Shuai Yuan

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EDUCATION

Ph. D. in Computer Science, Duke University, USA   *Aug 2018 - Dec 2023 (expected)*
- 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 - June 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 - present*
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 joint estimation of optical flow , stereo depth, and 3D rigid motion segmentation from stereo videos; specifically interested in autonomous driving applications; first-author paper under review

Duke University learning-to-learn optimization project   *July 2019 - June 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 - June 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

Research Scientist Intern, Meta Platforms Inc., USA   *May 2023 - present*
- Core AI Team and Computational Photography Team (Reality Labs); Optical flow estimation and video enhancement
- First-author paper under review

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

Teaching Assistant, Duke University, USA   *Jan 2019 - Dec 2019*
- Teaching assistant for Computer Vision (Spring 2019) and Elements of Machine Learning (Fall 2019)
- Held office hours and Q&A sessions; graded exams and assignments

PUBLICATIONS

- **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. Accepted by Thirty-seventh Conference on *Neural Information Processing Systems (NeurIPS)*, 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.
- Shuzhi Yu, Hannah Kim, **Shuai Yuan**, and Carlo Tomasi. Unsupervised Flow Refinement near Motion Boundaries. In *British Machine Vision Conference (BMVC)*. BMVA Press, 2022.
- 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.

TECHNICAL SKILLS

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

HONORS & AWARDS

- Best Paper Award, ACCV Workshop on Vision Transformers: Theory and Application
- 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

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   *July 2015 - July 2016*
- Mainly in charge of student academic activities
- Organized a university-level research essay contest and 6 public lectures/seminars
- Increased activity popularity (measured by number of participants) by 25% over the previous best record