Restricted Power Diagram **[Journal Track]**
Ningna Wang, Hui Huang, Shibo Song, Bin Wang, Wenping Wang, Xiaohu Guo
ACM Transactions on Graphics (SIGGRAPH Asia), 2024

CWF: Consolidating Weak Features in High-quality Mesh Simplification **[Journal Track]**
Rui Xu*, Longdu Liu*, *Ningna Wang*, SM Chen, Shiqing Xin, Xiaohu Guo, Zichun Zhong, Taku Komura, Wenping Wang, Changhe Tu
ACM Transactions on Graphics (SIGGRAPH), 43, pp. 1–14, 2024

Globally Consistent Normal Orientation for Point Clouds by Regularizing the Winding-Number Field **[Best Paper Award]**
Rui Xu, Zhiyang Dou, *Ningna Wang*, Shiqing Xin, Shuangmin Chen, Mingyan Jiang, Xiaohu Guo, Wenping Wang, Changhe Tu
ACM Transactions on Graphics (SIGGRAPH), 42, pp. 1–15, 2023

Point2MM: Learning medial mesh from point clouds
Mengyuan Ge, Junfeng Yao, Zhonggui Chen, Baorong Yang, *Ningna Wang*, Xiaohu Guo
Computers & Graphics (C&G), 115, pp. 511–521, 2023

Computing Medial Axis Transform with Feature Preservation via Restricted Power Diagram **[Journal Track]**
Ningna Wang, Bin Wang, Wenping Wang, Xiaohu Guo
ACM Transactions on Graphics (SIGGRAPH Asia), 41, pp. 1–18, 2022

IMMAT: Mesh reconstruction from single view images by medial axis transform prediction
Jianwei Hu, Gang Chen, Baorong Yang, *Ningna Wang*, Xiaohu Guo, Bin Wang
Computer-Aided Design (CAD), 150, p. 103304, 2022

[Conference Proceedings]

NASM: Neural Anisotropic Surface Meshing **[Conference Track]**
Hongbo Li, Haikuan Zhu, Sikai Zhong, *Ningna Wang*, Cheng Lin, Xiaohu Guo, Shiqing Xin, Wenping Wang, Jing Hua, Zichun Zhong
SIGGRAPH Asia, 2024

S3DS: Self-supervised Learning of 3D Skeletons from Single View Images
Jianwei Hu, *Ningna Wang*, Baorong Yang, Gang Chen, Xiaohu Guo, Bin Wang
ACM International Conference on Multimedia (ACM MM), pp. 6948–6958, 2023

A method of realistic leaves modeling based on point cloud

Yinghui Wang, Wen Hao, Gang Wang, Xiaojuan Ning, Jing Tang, Zhenghao Shi, *Ningna Wang*, Minghua Zhao

Proceedings of the 12th ACM SIGGRAPH International Conference on VRCAI, pp. 123–130, 2013

[In Submissions] * denotes equal contributions

MATStruct: Structure-aware Medial Axis Transform with Restricted Power Diagram

Ningna Wang, Rui Xu, Shibo Song, Bin Wang, Wenping Wang, Hui Huang, Xiaohu Guo

submitted to ACM Transactions on Graphics, 2025

Aerial Path Planning for Online Real-Time Change Exploration

Mingfeng Tang*, *Ningna Wang**, Ke Xie, Jianwei Hu, Xiaohu Guo, Hui Huang

submitted to ACM Transactions on Graphics, 2025

Work Experience

Department of Computer Science, University of Texas at Dallas — *Dallas, Texas, USA*

Research Assistant | Advisor: Dr. Xiaohu Guo — *Aug 2019 - Present*

- Developed a complete framework for computing the medial axis of 3D CAD meshes with **sharp-features preservation**.
- Developed a novel **topology-preserving** 3D medial axis computation framework based on volumetric restricted power diagram (RPD).
- Researched on new **learning-based methods** for mesh reconstruction via 3D skeleton prediction from **single view images** or **point clouds**.
- Developed a new method for estimating **globally consistent normal orientations** for a raw point cloud.
- Studied a smooth **mesh simplification** functional that simultaneously consolidates weak features in a high-quality mesh.

Teaching Assistant — *2021, 2022, 2024*

- Built starter code for all course projects in **UTD CS6323 Computer Animation and Gaming** and **CS6366 Computer Graphics**.
- Held office hours and graded homework for graphics-related courses.

Shenzhen University — *Shenzhen, Guangdong, China*

Research Intern | Advisor: Dr. Hui Huang — *Oct 2023 - Dec 2023*

- Conducted research on **aerial path planning** for drone trajectory and image capturing, efficiently yielding high-quality 3D scene reconstructions with maximum scene information and minimum flying cost.

