Ruiliang Gao

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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, Surgical Simulation

SurfLab Research Group, University of Florida

- TIPSlite — Jun 2020 – Now
  - TIPSlite is our new cross-platform, cell phone based remote surgical training interface, which features a remote simulator, a remote App manager, a thin client and the user cellphone controller 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, Smartphone 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, Physical 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 Possion-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)
- Photography

[*CV compiled on 2022-03-22*]