# Hamidreza Tavafoghi


CONTACT INFORMATION

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## APPOINTMENT

✍ **Postdoctoral Research Associate** October 2017 - present
University of California, Berkeley
*Mentors:* Pravin Varaiya and Kameshwar Poolla

## EDUCATION

✍ **Ph.D., Electrical Engineering**, University of Michigan September 2017
*Thesis:* "On Analysis and Design of Cyber-Physical Systems with Strategic Agents"
Advisor: Demosthenis Teneketzis
Committee: Mingyan Liu, David Miller, Suarabh Amin, Tamer Başar, Asuman Ozdaglar

✍ **M.A., Economics**, University of Michigan May 2017
*Focus:* Microeconomics

✍ **M.Sc., Electrical Engineering**,, University of Michigan May 2013
*Major:* Control

✍ **B.Sc., Electrical Engineering**, Sharif University of Technology, Iran June 2011
*Major:* Control

## RESEARCH INTERESTS

Reinforcement learning, stochastic control, data analytics, game theory, and mechanism design with applications including intelligent transportation, power systems, and cyber security.

## WORKING PAPERS

[W5] **H. Tavafoghi**, K. Poolla, and P. Varaiya, "Approximate Information State and Reinforcement Learning in Multi-Agent POMDPs", *in preparation*, 2019.

[W4] **H. Tavafoghi**, K. Poolla, and P. Varaiya, "On Asymptotically Regret-Optimal Reinforcement Learning in Multi-Agent POMDPs", *in preparation*, 2019.

[W2] **H. Tavafoghi**, K. Poolla, and P. Varaiya, "Prediction of Phase Durations for SPaT Messages in Actuated and Coordinated Traffic Signals", *in preparation*, 2019.

[W2] **H. Tavafoghi** and D. Teneketzis, "Strategic Information Provision in Routing Games", *working paper*, draft link, 2018.

[W1] **H. Tavafoghi** and D. Teneketzis, "Dynamic Market Mechanisms for Wind Energy", *working paper*, draft link, 2017.

## JOURNAL PAPERS

[S8] **H. Tavafoghi**, K. Poolla, and P. Varaiya, "A Queuing Approach to Parking: Modeling, Verification, and Prediction",*under review in Transportation Research: Part B*, arXiv link, 2019

[S7] **H. Tavafoghi**, Y. Ouyang, and D. Teneketzis, "A Unified Approach to Dynamic Decision Problems with Asymmetric Information - Part I: Nonstrategic Agents". *under review in IEEE Transaction on Automatic Control*, arXiv link, 2018.

[S6] **H. Tavafoghi**, Y. Ouyang, and D. Teneketzis, "A Unified Approach to Dynamic Decision Problems with Asymmetric Information - Part II: Strategic Agents". *under review in IEEE Transaction on Automatic Control*, arXiv link, 2018.

[J5] S. Li, **H. Tavafoghi**, K. Poolla, and P. Varaiya, "Regulating TNCs: Should Uber and Lyft Set Their Own Rules?", *to appear in Transportation Research: Part B*, arXiv link, 2019.

[J4] F. Farhadi, **H. Tavafoghi**, D. Teneketzis, and J. Golestani, "An Efficient Dynamic Allocation Mechanism for Security in Networks of Interdependent Strategic Agents", *Dynamic Games and Applications*, 2018.

[J3] **H. Tavafoghi** and D. Teneketzis, "Multidimensional Forward Contracts under Uncertainty for Electricity Markets",*IEEE Transactions on Control of Network Systems*, 2017.

[J2] Y. Ouyang, **H. Tavafoghi**, and D. Teneketzis "Dynamic Games with Asymmetric Information: Common Information Based Perfect Bayesian Equilibria and Sequential Decomposition", *IEEE Transactions on Automatic Control*, 2017.

[J1] **H. Tavafoghi** and M. Haeri, "On Exponential Flocking to the Virtual Leader in Network of Agents With Double-Integrator Dynamics", *Journal of Dynamic Systems, Measurement, and Control*, 2013.

## Conference Papers

[C8] **H. Tavafoghi**, A. Shetty, K. Poolla, and P. Varaiya, "Strategic Information Platforms in Transportation Networks", *to appear in the 57th Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, 2019.

[C7] **H. Tavafoghi**, Y. Ouyang, and D. Teneketzis, "A Sufficient Information Approach to Decentralized Decision Making with Asymmetric Information", *IEEE 57th Conference on Decision and Control (CDC)*, 2018.

[C6] **H. Tavafoghi**, D. Teneketzis, "Informational Incentives in Congestion Games", *55th Annual IEEE Conference on Communication, Control, and Computing (Allerton)*, 2017.

[C5] F. Farhadi, **H. Tavafoghi**, D. Teneketzis, and J. Golestani, "A Dynamic Incentive Mechanism for Security in Networks of Interdependent Agents", *7th International Conference on Game Theory for Networks (GameNets)*, 2017.

[C4] **H. Tavafoghi**, Y. Ouyang, and D. Teneketzis "On Stochastic Dynamic Games with Delayed Sharing Information Structure", *IEEE Conference on Decision and Control (CDC)*, 2016.

[C3] Y. Ouyang, **H. Tavafoghi**, and D. Teneketzis "Dynamic Oligopoly Games with Private Markovian Dynamics", *IEEE Conference on Decision and Control (CDC)*, 2015.

