

ERMIN WEI

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EMPLOYMENT

- Northwestern University**, Evanston, IL Sep 2014-Present
Assistant Professor
Department of Electrical Engineering and Computer Science
Courtesy Appointment
Department of Industrial Engineering & Management Sciences
Robert R. McCormick School of Engineering and Applied Science
- Philips Research North America**, Briarcliff Manor, NY May 2012 – Aug 2012
Research Intern
- Microsoft Corp.**, Redmond, WA Jun 2006 – Aug 2006
Software Develop Engineer Intern

EDUCATION

- Massachusetts Institute of Technology**, Cambridge, MA
Ph.D. in Electrical Engineering and Computer Science Sep 2014
Ph.D. thesis: Distributed Optimization and Market Analysis of Networked Systems
M.S. in Electrical Engineering and Computer Science Jun 2010
Masters thesis: Distributed Newton-type Algorithms for Network Resource Allocation
Advisor: Prof. Asu Ozdaglar
- Selected Awards and Honors:**
- Graduate Women of Excellence Award (2013)
 - Ernst A. Guillemin Thesis Award, 2nd place (2010)
 - Alpha Lambda Delta National Academic Honor Society Betty Jo Budson Fellowship (2009)
- University of Maryland**, College Park, MD
B.S. **Triple Degree:** Computer Engineering, Finance and Mathematics, Minor in German May 2008
- Selected Awards and Honors:**
- Undergraduate Student Researcher of the Year (2007-2008)
 - ISR Outstanding System Engineering Undergraduate Student Award (2008)
 - International Engineering Consortium's (IEC) William L. Everitt Award of Excellence (2008)
 - Department of Mathematics Abramowitz Award (2008)

RESEARCH INTERESTS

Smart grid and energy networks with focus of market analysis and mechanism design. Large scale distributed optimization algorithms and theory with emphasis on nonlinear convex optimization, network optimization and their applications.

TEACHING

- Introduction to Smart Grid Systems** Fall 2014
Distributed Optimization Winter 2015, 2017
Game Theory and Networked Systems Spring 2017 (Co-teach with Randy Berry)
Probabilistic Systems and Random Signals Spring 2015, Spring 2016, Fall 2016

PATENT

- S. R. Bagheri, S. Rangavajhala, E. Shen and E. Wei. Energy Retrofit Risk Management System. Philips Research North America.

PUBLICATIONS

- B. Zhuang, D. Guo, E. Wei and M. Honig, "Scalable Spectrum Allocation for Large Networks Based on Sparse Optimization", Proceedings of IEEE International Symposium on Information Theory, 2017
- D. Xiang, E. Wei, "Improving social welfare by demand response General Framework and Quantitative Characterization", Proceedings IEEE GlobalSIP, 2017
- F. Mansoori and E. Wei, "Superlinearly Convergent Asynchronous Distributed Network Newton Method", Proceedings of IEEE Conference on Decision and Control (CDC), 2017
- B. Zhuang, D. Guo, E. Wei and M. Honig, "Scalable Spectrum Allocation and User Association in Networks with Many Small Cells", IEEE Transactions on Communications, 2017
- E. Wei, "Parallel Multi-splitting Proximal Method for Star Networks", Proceedings of American Control Conference, 2017
- C. Liu, Y. Xiao, E. Wei and R. Berry, "Competition and Investment in On-Demand Networking Technology", Proceedings of IEEE/IFIP WONS, 13th Wireless On-demand Network systems and Services Conference, 2017
- Y. Xiao, C. Bandi and E. Wei, "Supply Function Equilibrium in Power Markets: Mesh Networks", Proceedings of IEEE GlobalSIP, 2016
- Y. Xiao, C. Bandi and E. Wei, "Robust Supply Function Bidding in Electricity Markets with Renewables", Proceedings of 54th Annual Allerton Conference on Communication, Control, and Computing, 2016
- E. Wei, C. Bandi, "Fairness Considerations in Network Flow Problems", Proceedings of IEEE Conference on Decision and Control (CDC), 2015
- Y. Xiao, C. Bandi, E. Wei, "Efficiency of Supply Function Equilibrium in Networked Markets", Allerton Conference on Communication, Control and Computing, 2015
- C. Liu, Y. Xiao, E. Wei, R. Berry, "Investment and Competition with Positive Externalities in Open Networks", Allerton Conference on Communication, Control and Computing, 2015
- Y. Xiao, C. Bandi, E. Wei, "Network Effects on Efficiency of Supply Function Equilibrium in Electricity Markets", Asilomar Conference on Signals, Systems and Computers, 2015
- E. Wei, S. R. Bagheri, S. Rangavajhala, E. Shen, "A Comprehensive Risk Management System On Building Energy Retrofit", Proceedings of SRII (Service Research and Innovation Institute), 2014
- E. Wei, A. Malekian and A. Ozdaglar, "Competitive Equilibrium in Electricity Markets with Adjustment Cost and Penalized Price Volatility", working paper, 2013
- S. Shtern, A. Ozdaglar and E. Wei, "Network Topology Effects on Distributed Alternating Direction Method of Multipliers", working paper, 2013
- E. Wei and A. Ozdaglar, "On the $O(1/k)$ Convergence of Asynchronous Distributed Alternating Direction Method of Multipliers", Proceedings of IEEE Global Conference on Signal and Information Processing, 2013
- E. Wei and A. Ozdaglar, "On the $O(1/k)$ Convergence of Asynchronous Distributed Alternating Direction Method of Multipliers", LIDS Report 2906, submitted to Mathematical Programming, ArXiv preprint, 2013
- E. Wei, A. Ozdaglar and A. Jadbabaie, "A Distributed Newton Method for Network Utility Maximization, I: Algorithm", IEEE Transactions on Automatic Control, vol. 58, no. 9, pp. 2162-2175, 2013

