# Parinaz Naghizadeh

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## APPOINTMENTS

- **Assistant Professor** — Sep 2019 - Present
  Department of Integrated Systems Engineering &
  Department of Electrical and Computer Engineering
  Ohio State University

- **Postdoctoral Research Associate** — Sep 2017 - Aug 2019
  Department of Electrical and Computer Engineering
  Purdue University and Princeton University Edge Lab

- **Postdoctoral Research Fellow** — Sep 2016 - Aug 2017
  Department of Electrical Engineering and Computer Science
  University of Michigan

## EDUCATION

- **Ph.D., Electrical Engineering**, University of Michigan — Aug 2016
  *Ph.D. thesis*: On the Provision of Public Goods on Networks:
  Incentives, Exit Equilibrium, and Applications to Cyber Security

- **M.Sc., Mathematics**, University of Michigan
  *Focus:* Mathematics of Optimization — May 2014

- **M.Sc., Electrical Engineering**, University of Michigan
  *Major:* Communications, *Minor:* Microeconomics — May 2013

- **B.Sc., Electrical Engineering**, Sharif University of Technology, Iran
  *Major:* Communications — Jun 2010

## RESEARCH INTERESTS

Network economics, game theory, reinforcement learning, and data analytics, with applications in edge computing and cybersecurity.

## HONORS AND AWARDS

- **Rising Stars in EECS**, Stanford University — Fall 2017

- **Finalist, ProQuest Distinguished Dissertation Award**, University of Michigan — Fall 2016

- **INFOCOM 2016 Best-in-Session Presentation Award**, Game Theory session — Apr 2016

- **ITA Graduation Day Invited Talk**, University of California, San Diego — Feb 2016

- **Honorable Mention, Richard and Eleanor Towner prize for outstanding Ph.D. research**, University of Michigan — Fall 2015

- **Barbour Scholarship**, University of Michigan — 2014 - 2015
  Engineering Graduate Symposium, University of Michigan — Fall 2012

- **Iran's National Elites Foundation Scholarship** — 2007 -2010

- **President's Honorary Award at Sharif University of Technology** — Fall 2006

- **Ranked $14^{th}$** among nearly 350,000 participants in Iran's Physics and Mathematics Nation-wide Universities Entrance Exam — Summer 2006

| WORKING PAPERS | [W2] "The Impacts of Prediction Technologies on Relational Contracts", with Thanh Nguyen and Shai Vardi. |

[W1] "The Role of Managers Revisited", with Thanh Nguyen.

JOURNAL PAPERS

[J6] D. Ghavidel, P. Naghizadeh, M. Liu, V. Gupta. "A Reputation-Based Contract for Repeated Crowdsensing with Costly Verification", *IEEE Transactions on Signal Processing*, accepted, 2019.

[J5] P. Naghizadeh, M. Liu. "Provision of Public Goods on Networks: On Existence, Uniqueness, and Centralities", *IEEE Transactions on Network Science and Engineering*, vol. 5, no. 3, pp. 225-236, 2018.

[J4] M. Khalili, P. Naghizadeh, M. Liu. "Designing Cyber Insurance Policies: The Role of Pre-Screening and Security Interdependence". *IEEE Transactions on Information Forensics and Security*, 13 (9): 2226-2239, 2018.

[J3] P. Naghizadeh, M. Liu. "Opting out of Incentive Mechanisms: A Study of Security as a Non-Excludable Public Good", *IEEE Transactions on Information Forensics and Security*, 11 (12): 2790-2803, 2016.

[J2] A. Sarabi, P. Naghizadeh, Y. Liu, M. Liu. "Risky Business: Fine-grained Data Breach Prediction Using Business Profiles", *Journal of Cybersecurity*, 2 (1): 15-28, Oxford University Press, 2016.

[J1] P. Naghizadeh, M. Liu. "Perceptions and Truth: A Mechanism Design Approach to Crowd-Sourcing Reputation", *IEEE/ACM Transactions on Networking*, 24 (1): 163-176, 2016.

REFEREED CONFERENCE AND WORKSHOP PAPERS

[C21] P. Naghizadeh, T, Nguyen, S. Vardi. "The Impacts of Prediction Technologies on Relational Contracts"', in the *30th Workshop on Information Systems and Economics (WISE'19)*, Dec 2019.

[C20] M. Abdallah, P. Naghizadeh, T. Cason, S. Bagchi, S. Sundaram. "Protecting Assets with Heterogeneous Valuations under Behavioral Probability Weighting", in the *Control and Decision Conference (CDC'19)*, Dec 2019.

[C19] P. Naghizadeh, A. Sinha. "Adversarial Contract Design for Private Data Commercialization", in *ACM conference on Economics and Computation (EC '19)*, Jun 2019.

[C18] M. Abdallah, P. Naghizadeh, A. R. Hota, T. Cason, S. Bagchi, S. Sundaram. "The Impact of Behavioral Probability Weighting on Security Investments in Interdependent Systems", in the *American Control Conference (ACC'19)*, Jul 2019.

