

# Runzhe Yang

First-Year Ph.D Student in Compute Science  
CS Department @ Princeton University

<http://runzhe-yang.science>

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## 💡 Research Interests

Artificial Intelligence: Reinforcement Learning, Imitation Learning, Deep learning, Bayesian Inference and Graphical Models, Game Theory and Multi-Agent Systems; as well as their applications in Dialogue Systems, Linguistics, Robotics and Scientific Discoveries, especially Neuroscience.

## 🎓 Education

Princeton University, USA

Sept. 2018 – Present

*Doctor of Philosophy (Ph.D.)* in Computer Science

Advisors: [Prof. Sebastian Seung](#) and [Prof. Karthik Narasimhan](#)

Shanghai Jiao Tong University, China

Sept. 2014 – Jun. 2018

*Honors Bachelor of Science (B.Sc. Hons)* in Computer Science

Member of [ACM Class](#), an elite CS program for top 5% of students.

Bachelor Thesis: **Deep Multi-Objective Reinforcement Learning and Its Application in Task-Oriented Dialogue Systems** { [📄 Thesis](#) | [🗉 Oral Defense](#) }

## 🏛️ Research Experience

**Research Intern** at [Institute for Computational Sustainability](#), Cornell University Jun. 2017 – Feb. 2018

- Mentored by [Prof. Carla Gomes](#) on Artificial Intelligence and Computational Sustainability.
- (1) Established a novel approach of imitation refinement, to improve imperfect data by mimicking the characteristics of ideal data; (2) Proposed a general game-theoretic crowdsourcing framework for improving the crowd workers' reliability during the label collection process; (3) Developed an adversarial-complementary multi-armed bandit system to minimize expert annotation time for eelgrass wasting disease monitoring; (4) Lead author of the research papers, submitted to AAAI, AAMAS and IJCAI.

**Undergraduate Researcher** at [SJTU Speech Lab](#), Shanghai Jiao Tong University Jul. 2016 – Jun. 2018

- Mentored by [Prof. Kai Yu](#) on Spoken Dialogue System.
- (1) Created the companion teaching framework for reinforcement learning based dialogue system to incorporate human teaching; (2) Quantitatively measured the safety and efficiency of the on-line dialogue policy learning; (3) Implemented natural language generation module and dialogue manager module; (4) Lead author of the research papers, accepted by EMNLP and EACL.

**Undergraduate Researcher** at [Zhiyuan Innovation Research Center \(ZIRC\)](#), SJTU Aug. 2016 – Jun. 2017

- Collaborated with [Laboratory of Quantum Technology](#) on Photonic Boson Sampling Project.
- (1) Collaborated with students majoring in physics to develop a system for efficient and accurate photon detection; (2) Conducted statistical analysis on experimental data to count photonic correlations.

## 📄 Publications

- Affordable On-line Dialogue Policy Learning.**
  - [Runzhe Yang\\*](#), [Cheng Chang\\*](#) (equal authorship), Lu Chen, Xiang Zhou and Kai Yu.
  - In proceedings of the [EMNLP 2017](#) Conference. { [📄 Paper](#) | [🗉 Bib](#) | [📄 Appendix](#) }
- Agent-Aware Dropout DQN for Safe and Efficient On-line Dialogue Policy Learning.**
  - Lu Chen, Xiang Zhou, Cheng Chang, [Runzhe Yang](#) and Kai Yu.
  - In proceedings of the [EMNLP 2017](#) Conference. { [📄 Paper](#) | [🗉 Bib](#) | [📄 Appendix](#) }
- On-line Dialogue Policy Learning with Companion Teaching.**
  - Lu Chen, [Runzhe Yang](#), Cheng Chang, Zihao Ye, Xiang Zhou and Kai Yu.
  - In proceedings of the [EACL 2017](#) Conference. { [📄 Paper](#) | [🗉 Bib](#) | [📄 Poster](#) }

## 📄 Manuscripts

1. **Imitation Refinement.** { [📄 ArXiv](#) | [📖 Bib](#) }  
- Runzhe Yang\*, Junwen Bai\* (equal authorship), Yexiang Xue, John Gregoire and Carla Gomes.
2. **Multi-Armed Image Segmentation.**  
- Brendan Rappazzo, Guillaume Perez, **Runzhe Yang**, Olivia Graham, Drew Harvell and Carla Gomes.
3. **Pedagogical Value-Aligned Crowdsourcing: Inspiring the Wisdom of Crowds via Interactive Teaching.**  
- **Runzhe Yang**, Yexiang Xue and Carla Gomes. { [📄 Working Paper](#) | [📖 Appendix](#) }

