Hang Li

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Research Interests

- Computer Graphics and Computer Vision: AR/VR/XR, Geometric Modeling, Computational Geometry, Computer Aided Geometry Design, Rendering, GPU Programming and Acceleration (GLSL), 3D Printing Algorithms
- AR/VR Sensor Calibration: Camera and Display

Education

- **Texas A&M University** 2015 - 2021
  Ph.D. in Computer Science
  Research Area: Computer Graphics
- **University of Science and Technology of China** 2011 - 2015
  B.S. in Mathematics

Experience

- **Research Engineer** April 2021 - present
  Meta Platforms, Redmond, WA
  - Developed sensor calibration algorithms to deliver high-precision camera and display models, enabling accurate SLAM localization and world-lock rendering for Orion AR glasses.
  - Built calibration stations and calibrated AR devices and prototypes for large-scale production.
  - Designed an end-to-end measurement system (OCalVal) to assess AR device rendering accuracy.
  - Deployed a runtime calibration correction algorithm in Orion AR glasses to compensate for physical device deformations.

- **Research Intern** May 2020 - Aug 2020
  Meta Platforms, Redmond, WA
  - Developed a SLAM visualization tool to support AR/VR algorithms.
  - Built a back-end server to synchronize data with the front-end in real time.
  - Designed an interactive front-end UI to demonstrate three-dimensional AR/VR scenes.
  - Collaborated with researchers from various disciplines to design and implement novel algorithms for visual learning and rendering challenges.

- **Software Engineer Intern** May 2019 - Aug 2019
  Halliburton, Houston, TX
  - Developed a volumetric rendering algorithm for data visualization with GPU acceleration.
  - Built a WebGL-based 3D Viewer for oil well drilling and embedded it into an existing software.
  - Designed a VR application for immersive oil well data visualization.

- **Research Assistant** 2015 - 2020
  Department of Computer Science and Engineering, Texas A&M University
  - Created a scheme for tolerance arrangement based on a statistical tolerance model.
  - Built an efficient 3D painting system with local parameterization.
  - Presented a new representation method for shapes as a combination of Gaussian functions.

- Proposed methods to support geometric analysis and construction planning for filament winding.

- **Research Assistant** 2013 - 2015
  Graphics & Geometric Computing Lab, University of Science and Technology of China
  - Presented an adaptive slicing scheme for reducing manufacturing time of 3D printing system.
  - Developed a fast slicing algorithm for implicit 3D model printing.
  - Designed a data-driven algorithm to reconstruct 3D shapes from a single image.

Programming Skills

Primary: C++, Python, Mathematica, OpenGL(GLSL)

Secondary: C, C#, Spark, SQL, Fortran, HTML, Java, JavaScript, MATLAB, R, Ruby on Rails, WebGL

Publications

[1] **Li, H.**, Sueda, S., Keyser, J., Computation of Filament Winding Paths with Concavities and Friction. Computer-Aided Design 141 (2021): 103089.

[2] **Li, H.**, Xu, S., Keyser, J., Optimization for Statistical Tolerance Allocation. Computer Aided Geometric Design 75 (2019): 101788.

[3] Xu, S., **Li, H.**, Keyser, J., Field-Aware Parameterization for 3D Painting. Computer Graphics International Conference, pp. 131-142. Springer, Cham, 2019.

[4] Wang, W., Chao, H., Tong, J., Yang, Z., Tong, X., **Li, H.**, Liu, X., Liu, L., Saliency-Preserving Slicing Optimization for Effective 3D Printing. Computer Graphics Forum. Vol. 34. No. 6. 2015.

[5] Xu, W., Wang, W., **Li, H.**, Yang, Z., Liu, X., Liu, L., Topology Optimization for Minimal Volume in 3D Printing. Journal of Computer Research and Development 52.1 (2015): 38.

Selected Projects

Details and more projects on `http://hangli.graphics/projects`

- **GPU-Based Real-Time Anisotropic Anti-Aliasing**
  Developed a real-time spatial anisotropic anti-aliasing algorithm with GLSL and mipmap for rendering scenes with high frequency textures.
- **Distributed Ray Tracer and Photon Mapping**
  Implemented a distributed ray tracer with photon mapping and environment mapping, which can generate caustics effect, depth of field (DOF) effect, and 3D stereo view.
- **Spectrum Rendering and Cook-Torrance BRDF**
  Simulated the appearances of different materials in the sunlight by a spectrum rendering algorithm with Cook-Torrance BRDF.
- **Marching Cube and Toon Shading**
  Implemented a marching cube algorithm and a real-time toon shader (GLSL) which can be used for 3D implicit surface display.
- **Radiosity Rendering**
  Improved the radiosity rendering algorithm for room rendering with GPU acceleration.

Services and Organizations

- Reviewer, The Shape Creation Using Layouts, Programs, & Technology Conference 2022
- Reviewer, IEEE Computer Graphics and Applications 2020 - present
- Reviewer, IEEE Transactions on Visualization and Computer Graphics 2019 - present
- Reviewer, ELSEVIER Computer-Aided Design Journal 2018 - present