[C2] **H. Tavafoghi**, D. Teneketzis "Sequential Contracts for Uncertain Electricity Resources", *10th Workshop on the Economics of Networks, Systems and Computation (NetEcon'15)*, 2015.

[C1] **H. Tavafoghi** and D. Teneketzis, "Optimal Contract Design for Energy Procurement", *52th Annual IEEE Conference on Communication, Control, and Computing (Allerton)*, 2014.

## Book Chapter

[B1] **H. Tavafoghi** , Y. Ouyang, D. Teneketzis, and M. Wellman, "Game Theoretic Approaches to Cyber Security: Issues and Challenges" in Adversarial and Uncertain Reasoning for Adaptive Cyber Defense (editor: Sushil Jajodia), Springer, 2019.

## Preprint

[P1] **H. Tavafoghi** and D. Teneketzis "Optimal Energy Procurement from a Strategic Seller with Private Renewable and Conventional Generation" arXiv:1401.5759, 2014.

## Honors and Awards

- **ITA Graduation Day Invited Presentation**, University of California, San Diego — February 2017
- **Finalist, Richard and Eleanor Towner prize for outstanding Ph.D. research**, University of Michigan — October 2016
- **Dow Distinguished Award for Interdisciplinary Sustainability**, May 2016
  A seed grant ($3,000) for "Environmental, economic, and social impacts of expanding a micro-grid from University of Liberia to surrounding communities"
- **NSF Early-Career Investigators Workshop on CPS and Smart City**, May 2015
  invited participant
- **Dow Doctoral Sustainability Fellowship** — September 2014 - September 2016
- **Engineering Graduate Symposium (EGS) award in Control, Power & Energy**, University of Michigan, — November 2013
- **Rackham Graduate Fellowship**, September 2011 - September 2012
  University of Michigan
- **Iran National Elites Foundation Scholarship** — September 2006
- **President's Honorary Rank Award**, Sharif University of Technology — October 2006
- **Silver Medalist** of $37^{th}$ *International Physics Olympiad*, Singapore — June 2006
- **Gold Medalist** of $18^{th}$ *National Physics Olympiad*, Iran — September 2005

## Invited Talks

- "Informational Incentives in Congestion Games"
  - Simons Institute of Theory and Computation, Berkeley, March 2018.
- "A Unified Approach to Dynamic Decision Problems with Asymmetric Information"
  - INFORMS Annual Meeting, Phoenix, October 2018.
  - Information Theory and Application Workshop (Graduation Day), San Diego, February 2017.
- "Dynamic Market Mechanisms for Wind Energy"
  - University of Southern California, April 2017.
  - University of Pennsylvania, March 2017.

## Selected Workshop Talks & Poster Presentations

- "Informational Incentives in Congestion Games", INFORMS Annual Meeting, Seattle, 2019.
- "Dynamic Market Mechanisms for Wind Energy", Richard and Eleanor Towner Prize for Outstanding Ph.D. Research, University of Michigan, November, 2017
- "Dynamic Games with Asymmetric Information: Common Information Based Perfect Bayesian Equilibria and Sequential Decomposition", The $5^{th}$ Midwest Workshop on Control and Game Theory (WCGT16), Purdue University, April 2016.

- "Sequential Contracts for Uncertain Electricity Resources", IPAM Graduate Summer School on Games and Contracts for Cyber-Physical Security, UCLA, July 2015.
- "Optimal Energy Procurement from a Strategic Seller", The $3^{rd}$ Midwest Workshop on Control and Game Theory (WCGT14), Ohio State University, April 2014.
- "Energy Procurement from Strategic Seller with Conventional and Renewbale Generation", Engineering Graduate Symposium, University of Michigan, November 2013.

## Teaching Experience

- **Teaching Assistant**, University of Michigan
  - EECS 401 - Probability (Graduate)– Instructor: Prof. Stark — Winter 2013
  - EECS 501 - Probability (Undergraduate)– Instructor: Prof. Teneketzeis — Fall 2012
- **Teaching Assistant**, Sharif University of Technology
  - Circuits Theory (Undergraduate) – Instructor: Prof. Fatemizadeh — Fall 2009
  - Principles of Electrical Engineering (Undergraduate) – Instructor: Prof. Fotowat — Fall 2008
- Iran National Physics Olympiad (Summer School), Young Scholars Club — Summer 2006-07
- AP Physics for Physics Olympiad Preparation, Tehran High Schools — July 2006 - May 2011

## Activities & Services

- **Reviewer**
  - Journals: IEEE Transactions on Automatic Control, Dynamic Games and Applications, IEEE Transactions on Power Systems, IEEE Transactions on Sustainability, IEEE Transactions on Communications, IEEE Transactions on Signal Processing, and IEEE Transactions on Control Systems Technology
  - Conferences: Web and Internet Economics (WINE), IEEE Conference on Decision and Control, IEEE American Control Conference, and IEEE Global Conference on Signal and Information Processing
- **Technical Program Committee (TPC)**
  - 21th International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc'20), Shanghai, China, 2020.
  - 20th International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc'19), Catania, Italy, 2019.
- **Session (Co-)Chair**
  - Session chair at the 57th IEEE Annual Allerton Conference on Communication, Control, and Computing (Allerton), 2019.
  - Session co-chair at Information Theory and Application Workshop (ITA), San Diego, February 2017.
  - Session chair at the $3^{rd}$ Midwest Workshop on Control and Game Theory (WCGT14), April 2014.
- President of Iranian Graduate Student Association, University of Michigan, September 2015 - September 2016.