

# Fei Xia

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## RESEARCH STATEMENT

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My research interests lie in Computer Vision and Machine Learning. In particular, I am interested in simulation to real world transfer and domain adaptation for vision and robotics tasks. For machine learning, I am interested in practical learning based methods with provable performance.

## EDUCATION

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- Stanford University**, Stanford, CA, USA *2016.9 - Present*  
PhD Student, Department of Electrical Engineering, Advisor: Silvio Savarese  
GPA: 4.2/4.0
- Tsinghua University**, Beijing, China *2012.8 - 2016.7*  
Bachelor of Engineering(*Anticipated*) Department of Automation  
Cumulative GPA: **94.1/100**, Class Rank: 1/144 in the Department of Automation
- Stanford University**, Stanford, CA, USA *2015.7 - 2015.9*  
Undergraduate Visiting Research Assistant in the Department of Electrical Engineering  
The Chinese Undergraduate Visiting Research (UGVR) Program, with only 18 students selected from China
- Georgia Institute of Technology**, Atlanta, GA, USA *2014.8 - 2014.12*  
Exchange Student in the School of Electrical and Computer Engineering  
GPA: **4.0/4.0**

## RESEARCH EXPERIENCES

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- Stanford University, Stanford, CA, USA *2016.12 - Present*  
*CVGL, Stanford AI Lab*  
Research Assistant, Advisor: **Prof. Silvio Savarese**, Secondary Advisor: **Prof. Leo Guibas**
- Project 1: View Synthesis from a Single RGB Image**
- Create an end-to-end deep learning based method where the geometric constraints inherent to the problem (specifically 3D rigid body transformation) are internally enforced.
  - Implemented the method and tested on two indoor scene datasets.
- Project 2: Cambria: Embodied active real-world perception**
- Developed Cambria, a robotics simulator for easy transfer to real-world. First robotics simulator that enables real-world perception.
  - Ongoing research project. Paper submitted to CVPR18.
- Stanford University, Stanford, CA, USA *2015.7 - 2016.12*  
*Information Systems Laboratory, Department of Electrical Engineering*  
Research Assistant, Advisor: **Prof. David Tse**
- Project 1: De novo DNA Sequence Assembly from Barcoded Reads**
- Established the information-theoretic bounds for a third generation sequencing technology, 10X. Discovered that closely spaced interleaved repeats are the main bottleneck for this read model.
  - Designed algorithms to take advantage of barcoded linked reads in order to generate better assembly than what is currently available.
  - Experimented on Human Chromosome 21, and boosted N50 of state-of-the-art assembler by 30%.
- Project 2: HINGE: A de novo Sparse String Graph Assembler for PacBio Reads**

- Generated **finished** assembly at accuracy 99.9% for *E.Coli* based on sparse string graph methods, with details in publication [1-2].
- Extended NSG(Not-So-Greedy) algorithm to a regime when triple repeats are all-bridged and interleaved repeats are bridged, i.e. information-theoretic bound for perfect assembly.

**Project 3: NeuralFDR: learning decision threshold from hypothesis features**

- Proposed a learning based method for FDR control. Developed mirroring method for FDP prediction. NeuralFDR has provable performance in FDP control.
- Implemented the method and tested on RNASeq and GWAS datasets. Details can be found in paper [1].

Megvii Inc., Beijing, China

2016.3-2016.7

*DTR(Detection, Tracking, Re-identification) Group*

Research Intern, Mentor: **Chi Zhang, Chief Scientist**

**Project 1: Pedestrian Parsing Models**

- Built a deep convolutional neural network model based on Holistically-Nested Edge Detection model and adapted it for pedestrian parsing.

**Project 2: Pixel Level Domain Transfer for Pedestrian Re-identification**

- Built a generative adversarial network that transfer from pedestrian domain to upper-cloth domain, and used that model for pedestrian re-identification.
- Both models were incorporated into company's API for downstream applications.

