

Utku Ozan Candogan

CONTACT INFORMATION	Laboratory for Information and Decision Systems Massachusetts Institute of Technology 77 Massachusetts Avenue, 32-D640 Cambridge, MA 02139	Voice: (857) 998-8805 E-mail: candogan@mit.edu www: web.mit.edu/candogan/
EDUCATION	Massachusetts Institute of Technology , Cambridge, MA PhD Candidate, Department of Electrical Engineering and Computer Science <i>2009 - present</i>	
	Massachusetts Institute of Technology , Cambridge, MA M.S., Department of Electrical Engineering and Computer Science <i>2007 - 2009</i> GPA: 5.00/5.00 <i>Thesis: Potential Games and Competitive Scheduling in Wireless Networks</i>	
	Bilkent University , Ankara, Turkey B.S., Department of Electrical and Electronics Engineering <i>June 2007</i> GPA: 4.00/4.00	
	Ankara Science High School , Ankara, Turkey High School Diploma, Ranked 1st <i>June 2003</i> GPA: 5.00/5.00	
RESEARCH INTERESTS	Game theory and its applications, mechanism design, learning in games, network economics, pricing and resource allocation in networked systems, network optimization and control.	
RESEARCH EXPERIENCE	Laboratory for Information and Decision Systems, MIT , Cambridge, MA <i>Research Assistant, Advisors: Asu Ozdaglar, Pablo Parrilo</i> <i>Sept. 2007 - present</i>	
	<ul style="list-style-type: none">• <i>Optimal Pricing in the Presence of Local Network Effects.</i> We study the optimal pricing strategies of a monopolist selling a divisible good (service) to consumers who are embedded in a social network. We assume that consumers experience a (positive) local network effect, i.e. they derive larger utility from the product, if their peers also use the same product. Using tools from optimization and game theory we obtain an optimal pricing/advertising policy which is closely related to a measure of the “centrality” of consumers in the network. In particular, under this policy, each agent is first offered a nominal price, and then receives a discount proportional to the amount it influences central agents, and receives a markup proportional to the influence of other agents on her. We also explore the dynamic structure of the problem and design dynamic pricing mechanisms.• <i>Flow Representation of Games: Near-Potential Games and Dynamics.</i> What are the classes of games that have desirable equilibrium/dynamic properties? What is the underlying global structure of preferences in games that leads to desirable properties? We answer these questions by obtaining a canonical decomposition of the space of games. The decomposition provides a useful framework for studying equilibrium and dynamic properties of arbitrary games.• <i>Dynamics in Near-Potential Games.</i> Except for special classes of games, there is no systematic framework for analyzing the dynamical properties of multi-agent strategic interactions. Potential games are one such special but restrictive class of games that allow for tractable dynamic analysis. Intuitively, games that are “close” to a potential game should share similar properties. In this work, we formalize and develop this idea, by quantifying to what extent the dynamic features of potential games extend to “near-potential” games.	
	Bilkent University , Ankara, Turkey <i>Undergraduate Researcher, Advisors: Haldun Ozaktas, Hitay Ozbay</i> <i>Jan. 2006 - June 2007</i>	
	<ul style="list-style-type: none">• Designed and implemented fast controllers based on the fractional Fourier Transform.	
PROFESSIONAL EXPERIENCE	Microsoft Research New England , Cambridge, MA <i>Summer Intern</i> <i>June 2010 - Sept. 2010 & May 2011 - Aug. 2011</i>	
	<ul style="list-style-type: none">• Studied optimal pricing mechanisms for perishable goods with variable supply and demand.• Conducted research on computational and dynamic properties of zero-sum games.• Analyzed repeated auctions as a sales mechanism for service goods.	

Aselsan Inc. Ankara, Turkey
Summer Intern *July. 2005 - Aug. 2005 & July. 2006 - Sept. 2006*

- Designed full duplex translator between RS-232 standard and ARINC standard.
- Implemented search algorithms for positioning on 3-D world maps using genetic algorithms.

TEACHING EXPERIENCE **MIT Dept. of EECS** Cambridge, MA
Teaching Assistant, Lecturers: Daron Acemoglu, Asu Ozdaglar *Sept. 2009 - Dec. 2009.*
 Class: Networks 6.207
 Networks is a course which highlights common principles that permeate the functioning of diverse technological, economic, and social networks. It utilizes three sets of tools –random graph models, optimization, and game theory– to study various social and economic networks.

Bilkent University Ankara, Turkey
Undergraduate Tutor *Sept. 2005 - June 2007*
 Classes: “Complex Calculus and Transformation Techniques” and “Calculus”.

