Hamidreza Tavafoghi

Contact Information

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Appointment

University of California Berkeley ,CA

- Postdoctoral Researcher — October 2017 - present
  Advisors: Pravin Varaiya and Kameshwar Poolla

Education

University of Michigan, Ann Arbor, MI

- Ph.D., Electrical Engineering: Systems — September 2017
  Thesis: "On Analysis and Design of Cyber-Physical Systems with Strategic Agents"
  Advisor: Demosthenis Teneketzis
- M.A., Economics — May 2017
- M.Sc., Electrical Engineering: Systems — May 2013

Sharif University of Technology, Tehran, Iran

- B.Sc., Electrical Engineering, Control — June 2011

Young Scholar Club, Tehran, Iran — July 2005 to Jun 2006

- 1-Year Courses on Physics and Mathematics for International Physics Olympiad

Research Interest

Energy markets, stochastic control, game theory, mechanism design, network economics, strategic learning

Honors and Awards

- Dow Distinguished Award for Interdisciplinary Sustainability, May 2016
- Dow Doctoral Sustainability Fellowship (two years), Spring 2015
- Engineering Graduate Symposium (EGS) technical session award in Control Systems, Power & Energy, University of Michigan, November 2013
- Rackham Graduate Fellowship (one year), University of Michigan , Fall 2011
- Fellowship Award of the *National Elite Foundation* (four years), Sharif University, Fall 2006
- *President's Honorary Rank Award*, Sharif University of Technology, October 2006
- Silver Medalist of 37^{th} *International Physics Olympiad*, Singapore, Jun 2006
- Gold Medalist of 18^{th} *National Physics Olympiad*, Tehran, Iran, September 2005

Submitted and Working Papers

- H. Tavafoghi and D. Teneketzis, "Dynamic Market Mechanisms for Wind Energy", *working paper*.
- H. Tavafoghi, Y. Ouyang, and D. Teneketzis, "Stochastic Dynamic Games with Asymmetric Information: A Common Information Appraoch", *working paper*.
- H. Tavafoghi, Y. Ouyang, and D. Teneketzis, "On Provision of Information in Transportation Networks", *working paper*.
- F. Farhadi, H. Tavafoghi, D. Teneketzis, and J. Golestani, "An Efficient Dynamic Allocation Mechanism for Security in Networks of Interdependent Strategic Agents", working paper.

Journal Publications

- ✐ Y. Ouyang, H. Tavafoghi, and D. Teneketzis "Dynamic Games with Asymmetric Information: Common Information Based Perfect Bayesian Equilibria and Sequential Decomposition", *IEEE Transaction on Automatic Control*, 2017.
- ✐ H. Tavafoghi and D. Teneketzis, "Multidimensional Forward Contracts under Uncertainty for Electricity Markets",*IEEE Transaction on Control of Network Systems*, 2017.
- ✐ 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 Publications

- ✐ H. Tavafoghi, D. Teneketzis, "Informational Incentives in Congestion Games", *55th Annual IEEE Conference on Communication, Control, and Computing (Allerton), 2017.*
- ✐ F. Farhadi, H. Tavafoghi, D. Teneketzis, and J. Golestani, "A Dynamic Incentive Mechanism for Security in Networks of Interdependent Agents", *to appear in 7th International Conference on Game Theory for Networks (GameNets)*, 2017.
- ✐ H. Tavafoghi, Y. Ouyang, and D. Teneketzis "On Stochastic Dynamic Games with Delayed Sharing Information Structure", To appear in *IEEE Conference on Decision and Control (CDC), 2016.*
- ✐ Y. Ouyang, H. Tavafoghi, and D. Teneketzis "Dynamic Oligopoly Games with Private Markovian Dynamics", *IEEE Conference on Decision and Control (CDC), 2015.*
- ✐ H. Tavafoghi, D. Teneketzis "Sequential Contracts for Uncertain Electricity Resources", *10th Workshop on the Economics of Networks, Systems and Computation (NetEcon'15), 2015.*
- ✐ H. Tavafoghi and D. Teneketzis, "Optimal Contract Design for Energy Procurement", *52th Annual IEEE Conference on Communication, Control, and Computing (Allerton), 2014.*

Preprint

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

Invited Talks

- ➢ "Dynamic Market Mechanisms for Wind Energy"
  - ➪ University of Southern California, April 2017.
  - ➪ University of Pennsylvania, March 2017.

Workshop Presentations

- ➢ "On Analysis and Design of Informational and Monetary Incentive Mechanisms for Dynamic Cyber-Physical Systems with Strategic Agents", Information Theory and Application Workshop (Graduation Day), San Diego, February 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.
- ➢ "Dynamic Mechanism design for Electricity Markets", NSF Early-Career Investigators Workshop on Cyber-Physical Systems and Smart Cities, Seattle, April 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.

Research Experience

- **Research Assistant** (University of Michigan)
  - **NSF Foundations Of Resilient CybEr-physical Systems** May 2013 - September 2017
    FORCES is contributing to the development of new Science of CPS by being the first project that integrates networked control with game theoretic tools and economic incentives of human decision makers for resilient CPS design and operation. The FORCES integrated co-design philosophy is being validated on two CPS domains: electric power distribution and consumption, and transportation networks.
  - **Nasa Soilscape Project** May 2013 - September 2015
    This is a part Soil Moisture Active and Passive (SMAP) mission that will map Earth's soil moisture from space. In Soilscape we install and test ground networks of in-situ soil moisture sensors at several test sites that are designed to communicate with each other to adaptively and efficiently measure soil moisture at various depths. The data from the SoilSCAPE test sites will be used to calibrate and validate SMAP soil moisture products, ensuring the satellite gives accurate readings.
  - **Environmental, Economic, and Social Impacts of Expanding a Micro-Grid from University of Liberia to Surrounding Communities** April 2016 - February 2017
    This project investigates the expansion of existing micro-grid at University of Liberia - Fendell Campus to surrounding communities. It studies different approaches to increase the electrification rate by utilizing the potential renewable resources. It provides short-term and long-term proposals and analyzes the environmental, economic, and social impacts of them.

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)
  - Multivariable Control (Graduate) – Instructor: Prof. Nobakhti Fall 2010
  - Nonlinear Systems (Graduate) – Instructor: Prof. Karimi Spring 2009
  - Circuits Theory (Undergraduate) – Instructor: Prof. Fatemizadeh Fall 2009
  - Principles of Electrical Engineering (Undergraduate) – Instructor: Prof. Fotowat Fall 2008
- Iran National Physics Olympiad Committee, Young Scholars Club Summer 2006&7
- Preparation Courses for Physics Olympiad, Tehran High Schools July 2006 - May 2011

Selected Courses

- Advanced Game Theory, Special Topics in Microeconomics (Dynamic Mechanism Design, Repeated Games, Matching Markets, Bounded Rationality), Microeconomics I,II,III,&IV, Econometrics I&II, Macroeconomics I, Nonlinear Programming, Probability, Stochastic Processes, Stochastic Control, Nonlinear Control, Communication Networks, Power Networks & Electricity Markets

Activities & Services

- ➢ Reviewer for IEEE Transactions on Automatic Control, IEEE Transactions on Power Systems, IEEE Transactions on Sustainability, IEEE Transactions on Communications, IEEE Conference on Decision and Control, IEEE American Control Conference, and IEEE Global Conference on Signal and Information Processing
- ➢ 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

References

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