Georgia Institute of Technology, Atlanta, GA, USA

2014.8 - 2014.12

*Sun Lab, School of Computational Science & Engineering, College of Computing*

Research Assistant, Advisor: **Professor Jimeng Sun**

**Project 1: Epilepsy Seizure Prediction Based on EEG Data**

- Built an analytic model for epilepsy seizure prediction based on EEG data. Developed methods for feature extraction from EEG data and dealing with imbalanced datasets.
- Participated in the Kaggle Competition, achieved AUC of 0.7298, and ranked in the top 8% (out of 504 teams)

**Project 2: Cost Estimation for Cloud-Based Analytic Machine Learning Pipeline**

- Proposed models and conducted experiments in order to do estimation for running time, cost and progress of cloud-based analytical pipeline.

Tsinghua University, Beijing, China

2014.2 - 2015.2

*Knowledge Engineering Group, Department of Computer Science and Technology*

Research Assistant, Advisor: **Professor Jie Tang**

**Project: Continuous Time Information Network Mining for Diffusion Cascades**

- Designed models that consider indirect influence and structural influence for continuous-time information diffusion in networks
- Proposed gradient descent methods for learning models.
- Experimented on Sina Weibo dataset and increased AUC by 0.3 compared to baseline algorithms.

Tsinghua University, Beijing, China

2013.1 - 2014.7

*Tinker@Home Group, Texas Instruments-Tsinghua Future Robots Club*

Team Leader

- Worked on developing a robust face detection and recognition system for robots.
- Developed an ROS package for face detection, alignment, archive building, and recognition.
- Participated in RoboCup 2014 in João Pessoa, Brazil, won 10<sup>th</sup> place in @Home League.

## PUBLICATIONS AND MANUSCRIPTS

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- [1] **Fei Xia\***, Martin Zhang\*, James Zou, David Tse. NeuralFDR: learning decision threshold from hypothesis features. *NIPS 2017*. (\*equal contributions)
- [2] Qiao Liu, **Fei Xia**, Qijin Yin, Rui Jiang. Chromatin accessibility prediction via a hybrid deep convolutional neural network. *Bioinformatics*.
- [3] G. Kamath\*, I. Shomorony\*, **F. Xia\***, T. Courtade, D. Tse. “HINGE: Long-Read Assembly Achieves Optimal Repeat Resolution.” *Genome Research Vol 27 2017*.(\*equal contributions)
- [4] I. Shomorony, G. Kamath, **F. Xia**, T. Courtade and D. Tse, “Partial DNA Assembly: A Rate-Distortion Perspective.” *ISIT 2016*.
- [5] **F. Xia**, *et al.* “Human-aware mobile robot exploration and motion planner.” *Proceeding of IEEE SoutheastCon 2015*.
- [6] Soheil Feizi, Changho Suh, **Fei Xia** and David Tse. Understanding GANs: the LQG Setting. Under review, 2017.

## AWARDS

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- 2016** Stanford Graduate Fellowship ((Michael J. Flynn Fellow), Stanford University)
- 2015** Chang Jiong Scholarship (Highest honor in Dept. of Automation, 1/560)
- 2014** Fang Chongzhi Scholarship (Highest honor in Dept. of Automation, 1/560)
- 2014** China Scholarship Council Excellent Undergraduate Fellowship
- 2014** Tsinghua Sparks Program Fellowship (Highest Academic Honor, 50/3000)
- 2014** Bronze Prize, International Genetically Engineered Machine Competition
- 2013** National Southwest Associated University Scholarship (1/560)
- 2012** Tsinghua University Outstanding Freshman Scholarship
- 2011** Gold Medal in 25<sup>th</sup> National Chemistry Olympics Contest (Ranking 8/92000)

## TECHNICAL STRENGTHS

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<b>Deep Learning Software Stacks</b>	Torch, PyTorch, Tensorflow, TF & PyTorch CUDA module development
<b>Programming Languages</b>	Proficient with C/C++, Python, MATLAB, Java
<b>Research Skills</b>	Familiar with state-of-the-art machine learning, statistics, neuroscience signal processing and NGS data analytics.
<b>Additional Skills</b>	ROS, L <sup>A</sup> T <sub>E</sub> X, bash, MPI, OpenMP, CUDA

## LANGUAGE SKILLS

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<b>English</b>	Excellent listening, speaking, reading and writing abilities <ul style="list-style-type: none"><li>• TOEFL iBT 109/120 (Reading 30, Listening 29, Speaking 24, Writing 26)</li><li>• GRE Verbal 155/170, Quantitative 170/170, Analytical Writing 4.0/6.0</li></ul>
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