

CEYHUN EKSIN

Texas A&M University
Industrial and Systems Engineering Department
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RESEARCH INTERESTS

Game theoretic modeling and optimization of networked multi-agent systems. Topics of interest include evolutionary game theory, autonomous systems, and public health.

Areas of expertise: Game theory, optimization, network theory, and epidemics.

EXPERIENCE

Texas A&M University College Station, TX
Tenure-track Assistant Professor July 2018–
Affiliation: Industrial and Systems Engineering Department

Max Planck Institute for Dynamics and Self-organization Göttingen, Germany
Associate visiting researcher January 2018–June 2018

Texas A&M University College Station, TX
Adjunct Assistant Professor September 2017–June 2018
Affiliation: Industrial and Systems Engineering Department

Georgia Institute of Technology Atlanta, GA
Postdoctoral Researcher April 2015–August 2017
Affiliations: School of Electrical & Computer Engineering, and Biological Sciences
Supervisors: Prof. J.S. Shamma and Prof. J.S. Weitz
Projects: Control and modeling of coevolving networks. Social epidemic models.

EDUCATION

University of Pennsylvania Philadelphia, PA
Ph.D. in Electrical & Systems Engineering May 2015
Thesis: “Bayesian Network Games”
Advisor: Prof. Alejandro Ribeiro

Wharton School of the University of Pennsylvania Philadelphia, PA
M.A. in Statistics May 2015

Boğaziçi University Istanbul, Turkey
M.S. in Industrial Engineering December 2008
Thesis: “Applying Genetic Algorithms to Policy Design in System Dynamics”

Istanbul Technical University Istanbul, Turkey
B.S. in Control Engineering June 2005
Thesis: “Fuzzy Logic Approach to Mimic Decision Making Behavior of Humans in Stock Management Game”

ACADEMIC HONORS

- Serve-Learn-Sustain Smart Cities & Connected Communities Fellow, 2017 (\$1000).
- Finalist at the 2nd Annual GA Tech Postdoctoral Research Symposium, 2015.

- Fellowship for Graduate Students by The Scientific and Technological Research Council of Turkey (TUBITAK), (September 2006 - August 2008)
- Erasmus Exchange Student at TU/Eindhoven, the Netherlands (Feb. - July 2007)
- Ranked in top 300 (among 100,000 students) in the National Graduate Entrance Exam of Turkey (GRE like), 2004

PUBLICATIONS **Book chapters**

1. **C. Eksin**, B. Swenson, S. Kar, and A. Ribeiro, "Game Theoretic Learning", In Cooperative Graph Signal Processing, pp. 209-235, Ch. 7, 2018

In review journals

1. *S. Aydin, S. Arefizadeh, **C. Eksin**, "Decentralized fictitious play in near-potential games with time-varying communication networks," submitted, 2021.
2. *F. Sezer, H. Khazaei, **C. Eksin**, "Social welfare maximization and conformism via Information design in linear-quadratic-Gaussian games," submitted, 2021.
3. *S. Aydin and **C. Eksin**, "Decentralized learning-aware communication and communication-aware mobility control for the target assignment problem," submitted, 2021.
4. A. Garcia, R. Khatami, **C. Eksin**, *F. Sezer, "An iterative mechanism for coupling electricity markets," submitted to IEEE Trans. Power Systems as a two-parter manuscript, 2020.
5. L. Hong, A. Garcia, and **C. Eksin**, "Distributed estimation via network regularization," submitted, 2020.

