

## Shun Zhang

---

CONTACT INFORMATION	<p>Department of Computer Science The University of Texas at Austin 1 University Station A8000 Austin, TX 78712 <a href="http://cs.utexas.edu/~menie482/">http://cs.utexas.edu/~menie482/</a></p> <p>512-574-3694 <a href="mailto:jensen.zhang@utexas.edu">jensen.zhang@utexas.edu</a></p>
RESEARCH INTERESTS	Reinforcement learning, robotics, multiagent systems, convex optimization, human cognition.
EDUCATION	<p><b>University of Texas at Austin</b>, Austin, TX</p> <p>Integrated B.S./M.S. Program, <b>Computer Science</b>, Jan. 2012 - May. 2015 (Expected)</p> <ul style="list-style-type: none"> <li>• Major G.P.A. 3.8. Overall G.P.A. 3.55.</li> <li>• Master Thesis.</li> </ul> <p><b>Nanjing University of Aeronautics and Astronautics</b>, Nanjing, China</p> <p>Undergraduate program, Computer Science and Technology, Sep. 2009 - Dec. 2011</p> <ul style="list-style-type: none"> <li>• G.P.A. 3.8/5.0.</li> <li>• Transferred to University of Texas at Austin in Jan. 2012.</li> </ul>
RESEARCH EXPERIENCE	<p><b>Modular Reinforcement Learning</b> Fall 2014 — Spring 2015 Department of Computer Science and Center for Perceptual Systems University of Texas at Austin</p> <ul style="list-style-type: none"> <li>• Supervisor: Prof. <a href="#">Dana Ballard</a> and Prof. <a href="#">Mary Hayhoe</a>.</li> <li>• Research question: <i>Assume human already has Markov Decision Processes (MDP) trained for preliminary tasks, how would these MDPs contribute to complicated behaviors?</i></li> <li>• Using Inverse Reinforcement Learning to interpret human's behavior, assuming that it is a combination of the MDPs for preliminary tasks.</li> <li>• Master thesis. Part of the draft <a href="#">[link]</a>.</li> </ul> <p><b>Determining Placements of Influencing Agents in a Flock</b> Fall 2014 Department of Computer Science University of Texas at Austin</p> <ul style="list-style-type: none"> <li>• Supervisor: Prof. <a href="#">Peter Stone</a>.</li> <li>• Research question: <i>Where should influencing agents be located within a flock to maximize their influence on the flock?</i></li> <li>• Using MASON simulator to evaluate different placements of influencing agents, including border, grid, and graph-based placements.</li> <li>• Paper Submitted: Katie Genter, Shun Zhang and Peter Stone. Determining Placements of Influencing Agents in a Flock.</li> </ul> <p><b>Reinforcement Learning on Atari Games</b> Fall 2013 Department of Computer Science University of Texas at Austin</p> <ul style="list-style-type: none"> <li>• Supervisor: Prof. <a href="#">Peter Stone</a>.</li> <li>• Research question: <i>Can we apply TEXPLORE, a sample-efficient Reinforcement Learning algorithm, to complicated domains like Atari games?</i></li> <li>• Undergraduate research course <a href="#">[link]</a>.</li> </ul> <p><b>Action Selection in Robotic Motion Learning</b> Fall 2013</p>

Department of Computer Science  
University of Texas at Austin

- Supervisor: Prof. [Peter Stone](#).
- Research question: *Instead of uniformly randomly selecting actions to try, can a robot explicitly select actions to explore its belief state space?*
- Implementing ASAMI (a model-learning algorithm) on Nao robot using bandit-based exploration.
- Autonomous Robots course project. Achieved in Undergraduate Research Journal in University of Texas at Austin, 2014. [\[link\]](#)

### Structured Exploration for Relational Reinforcement Learning    Spring 2013

Department of Computer Science  
University of Texas at Austin

- Supervisor: Prof. [Peter Stone](#).
- Research question: *Can we improve the exploration efficiency of the Relational Reinforcement Learning algorithm?*
- Applying the exploration mechanism in Rmax-Q to Relational Reinforcement Learning to improve the latter's sample efficiency.
- Reinforcement Learning course project. [\[link\]](#)

