

# Zhenjia Xu

✉ xuzhenjia1997@gmail.com • 🌐 www.zhenjiayu.com • 🌐 xzj1997

## Research Interests

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Computer Vision, Robotics, Deep Learning

## Education

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Shanghai Jiao Tong University

Shanghai, China

Bachelor of Engineering, Computer Science, ACM class

September 2015 - June 2019 (expected)

Advisor: [Yong Yu](#)

- ACM Class is a highly selective class (**top 5%**) in the Department of Computer Science and Engineering.
- GPA: **overall: 91.11/100 (3.94/4.3) | major: 93.75/100 (4.10/4.3) | ranking: 3<sup>rd</sup>/24.**
- TOEFL: **108** (R30, L28, S22, W28).

Massachusetts Institute of Technology

Cambridge, MA, USA

Visiting Student, Electrical Engineering and Computer Science Department

July 2018 - January 2019

Advisors: [Joshua B. Tenenbaum](#)

## Publications

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**Modeling Parts, Structure, and System Dynamics via Predictive Learning**

*Zhenjia Xu\**, *Zhijian Liu\**, *Chen Sun*, *Kevin P. Murphy*, *William T. Freeman*, *Joshua B. Tenenbaum*, and *Jiajun Wu*  
*International Conference on Learning Representations (ICLR) 2019.* [\[PDF\]](#)[\[Project Page\]](#)

## Research Experiences

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Massachusetts Institute of Technology

Cambridge, MA, USA

Research Intern, Computer Science & Artificial Intelligence Lab

July 2018 - present

Advisors: [Joshua B. Tenenbaum](#) and [Shuran Song](#) (incoming Professor at Columbia University).

### ○ Modeling Parts, Structure, and System Dynamics via Predictive Learning

**Objective:** Parts recognition, hierarchical structure decomposition, and future prediction.

- Proposed a novel formulation that learns to recognize and segment each object and its parts, build their hierarchical structure, and capture their motion distribution with a generative model, which can be further utilized for future prediction and video synthesis.
- Evaluated our PSD model on both real and synthetic datasets, and our model works well on all three tasks: segmentation, building the hierarchical structure, and future prediction.
- Submitted a paper to *International Conference on Learning Representations (ICLR) 2019.*

### ○ Robot Learning of Physical Object Properties

**Objective:** Self-supervised learning of physical property representation via interaction.

- Built a simulator for testing models and implemented two primitive actions: push and collide.
- Proposed a novel recurrent model to encourage the learning of physical properties. The representation can be used for further application.
- Achieved good performance on both on both simulator and real robot, especially the great generalization ability when encountering new objects.
- In progress. Prepare to submit to *Robotics: Science and Systems (RSS) 2019.*

## Cornell University

Remote Collaboration, Systems and Networking Group

Advisor: [Robbert van Renesse](#).

Ithaca, NY, USA

June 2018 - July 2018

### o Consensus Protocol Design and Implementation

**Objective:** A system for maintaining decentralized, authenticated data structures.

- *Charlotte* addresses the fundamental shortcoming of traditional blockchains: scalability and efficiency.
- Proposed and implemented a novel permissionless consensus protocol with *Charlotte*. The experiment result proves that *Charlotte* can reduce overhead effectively when the network scale becomes large.
- In progress. Prepare to submit to *IEEE Symposium on Security and Privacy (Oakland)* 2020.

## Shanghai Jiao Tong University

Research Intern, Apex lab

Advisors: [Yong Yu](#) and [Weinan Zhang](#).

Shanghai, China

July 2017 - June 2018

### o IJCAI-18 Alimama Sponsored Search Conversion Rate (CVR) Prediction Contest

**Objective:** Predict the conversion rate (CVR) in sponsored search.

- Proposed a flexible framework including feature extraction, CVR prediction, and model ensemble.
- Designed the whole pipeline, implemented the majority of feature extraction modules and tried several state-of-the-art recommendation models.

## Course Projects

- o **Audio Event Recognition**, using deep learning to recognize audio. **97/100** [\[PDF\]](#)
- o **Text Classification & Item Recommendation**, using machine learning. **99/100** [\[PDF\]](#)[\[PDF\]](#)
- o **Mx Compiler**, translating a C-like language into x86-64, over **12,000** lines. **99/100** [\[GitHub\]](#)
- o **Advanced Data Structures** {Strict Fibonacci Heap, AAA Tree, PQ Tree}. **98/100** [\[GitHub\]](#)

## Honors and Awards

### Scholarships.....

- o **National Scholarship** (highest honor for undergraduates, **top 0.2%** in China). 2016, 2017
- o **Rongchang Scholarship** (**top 1%** over 17,000 students in SJTU). 2016
- o **Zhiyuan Honorary Scholarship** (**top 5%** over 17,000 students in SJTU). 2016, 2017

### Programming Contests.....

- o **Second Runner-up** (**3<sup>rd</sup> over 150** teams) in ACM-ICPC Regional Contest, Beijing Site. 2016
- o **Second Runner-up** (**3<sup>rd</sup> over 120** teams) in Chinese Collegiate Programming Contest. 2016
- o **Gold Medal** (**top 5% over 200** teams) in ACM-ICPC China Final. 2016
- o **Gold Medal** (**top 7% over 150** teams) in ACM-ICPC Regional Contest, Beijing Site. 2015
- o **Silver Medal** (**top 0.1% over 70,000** participants) in National Olympiad in Informatics. 2014

### Mathematical Contest in Modeling.....

- o **Meritorious Winner** (**top 10%**) in Mathematical Contest in Modeling. 2017

## Teaching Experiences

- o **Teaching Assistant** of Data Structure (*MS105*). 2017
- o **Assistant Coach** of SJTU ACM-ICPC Team. 2017 - 2018

## Technical Strengths

**Programming Languages:** C/C++, Python, Java, Pascal, JavaScript, MATLAB.

**Toolkits / Software:** Torch, Pytorch, Tensorflow, MXNet, Pybullet.