

Shuai Yuan

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EDUCATION

Ph.D. in Computer Science, [Duke University](#), USA

Aug 2018 - Dec 2023

- Research area: **Computer Vision** and **Machine Learning**, supervised by [Dr. Carlo Tomasi](#)
- Focused on optical flow estimation, stereo depth perception, 3D scene geometry, and motion tracking from videos
- Relevant coursework: Machine Learning (A+), Intro to Deep Learning (A+), Theory of Inference (A+), Predictive Modeling (A), Information Theory (A), Bayesian and Modern Statistics (A), Probability/Measure Theory (A)

B.S. in Computer Science and Technology, [Nanjing University](#), China

Sep 2014 - Jun 2018

- Student of the [Kuang Yaming Honors School](#) of Nanjing University (“NJU Elite Program”)
- Overall GPA: **4.60/5.00**, ranking **1/41** in the Computer Science Elite Program
- Relevant coursework: Machine Learning (100/100), Pattern Recognition (100/100), Artificial Intelligence (97/100), Digital Image Processing (94/100), Computer Graphics (90/100), Multivariate Statistical Analysis (94/100)

WORK EXPERIENCE

Machine Learning Engineer - Computer Vision, [TikTok Inc.](#), USA

Feb 2024 - present

- Research and development on video understanding using multimodal models and LLMs

Research Scientist Intern, [Meta Platforms Inc.](#), USA

May 2023 - Dec 2023

- XR Core AI Team and Computational Photography Team (Reality Labs)
- Research on optical flow estimation using large AI foundation models; First-author paper accepted by CVPR 2024

Research Engineer Intern, [Meta Platforms Inc.](#), USA

May 2022 - Aug 2022

- RL Research Surreal Team (Reality Labs); Stereo matching, depth perception, and 3D reconstruction for AR device

Research Scientist Intern, [Facebook Inc.](#), USA

May 2020 - Aug 2020

- RL Research Agios Team (Reality Labs); Optical flow estimation and hand motion tracking for VR device

RESEARCH EXPERIENCE

[Duke University Computer Vision Lab](#)

Aug 2018 - Dec 2023

Advisor: [Dr. Carlo Tomasi](#)

- Research on the semi-supervised training of optical flow and active learning as an approach to reduce annotation costs; first-author paper accepted by ECCV 2022
- Research on using semantic segmentation to improve unsupervised optical flow estimation for autonomous driving videos; first-author paper accepted by ICCV 2023
- Research on the unsupervised joint estimation of optical flow, stereo depth, and 3D rigid motion map from stereo videos; specifically interested in autonomous driving applications; first-author paper under review
- Research on the unsupervised refinement of optical flow (paper accepted by BMVC 2022) and transformer-based video interpolation (paper accepted by ACCV Workshop 2022, [VTTA@ACCV](#) Workshop **Best Paper Award**.)

[Nanjing University LAMDA \(Learning And Mining from Data\) group](#)

Nov 2015 - Jun 2018

Advisor: [Dr. Zhi-Hua Zhou](#)

- Contributed open source code for the models gcForest (a deep forest) and eForest (a forest auto-encoder)
- Worked on improving deep forest by adding in decision path information as the final-year bachelor’s degree thesis

[Stanford University online research project](#)

Sept 2017 - Mar 2018

Advisors: [Dr. Jiantao Jiao](#), [Dr. Tsachy Weissman](#)

- Won first place in the research project competition “Optimal Estimation of the Differential Entropy”
- Worked on generating tighter exponential concentration bounds of the KL-Divergence for empirical estimation

