

Ruiliang Gao

University of Florida, Gainesville, FL32611, USA
rgao15@ufl.com • +1 (352) 215-3654

EDUCATION

University of Florida (UF)

- Ph.D. candidate in Computer Engineering Aug 2015 – Apr 2022
 - Research interests: Computer Graphics, Physical Simulation, Geometry Modeling
 - Advisor: Jörg Peters
 - Cumulative GPA: 3.82 / 4.00

University of Science and Technology of China (USTC)

- B.S. in Computational Mathematics Sep 2011 – Jun 2015
 - Advisor: Ligang Liu
 - Cumulative GPA: 3.76 / 4.30 (top 10%)

SKILLS

- Proficient in C++
- Familiar with Python, Java, MATLAB, OpenGL, Vulkan, Blender 3D Modeling, Abaqus CAE
- Language: Chinese (native); English (proficient)

PROFESSIONAL & RESEARCH EXPERIENCE

R&D intern, Kitware, Inc, North Carolina

- PBD and Pattern Cutting in iMSTK May 2019 – Aug 2019
 - Developed a runtime topology modification algorithm in iMSTK based on the PBD method
 - Created a pattern cutting surgical training application
 - Advisor: Andinet Enquobahrie, Sreekanth Arikatla
 - Area: Physical simulation

SurfLab Research Group, University of Florida

- TIPSLite Jun 2020 – Now
 - TIPSLite is our new cross-platform, cell phone based remote surgical training platform, which features a remote simulator, a remote App manager, a thin client and user cellphone APP
 - Developed the remote simulator, TIPS controller Android APP and part of the IOS APP
 - Tested, deployed and maintained the remote App manager and the thin client
 - Advisor: Jörg Peters, Krista Terracina
 - Area: Virtual reality, Surgical simulation, Smart phone applications
- Elastoplasticity FEM modeling in surgery simulation Oct 2020 – Jan 2022
 - Extended the existing elastic FEMs in Simulation Open Framework Architecture (SOFA) to handle plastic deformation on hexahedral meshes
 - Devised a simple plastic decomposition scheme that handles both rotational and stretching plasticity
 - Implemented our plasticity method in both the Corotational FEM and hyperelastic FEM
 - Area: Elastoplasticity modeling, Soft-tissue simulation
- Toolkit for Illustration of Procedures in Surgery (TIPS) Dec 2015 – Dec 2021
 - TIPS is a 3D interactive multimedia authoring and learning environment for communication of surgical procedures, which integrates three layers: 1) TIPS Simulator, 2) TIPS Artist, 3) TIPS Author
 - Implemented and improved several plugins and features in the SOFA based TIPS Simulator
 - Developed several components for modeling geometry and physics in Blender2SOFA.
 - Maintained the TIPS Author that allows surgeon-educators to and customize surgical procedures
 - Area: Virtual Reality, Surgical simulation, Geometry Modeling
- Structured Hexahedral Mesher Jan 2018 – May 2018
 - Implemented a structured hexahedral mesher using grid-based and swapping-based techniques in our Blender plugin – Blender2Sofa. The output hex meshes conform to the input surface and allows embedding internal structures. Source code
 - Adviser: Jörg Peters, Alper Üngör
 - Area: Computational Geometry, Geometry Modeling

Graphics&Geometric Computing Lab, University of Science and Technology of China

- 3D User Interaction based on Binocular Vision System Jan 2015 – Jun 2015
 - Developed a binocular vision tracking system that incorporates the image capturing, camera calibration, object tracking and 3-D user interaction, based on OpenCV 2.0 and MATLAB Camera Calibrator
 - Adviser: Ligang Liu

- 3D Iterative Mesh Deformation Jul 2014 – Sep 2014
 - Implemented and compared several interactive Mesh Deformation methods including the Laplacian-based and Poisson-based surface editing methods
 - Adviser: Ligang Liu
- 3D Computer Game Design May 2014 – Jul 2014
 - Developed a 3D computer game using Unity3D, *Zombie City*, a third person shooting game. It was awarded as the best Computer Graphics course project
 - Worked on the characters, storyline
 - Adviser: Ligang Liu

- PUBLICATION**
- [1] R. Gao and J. Peters, "Improving Hexahedral-FEM-Based Plasticity in Surgery Simulation," *International Conference on Medical Image Computing and Computer-Assisted Intervention*, pp. 571–580, Springer, Mar 2021.
 - [2] R. Gao, S. Kurenov, E. W. Black, and J. Peters, "Adding Safety Rules to Surgeon-Authored VR Training," preprint, arXiv:2111.02523, Nov 2021.
 - [3] M. Sarov, R. Gao, J. Youngquist, G. Sarosi, S. Kurenov, and J. Peters, "An Authoring Interface for Surgeon-Authored VR Training," *International Journal of Computer Assisted Radiology and Surgery*, pp. 1-4, Jun 2018.
 - [4] R. Gao and J. Peters, "Plastic hexahedral FEM for surgical simulation," *International Journal of Computer Assisted Radiology and Surgery (IJCARS)*, Feb 2022 (under review).

- TEACHING EXPERIENCE**
- Teaching Assistant at the CISE department, UF Sep 2015 – Now
 - Numerical Analysis, Adv Data structures, Computer Architecture, Prog Fundamental, Algorithm Analysis, etc.
 - Project leader on TIPS and TIPSlite projects Jun 2019 – Now
 - Instructed Grads/Undergrats to develop some features on TIPS-author and TIPSlite
 - Lab mentor for SSTP program, CISE Department, UF Jun 2017 – Sep 2018
 - Instructed the SSTP students to work on TIPS project and Blender
 - Teaching Assistant at USTC Feb 2015 – Jun 2015

- CONFERENCE EXPERIENCE**
- Conference presenter at MICCAI 2021 Sep 2021
 - Exhibitor at Academic Surgical Congress (ASC) 2020 Feb 2020
 - Exhibitor at ACS Clinical Congress 2019 Oct 2019

- SCHOLARSHIP& AWARDS**
- Graduate assistantship from University of Florida 2015 – 2022
 - Excellent Student Scholarship Silver from Univ. of Sci & Tech. of China (top 10%) 2011 – 2014
 - The national high school mathematics League provincial first division 2010

- HOBBIES**
- Tennis
 - Musical instruments (guitar, accordion, piano, kalimba)
 - Photography

[CV compiled on 2022-02-27]