

# Fei Miao

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## EDUCATION

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**Ph.D. in Electrical and Systems Engineering** **Sep. 2010-May. 2016**  
University of Pennsylvania, Philadelphia, PA  
Dissertation: “Data-Driven Dynamic Robust Resource Allocation: Application to Efficient Transportation”  
Advisor: Prof. George J. Pappas  
**Charles Hallac and Sarah Keil Wolf Award for Best Doctoral Dissertation**

**M.A. in Statistics** **Sep. 2013-Aug. 2015**  
University of Pennsylvania, Philadelphia, PA

**Bachelor of Engineering in Automation, with minor in Finance** **Sep. 2006-June 2010**  
Department of Automation, School of Electronic, Information and Electrical Engineering  
Shanghai Jiao Tong University, Shanghai, China  
Undergraduate thesis: “Distributed algorithms for multi-agent coordination”  
Advisor: Prof. Yugeng Xi, Director of the Complex System and Control Theory Lab

## ACADEMIC APPOINTMENTS

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**Tenure-Track Assistant Professor** **Aug.2017-**  
Department of Computer Science and Engineering (joint appointment at ECE Department)  
UTC-Institute of Advanced Systems Engineering  
University of Connecticut

**Postdoctoral Researcher** **Sep. 2016-July.2017**  
GRASP (General Robotics, Automation, Sensing & Perception) Lab  
PRECISE (Penn Research in Embedded Computing and Integrated Systems Engineering) Center  
Department of Electrical and Systems Engineering, University of Pennsylvania  
Mentors: Prof. George J. Pappas, Prof. Daniel D. Lee

## RESEARCH INTERESTS

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- **Develop the foundations for the science of cyber-physical systems (CPS) and intelligent autonomous systems in smart cities, to assure safety, efficiency and security for application areas such as transportation, healthcare and network systems.**
- Relevant fields: control theory, optimization, machine learning, statistics, game theory, and robotics.
- Current ongoing research topics: ontology representations for assuring safety of perception, learning and control of connected autonomous vehicles; learning and control based on heterogeneous data in the Internet of Things level; CMU-UPENN T-SET UTC research on technologies for safe and efficient transportation
- Research contributions: data-driven real-time robust resource allocation with application in smart cities, especially in ride-sharing of intelligent transportation systems; secure control and attack detection of CPS for DARPA HACMS project; wireless sensor and control networks.

## HONORS&AWARDS

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**Charles Hallac and Sarah Keil Wolf Award for Best Doctoral Dissertation** **Aug. 2016**  
Department of Electrical and Systems Engineering, University of Pennsylvania, for the Ph.D. dissertation of “Data-Driven Dynamic Robust Resource Allocation: Application to Efficient Transportation”.

<b>Best Paper Award Finalist</b>	<b>Apr. 2015</b>
6 <sup>th</sup> ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS' 15) for the paper "Taxi Dispatch with Real-Time Sensing Data in Metropolitan Areas- a Receding Horizon Control Approach".	
<b>NSF student travel award, ACM SIGBED student travel award</b>	<b>Apr. 2015</b>
<b>IEEE CSS student travel award</b>	<b>June 2013</b>
<b>Excellent Graduate student of Shanghai</b>	<b>June 2010</b>
<b>Academic Excellence Scholarship of Shanghai Jiao Tong University</b>	<b>Dec. 2009</b>
<b>SAMSUNG Scholarship of Shanghai Jiao Tong University</b>	<b>June 2009</b>
<b>Excellent University Student of Shanghai</b>	<b>Dec. 2007</b>
<b>National Scholarship of China</b>	<b>June 2007</b>

#### PREPRINTS (JOURNALS TO APPEAR)

1. **Fei Miao**, Shuo Han, Shan Lin, John A. Stankovic, Qian Wang, Desheng Zhang, Tian He, George J. Pappas, "Data-Driven Robust Taxi Dispatch under Demand Uncertainties", Accepted as a Regular Paper, *IEEE Transactions on Control Systems Technology*, 2017.
2. **Fei Miao**, Quanyan Zhu, Miroslav Pajic and George J. Pappas, "A Moving-Horizon Hybrid Stochastic Game for Secure Control of Cyber-Physical Systems", Accepted as a Regular Paper, *Automatica*, 2017.

#### PUBLICATIONS (JOURNALS)

3. **Fei Miao**, Quanyan Zhu, Miroslav Pajic and George J. Pappas, "Coding Schemes for Securing Cyber-Physical Systems against Stealthy Data Injection Attacks", in *IEEE Transactions on Control of Network Systems*, vol. 4, no. 1, pp. 106-117, March 2017.
4. **Fei Miao**, Shuo Han, Shan Lin, Sirajum Munir, John A. Stankovic, Hua Huang, Desheng Zhang, Tian He, George J. Pappas, "Taxi Dispatch with Real-Time Sensing Data in Metropolitan Areas: A Receding Horizon Control Approach", in *IEEE Transactions on Automation Science and Engineering* (invited paper), vol. 13, no. 2, pp. 463-478, April 2016.
5. Shan Lin, **Fei Miao**, Jingbin Zhang, Gang Zhou, Lin Gu, Tian He, John A. Stankovic, Sang Son and George J. Pappas, "ATPC: Adaptive Transmission Power Control for Wireless Sensor Networks", in *ACM Transactions on Sensor Networks*, vol. 12, no. 1, pp. 1-31, March 2016.

