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. I aim to explore new representations and algorithms to process geometric data more efficiently and effectively. Additionally, I am also interested in exploring **aerial path planning** for 3D urban scene reconstruction.

Education

Ph.D. in Computer Science	**University of Texas at Dallas** | *Dallas, Texas, USA*	*2019 - Present*
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*

Publications

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

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
to appear in ACM Transactions on Graphics (TOG/SIGGRAPH Asia) (2024). 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 (Proc. of SIGGRAPH) 43.4 (2024). ACM New York, NY, USA, 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 (Proc. of SIGGRAPH) (2023). ACM New York, NY, USA, 2023

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) (2023). 2023

Point2MM: Learning medial mesh from point clouds
Mengyuan Ge, Junfeng Yao, Zhonggui Chen, Baorong Yang, **Ningna Wang**, Xiaohu Guo
Computers & Graphics (Proceedings of CAD/Graphics) (2023). 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 (Proc. of SIGGRAPH Asia) 41.6 (2022) pp. 1–18. ACM New York, NY, USA, 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 (2022) p. 103304. Elsevier, 2022

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 Virtual-Reality Continuum and Its Applications in Industry, 2013

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, 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, Jan 2024*

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 — *2020, 2021, 2022*

- 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-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.

Awards

2024	**First Place CAST STAR Award (1/16 teams)**, CAST-STEM Bridge Summer Camp	*USA*
2023	**Best Paper Award**, SIGGRAPH 2023	*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*

Review Service

Conference	ACM SIGGRAPH | ACM SIGGRAPH Asia	*2024*
Conference	International Conference on Geometric Modeling and Processing (GMP)	*2024*
Conference	Pacific Graphics IPC	*2023*
Journal	Graphical Models	*2024*
Journal	IEEE Transactions on Visualization and Computer Graphics (TVCG)	*2022*

Teaching

Teaching Assistant	UTD Clark Summer Research Program	*2024 Summer*
Teaching Assistant	CAST-STEM Bridge Summer Camp	*2024 Summer*
Teaching Assistant	UTD CS6323 Computer Animation and Gaming	*2022 Fall*
Teaching Assistant	UTD CS6366 Computer Graphics	*2021 Spring*
Teaching Assistant	UTD CS6334 Virtual Reality	*2020 Spring*
Teaching Assistant	UTD CS4347 Database Systems	*2022 Fall, 2021 Spring*
Teaching Assistant	UTD CS4332 Introduction to Programming Video Games	*2019 Fall*