Shuai Yuan

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EDUCATION

Ph. D. in Computer Science, Duke University, USA *Aug 2018 - present*

- Research interests: **Computer Vision** and **Deep Learning**, supervised by Dr. Carlo Tomasi
- Focused on optical flow estimation and 3D scene geometry analysis from videos
- Current GPA: **4.00/4.00**; minor (concurrent master's) in Statistics
- 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, Nanjing University ("NJU"), 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 combining 3D scene geometry with motion analysis: estimating 3D scene structure (depth) and motion (camera motion and optical flow) from binocular cameras; specifically interested in autonomous driving applications
- Research on the unsupervised refinement of optical flow (paper accepted by BMVC 2022) and transformer-based video interpolation (paper accepted by ACCV Workshop 2022)

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 *Mar 2017 - May 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

WORK EXPERIENCE

Research Engineer Intern, Meta Reality Labs, Meta Platforms Inc., USA *May 2022 - Aug 2022*

- Stereo matching, depth perception, and 3D reconstruction for AR device

Research Scientist Intern, Facebook Reality Labs, Facebook Inc., USA *May 2020 - Aug 2020*

- 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

Biological Data Analyst Intern, Toplore Bio-Tech, Nanjing, China *July 2018 - Aug 2018*
- Biological data analysis based on medical image processing and genetic statistics
- Applied machine learning algorithms to detect cancer cells and chromosome abnormality

Quant Intern, Tianfeng Securities, Shanghai, China *July 2016 - Aug 2016*
- Implemented statistical methods on financial decision-making models by computer simulations
- Predicted potential profits of strategies based on Investor Sentiment Index Models

PUBLICATIONS

- Xiang Wang, **Shuai Yuan**, Chenwei Wu, and Rong Ge. Guarantees for Tuning the Step Size using a Learning-to-Learn Approach. In *International Conference on Machine Learning (ICML)*, pp. 10981-10990. PMLR, 2021.
- **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.
- Shuzhi Yu, Hannah Kim, **Shuai Yuan**, and Carlo Tomasi. Unsupervised Flow Refinement near Motion Boundaries. *arXiv Preprint* (to be presented in BMVC 2022), 2022.
- Hannah Kim, Shuzhi Yu, **Shuai Yuan**, and Carlo Tomasi. Cross-Attention Transformer for Video Interpolation. *arXiv Preprint* (to be presented in ACCV 2022 Workshop), 2022.

HONORS & AWARDS

- Duke PhD Fellowship, 2018
- Lu Dexin Award of Nanjing University, 2018
- International Exchange Student Scholarship of K.Y. Honors School, Nanjing University, 2017
- Meritorious Winner, Mathematical Contest in Modeling, 2016 (top 8% worldwide)
- First Prize of the Elite Program Scholarship Award, 2015 and 2016
- First Prize of the People's Scholarship Award, 2015 and 2016

TECHNICAL SKILLS

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

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