AWARDS & HONORS

- Siebel Scholar (MIT), for academic achievement and excellence. *Sept. 2008- May 2009*
- Bilkent University High Honor student with Full Scholarship. *2003 - 2007*
- The Scientific and Technological Research Council of Turkey Project Contest among High School Students, Physics, 2nd place. *May 2003*
- Antalya Mathematical Olympiads, 4th place. *May 2001 & May 2002*
- University Entrance Exam - Ranked 55th out of 1.5 million candidates. *June 2003*

TEAM PROJECTS & LEADERSHIP POSITIONS

- Led a team for development of a vehicle tracking system using GPS, GPRS, and digital maps. *Sept. 2005 - June 2005*
- Led a student team for design of a 32 bit pipelined processor with reduced instruction set. *March 2005 - May 2005*
- Elected as the Vice Chair of the IEEE Bilkent Student Branch. *Sept. 2005*

SKILLS **Programming Languages:** Java, VHDL, Verilog.
Applications: MatLab, Mathematica, GNU Octave, L^AT_EX, MS Office.

MEMBERSHIPS Student member of IEEE since 2005, member of MIT Nautical Association, member of MIT Science and Engineering Business Club.

PUBLICATIONS **Journal Publications:**

- U. O. Candogan, I. Menache, A. Ozdaglar, P. A. Parrilo, “Flow Representations of Games: Harmonic and Potential Games”, *Mathematics of Operations Research*.
- U. O. Candogan, K. Bimpikis, A. Ozdaglar, “Optimal Pricing in Networks with Externalities”, submitted to *Operations Research*.
- C. Borgs, U. O. Candogan, J. Chayes, I. Lobel, H. Nazerzadeh, “Optimal Multi-Period Pricing with Service Guarantees”, submitted to *Management Science*.
- U. O. Candogan, A. Ozdaglar, P. A. Parrilo, “Dynamics in Near-Potential Games”, submitted to *Games and Economic Behavior*.
- U. O. Candogan, A. Ozdaglar, P. A. Parrilo, “Near-Potential Games: Geometry and Dynamics”, submitted to *Transactions on Economics and Computation*.

Conference Publications:

- C. Borgs, U. O. Candogan, J. Chayes, I. Lobel, H. Nazerzadeh, “Optimal Multi-Period Pricing with Service Guarantees”, submitted to WINE 2011.
- U. O. Candogan, A. Ozdaglar, P. A. Parrilo, “Learning in Near-Potential Games”, accepted to CDC 2011.
- U. O. Candogan, K. Bimpikis, A. Ozdaglar, “Optimal Pricing in the Presence of Local Network Effects”, WINE 2010.

- U. O. Candogan, I. Menache, A. Ozdaglar, P. A. Parrilo, “Dynamics in Near-Potential Games”, Allerton Conference 2010.
- U. O. Candogan, A. Ozdaglar, P. A. Parrilo, “A Projection Framework for Near-Potential Games”, CDC 2010.
- U. O. Candogan, I. Menache, A. Ozdaglar, P. A. Parrilo, “Near-Optimal Power Control in Wireless Networks: A Potential Game Approach”, Infocom 2010.
- U. O. Candogan, I. Menache, A. Ozdaglar, P. A. Parrilo, “Competitive Scheduling in Wireless Collision Channels with Correlated Channel State”, *Proc. of the International Conference on Game Theory for Networks*, July 2009.
- U.O. Candogan, H. Ozbay, H. M. Ozaktas, “Controller Implementation for a Class of Spatially-Varying Distributed Parameter Systems”, *Proc. of the 17th IFAC World Congress*, pp. 7755-7760, July 2008.

PATENTS C. Borgs, U. O. Candogan, J. Chayes, I. Lobel, H. Nazerzadeh, “Optimal Mechanisms for Perishable Goods With Variable Supply and Demand”, Microsoft Research, submitted.

RELATED COURSEWORK *Networks*: Network Algorithms, Fundamentals of Network Science and Engineering, Networks (Teaching Assistant).
Operations Research: Introduction to Mathematical Programming, Nonlinear Programming, Algebraic Techniques and Semidefinite Optimization.
Economics: Microeconomic Theory 1 & 2, Industrial Organization, Topics in Game Theory (Listener).
Stochastic Processes: Fundamentals of Probability, Advanced Stochastic Processes, Real and Functional Analysis (Listener), Statistical Inference in High-Dimensional Settings (Listener).

CITIZENSHIP Turkish LANGUAGE English and Turkish DATE OF BIRTH 02/20/1987