# Qisi Wang

qisi.wang@gmail.com cheesew.github.io

## Education

**Ph.D. in Computer Sciences**, University of Wisconsin–Madison, Madison, WI
Aug 2015 – Present

**B.Sc. in Computer Engineering**, Georgia Institute of Technology, Atlanta, GA
Aug 2011 – May 2015

## Research Interests

Physically based simulation, soft-body dynamics, facial animation, computer graphics, scientific computing, GPU acceleration, surgical simulation, data-driven physics models

## Research Experience

**Simulation Developer**,
Computer Graphics Group, University of Wisconsin–Madison *May 2017 – Present*

- Developed a physically based simulation engine for soft-body dynamics using projective dynamics.
- Optimized performance through SIMD, CUDA, and cache-aware techniques; achieved 10 FPS on 500K tetrahedron models.
- Ported engine as Houdini plugin; automated pipeline via Bash and Python.
- Integrated engine into cognitive plastic surgery simulator; collaborated with non-technical domain experts.
- Extended engine for facial muscle simulation and integrated into variational autoencoder architecture.
- Collaborated on USD-based mesh integration and managed codebase with Git and Mercurial.

**Facial Flap Simulator**,
Computer Graphics Group, University of Wisconsin–Madison *2021.Mar–Present*

- Proposed a virtual cognitive plastic facial flap surgery simulator based on Projective Dynamics simulation of volumetric model.
- Efficiently implemented an interactive simulation engine supporting contact between skin flaps and tissue underneath with high resolution simulation grid to support the detailed incision required for facial flap surgeries
- Collaborate with a multidisciplinary team including a plastic surgeon. Strong communication skill in explain technical detail and establish requirement from plastic surgeon user

**Learning Active Quasistatic Physics-Based Models From Data**,
Computer Graphics Group, University of Wisconsin–Madison *2020.Feb–2021.Mar*

- Design and implement a customized differentiable quasistatic physically based simulation layer into a variational autoencoder in pytorch for low dimensional control space extraction of elemental actuation in facial expressions.
- Achieved better reconstruction on seen poses and generalized better to unseen poses compare to purely surface based method. Enable better generalization to unseen poses and the addition of physical effects (gravity, collision, change of material parameters) to reconstructed facial expressions

**Optimized Processing of Localized Collisions in Projective Dynamics**, Computer Graphics Group, University of Wisconsin–Madison *2019.Jan–2021.May*

- Propose a new and distinctive approach to reconcile collision resolution with the paradigm of Projective Dynamics.
- Apply parallelization techniques (SIMD, CUDA, data oriented programming) to accelerate physically based animation of human body deformation on a 500K-tetrahedral meshes to interactive speed.
- Presented in the 43rd annual conference of the European association for computer graphics

**Hierarchical Direct Solver for Linear System of Equation**,
Computer Graphics Group, University of Wisconsin–Madison *2017.May–2018.July*

- Aim to develop direct solver for sparse linear system originated from discretization of elasticity. Subdivide physical domain to subdomains to save memory footprint and leverage parallelization

## Industry Experience

**Research Engineer**,
Foundation LLM, Inc *Aug 2024 – Present*

- Designed and developed geometric features extraction algorithms mechanical assemblies
- Develop simulation algorithms for assembly sequence generation

**Engine Programmer Intern**,
Lightspeed & Quantum Studio, Tencent America *Sep 2021 – Jan 2022*

- Prototyped a real-time fluid simulation backend in C++ (400x400 resolution).
- Authored internal wiki documentation; presented in weekly reading groups on simulation research.

## Teaching Experience

**Teaching Assistant**, Dept. of Computer Sciences, UW–Madison *Aug 2015 – May 2017*

- Delivered MATLAB lectures and lab exercises to 100+ undergraduate students.
- Provided detailed written and verbal feedback on coursework.

## Publications

Wang, Q., Cutting, C., & Sifakis, E. (Forthcoming). *Computer Based Simulation of Facial Flap and Cleft Lip Reconstruction Using Multiresolution Physics*. **Plastic and Reconstructive Surgery Global Open**. [Accepted]

Wang, Q., Tao, Y., Cutting, C., & Sifakis, E. (2022). *A computer-based facial flaps simulator using projective dynamics*. **Computer Methods and Programs in Biomedicine**, 218, 106730.

Murawski, E.L., Gawrych, E.H., Cutting, C.B., Sifakis, E.D., Wang, Q., & Tao, Y. (2022). *Long-Term Results of the Murawski Unilateral Cleft Lip Repair*. **Plastic and Reconstructive Surgery**, 149(2), 254E–260E.

Srinivasan, S.G., Wang, Q., Rojas, J., Klár, G., Kavan, L., & Sifakis, E. (2021). *Learning active quasistatic physics-based models from data*. **ACM Transactions on Graphics**, 40(4), 1–14.

Wang, Q., Tao, Y., Brandt, E., Cutting, C., & Sifakis, E. (2021). *Optimized Processing of Localized Collisions in Projective Dynamics*. **Computer Graphics Forum**, 40(6), 382–393.

## Technical Skills

**Languages:** C++, Python, Bash, MATLAB
**Simulation/Graphics:** CUDA, SIMD, Houdini plugin, USD
**Version Control:** Git, Mercurial
**Platforms:** Linux, Windows
**Other:** HPC optimization, scientific computing, data-driven modeling