# Tengyang Xie

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**Research Interests**

My research interests lie primarily in the intersection of **machine learning**, **statistics** and **optimization**, with focus on **reinforcement learning**, **differential privacy**, **stochastic programming**, and **deep learning**.

**Education**

*Ph.D. Student* - Computer Science (GPA: 4.0/4.0)                                                    2016 - Present
University of Massachusetts Amherst, Amherst, MA, USA
*Advisor:* Prof. Gerome Miklau *and* Prof. Philip Thomas

*Bachelor of Science* - Physics (Major GPA: 4.0/4.3)                                                  2012 - 2015
*Undergraduate Student* - Mathematics (Major GPA: 4.0/4.3)                                  2011 - 2012
University of Science of Technology of China, Hefei, Anhui, China

**Relevant Courseworks**

*Mathematics & Physics*: Probability Theory, Mathematical statistics, Real Analysis, Complex Analysis, Functional Analysis, Statistical Physics, Quantum Mechanics, Advanced Quantum Mechanics, Computational Physics (Monte Carlo Methods)

*Computer Science*: Machine Learning, Probabilistic Graphic Model, Reinforcement Learning, Advanced Algorithm, Interactive Machine Learning

**Research Experience**

University of Massachusetts Amherst | Amherst, MA
*- Research Assistant*
*- Advisor:* Prof. Gerome Miklau *and* Prof. Philip Thomas

- I am working with Prof. Gerome Miklau and Prof. Philip Thomas on the intersection between machine learning and privacy, in particular reinforcement learning and differential privacy. I am also working closely with Prof. Bo Liu and Prof. Yangyang Xu on reinforcement learning and stochastic optimization.
- We proposed privacy approaches for policy evaluation and off-policy policy evaluation (OPE). We also developed a policy search approach for reinforcement learning with variance-related criteria under coordinate descent update framework.

University of Science and Technology of China | Hefei, Anhui, China
*- Research Assistant*
*- Advisor:* Prof. Kai Xing

- I was working with Prof. Kai Xing on data mining and networking. We proposed an acoustic localization approach which is the first post-disaster remote localization approach that is robust against most harsh environments in underground disasters, and implemented it by extensive experimental study in an operating coal mine.

**Key Research Projects**

**Policy Evaluation with Differential Privacy**
*- with Prof. Gerome Miklau and Prof. Philip Thomas*

- Intersection between **reinforcement learning** and **differential privacy**.
- Proposed and implemented a data-efficient approach of differential private policy evaluation with temporal-difference (TD) methods.
- Proposed a robust approach of differential private off-policy policy evaluation (OPE).
- **Paper in progress**.

**Proximal Risk-Sensitive Policy Optimization**
*- with Prof. Bo Liu and Prof. Yangyang Xu*

- Intersection between **reinforcement learning** and **optimization**.
- Developed a policy search approach for reinforcement learning with variance-related criteria and a variance reduction technique based on stochastic block coordinate descent.
- Provided convergence analysis and finite-sample analysis theoretically and evaluated on various domains.
- **Paper in progress**.

**Generating Synthetic Datasets Differential Privately Using GANs**
*- with Prof. Gerome Miklau*

- Intersection between **deep learning** and **differential privacy**.
- Developed an approach to generating synthetic datasets not only providing differential privacy guarantees but also remaining statistical properties of the real data using generative adversarial networks (GANs).

**Off-Policy Control Based on Bellman Residual**
*- with Prof. Bo Liu*

- This project mainly focuses on **reinforcement learning**.
- Proposed and implemented a new objective function for policy optimization, which is a gradient based TD-learning algorithm that incorporates policy gradients.

## Skills

Python, C/C++, Tensorflow, Matlab, Mathematica, LaTeX...

## Teaching

*Teaching Assistant*                                                                 Spring 2018
CS 590M, Introduction to Simulation, Prof. Peter J. Haas
University of Massachusetts Amherst, Amherst, MA, USA

## Awards

2014 Outstanding Student Scholarship, Silver Medalist (Top 10%)
2014 The Mathematical Contest in Modeling (MCM), Honorable Mention
2013 Outstanding Student Scholarship, Silver Medalist (Top 10%)
2012 Outstanding Student Scholarship, Bronze Medalist (Top 20%)
2011 Outstanding Freshmen Scholarship
2010 China National Physics Olympiad, First Prize
2009 China National Physics Olympiad, Second Prize
2009 China National Mathematical Olympiad, Second Prize

## References

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