## 🎯 Highlighted Course Projects

1. [Hierarchical Neural Model for Recommending Articles](#), Machine Learning coursework, CS420 **98/100**.
2. [Delving into Deep Learning Toolkits on Tone Classification](#), compared *Torch*, *Tensorflow*, and *Theano* on the Chinese tone classification task. Deep Learning course project, MS318, **98/100**
3. [MIPS32-cpu](#), a five-stage pipeline processor based on mips32 written in *verilog*, MS108 **98/100**.
4. [Rz\\_compiler](#), a toy compiler for *Java*-like language, implemented in *Java*, MS208 **96/100**.

## 🐱 Extracurricular Projects

1. Participated in Deep Learning and Reinforcement Learning Books Translation:  
- Yoshua Bengio, **Learning Deep Architecture for AI**, Chinese edition is now published! [[a](#)]  
- Sutton, R. S., Barto, A. G, **Reinforcement Learning: An Introduction**, Chinese edition in progress.
2. Contributed to the chess opening book for [Yixin, the strongest Gomoku/Renju AI in the world](#).

## 🖥️ Programming Skills

- **Programming Languages:** Python, Mathematica, C/C++, Java, Lua, Verilog, Matlab
- **Deep Learning Toolkits:** PyTorch, Torch, MXNet, Tensorflow, Theano
- **Others:** Unix/Linux,  $\LaTeX$ , Markdown, Jupyter notebook

## 👥 Leadership and Activities

<b>President</b> of Zhiyuan Association for Science and Technology, SJTU.	Jun. 2015 – Jun. 2018
<b>Chairperson</b> of ACM Honors Class of 2018, SJTU.	Sept. 2016 – Jun. 2018
<b>Co-organizer</b> of the 8th ACM-Class Student Academic Festival (ASAF2017).	Jun. 2017
<b>Co-organizer</b> of the 2nd and 3rd INS-ZY Student Conference on Natural Science.	Jun. 2015, Apr. 2016
<b>Teaching Assistant</b> of CS120: Introduction to Computer Science.	Sept. 2016 – Jan. 2017
<b>Teaching Assistant</b> of CS389: Mathematics for the Information Age.	May. 2018 – June. 2018

## 🏆 Honors and Awards

<b>Excellent Graduate Award</b> of Shanghai ( <b>the highest award for graduates, top 1%</b> )	May. 2018
<b>Excellent Bachelor Thesis</b> of Shanghai Jiao Tong University ( <b>top 1%</b> )	Jun. 2018
<b>Zhiyuan Outstanding Student Scholarship</b> of Shanghai Jiao Tong University	Jun. 2018
<b>Outstanding Achievement Award Runner-Up</b> of Zhiyuan Scholar Program	Jul. 2018
<b>Academic Excellence Scholarship</b> of Shanghai Jiao Tong University ( <b>A-level, top 1%</b> )	Oct. 2015, 2017
Arawana Scholarship (gpa ranking is in <b>top 1%</b> , awarded to 2 students out of 300+)	Oct. 2017
<b>1st prize</b> in “Hsue-shen Tsien Cup” Collegiate Science and Technology Contest	Apr. 2017
Sunny Leadership Scholarship ( <b>A-level</b> , awarded to <b>high leadership potential</b> students)	Dec. 2016
Leo KoGuan Scholarship ( <b>top 4%</b> , awarded to <b>high scientific research potential</b> students)	Nov. 2016
United-Water Scholarship (gpa & integrated ranking are both in <b>top 4%</b> )	Nov. 2015
<b>1st prize</b> in China Undergraduate Mathematical Contest in Modeling (Shanghai Division)	Oct. 2015
Honorable Mentions in 2015 & 2016 American Mathematical Contest in Modeling (MCM)	Jan. 2015, 2016

## 📝 Referees

Professors [Carla P. Gomes](#) and [John E. Hopcroft](#) at Cornell; Professors [Kai Yu](#) and [Yong Yu](#) at SJTU.