[C17] S. Ahn, M. Gorlatova, P. Naghizadeh, M. Chiang, "Personalized Augmented Reality Via Fog-based Imitation Learning", in the *IEEE Workshop on Fog Computing and the IoT (co-located with IEEE CPS-IoT Week)*, Apr 2019.

[C16] P. Naghizadeh, M. Gorlatova, A. Lan, M. Chiang. "Hurts to Be Too Early: Benefits and Drawbacks of Communication in Multi-Agent Learning", In *IEEE INFOCOM*, 2019.

[C15] S. Ahn, M. Gorlatova, P. Naghizadeh, M. Chiang, P. Mittal. "Adaptive Fog-Based Output Security for Augmented Reality", *ACM SIGCOMM VR/AR Network Workshop*, Aug 2018.

[C14] P. Naghizadeh, M. Liu. "On the Uniqueness and Stability of Equilibria of Network Games", *The 55th Annual Allerton Conference on Communication, Control and Computing*, Oct 2017.

[C13] M. Khalili, P. Naghizadeh, M. Liu. "Embracing Risk Dependency in Designing Cyber-Insurance Contracts", *The 55th Annual Allerton Conference on Communication, Control and Computing*, Oct 2017.

[C12] M. Khalili, P. Naghizadeh, M. Liu. "Designing Cyber Insurance Policies in the Presence of Security Interdependence", *The 12th Workshop on the Economics of Networks, Systems and*

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*Computation (NetEcon)*, Jun 2017.

[C11] D. Ghavidel, P. Naghizadeh, M. Liu, V. Gupta. "A Reputation-Based Contract for Repeated Crowdsensing with Costly Verification", *American Control Conference (ACC)*, May 2017.

[C10] M. Khalili, P. Naghizadeh, M. Liu. "Designing Cyber Insurance Policies: Mitigating Moral Hazard Through Security Pre-Screening", *The 7th International Conference on Game Theory for Networks (GameNets)*, May 2017.

[C9] P. Naghizadeh, M. Liu. "Exit Equilibrium: Towards Understanding Voluntary Participation in Security Games", In *IEEE INFOCOM*, Feb 2016.

[C8] P. Naghizadeh, M. Liu. "Inter-Temporal Incentives in Security Information Sharing Agreements", position paper, *AAAI workshop on Artificial Intelligence for Cyber Security (AICS)*, Feb 2016.

[C7] P. Naghizadeh, M. Liu. "Provision of Non-Excludable Public Goods on Networks: From Equilibrium to Centrality Measures", *The 53rd Annual Allerton Conference on Communication, Control and Computing*, Oct 2015.

[C6] Y. Liu, A. Sarabi, J. Zhang, P. Naghizadeh, M. Karir, M. Bailey, M. Liu. "Cloudy with a Chance of Breach: Forecasting Cyber Security Incidents", *The 24th USENIX Security Symposium*, Aug 2015.

[C5] A. Sarabi, P. Naghizadeh, Y. Liu, M. Liu. "Prioritizing Security Spending: A Quantitative Analysis of Risk Distributions for Different Business Profiles", *The 14th Workshop on the Economics of Information Security (WEIS)*, Jun 2015.

[C4] P. Naghizadeh, M. Liu. "Budget Balance or Voluntary Participation? Incentivizing Investments in Interdependent Security Games", *The 52nd Annual Allerton Conference on Communication, Control and Computing*, Oct 2014.

[C3] A. Sarabi, P. Naghizadeh, M. Liu. "Can Less Be More? A Game-Theoretical Analysis of Investment vs. Filtering", *The 5th Conference on Decision and Game Theory for Security (GameSec)*, Nov 2014.

[C2] P. Naghizadeh, M. Liu. "Voluntary Participation in Cyber-insurance Markets", *The 13th Workshop on the Economics of Information Security (WEIS)*, Jun 2014.

[C1] P. Naghizadeh, M. Liu. "Establishing Network Reputation via Mechanism Design", *The 3rd International Conference on Game Theory for Networks (GameNets)*, 2012.

NON-REFEREED PUBLICATIONS/ PRE-PRINTS

[P3] P. Naghizadeh, M. Liu. "Inter-Temporal Incentives in Security Information Sharing Agreements", *Information Theory and Applications Workshop (ITA)*, Feb 2016.

[P2] P. Naghizadeh, M. Liu. "Closing the Price of Anarchy Gap in the Interdependent Security Game", *Information Theory and Applications Workshop (ITA)*, Feb 2014.

[P1] P. Naghizadeh, M. Liu. "Incentives, Quality, and Risks: A Look into the NSF Proposal Review Pilot", arXiv:1307.6528, 2013.

SELECTED WORKSHOP AND POSTER PRESENTATIONS

- "Provision of Non-Excludable Public Goods: Incentives, Exit Equilibrium, and Applications to Cyber Security", (poster) *IPAM Graduate Summer School on Games and Contracts for Cyber-Physical Security*, Jul 2015.