#### PULICATIONS (CONFERENCES)

6. Xiang Deng, **Fei Miao** and Daniel D. Lee, "Artificial Invariant Subspace with Potential Functions for Humanoid Robot Balancing", to Appear, in Proceedings of the 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2017).
7. Ximing Chen, **Fei Miao**, George J. Pappas and Victor M. Preciado "Hierarchical Data-Driven Vehicle Dispatch for Large-Scale Ride-sharing Networks", to Appear, in Proceedings of the Conference on Decision and Control (CDC 2017).
8. **Fei Miao**, Shuo Han, Abdeltawab M. Hendawi, Mohamed E. Khalefa, John A. Stankovic, George J. Pappas, "Data-Driven Distributionally Robust Vehicle Balancing Using Dynamic Region Partitions", in *Proceedings of the 8<sup>th</sup> ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS), CPSWeek*, pp. 261-271, 2017 (**11 pages, acceptance rate < 24%**).
9. **Fei Miao**, Shuo Han, Shan Lin, George J. Pappas, "Robust Taxi Dispatch under Model Uncertainties", to appear, in *Proceedings of the 54<sup>th</sup> Conference on Decision and Control (CDC)*, 2816-2821, Osaka, Japan, 2015.
10. **Fei Miao**, Shan Lin, Sirajum Munir, John A. Stankovic, Hua Huang, Desheng Zhang, Tian He, George J. Pappas, "Taxi Dispatch with Real-Time Sensing Data in Metropolitan Areas- a Receding Horizon Control Approach", in *Proceedings of the 6<sup>th</sup> ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS)*, CPSWeek, pp. 100-109, Seattle, WA, 2015 (**Best Paper Award Finalist, 3/91, 10 pages, acceptance rate < 24%**).
11. **Fei Miao**, Quanyan Zhu, Miroslav Pajic and George J. Pappas, "Coding Sensor Outputs for Injection Attacks Detection", in *Proceedings of the 53<sup>rd</sup> Conference on Decision and Control (CDC)*, pp.5776 – 5781, Los Angeles, CA, 2014.
12. **Fei Miao**, Quanyan Zhu, Miroslav Pajic and George J. Pappas, "A Moving-Horizon Hybrid

- Stochastic Game for Secure Control of Cyber-Physical Systems”, in *Proceedings of the 53<sup>rd</sup> Conference on Decision and Control (CDC)*, pp.517-522, Los Angeles, CA, 2014.
13. **Fei Miao**, Miroslav Pajic and George J. Pappas, “Stochastic Game Approach for Replay Attack Detection”, in *Proceedings of the 52<sup>th</sup> Conference of Decision and Control (CDC)*, pp.1854-1859, Florence, Italy, 2013.
  14. **Fei Miao**, Miroslav Pajic, Rahul Mangharam and George J. Pappas, “Networked Realization of Discrete-Time Controllers”, in *Proceedings of American Control Conferences (ACC)*, pp.2996-3001, Washington D.C. MD, 2013.

#### SELECTED TALKS & POSTERS

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1. “Data-Driven Dynamic Robust Resource Allocation: Application to Efficient Transportation”, invited talks, Beijing University, Zhejiang University, ShanghaiTech University, Shanghai Jiao Tong University, July 2016; Tsinghua University, Aug. 2016.
2. “Data-Driven Robust Resource Allocation”, invited talk, MIT, Mar. 2016.
3. “Data-Driven Robust Taxi Dispatch Approaches”, talk at ESE PhD Colloquium, University of Pennsylvania, Sep. 2015.
4. “Coding Sensor Outputs for Injection Attacks Detection”, poster, Fei Miao, Quanyan Zhu, Miroslav Pajic and George J. Pappas. DARPA PI meeting, Princeton, July 2014.
5. “A Stochastic Game Formulation for System Against Replay Attack”, poster, Fei Miao, Miroslav Pajic and George J. Pappas, 16<sup>th</sup> ACM International Conference on Hybrid Systems: Computation and Control (HSCC), CPSWeek, Philadelphia, PA, Apr. 2013.

#### TEACHING EXPERIENCE

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**Instructor, Introduction to Machine Learning** Fall 2017  
**Department of Computer Science and Engineering, University of Connecticut**

**Teaching Assistant, University of Pennsylvania, Philadelphia, PA**  
 ESE504 -- Linear Optimization Fall 2012  
 ESE605 -- Convex Optimization Spring 2012

#### PROFESIONAL SERVICE

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**Technical Program Committees**  
 IEEE International Symposium on Nanoelectrical and Information Systems (iNIS 2015)  
**Journal and Conference Reviewer**  
 IEEE Transactions on Automatic Control  
 IEEE Transactions on Control of Network Systems  
 IEEE Control Systems Letters (L-CSS)  
 ACM/IEEE International Conference on Cyber-Physical Systems  
 IEEE Conference on Decision and Control  
 American Control Conference

#### UNIVERSITY SERVICE

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**Outreach**  
 Committee, Transportation Youth Summit 2017, responsible as organizer challenge project  
 Volunteer for CISTERS (Community in Science, Technology, and Engineering) of graduate women, University of Pennsylvania, 2013, 2014, and 2015.  
 Vice-President of the Student Union in School of Electronic and Electric Engineering, 2007, 2008; Minister of Students’ Science and Technology Association, Shanghai Jiao Tong University, 2006, 2007.