

Qianfan Shen

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 Qianfan Shen |  qianfanshen

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OBJECTIVE

As a senior majoring in Computer Science and Technology at Peking University, I specialize in computer graphics and 3D vision. My research emphasizes **high-quality reconstruction**, **photorealistic simulation**, and **neural rendering**, with the ultimate goal of creating physically-plausible digital twins and scalable models enriched with physics knowledge. I am now seeking graduate study and collaboration opportunities to deepen my expertise and contribute to this field.

EDUCATION

- **Peking University** Sep 2022 - Now
B.S., Computer Science and Technology Beijing, China
 - **GPA:** 3.674/4.000 (88.16/100)
 - **Relevant Courses:** Algorithm Design and Analysis, Introduction to Visual Computing and Interaction, Introduction to Computer Systems, Introduction to Discrete Mathematics, The Frontier of Gemotry Computing, Probability Theory and Statistics in Information Science, Digital Image Processing

RESEARCH EXPERIENCE

- **Vision Group, University of Illinois Urbana-Champaign** Jun 2025 - Now
Undergraduate Researcher, Supervised by Prof. Shenlong Wang Champaign, IL, US
 - **Generation and Reconstruction of Heat Dynamics.** Jun 2025 - Now
Submitted to CVPR 2026
 - Developed forward simulation of heat dynamics using MPM methods, modeling phase change and multi-mode heat transfer.
 - Designed inverse frameworks to recover thermal and dynamic parameters from visual observations and video data.
 - Integrated simulation outputs with photorealistic rendering pipelines, enabling efficient reconstruction of real-world heat-driven material behaviors.
- **Visual Computing and Learning Lab (VCL)** July 2024 - Now
Undergraduate Researcher, Supervised by Prof. Wenzheng Chen and Prof. Baoquan Chen Beijing, China
 - **RainyGS: Efficient Rain Synthesis with Physically-Based Gaussian Splatting** Aug 2024 - Feb 2025
CVPR 2025
 - Led the modelling and reconstruction of 3D scenes, including outdoor scenes and Waymo autonomous driving scenes for physical simulation. Specifically responsible for both appearance and geometry reconstruction, integrating the two components into a unified framework.
 - Developed algorithms for generation of auxiliary mesh-based height maps from the geometry reconstruction to simulate shallow water waves.
 - Reproduced baseline models (not open source) for algorithm comparison purposes to evaluate performance.
 - **FieryGS: Open-World Fire Synthesis with Physics-Integrated Gaussian Splatting** Feb 2025 - Sep 2025
In Submission
 - Led the development of material reasoning modules, integrating segmentation techniques with multimodal large language models to achieve accurate, scene-level material inference.
 - Led the geometric reconstruction components, designed interfaces and data structures coupling physical simulation and rendering, and implemented highly flexible user-control algorithms.
 - Managed the setup of all experimental datasets and reproduced baseline methods.

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

- [C.1] Qiyu Dai*, Xingyu Ni*, **Qianfan Shen**, Wenzheng Chen, Baoquan Chen, Mengyu Chu. **RainyGS: Efficient Rain Synthesis with Physically-Based Gaussian Splatting.** In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. IEEE. 2025, Nashville, TN, USA. (**Top 3 Paper Award / Best Technique Honorable Mention @ China3DV 2025**). DOI: 10.48550/arXiv.2503.21442
- [S.1] **Qianfan Shen***, Ningxiao Tao*, Qiyu Dai*, Tianle Chen, Minghan Qin, Yongjie Zhang, Mengyu Chu, Wenzheng Chen, Baoquan Chen. **FieryGS: Open-World Fire Synthesis with Physics-Integrated Gaussian Splatting.** (*Title anonymized for double-blind review*) Submitted to ICLR2026.
- [S.2] **Qianfan Shen**, Chih-hao Lin, Shenlong Wang. **Generation and Reconstruction of Thermal Dynamics.** (*Title anonymized for double-blind review*) Submitted to CVPR2026.

SELECTED PROJECTS

- **An Integrated Geometric Processing Demo**
Tools: [Python, Open3D]
 - Laplace Mesh Smoothing: Applied Laplace smoothing to improve mesh quality by reducing irregularities.
 - Mesh Simplification Using Quadratic Error Metrics (QEM): Implemented a mesh simplification algorithm based on QEM to reduce the complexity of 3D meshes while preserving their shape.
 - Tutte Embedding for Mesh Parameterization: Utilized the Tutte Embedding method for mesh parameterization to map 3D surfaces onto a 2D plane.
 - Mesh Deformation Using ARAP (As-Rigid-As-Possible): Applied the ARAP algorithm to deform 3D meshes while maintaining rigid structure as much as possible.

May 2024 - June 2024
[GitHub]
- **The Visualization of the Twenty-Four Histories' Publishing and Collection**
Tools: [D3.js, CSS, HTML]
 - Ancient Texts Data Collection and Processing.
 - Web Framework Development: Developed the overall structure of the project's web framework, ensuring seamless data integration and presentation.
 - Visualization Narrative Design: Led the creation of the complete visualization narrative, organizing the data flow and content presentation to enhance the user experience and data interpretation.
 - Design and Implementation of Visual Elements: Designed and implemented key visual elements, including the project's cover page, introduction, line charts, and collection maps, ensuring they effectively communicated the project's data insights.

Oct 2024 - Jan 2025
[GitHub][Globe]

SKILLS

- **Programming Languages:** Python, PyTorch, C, C++, SQL, JavaScript
- **Languages:** Chinese, English(TOEFL IBT: 112/120; CET-6: 671/710), French(a little bit)
- **DevOps & Version Control:** Git
- **Database Systems:** MySql, PostgreSQL

HONORS AND AWARDS

- **Third Prize of Peking University Scholarship**
Peking University
 - **Merit Student**
Peking University
 - **Shenzhen Stock Exchange Scholarship**
Peking University
 - **Lee Wai Wing Scholarship**
Peking University
 - **Award of Academic Excellents**
Peking University
 - **First Place Nationally**
The 2nd KPMG ESG Case Analysis Competition, KPMG, Renmin University of China
 - **Champion and Team Captain**
Peking University Cup Tennis Tournament, Peking University Freshman Cup Tennis Tournament
 - **Freshman Scholarship**
Peking University

2025
2024, 2025
2024
2023
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2023, 2024
2022