Journal publications

1. **C. Eksin**, M. Ndeffo-Mbah, and J.S. Weitz, "Reacting to outbreaks in neighboring localities", (to appear), *Journal of Theoretical Biology*, 2021.
2. A. Nourmohammad, and **C. Eksin**, "Optimal evolutionary control for artificial selection on molecular phenotypes", (to appear), *Physical Review X*, 2021.
3. J.S. Weitz, S.W. Park, **C. Eksin**, and J. Dushoff, "Awareness-driven behavior changes can shift the shape of epidemics away from peaks and towards plateaus, shoulders, and oscillations", *The Proceedings of the National Academy of Sciences of the USA (PNAS)*, 117(51), pp. 32764-32771, 2020.
4. **C. Eksin**, and K. Paarporn, "Control of learning in anti-coordination network games", *IEEE Trans. Control of Network Systems*, 7(4), pp. 1823-1835, 2020.
5. **C. Eksin**, K. Paarporn, and J. S. Weitz, "Systematic biases in disease forecasting - the role of behavior change", *Epidemics*, vol. 27, pp. 96-105, 2019.
6. B. Swenson, **C. Eksin**, S. Kar, and A. Ribeiro, "Distributed Inertial Best-Response Dynamics", *IEEE Trans. Autom. Control*, vol. 63, no. 12, 2018.
7. K. Paarporn, **C. Eksin**, and J. S. Weitz, "Information sharing for a coordination game in fluctuating environments". *Journal of Theoretical Biology*, vol. 454, 2018.
8. **C. Eksin** and A. Ribeiro, "Distributed fictitious play for multiagent systems in uncertain environments", *IEEE Trans. Autom. Control*, vol. 63, no. 4, 2018.
9. **C. Eksin**, H. Deliç and A. Ribeiro, "Demand response with communicating rational consumers", *IEEE Trans. Smart Grid*, vol. 9, no. 1, 2018.

10. K. Paarporn, **C. Eksin**, J. S. Weitz, and J. S. Shamma, "Networked SIS epidemics with awareness", *IEEE Trans. Computational Social Systems*, vol. 4, no. 3, 2017
11. **C. Eksin**, J.S. Shamma, J.S. Weitz, "Disease dynamics on a network game: a little empathy goes a long way", *Scientific Reports*, 7:44122, March 2017.
12. J.S. Weitz, **C. Eksin**, K. Paarporn, S.P. Brown, and W.C. Ratcliff, "An oscillating tragedy of the commons in replicator dynamics with game-environment feedback", *Proceedings of the National Academy of Sciences USA*, vol. 113, no. 47, 2016.
13. P. Molavi, **C. Eksin**, A. Ribeiro and A. Jadbabaie, "Learning to coordinate in social networks", *Operations Research*, vol. 64, no. 3, 2016.
14. **C. Eksin**, H. Deliç and A. Ribeiro, "Demand response management in smart grids with heterogeneous consumer preferences", *IEEE Trans. Smart Grid*, vol. 6, no. 6, pp. 3082 - 3094, 2015.
15. **C. Eksin**, P. Molavi, A. Ribeiro and A. Jadbabaie, "Bayesian quadratic network game filters", *IEEE Trans. Signal Process.*, vol. 62, no. 9, pp. 2250-2264, 2014.
16. **C. Eksin**, P. Molavi, A. Ribeiro and A. Jadbabaie, "Learning in networks with incomplete information: asymptotic analysis and tractable implementation of rational behavior", *IEEE Signal Process. Mag.*, vol. 30, no. 3, pp. 30-42, 2013.
17. **C. Eksin** and A. Ribeiro, "Distributed network optimization with heuristic rational agents", *IEEE Trans. Signal Process.*, vol. 60, no. 10, pp. 5396-5411, 2012.

Peer-reviewed conference publications

1. S. Aydin and **C. Eksin**, "Decentralized Fictitious Play with Voluntary Communication in Random Communication Networks", *IEEE Conf. on Decision and Control (CDC)*, pp. 337-342, 2020.
2. L. Hong, A. Garcia, and **C. Eksin**, "Distributed Networked Learning with Correlated Data", *IEEE Conf. on Decision and Control (CDC)*, pp. 5923-5928, 2020.
3. S. Aydin and **C. Eksin**, Learning-aware Decentralized Communication and Mobility Control for the Target Assignment Problem, *IEEE Conf. on Control Technology and Applications (CCTA)*, pp. 334-339, 2020.
4. **C. Eksin**, Control of stochastic disease network games via influential individuals, *IEEE Conf. on Decision and Control (CDC)*, pp. 6893-6898, 2019.
5. S. Arefizadeh and **C. Eksin**, Distributed fictitious play in potential games with time-varying communication networks, *Asilomar Conf. Signals, Systems & Comp.*, pp. 1755-1759, 2019.
6. K. Paarporn, **C. Eksin**, J. S. Weitz, and Y. Wardi, Optimal control policies for evolutionary dynamics with environmental feedback, in *IEEE Conf. on Decision and Control*, pp. 1905-1910, Miami FL, Dec. 17-19 2018.
7. K. Paarporn and **C. Eksin**, Incentive Control in network anti-coordination games with binary types, *Asilomar Conf. Signals, Systems & Comp.*, pp. 316-320, 2018.
8. K. Paarporn, **C. Eksin**, J. S. Weitz, and J. S. Shamma, The effect of awareness on networked SIS epidemics, in *IEEE Conf. on Decision and Control*, pp. 973-978, Las Vegas NV, Dec. 10-13 2016.
9. **C. Eksin**, B. Swenson, S. Kar and A. Ribeiro, Learning pure-strategy Nash equilibria in networked multi-agent systems with uncertainty, in *IEEE Conf. on Decision and Control*, pp. 5292-5297, Las Vegas NV, Dec. 10-13 2016.