PUBLICATIONS

- **Shuai Yuan**, Lei Luo, Zhuo Hui, Can Pu, Xiaoyu Xiang, Rakesh Ranjan, and Denis Demandolx. [UnSAMFlow: Unsupervised Optical Flow Guided by Segment Anything Model](#). In *Proceedings of the IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR)*, pp. 19027-19037, 2024.
- **Shuai Yuan**, Shuzhi Yu, Hannah Kim, and Carlo Tomasi. [SemARFlow: Injecting Semantics into Unsupervised Optical Flow Estimation for Autonomous Driving](#). In *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, pp. 9566-9577, 2023.
- **Shuai Yuan**, Xian Sun, Hannah Kim, Shuzhi Yu, and Carlo Tomasi. [Optical Flow Training under Limited Label Budget via Active Learning](#). In *European Conference on Computer Vision (ECCV)*, pp. 410-427, 2022.
- **Shuai Yuan** and Carlo Tomasi. [UFD-PRIME: Unsupervised Joint Learning of Optical Flow and Stereo Depth through Pixel-Level Rigid Motion Estimation](#). *arXiv Preprint*, 2023.
- Yimu Wang*, Xuye Liu*, Wei Pang*, Li Ma*, **Shuai Yuan***, Paul Debevec, and Ning Yu. [Survey of Video Diffusion Models: Foundations, Implementations, and Applications](#). In *Transactions on Machine Learning Research*, 2025. (* Equal contribution)
- Fanjie Kong, **Shuai Yuan**, Weituo Hao, and Ricardo Henao. [Mitigating Test-Time Bias for Fair Image Retrieval](#). In *Advances in Neural Information Processing Systems (NeurIPS)*, pp. 71520-71539, 2023.
- Xiang Wang, **Shuai Yuan**, Chenwei Wu, and Rong Ge. [Guarantees for Tuning the Step Size using a Learning-to-Learn Approach](#). In *Proceedings of the 38th International Conference on Machine Learning (ICML)*, pp. 10981-10990. PMLR, 2021.
- Yimu Wang, **Shuai Yuan**, Bo Xue, Xiangru Jian, Wei Pang, Mushi Wang, and Ning Yu. [DREAM: Improving Video-Text Retrieval Through Relevance-Based Augmentation Using Large Foundation Models](#). *The Nations of the Americas Chapter of the Association for Computational Linguistics (NAACL)*, 2025.
- Kelsey Lieberman, **Shuai Yuan**, Swarna Kamlam Ravindran, and Carlo Tomasi. [Optimizing for ROC Curves on Class-Imbalanced Data by Training over a Family of Loss Functions](#). *arXiv Preprint*, 2024.
- Hannah Kim, Shuzhi Yu, **Shuai Yuan**, and Carlo Tomasi. [Cross-Attention Transformer for Video Interpolation](#). In *Proceedings of the Asian Conference on Computer Vision (ACCV) Workshops, Best Paper Award for VTTA@ACCV Workshop*, 2022.
- Shuzhi Yu, Hannah Kim, **Shuai Yuan**, and Carlo Tomasi. [Unsupervised Flow Refinement near Motion Boundaries](#). In *British Machine Vision Conference (BMVC)*. BMVA Press, 2022.

TECHNICAL SKILLS

- **Programming:** Python, C/C++, MATLAB, R, and SQL
- **Frameworks:** PyTorch and Tensorflow; Linux-based servers; multi-GPU distributed training
- **Languages:** English, Mandarin Chinese

COMMUNITY & LEADERSHIP

- Academic Conference Reviewer** *Jun 2022 - present*
 - **Computer Vision:** CVPR 2024, 2025, 2026; ICCV 2025; ECCV 2024; ACCV 2022.
 - **Machine Learning:** ICML 2024, 2025; NeurIPS 2023, 2026; ICLR 2025, 2026
 - **Artificial Intelligence:** AAAI 2025.
- Student Assistant, Duke CS Faculty Search Committee** *Jan 2019 - Mar 2020*
 - Notified the students of faculty search schedules and arranged escorts from volunteers
 - Organized graduate student meetings with prospective new faculties and collected student feedbacks
- Vice President, Students' Union of the Kuang Yaming Honors School, NJU** *Jul 2015 - Jul 2016*
 - Mainly in charge of student academic activities
 - Organized a university-level research essay contest and 6 public lectures/seminars