

LAHAV LIPSON

Phone: (607) 379-2016 Email: llipson@princeton.edu

EDUCATION

Princeton University:

Sept. 2019 – Present

Ph.D. Candidate in Computer Science

Advisor: Jia Deng

Columbia University:

Sept. 2015 – May 2019

B.S. in Computer Science.

GPA: 4.06 / 4.33 (top 5%)

RESEARCH INTERESTS

3D Reconstruction, SLAM, Visual Odometry, Structure from Motion, Multiview Stereo, Object Pose, Camera Localization

AWARDS AND HONORS

Princeton SEAS Award for Excellence

Sept. 2023

Qualcomm Innovation Fellowship finalist

May 2023

Best Student Paper Award – *International Conference on 3D Vision (3DV)*

Oct. 2021

- State-of-the-art stereo matching

Summa Cum Laude from Columbia University

May 2019

Academic Excellence Award from Columbia, Department of Computer Science

May 2019

PUBLICATIONS

Lahav Lipson, Jia Deng “Multi-Session SLAM Using Wide-Baseline Optical Flow” *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

Alexander Raistrick, Lingjie Mei, Karhan Kaan Kayan, David Yan, Yiming Zuo, Beining Han, Hongyu Wen, Meenal Parakh, Stamatis Alexandropoulos, Lahav Lipson, Zeyu Ma, Jia Deng “Infinigen Indoors: Photorealistic Indoor Scenes using Procedural Generation” *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

Zeyu Ma, Alexander Raistrick, Lahav Lipson, Jia Deng. “View-Dependent Octree-based Mesh Extraction in Unbounded Scenes for Procedural Synthetic Data” *arXiv preprint arXiv:2312.08364*, 2024.

Lahav Lipson*, Alexander Raistrick*, Zeyu Ma*, Lingjie Mei, Mingzhe Wang, Yiming Zuo, Karhan Kayan, Hongyu Wen, Beining Han, Yihan Wang, Alejandro Newell, Hei Law, Ankit Goyal, Kaiyu Yang and Jia Deng. "Infinite Photorealistic Worlds using Procedural Generation." *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.

(* Equal contribution)

Zachary Teed*, Lahav Lipson*, and Jia Deng. "Deep Patch Visual Odometry" *In Proceedings of the 2023 Conference on Neural Information Processing Systems (NeurIPS)*.

(* Equal contribution)

Lahav Lipson, Zachary Teed, Ankit Goyal, and Jia Deng. "Coupled Iterative Refinement for 6D Multi-Object Pose Estimation." *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022.

Lahav Lipson, Zachary Teed, and Jia Deng. "RAFT-Stereo: Multilevel recurrent field transforms for stereo matching." *In 2021 International Conference on 3D Vision (3DV)*, 2021. (**Best Student Paper Award**)

EXPERIENCE

Visual Odometry and SLAM

Sept. 2019 – Present

- Co-first authored "Deep Patch Visual Odometry (DPVO)" at NeurIPS 2023.
- First authored "Multi-Session SLAM using Wide-Baseline Optical Flow" as CVPR 2024
- Developed a new deep learning system for monocular Visual Odometry, and for monocular SLAM on multiple video streams.
- We outperform all prior work (classical or learned) in both accuracy and/or speed on standard benchmarks.
- Our DPVO method is accurate and robust while running at up to 5x real-time speeds on a single RTX-3090 GPU using only 4GB of memory.

6D Object Pose

Sept. 2019 – Present

- Published "Coupled Iterative Refinement for 6D Multi-Object Pose Estimation" at CVPR 2022.
- We proposed an end-to-end pipeline for estimating 6-DOF object pose from a single image.
- We introduced a differentiable solver layer which jointly optimizes both pose and correspondence, enabling us to dynamically remove outliers to improve accuracy.
- Our method works with-or-without depth input, using one of two variants of our introduced solver layer.
- We achieved state-of-the-art results among published methods on standard benchmarks.
- Co-Winner of the BOP Object Pose Challenge at ECCV 2022 and ICCV 2023

Stereo Matching

Sept. 2019 – Present

- Published "RAFT-Stereo: Multilevel Recurrent Field Transforms for Stereo Matching" at 3DV 2021.
- We introduced a new deep architecture for rectified stereo from image pairs.
- Our method uses multi-level recurrent updates to refine a high-resolution disparity-field between images.
- Our method is extremely memory efficient, and a version runs in real-time.
- We achieved state-of-the-art results across multiple real-world datasets.

WORK EXPERIENCE

Amazon Intern

June 2018 – Aug. 2018

Software Developer Engineer

- Designed and developed an AI-based product recommendation system as part of the Amazon Stores Team.

Teaching Assistant

2018, 2020 – 2021

Computer Vision (Princeton), Algorithms and Data Structures (Princeton), Computer Science Theory (Columbia)

- Wrote and/or graded assignments, held office hours and led precepts and discussions.