- E. Wei, A. Ozdaglar and A. Jadbabaie, "A Distributed Newton Method for Network Utility Maximization, II: Convergence", IEEE Transactions on Automatic Control, vol. 58, no. 9, pp. 2176-2188, 2013
- E. Wei and A. Ozdaglar, "Distributed Alternating Direction Method of Multipliers", Proceedings of Conference on Decision and Control (CDC), 2012
- E. Wei, A. Ozdaglar, A. Eryilmaz and A. Jadbabaie, "A Distributed Newton Method for Dynamic Network Utility Maximization with Delivery Contracts", Proceedings of Conference on Information Sciences and Systems (CISS), 2012
- E. Wei, M. Zargham, A. Ozdaglar and A. Jadbabaie, "On Dual Convergence of the Distributed Newton Method for Network Utility Maximization", Proceedings of Decision and Control and European Control Conference (CDC-ECC), 2011
- E. Wei and A. Ozdaglar and A. Jadbabaie, "A Distributed Newton Method for Network Utility Maximization", Proceedings of Conference on Decision and Control (CDC), 2010
- E. Wei, E. Justh and P. S. Krishnaprasad, "Pursuit and an Evolutionary Game", Proc. R. Soc. A, vol. 465, no. 2105:1539-1559, 2009

Funding

- "Systematic Modeling and Analysis of Electricity Market with Demand Response", Finite Earth Initiatives support provided by Leslie and Mac McQuown, Co-PI
- "Distributed System Operations with Demand Response", US-India Joint Clean Energy Research and Development Center, Co-PI (In budget negotiation with DOE)
- "Resource Management for Emerging Wireless Networks: Heterogeneity, Efficiency, and Scalability", NSF, Co-PI (Pending)
- "CPS: Small: Collaborative Research: Algorithms for real-time emergency control against voltage instability in modern power grids with active distribution systems", NSF, Co-PI (Pending)
- "SCC-IRG: Shared Mobility Enabled Medical Home Care Systems for Underserved Communities with Real-time Data Streaming and Operations", NSF, Co-PI (Pending)

INVITED TALKS AND CONFERENCE PRESENTATIONS

- Superlinearly Convergent Asynchronous Distributed Network Newton Method
 - Midwest Workshop on Control and Game Theory 2017
- Parallel Multi-splitting Proximal Method for Star Networks
 - International Conference on Continuous Optimization (ICCOPT) 2016
- Robust Supply Function Bidding in Electricity Markets with Renewables
 - Information Theory and Applications Workshop (ITA) 2017
 - Asilomar Conference on Signals, Systems and Computers 2016
 - Institute for Operations Research and the Management Sciences (INFORMS) 2016
- Efficiency of Supply Function Equilibrium in Networked Markets
 - Allerton Conference on Communication, Control and Computing 2015
 - Asilomar Conference on Signals, Systems and Computers 2015
 - Global Conference on Signal and Information Processing (GlobalSIP) 2016
- Demand Response and Fluctuation Reduction in Smart Grid
 - Decision and Control Lecture Series Coordinated Science Laboratory 2015
- On the $O(1/k)$ Convergence of Asynchronous Distributed Alternating Direction Method of Multipliers
 - Ohio State University Seminar 2015

- Argonne National Laboratory Seminar 2014
- Huawei North America Seminar 2015
- IEEE Global Conference on Signal and Information Processing, 2013
- A Distributed Newton Method for Dynamic Network Utility Maximization with Delivery Contracts
 - Annual Conference on Information Sciences and Systems, 2012
- Distributed Alternating Direction Method of Multipliers
 - IEEE Conference on Decision and Control CDC 2012
 - INFORMS annual meeting 2012
- A Comprehensive Risk Management System On Building Energy Retrofit
 - Philips Research Seminar 2012
- Distributed Newton Method for Network Utility Maximization
 - IEEE Conference on Decision and Control CDC 2010
- On Dual Convergence of the Distributed Newton Method for Network Utility Maximization
 - IEEE Conference on Decision and Control CDC 2010

PROFESSIONAL ACTIVITIES

Conference Organizations

- Invited session organizer for Allerton Conference on Communication, Control and Computing 2015
- Invited session organizer for Asilomar Conference on Signals, Systems and Computers 2015
- Invited session organizer for IEEE Conference on Decision and Control CDC 2012, 2014, 2017
- Invited session organizer for INFORMS annual meeting, 2013, 2017
- Co-chair for LIDS (Laboratory for Information and Decision System) student conference 2013
- CO-Organizer of Northwestern ETOPIA (Engineering Transdisciplinary Outreach Projects in the Arts) 2015-Present

Review services

- Global Conference on Signal and Information Processing Technical Program Committee
- INFORMS Optimization Society Student Paper Prize Committee
- IEEE Transactions on Automatic Control
- IEEE Transactions on Control of Network Systems
- IEEE Transactions on Signal and Information Processing
- IEEE Transactions on Control Systems Technology
- Optimization journal
- Neural Information Processing Systems (NIPS)
- American Control Conference
- IEEE Conference on Decision and Control

Society Memberships

- IEEE
- INFORMS
- SIAM