- "User Participation in Monopolistic Cyber-Insurance Markets", (talk) *The 3rd Midwest Workshop on Control and Game Theory (WCGT)*, Apr 2014.

- "Achieving Socially Optimal Security Investments Through Insurance", (poster) *ITA Graduation Day Poster Session*, UCSD, Feb 2014.

| TEACHING EXPERIENCE | **University of Michigan** | |
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| | • EECS 557: Communication Networks (*Substitute Instructor*) | Fall 2017 |
| | • EECS 401: Probabilistic Methods in Engineering (*Graduate Student Instructor*) | Fall 2012 |

**Sharif University of Technology**

- Machine Language & Architecture (*Teaching Assistant*) — Fall 2009
- Electrical Engineering Basics Lab (*Lab Instructor*) — Fall 2009
- A Crash Course in PSpice for EE Freshmen (*Instructor*) — Fall 2009
- Principles of Electronics Lab (*Lab Instructor*) — Spring 2009

PEDAGOGICAL TRAINING

- Preparing Future Faculty Seminar — May - June 2015

  A five-week seminar for selected doctoral students from across the University of Michigan, designed to help prepare senior graduate students for faculty positions.

- NextProf Workshop for Michigan Students — May 2015

  A two-day workshop for selected research fellows and doctoral students from across the college of engineering at the University of Michigan, designed to prepare participants for navigating first faculty positions.

INVITED TALKS

- "On Communication in Multi-agent Reinforcement Learning", *INFORMS 2018 Annual Meeting, Advanced Probability Invited Session*, Nov 2018.

- "Network Games with Applications in Cyber Security", *Purdue CS Theory Seminar*, Apr 2018.

- "Adversarial Contract Design for Selling Data", *Information Theory and Applications Workshop (ITA), UCSD*, Feb 2018.

- "Network Games with Applications in Cyber Security", *Purdue ECE Seminar*, Dec 2017.

- "Decision Making and Crowdsourcing on Networks", *EDGE lab, Princeton University*, May 2017.

- "Improving Cyber Security through Cyber Insurance and Data Analytics", *Electrical Engineering Department, Texas A&M University*, April 2017.

- "Incentivizing Improved Cyber Security: A Study of Security as a Public Good"', *Computer Engineering and Systems Group Remote Seminar, Texas A&M University*, March 2017.

- "Network Structures and Public Good Provision Games", *Information Theory and Applications Workshop (ITA), UCSD*, Feb 2017.

- "Security Pre-Screening in the Design of Cyber-Insurance Policies", *CSP Seminar, Department of Electrical Engineering, University of Michigan*, Jan 2017.

- "Incentivizing Improved Cybersecurity: A Study of Security as a Public Good", *Department of Electrical Engineering, University of California San Diego*, Nov 2016.

- "On the Provision of Public Goods on Networks", *Communications, Networks, and Systems Seminar, Ming Hsieh Institute, University of Southern California*, Nov 2016.

- "Provision of Public Goods on Networks: On Existence, Uniqueness, and Centralities" (presented by Mingyan Liu), *UECE Lisbon Meetings: Game Theory and Applications*, Nov 2016.

- "Provision of Public Goods on Networks and its Applications to Cyber-Security", *University of Notre Dame*, Sep 2016.

- "Provision of Non-Excludable Public Goods on Networks: Incentives, Exit Equilibrium, and Applications to Cyber Security", *ITA Graduation Day*, Feb 2016.

SERVICE

- **Ph.D. Committee Member:**
  - MohammadMahdi Khalili, University of Michigan (advisor: Mingyan Liu)

Expected Defense Date: Dec 2019.

- **Technical Program Committee Member:**
  - MobiHoc        2019 – 2020
  - WiOpt        2019
  - IEEE Sarnoff Symposium        2019
  - DSN Fast Abstract        2019
  - CoNEXT Student Workshop        2019

- **Reviewer**,
  *Journals:* IEEE Security & Privacy, IEEE Trans. on Information Forensics & Security, IEEE/ACM Trans. on Networking, IEEE Trans. on Communications, IEEE Trans. on Information Theory, IEEE Trans. on Mobile Computing, IEEE Trans. on Dependable and Secure Computing, IEEE Trans. on Vehicular Technology, IEEE Trans. on Cognitive Communications & Networking, ACM Trans. on Internet Technology, International Journal on Robust and Nonlinear Control, Information Technology and People, Physica A
  *Conferences:* VTC 2015, 2018, GlobalSIP 2015, ICC 2016, 2017, ACC 2017, CDC 2018

- **Session chair**, Game theory session, Information Theory and Applications (ITA) Workshop, UCSD        2017

- **Track chair**, control and robotics, systems and communications, and signal processing and computer vision sessions, at the Engineering Graduate Symposium, University of Michigan    2013

- **Organizing member**, networking events and social gatherings for graduate women in Electrical Engineering and Computer Science, University of Michigan        Winter 2013 - Winter 2015