Songyou Peng | Curriculum Vitae

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Education

ETH Zurich **Zurich, Switzerland**
Doctor of Sciences, Max Planck ETH Center for Learning Systems PhD Fellowship *09/2019–11/2023*
Supervisor: Prof. Marc Pollefeys & Prof. Andreas Geiger
Committee: Prof. Leonidas J. Guibas (Stanford) and Prof. Vincent Sitzmann (MIT)

Heriot-Watt University/University of Girona/University of Bourgogne
Erasmus Mundus M.Sc in Computer Visions and Robotics (VIBOT) *09/2015–09/2017*
GPA: 17/20 (**rank 3/23**) **with distinction**
Thesis:"High Quality Shape from an RGB-D Camera Using Photometric Stereo"
Supervisor: Prof. Daniel Cremers

Xi'an Jiaotong University **Xi'an, China**
B.Eng in Automation, focus: artificial intelligence *08/2011–07/2015*

Experience

Google DeepMind **San Francisco, USA**
Research Scientist *05/2024–present*
- Core contributor of Gemini 2.5, pre-training/post-training for multi-modal spatial reasoning.
- Co-lead the project in world-scale 3D scene representations, in collaboration with Google Maps.

ETH Zurich **Zurich, Switzerland**
Senior Researcher/Postdoc *12/2023–05/2024*
- Advised 3 PhD students and 4 master students on their research projects.
- Drafted, applied, and successfully obtained research fundings for 2 PhD positions.

Google Research **Mountain View, USA**
Research Intern, mentor: Prof. Thomas Funkhouser *07/2022–11/2022*
- Published OpenScene at CVPR 2023, first effort in open-vocabulary 3D scene understanding.
- Directly resulted in a world-scale scene understanding effort inside Google called Geo Foundational Features.

Meta Reality Labs Research **Pittsburgh, USA (remote)**
Research Intern, mentor: Dr. Michael Zollhöfer *09/2021–12/2021*
- Real-time neural rendering for 360-degree indoor scenes.

Agency for Science, Technology and Research (A*STAR) **Singapore**
Research Engineer, Institute for Infocomm Research *10/2018–07/2019*
- Performed an independent research project on universal architecture for bad-weather image restoration.
- Worked on traffic flow prediction with gated spatial-temporal CNNs and graph CNNs.

Advanced Digital Sciences Center, UIUC **Singapore**
Research Engineer, supervisor: Dr. Stefan Winkler, IEEE Fellow *01/2018–03/2019*
Research in affective computing.
- Developed a facial emotion analysis SDK for a 2-million SGD project.
- Published an ACM MM demo paper and an IEEE Transactions on Affective Computing paper.
- Won 1st place in vision-only task and 2nd place in overall in OMG-Emotion Challenge 2018.

Technical University of Munich (TUM) **Munich, Germany**
Master Thesis, supervisor: Prof. Daniel Cremers & Dr. Yvain Queau *01/2017–07/2017*
Depth Super-Resolution using photometric techniques.

- Proposed three photometric methods to obtain high-resolution depths with fine geometric details.
- One TPAMI paper and one ICCVW paper.

INRIA **Grenoble, France**
Research Intern, supervisor: Prof. Peter Sturm *2016 & 2017 summer*

- ICCV oral paper: designed a calibration guidance system for obtaining optimal calibration images.

Selected Publications (Full List at Google Scholar)