Booking.com B.V. — *Amsterdam, Netherlands*

Senior Software Engineer — *Nov. 2018 - July 2019*

Core Software Engineer — *Aug. 2017 - Nov. 2018*

- [System Design and Development] Responsible for the design, development, and continued operation of the **hotel availability search system**, which handles thousands of incoming hotel search requests per second.
- [Production Infrastructure Optimization] Significantly enhanced system stability and scalability by distributing hotel availabilities using **jump consistent hashing**, a fast consistent hash algorithm with no storage and minimal memory requirements.
- [Cross-Functional Collaboration] Collaborated seamlessly with product-side engineers and partner-side engineers to ensure the successful development and delivery of the search system.

The Priceline Group Inc. — *Amsterdam, Netherlands | Seattle, WA, USA*

Graduate Software Engineer — *Aug. 2016 - Aug. 2017*

- [System Design] Developed a **hotel inventory management system** with a wealth of features, including property listing, yield management, and revenue analytics.
- [Feature Optimization] Implemented and experimented new features for the **Genius loyalty program** for various discounts and travel rewards.

Teaching

Teaching Assistant	UTD CS4361/CS6366 Computer Graphics	*2024 Fall, 2021 Spring*
Teaching Assistant	UTD Clark Summer Research Program	*2024 Summer*
Teaching Assistant	CAST-STEM Bridge Summer Camp	*2024 Summer*

- Supervised a team of nine high school students on a 3D talking face project.
- Lectured on basic concepts of deep learning and artificial intelligence, including CNNs, Autoencoders, VAEs, and Diffusion models.

Teaching Assistant	CAST-STEM Bridge Summer Camp	*2024 Summer*
Teaching Assistant	UTD CS6323 Computer Animation and Gaming	*2022 Fall*
Teaching Assistant	UTD CS4347 Database Systems	*2022 Fall, 2021 Spring*
Teaching Assistant	UTD CS6334 Virtual Reality	*2020 Spring*
Teaching Assistant	UTD CS4332 Introduction to Programming Video Games	*2019 Fall*

Invited Talks

Computing Medial Axis Transform with Feature Preservation via Restricted Power Diagram
ACM SIGGRAPH ASIA 2022 — *Daegu, South Korea, Dec 2022*
Center for Digital Media Computing, Xiamen University — *Online, Jan 2024, Nov 2022*

MATTopo: Topology-preserving Medial Axis Transform with Restricted Power Diagram
Visual Computing Research Center, Shenzhen University — *Shenzhen, China, Nov 2023*
Center for Digital Media Computing, Xiamen University — *Online, Oct 2024*

Review Service

Conference	Reviewer	ACM SIGGRAPH | ACM SIGGRAPH Asia	*2024*
Conference	Reviewer	International Conference on Geometric Modeling and Processing (GMP)	*2024*
Conference	Program Committee	International Conference on Computational Visual Media (CVM)	*2024*
Journal	Reviewer	Graphical Models	*2024*
Journal	Reviewer	IEEE Transactions on Visualization and Computer Graphics (TVCG)	*2022*

Softwares

Additionally, open-source code is available for publications above at https://ningnawang.github.io/.

LibMAT
github.com/ningnawang/libmat
A C++ library of data structure and algorithms for processing the 3D medial axis transform (MAT), with a special emphasis on medial meshes.

Blender-mat-addon
github.com/songshibo/blender-mat-addon
A Blender plugin that enables import and export of medial meshes within Blender. It supports loading medial meshes from MA format files and can interpolate all medial primitives, including spheres, cones, and slabs.

Q-MAT open-source
github.com/ningnawang/QMAT
An open-source C++ code repository for SIGGRAPH 2015 paper *Q-MAT: Computing Medial Axis Transform by Quadratic Error Minimization*. The code is compatible with both macOS and Windows platforms.

Reference Contacts

Professor **Xiaohu Guo**	University of Texas at Dallas (UTD) | *xguo@utdallas.edu*	*Texas, USA*
Professor **Wenping Wang**	Texas A&M University (TAMU) | *wenping@tamu.edu*	*Texas, USA*
Professor **Bin Wang**	Tsinghua University | *wangbins@tsinghua.edu.cn*	*Beijing, China*
Professor **Hui Huang**	Shenzhen University | *huihuang@szu.edu.cn*	*Shenzhen, China*

Skills

Programming C++, Java, Python, LaTeX, Markdown
Technologies OpenGL, Git, CMake, Eigen, PyTorch, CGAL, Geogram, libigl
Tools Linux/Unix, Shell (Bash/Zsh), VIM, Blender, Adobe Illustrator, Final Cut Pro