### Semi-Autonomous Intersection Management

Summer, Fall 2012

Department of Computer Science  
University of Texas at Austin

- Supervisor: Prof. [Peter Stone](#) and Prof. [Tsz-Chiu Au](#).
- Research question: *Can we find a policy better than traffic signals, if human-driven, semi-autonomous and fully-autonomous vehicles are sharing the road?*
- Designing and evaluating a policy that is competent with all three types of vehicles, and performs better than traffic signals.
- Related publication: Tsz-Chiu Au, Shun Zhang, and Peter Stone. Autonomous Intersection Management for Semi-Autonomous Vehicles. In Handbook of Transportation, May 2015. [\[link\]](#)

### PUBLICATIONS

- Tsz-Chiu Au, **Shun Zhang**, and Peter Stone. Semi-Autonomous Intersection Management (Extended Abstract). Autonomous Agents and Multiagent Systems (AAMAS), 2014. [\[link\]](#)
- Tsz-Chiu Au, **Shun Zhang**, and Peter Stone. Autonomous Intersection Management for Semi-Autonomous Vehicles. In Handbook of Transportation, May 2015. [\[link\]](#) <sup>1</sup>

### PAPERS SUBMITTED

- Katie Genter, **Shun Zhang**, and Peter Stone. Determining Placements of Influencing Agents in a Flock.

### PRESENTATION

- Intersection Management with Constraint-Based Reservation Systems. Autonomous Robots and Multirobot Systems (ARMS), 2014.

### CONFERENCE ATTENDANCE

- Autonomous Agents and Multiagent Systems (AAMAS), Paris, 2014.

### COURSES AND PROJECTS

Graduate Level

- Large Scale Optimization (EE 381V)
- Markov Chain and Mixing Time (M 394C)
- Final Project: *Mixing Time in Reinforcement Learning Convergence Analysis* . [\[link\]](#)

---

<sup>1</sup>This is the extended version of the Semi-Autonomous Intersection Management paper.

- Machine Learning (CS 391L)  
Project reports:
  - *Principal Component Analysis.* [\[link\]](#)
  - *Independent Component Analysis.* [\[link\]](#)
  - *Approximate Inference in Bayesian Networks.* [\[link\]](#)
  - *Reinforcement Learning.* [\[link\]](#)
  - *Genetic Algorithm.* [\[link\]](#)
- Autonomous Robots (CS 393R)
- Randomized Algorithms (CS 388R)
- Reinforcement Learning (CS 394R)  
Project reports:
  - *N-armed bandit Problem.* [\[link\]](#)
  - *Eligibility Traces.* [\[link\]](#)
  - *Bootstrapping with Function Approximation.* [\[link\]](#)
  - *Transfer Learning in Gridworld.* [\[link\]](#)

## Undergraduate Level

- Artificial Intelligence (CS 343)
- Principles of Computer Systems (CS 439)
- Automata Theory (CS 341)
- Information Retrieval (CS 371R)
- Programming Languages (CS 345)
- Final Project: *List Interpreter*. [\[link\]](#)
- etc.

## AWARDS

Student Awards — University of Texas at Austin

- Louis E. Rosier Memorial Endowment Scholarship. 2013-2014

Student Awards — Nanjing University of Aeronautics and Astronautics

- Department Scholarships. 2009-2011

## TEACHING EXPERIENCE

Undergraduate Teaching Assistant (Proctor)

Fall 2013, Spring 2014

CS 301K Foundations of Logical Thought  
with Dr. Jacob Schrum  
Department of Computer Science,  
University of Texas at Austin

## INDUSTRY EXPERIENCE

## SDE Intern at Amazon

Summer 2014

Seattle, WA

- Created an internal tool that supports WebRTC in Firefox.
- Modifying an internal tool for visualizing customer data, using Scala on Spark.

## SDE Intern at Semantic Designs

Summer 2013

Austin, TX

- Integrating a GUI viewer to Smart Differencer (TM) tools. Using JavaCC for parsing and Swing for GUI.

## LANGUAGES

- Natural languages: Mandarin Chinese (native), English (fluent), Japanese (preliminary).
- Programming languages: Proficient in programming in Python, Octave/Matlab, Java, C/C++; Familiar with Lisp, Oracle SQL, L<sup>A</sup>T<sub>E</sub>X, Web Development Languages (HTML, JavaScript, PHP), Perl, Scala.