- Botao Ye, Sifei Liu, Haofei Xu, Xueting Li, Marc Pollefeys, Ming-Hsuan Yang, **Songyou Peng**, "No Pose, No Problem: Surprisingly Simple 3D Gaussian Splats from Sparse Unposed Images", ***ICLR***, 2025. (**Oral, top 1.6%**)
- Jan Ackermann, Jonas Kulhanek, Shengqu Cai, Haofei Xu, Marc Pollefeys, Gordon Wetzstein, Leonidas Guibas, **Songyou Peng**, "CL-Splats: Continual Learning of Gaussian Splatting with Local Optimization", ***ICCV***, 2025.
- Boyang Deng, **Songyou Peng**, Kyle Genova, Gordon Wetzstein, Noah Snavely, Leonidas Guibas, Thomas Funkhouser, "Visual Chronicles: Using Multimodal LLMs to Analyze Massive Collections of Images", ***ICCV***, 2025. (**Highlight**)
- Jonas Kulhanek, **Songyou Peng**, Zuzana Kukelova, Marc Pollefeys, Torsten Sattler, "WildGaussians: 3D Gaussian Splatting in the Wild", ***NeurIPS***, 2024.
- Rui Huang, **Songyou Peng**, Ayça Takmaz, Federico Tombari, Marc Pollefeys, Shiji Song, Gao Huang, Francis Engelmann, "Segment3D: Learning Fine-Grained Class-Agnostic 3D Segmentation without Manual Labels", ***ECCV***, 2024.
- Weining Ren*, Zihan Zhu*, Boyang Sun, Jiaqi Chen, Marc Pollefeys, **Songyou Peng**, "NeRF *On-the-go*: Exploiting Uncertainty for Distractor-free NeRFs in the Wild", ***CVPR***, 2024.
- **Songyou Peng***, Zihan Zhu*, Viktor Larsson, Zhaopeng Cui, Martin R. Oswald, Andreas Geiger, Marc Pollefeys, "NICER-SLAM: Neural Implicit Scene Encoding for RGB SLAM", ***3DV***, 2024. (**Oral, Best Paper Honorable Mention**)
- **Songyou Peng**, Kyle Genova, Chiyu "Max" Jiang, Andrea Tagliasacchi, Marc Pollefeys, Thomas Funkhouser, "OpenScene: 3D Scene Understanding with Open Vocabularies", ***CVPR***, 2023.
- **Songyou Peng***, Zihan Zhu*, Viktor Larsson, Weiwei Xu, Hujun Bao, Zhaopeng Cui, Martin R. Oswald, Marc Pollefeys, "NICE-SLAM: Neural Implicit Scalable Encoding for SLAM", ***CVPR***, 2022.
- **Songyou Peng**, Chiyu "Max" Jiang, Yiyi Liao, Michael Niemeyer, Marc Pollefeys, Andreas Geiger, "Shape As Points: A Differentiable Poisson Solver", ***NeurIPS***, 2021. (**Oral, top 0.6%**)
- **Songyou Peng**, Michael Niemeyer, Lars Mescheder, Marc Pollefeys, Andreas Geiger, "Convolutional Occupancy Networks". ***ECCV***, 2020. (**Spotlight, top 5%**)
- **Songyou Peng**, Peter Sturm, "Calibration Wizard: A Guidance System for Camera Calibration Based on Modelling Geometric and Corner Uncertainty". ***ICCV***, 2019. (**Oral, top 4.6%**)
- **Songyou Peng***, Bjoern Haefner*, Alok Verma*, Yvain Quéau, Daniel Cremers, "Photometric Depth Super-Resolution". ***TPAMI***, 2019.
- Zehao Yu, **Songyou Peng**, Michael Niemeyer, Torsten Sattler, Andreas Geiger, "MonoSDF: Exploring Monocular Geometric Cues for Neural Implicit Surface Reconstruction", ***NeurIPS***, 2022.
- Michael Oechsle, **Songyou Peng**, Andreas Geiger, "UNISURF: Unifying Neural Implicit Surfaces and Radiance Fields for Multi-View Reconstruction". ***ICCV***, 2021. (**Oral, top 3%**)
- Christian Reiser, **Songyou Peng**, Yiyi Liao, Andreas Geiger, "KiloNeRF: Speeding up Neural Radiance Fields with Thousands of Tiny MLPs", ***ICCV***, 2021.
- Shaohui Liu, Yinda Zhang, **Songyou Peng**, Boxin Shi, Marc Pollefeys, Zhaopeng Cui, "DIST: Rendering Deep Implicit Signed Distance Function with Differentiable Sphere Tracing". ***CVPR***, 2020.

Awards & Fellowships

- ECVA PhD Award (two awardees across the whole Europe per year) 2024
- Best Paper Honorable Mention Award at 3DV 2024
- Max Planck ETH Center for Learning Systems PhD Fellowship 2019 – 2023
- Best Presentation Award at ICVSS 2023
- 1st place in partial object recovery in SHARP Challenge at CVPR 2022
- Outstanding Reviewer of CVPR (Top 2%) 2022
- Highlighted Reviewer of ICLR (Top 8%) 2022
- Most Influential ECCV Papers: ConvONet #12 (link) 2020
- 1st place in vision-only task and 2nd in overall in OMG-Emotion Recognition Challenge 2018
- EU Erasmus+ mobility grant, awarded by European Union Commission 2016 & 2017
- Excellent bachelor thesis (top 5% of all graduates), XJTU 2015
- 1st in Search and Rescue Robot Challenge, California State University, USA 2010
- 2nd in Trinity College Fire Fighting Home Robot Contest, Connecticut, USA 2010
- 2nd in RoboCup Junior China Qualification Trial, Suzhou, China 2007

