

# Shuai Yuan

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## EDUCATION

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

Aug 2018 - Dec 2023

- Research area: **Computer Vision** and **Robotics**, 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

Sept 2014 - Jun 2018

- Student of the [Kuang Yaming Honors School](#) of Nanjing University (“NJU Elite Program”)
- Overall GPA: **4.59/5.00**, 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)

## RESEARCH EXPERIENCE

### Duke University Computer Vision Lab

Sept 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
- Other collaborative research on topics including video interpolation, motion boundary, image retrieval, and class imbalance; second- or third-author papers published on NeurIPS, BMVC, ACCV workshops, etc.

### Duke University learning-to-learn optimization project

Jul 2019 - Jun 2020

Advisor: [Dr. Rong Ge](#)

- Collaborated on the research of the meta-learning of optimizers, leading to a second-author paper in ICML 2021
- Implemented open-source meta-learning code and ran all experiments for the paper

### 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

## WORK EXPERIENCE

### Machine Learning Engineer - Computer Vision, TikTok Inc., USA

Feb 2024 - present

- Research and development on vision-language models for TikTok videos

### 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
- 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

## PUBLICATIONS

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- **Shuai Yuan**, Lei Luo, Zhuo Hui, Can Pu, Xiaoyu Xiang, Rakesh Ranjan, and Denis Demandolx. [UnSAMFlow: Unsupervised Optical Flow Guided by Segment Anything Model](#). To be presented at *IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR)*. 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. Springer, 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.
- 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**, Xiangru Jian, Wei Pang, Mushi Wang, Ning Yu. [HaVTR: Improving Video-Text Retrieval Through Augmentation Using Large Foundation Models](#). *arXiv Preprint*, 2024.
- 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

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

## HONORS & AWARDS

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- Best Paper Award, ACCV Workshop on Vision Transformers: Theory and Application, 2022
- Duke PhD Fellowship, 2018
- Lu Dexin Award of Nanjing University, 2018
- International Exchange Student Scholarship of K.Y. Honors School, Nanjing University, 2017
- First Prize of the Elite Program Scholarship Award, 2015 and 2016
- First Prize of the People's Scholarship Award, 2015 and 2016

## COMMUNITY & LEADERSHIP

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### Academic Conference Reviewer

*Jun 2022 - present*

- Served as a reviewer for ECCV 2024, ICML 2024, CVPR 2024, NeurIPS 2023, and ACCV 2022

### 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