10. **C. Eksin** and A. Ribeiro, Distributed fictitious play in potential games of incomplete information, in *IEEE Conf. on Decision Control*, pp. 5190-5196, Osaka Japan, Dec. 15-18 2015.
11. K. Paarporn, **C. Eksin**, J. S. Weitz, and J. S. Shamma, Epidemic spread over networks with agent awareness and social distancing, in *53rd Annual Allerton Conference on Communication, Control, and Computing*, pp. 51-57, Monticello IL, Sept. 29 - Oct. 2 2015.
12. **C. Eksin**, A. Hooshmand and R. Sharma, A decentralized energy management system, in *Proc. European Control Conference (ECC)*, pp. 2260-2267, Linz Austria, July 15-17 2015.
13. **C. Eksin**, H. Deliç and A. Ribeiro, Smart pricing in demand response management with heterogeneous consumer preferences, in *Proc. American Control Conference (ACC)*, pp. 5692 - 5699, Chicago IL, July 1-3 2015.
14. **C. Eksin**, H. Deliç and A. Ribeiro, Rational consumer behavior models in smart pricing, *Int. Conf. Acoustics Speech Signal Process. (ICASSP)*, pp. 3167-3171, Brisbane Australia, April 19-24 2015.
15. **C. Eksin**, H. Deliç and A. Ribeiro, "Distributed demand side management for heterogeneous rational consumers in smart grids with renewable sources," *Int. Conf. Acoustics Speech Signal Process. (ICASSP)*, pp. 1100-1104, Firenze Italy, May 4-9 2014.
16. **C. Eksin**, P. Molavi, A. Ribeiro and A. Jadbabaie, "Information aggregation in a beauty contest game," *Int. Conf. Acoustics Speech Signal Process. (ICASSP)*, pp. 4783-4787, Firenze Italy, May 4-9 2014.
17. P. Molavi, **C. Eksin**, A. Ribeiro and A. Jadbabaie, "Learning to coordinate in a beauty contest game," in *Proc. Conf. on Decision and Control*, pp. 7358-7363, Firenze Italy, Dec. 10-13 2013.
18. **C. Eksin**, P. Molavi, A. Ribeiro and A. Jadbabaie, "Bayesian quadratic network game filters," in *Proc. Int. Conf. Acoustics Speech Signal Process. (ICASSP)*, pp. 4589-4593, Vancouver Canada, March 26-31 2013.
19. **C. Eksin**, P. Molavi, A. Ribeiro and A. Jadbabaie, "Dynamic games with side information in economic networks," in *Proc. Asilomar Conf. on Signals, Systems and Computers*, pp. 520-524, Pacific Grove CA, Nov. 4-7 2012.
20. **C. Eksin**, P. Molavi, A. Ribeiro and A. Jadbabaie, "Learning in Linear Games over Networks," in *Proc. Allerton Conference on Communication, Control and Computing*, pp. 434-440, Monticello IL, Oct. 1-5 2012.
21. **C. Eksin** and A. Ribeiro, "Heuristic rational models in social networks," in *Proc. Int. Conf. Acoustics Speech Signal Process. (ICASSP)*, pp. 3077-3080, Kyoto Japan, March 25-30 2012.
22. B. D. Nye, G. K. Bharathy, B. G. Silverman, and **C. Eksin**. "Simulation-based training of ill-defined social domains: the complex environment assessment and tutoring system (CEATS)," in *Int. Conf. Intelligent Tutoring Systems*, pp. 642-644. Springer Berlin Heidelberg, 2012.
23. **C. Eksin** and A. Ribeiro, "Network optimization with heuristic rational agents," in *Proc. Asilomar Conf. on Signals, Systems and Computers*, pp. 53-57, Pacific Grove CA, Nov. 6-9 2011.
24. **C. Eksin**, B. G. Silverman, D. Pietrocola and R. Kang. "Dimensions of leader-in-

context models,” in *Proc. Int. Conf. Cognitive Modeling*, pp. 61-66, Philadelphia PA, Aug. 5-8 2010.