Invited Talks

- A "Splatacular" Year of 3D Reconstruction. *Stanford University* 2025
- A "Splatacular" Year of 3D Reconstruction. *KAIST* 2025
- 2D Magic in a 3D World. *Czech Technical University (CTU)* 2024
- 2D Magic in a 3D World. *Imperial College London* 2024
- 2D Magic in a 3D World. *The University of Hong Kong* 2024
- Dive into Neural Implicit-Explicit 3D Representations. *Invited lecture at SGP graduate school* 2023
- OpenScene: 3D Scene Understanding with Open Vocabularies. *Apple* 2023
- OpenScene: 3D Scene Understanding with Open Vocabularies. *Stability.ai* 2023
- OpenScene: 3D Scene Understanding with Open Vocabularies. *Peking University* 2023
- Learning to Reconstruct and Understand the 3D World. *Microsoft Mix Reality & AI Lab* 2023
- Learning Neural Scene Representations for 3D Reconstruction and Understanding. *Shanghai AI Lab* 2023
- How do NeRF and CLIP advance 3D Scene Reconstruction and Understanding? *Bosch* 2023
- Large-Scale 3D Scene Reconstruction with NeRF. *Stanford University* 2022
- Towards Practical Applications of NeRF. *Adobe Research* 2022
- Neural Scene Representations for 3D Reconstruction. *University of Basel* 2022
- Shape As Points: A Differentiable Poisson Solver. *Talking Papers Podcast* 2022
- Towards Practical Applications of NeRF. *GAMES Webinar Series* 2021

Teaching

Teaching Assistant at ETH Zurich

- [252-0579-00L] 3D Vision (Lecturer: Marc Pollefeys & Daniel Barath) Spring 23
- [263-5902-00L] Computer Vision (Lecturer: Marc Pollefeys & Siyu Tang & Fisher Yu) Fall 22
- [252-0579-00L] 3D Vision (Lecturer: Marc Pollefeys & Daniel Barath) Spring 22

- [263-5904-00L] Deep Learning for Computer Vision: Seminal Work — Spring 22
- [252-0579-00L] 3D Vision (Lecturer: Marc Pollefeys & Viktor Larsson) — Spring 20
- [263-5904-00L] Deep Learning for Computer Vision: Seminal Work — Spring 20

Teaching Assistant at University of Tübingen

- [ML-4103] Deep Learning (Lecturer: Andreas Geiger) — Winter 20/21

PhD Students Mentored at Google DeepMind

- *Gene Chou* (Cornell): Ongoing, 3D world reconstruction — 2025
- *Youming Deng* (Cornell): Ongoing, Universal camera pose estimator — 2025
- *Jiahao Wang* (John Hopkins): Ongoing, Waymo world simulator — 2025
- *Jonas Kulhanek* (CTU/ETH Zurich): LODGE [NeurIPS'25 paper] — 2025
- *Boyang Deng* (Stanford): Visual Chronicles [ICCV'25 highlight paper] — 2024
- *Anh Thai* (Georgia Tech): SplatTalk [ICCV'25 paper] — 2024

Supervised Master Students at ETH Zurich

- [Semester project] Jan Ackermann (Next: PhD Student at Stanford University) — 2024
- [Master thesis] Gonca Yilmaz (Next: Software Engineer at Google Zurich) — 2024
- [Master thesis] Weining Ren (Next: PhD Student at the University of Hong Kong) — 2023
- [Master thesis] Lei Li (Next: Research Engineer at ByteDance) — 2023
- [Master thesis] Mirlan Karimov (Next: PhD Student at Mercedes-Benz AG) — 2023
- [Semester project] Gonca Yilmaz (Next: Master thesis with CVG, ETH Zurich) — 2023
- [Semester project] Shengqu Cai (Next: PhD Student at Stanford University) — 2023
- [Semester project] Zihan Zhu (Next: PhD Student at ETH Zurich) — 2022
- [Master thesis] Pfister Severin (Next: Consultant at McKinsey) — 2021
- [Semester project] Weirong Chen (Next: PhD Student at TU Munich) — 2021

Service

- **Publicity Chair**: 3DV 2025
- **Area Chair**: CVPR 2026, ICLR 2026, ICCV 2025, ICML 2025, 3DV 2024 (done during PhD)
- **Workshop Organizer**:
  - MUSI: Workshop on Multi-Modal Spatial Intelligence, ICCV 2025
  - 5th Workshop on 3D Scene Understanding for Vision, Graphics, and Robotics, CVPR 2025
  - OpenSUN3D: 3rd Open-Vocabulary 3D Scene Understanding, ECCV 2024
  - FOCUS: Foundation Models Creators Meet Users, ECCV 2024
  - OpenSUN3D: 2nd Open-Vocabulary 3D Scene Understanding, CVPR 2024
  - OpenSUN3D: 1st Open-Vocabulary 3D Scene Understanding, ICCV 2023
- **Conference Reviewer**: CVPR, ICCV, ECCV, SIGGRAPH, SIGGRAPH Asia, NeurIPS, ICLR, RSS
- **Journal Reviewer**: TPAMI, IJCV, CVIU