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# Shaohui Liu

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## RESEARCH INTEREST

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My research interests span the area of 3D computer vision, with strong connections to computer graphics, robotics and computational photography. In particular, I am interested in building a robust mapping and localization system for visual images/videos and its applications to real-world practice.

## EDUCATION

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<b>ETH Zurich, Department of Computer Science</b> <i>PhD student in Computer Science, Advised by Prof. Marc Pollefeys</i>	Oct 2022 – Present
<b>ETH Zurich, Department of Computer Science</b> <i>Master in Computer Science</i>	Sep 2020 – Sep 2022
<b>Tsinghua University, Department of Electronic Engineering</b> <i>Bachelor of Engineering in Electronic Engineering</i> Top 10% (GPA: 3.75/4.0)	Aug 2015 – Jun 2020

## EXPERIENCE

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<b>ByteDance Inc.</b> – Beijing, China <i>[Research Intern] Group "SLAM &amp; 3D Vision", Advised by Hengkai Guo.</i> • Topic: plane-assisted multi-view stereo, multiple plane detection, segmentation, and estimation for daily videos. [7] [8]	Jan 2020 – Sep 2021
<b>ETH Zurich</b> - Zurich, Switzerland <i>[Academic Guest] Computer Vision and Geometry Group (CVG). Led by Prof. Marc Pollefeys.</i> • Topic: 3D reconstruction (structure-from-motion, differentiable rendering) [5]	Jul 2019 – Nov 2019
<b>Microsoft Research Asia</b> - Beijing, China <i>[Research Intern] Visual Computing Group. Advised by Dr. Han Hu &amp; Dr. Steve Lin.</i> • Semantically aligned deformation modeling (RepPoints): learning a set of 2D representative points for object detection, contour matching, instance segmentation and geometric/semantic correspondence. [3]	Dec 2018 – May 2019
<b>University of Pennsylvania [Remote]</b> – Philadelphia, PA, United States / Beijing, China <i>GRASP Lab. Advised by Prof. Jianbo Shi.</i> • Normalized diversification (safe interpolation & active extrapolation): complete and closed mapping of the output space. [2] • Modeling cross-domain alignment between deformed pose domain and warped image domain.	Jul 2018 – Feb 2019
<b>Tsinghua University</b> – Beijing, China <i>Intelligent Vision Group (IVG). Advised by Prof. Jiwen Lu.</i> • Conditional single-view shape modeling for multi-view reconstruction via multi-view consistency optimization. [1] • Developed an improved evaluation framework to partially address the problem of FID.	Sep 2017 – Sep 2018
<b>Sensetime</b> – Beijing, China <i>[Research Intern] Group "Video Intelligence" (camera department). Advised by Dr. Hongwei Qin.</i> • Major developer of a complete online real-time system for face identification in the wild (already been applied to market products). This involves video object detection, visual tracking, and face analysis.	Jun 2017 – Mar 2018

## PROJECTS & HONORS

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**[Selected Projects]:** Please refer to <http://b1ueber2y.me/academic.html> for details.

**[Publications]:** (\* indicates equal contribution)

- [10] Rémi Pautrat, **Shaohui Liu**, Petr Hruby, Marc Pollefeys, Daniel Barath, "Vanishing Point Estimation in Uncalibrated Images with Prior Gravity Direction". In ICCV, 2023.
- [9] **Shaohui Liu**, Yifan Yu, Rémi Pautrat, Marc Pollefeys, Viktor Larsson, "3D Line Mapping Revisited". In CVPR, 2023 (Highlight).
- [8] Wang Zhao, **Shaohui Liu**, Hengkai Guo, Wenping Wang, Yong-Jin Liu, "Particulate SfM: Exploiting Dense Point Trajectories for Localizing Moving Cameras in the Wild". In ECCV, 2022.
- [7] Wang Zhao\*, **Shaohui Liu\***, Yi Wei, Hengkai Guo, Yong-Jin Liu, "A Confidence-based Iterative Solver of Depths and Surface Normals for Deep Multi-view Stereo". In ICCV, 2021.
- [6] Yi Wei, **Shaohui Liu**, Yongming Rao, Wang Zhao, Jiwen Lu, and Jie Zhou, "NerfingMVS: Guided Optimization of Neural Radiance Fields for Indoor Multi-view Stereo". In ICCV, 2021 (Oral).
- [5] **Shaohui Liu**, Yinda Zhang, Songyou Peng, Boxin Shi, Marc Pollefeys and Zhaopeng Cui, "DIST: Rendering Deep Implicit Signed Distance Function with Differentiable Sphere Tracing". In CVPR, 2020.
- [4] Wang Zhao, **Shaohui Liu**, Yezhi Shu and Yong-Jin Liu, "Towards Better Generalization: Joint Depth-Pose Learning without PoseNet". In CVPR, 2020.
- [3] Ze Yang\*, **Shaohui Liu\***, Han Hu, Liwei Wang and Stephen Lin, "RepPoints: Point Set Representation for Object Detection", In ICCV, 2019.
- [2] **Shaohui Liu\***, Xiao Zhang\*, Jianqiao Wang and Jianbo Shi, "Normalized Diversification", In CVPR, 2019.
- [1] Yi Wei\*, **Shaohui Liu\***, Wang Zhao\*, Jiwen Lu and Jie Zhou, "Conditional Single-view Shape Generation for Multi-view Stereo Reconstruction", In CVPR, 2019.

- **Honors:**
- Outstanding reviewer for ECCV (2022)
  - Direct Doctorate Scholarship (2020)
  - Qualcomm Scholarship (2017)
  - Sensetime Undergraduate Scholarship (2017)
  - Tsinghua Research Excellence Scholarship (2016, 2017, 2018)

## TECHNICAL SKILLS

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**Programming:** C/C++, CUDA, Python, MATLAB, R, HTML/CSS, JavaScript, SQL, Verilog, L<sup>A</sup>T<sub>E</sub>X, Linux/Unix

**Language:** Mandarin (native), English (fluent)