25. **C. Eksin**, M. Guzelkaya, E. Yesil, and I. Eksin, “Fuzzy logic approach to mimic decision making behavior of humans in stock management game,” in *Proc. Int. Conf. of the System Dynamics Society*, Athens Greece, July 20-24, 2008
26. **C. Eksin** and A.O. Konuray, “Business dynamics of a record company as influenced by online channels,” in *Proc. Int. Conf. of the System Dynamics Society*, Athens Greece, July 20-24, 2008.
27. **C. Eksin** and Y. Barlas, “Genetic algorithms for multi-objective optimization in dynamic systems,” in *Proc. Int. Conf. of the System Dynamics Society*, Athens Greece, July 20-24, 2008.

Reports

1. C. Stefan, S. Dommers, **C. Eksin**, R. Sitters, A. Stougie, and L. Stougie. “A PTAS for the multiple depot vehicle routing problem,” *SPOR Report*, No. 2008-03, TU/Eindhoven, Netherlands, 2008.

PATENT

A. Hooshmand, R. Sharma, and **C. Eksin**, “Decentralized Energy Management Platform”, US20150295410, App. No. US 14/681, 2019.

GRANTS

NSF- Computing and Communication Foundations (CCF) 10/2020–9/2023
 “Communication-Aware Decentralized Game-Theoretic Learning Algorithms for Networked Systems with Uncertainty”, Role: **PI**, **\$361,086**

NSF- Energy, Power, Control and Networks (EPCN) 9/2020–8/2023
 “Modeling and Control of Coevolutionary Network Formation with Applications to Finishing Processes for 3D Printed Components”, Role: **PI**, CoPIs: Satish Bukkapatnam, **\$430,000**

T3 Texas A&M 1/2020-1/2022
 “Understanding individual behavior and value of social network information during the flu season”, Role: **PI**, CoPIs: Martial Ndeffo Mbah, Alexander Brown, **\$30,000**

Innovation [X] School of Innovation and Office of Diversity, Texas A&M 2020-2021
 “Effective Communication Strategies During Covid-19”, Role: **Co-PI**, PI: C. Lakimsetti, Co-PIs: E. Amaral, E. Santana, D. Over, M. Perez-Patron, **\$20,000**

INTERNSHIP

NEC Laboratories America Inc. Cupertino, CA
 Energy Department Research Intern May 2014 - August 2014
Projects: Decentralized energy management systems with storage and renewables.

ADVISEES

- *Hossein Khazaei*, Postdoctoral Researcher (co-advised with Alfredo Garcia), Texas A&M, TX, Fall 2020–present
- *Roohallah Khatami*, Postdoctoral Researcher (co-advised with Alfredo Garcia), Texas A&M, TX, Fall 2019–Spring 2020.

PhD Students:

- *Soham Das*, PhD Candidate, Texas A&M, TX, Fall 2020–present

- *Sarper Aydin*, PhD Candidate, Texas A&M, TX, Fall 2019–present
- *Furkan Sezer*, PhD Candidate, Texas A&M, TX, Fall 2019–present
- Graduate Students:**
- Francisco Donoso, ISEN Masters Texas A&M, Spring 2021–present
- Soham Das, ISEN Masters Texas A&M, Spring 2020–Summer 2020
- Undergraduate:**
- Daniel Guerson, ECE Texas A&M, Spring 2020–present
- Francisco Donoso, ISEN Texas A&M, Spring 2020-Fall 2020
- *Capstone*: Luke Shafik, Shayne Jayawardene, Preston Crow, Byron Barthelemy, Spring 2019
- *Capstone*: Ian McNelis, Hudson Surjana, Natasha Surjana, Alberto Maldonado, Alexa Gutierrez - **(Best Project)**, Fall 2018
- Adam B. Zhang & Brighton Ancelin, Bachelors, Georgia Tech, GA, Spring 2017, *Supervised project*: A network data repository for epidemics models–**Best presentation in the Undergraduate Symposium at Georgia Tech**
- Keith Paarporn, ECE, Ph.D. candidate, Georgia Tech, Fall 2016-Spring 2017, *Supervised project*: Global coordination games
- Walker Gussler, Biology, Masters, Georgia Tech, GA, Fall 2016, *Supervised project*: Pitfalls in disease forecasting: effects of behavior and networks
- Adam B. Zhang, Applied Mathematics, Bachelors, Georgia Tech, GA, Fall 2016, *Supervised project*: Networked SIS epidemics with awareness - empirical networks
- Keith Paarporn, ECE, Masters, Georgia Tech, GA, Fall 2015 - Spring 2016, *Supervised project*: Networked SIS epidemics with awareness

