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 prediction; multi-view pixel-level motion and 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 Vison Lab *Sept 2018 - present*

Advisor: Dr. Carlo Tomasi

- Research on combining scene geometry with motion analysis: estimating scene structure (depth) and motion (camera motion and optical flow) from binocular cameras; specifically interested in autonomous driving applications
- Research on video motion analysis: the joint training of optical flow, occlusion, and motion boundaries

Duke University learning-to-learn optimization project *July 2019 - June 2020*

Advisor: Dr. Rong Ge

- Collaborated on 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 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

Duke University undergraduate research program *Aug 2016 - Dec 2016*

Advisor: Dr. Carlo Tomasi

- Enrolled in a one-on-one Research Independent Study program as an exchange student with final grade A+
- Developed image path metrics based on Earth Mover's Distance and applied in Manifold Learning

WORK EXPERIENCE

Research Intern (Robotics), Facebook Reality Labs, Facebook Inc., USA *May 2020 - Aug 2020*

- Built a novel pipeline to generate optical flow datasets with synthetic egocentric hand motion
- Developed optical flow prediction networks for hand sequences from VR headset cameras

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)*, pages 10981-10990. PMLR, 2021. [url]

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)
- Outstanding Student Award (the "Dean's List") of Nanjing University, both 2015 and 2016
- First Prize of the Elite Program Scholarship Award, 2015
- First Prize of the People's Scholarship Award, 2015

TECHNICAL SKILLS

- **Programming**: Proficient in C/C++, Python, MATLAB, and R programming
- **Deep Learning**: Proficient in 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