

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 <i>Dallas, Texas, USA</i>	2019 - 2025 (Expected)
M.S. in Computer Science	Carnegie Mellon University <i>Pittsburgh, PA, USA</i>	2014 - 2016
B.S. in Computational Mathematics	Jilin University <i>Changchun, Jilin, China</i>	2010 - 2014

Awards

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

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

CFW: 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
	<ul style="list-style-type: none">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

MATopo: Topology-preserving Medial Axis Transform with Restricted Power Diagram

ACM SIGGRAPH ASIA 2024

Visual Computing Research Center, Shenzhen University

Center for Digital Media Computing, Xiamen University

Tokyo, Japan, Dec 2024

Shenzhen, China, Nov 2023

Online, Oct 2024

Computing Medial Axis Transform with Feature Preservation via Restricted Power Diagram

ACM SIGGRAPH ASIA 2022

Center for Digital Media Computing, Xiamen University

Daegu, South Korea, Dec 2022

Online, Jan 2024, Nov 2022

A Method of Realistic Leaves Modeling Based on Point Cloud

ACM SIGGRAPH VRCAI 2013

Hong Kong, China 2013

Review Service

Conference	Reviewer	ACM SIGGRAPH	2024
Conference	Reviewer	ACM SIGGRAPH Asia	2024
Conference	Reviewer	International Conference on Geometric Modeling and Processing (GMP)	2024
Conference	Reviewer	Pacific Graphics IPC	2023
Conference	Program Committee	International Conference on Computational Visual Media (CVM)	2024
Journal	Reviewer	Computer Aided Geometric Design	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