TEACHING EXPERIENCE

- Instructor** for “ISEN 613 - Engineering data analysis” (Distance Learning Section), Texas A&M Fall 2020
- Co-Instructor** for “ISEN 689 - Sp. Tp: Learning and Optimization over Networks”, Texas A&M Spring 2020
- Instructor** for “ISEN 613 - Engineering data analysis” (Distance Learning Section), Texas A&M Spring 2020
- Instructor** for “ISEN 613 - Engineering data analysis” (Distance Learning Section), Texas A&M Fall 2019
- Instructor** for “ISEN 613 - Engineering data analysis”, Texas A&M Fall 2019
- Instructor** for “ISEN 320 - Operations Research I”, Texas A&M Spring 2019
- Instructor** for “ISEN 613 - Engineering data analysis”, Texas A&M Fall 2018
- Teaching assistant** for “Systems Methodology”, Univ. of Pennsylvania Spring 2011
- Teaching assistant** for “Agent Based Modeling”, Univ. of Pennsylvania Fall 2010
- Teaching assistant** for “Agent Based Modeling”, Univ. of Pennsylvania Fall 2009

INVITED PRESENTATIONS

- *Optimal Control for Evolutionary Dynamics*
Bio-Group Seminar, Texas A&M ECE (2020)
- *Learning and Influence in Networked Multiagent Systems with Uncertainty*
Universidad Rey Juan Carlos ECE, Madrid, Spain (2019)
- *Learning networked multiagent systems with uncertainty*
Texas A&M ECE (2018)

- *Decision making in networked multiagent systems with uncertainty*
Faculty of Math and Sciences - Groningen University (January 2017), Industrial and Systems Engineering - University of Florida (March 2017), Electrical Engineering - University of Hawaii (April 2017), Industrial and Systems Engineering - Texas A&M (May 2017)
- *Networked multiagent systems with uncertainty*
Sabancı University (April 2016), Boğaziçi University (May 2016).
- *Disease dynamics on a network game*
UPenn (April 2016), Yale Inst. Network Science (2017), University of Stuttgart (2018)
- *Multiagent systems with uncertainty: Infectious disease dynamics over networks*
Bilkent University (Dec. 2015), Boğaziçi University (Jan. 2016).
- *Bayesian network games approach to demand response management in smart grids*
Power and Energy Systems Group at UIUC, (May 2014).
- *Bayesian network games*
Sabancı University (Dec. 2013), Koç University (Dec. 2013), Boğaziçi University (Dec. 2013), Princeton (April 2014).
- *Network optimization with heuristic rational agents*
Penn Seminar on Communications and Networking, UPenn (Oct. 2011).

PROFESSIONAL AFFILIATIONS AND REVIEW ACTIVITIES

- IEEE Member, IEEE Control Systems and Signal Processing Societies Member, INFORMS.
- **Editor:** PLOS ONE - Complex Networks Channel
- **Reviewer for Journals:** IEEE Trans. Automatic Control, Automatica, IEEE Trans. Control Systems Technology, Control Systems Letters, IEEE Trans. Signal Process., Signal Process. Letters, IEEE Trans. Signal and Information Process. over Networks, IEEE Journal Sel. Topics in Signal Process., IEEE Trans. Smart Grids, Operations Research, System Dynamics Review, Theoretical Biology, INFORMS Journal Computing, Optimization Letters.
- **Reviewer for Conferences:** Int. Conf. Acoustics, Speech, Signal Process., IEEE Conf. Decision and Control, IEEE Global Conf. on Signal and Inf. Process., IEEE Conf. on Decision and Control (CDC), American Control Conf. (ACC), GAMENETS.
- **Invited session organizer:**
'Multiagent Systems and Game Theory' at the Asilomar Conference on Signals, Systems, and Computers, 2016
'Network Games' at the Asilomar Conference on Signals, Systems, and Computers, 2018
'Game Theoretic Learning over Networks' at the Asilomar Conference on Signals, Systems, and Computers, 2019
'Game Theoretic Learning in Networks' at the INFORMS Annual Meeting – Optimization track, 2020.