

William E. Walsh

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Overview

Passionate about developing innovative electronic marketplaces that have real impact on the world. Extensive experience working at the intersection of research and implementation of electronic markets, using techniques from economics, artificial intelligence, and optimization.

Education

- Ph.D.** **University of Michigan**, Ann Arbor, MI 1997 – 2001
Computer Science and Engineering – Intelligent Systems
Dissertation: *Market Protocols for Decentralized Supply Chain Formation*
Advisor: Prof. Michael P. Wellman
- M.S.E.** **University of Michigan**, Ann Arbor, MI 1995 – 1997
Computer Science and Engineering – Intelligent Systems
- B.S.E.** **University of Michigan**, Ann Arbor, MI 1991 – 1995
Summa Cum Laude, Computer Engineering

Employment

- 2010 – pres. **Software Engineer, Google**, New York, NY
- 2009 – 2010. **Senior Research Scientist & Manager of Ad Auction Development, CombineNet, Inc**, Pittsburgh, PA
Managed development and real-data testing of expressive ad auction optimizing system.
- 2005 – 2009 **Senior Research Scientist, CombineNet, Inc**, Pittsburgh, PA
- Built a highly scalable prototype for optimal matching of campaigns to inventory in expressive advertising auctions. The system scales to an unprecedented numbers of bidders and attributes, and supports a much more expressive bidding language than standard advertising auctions.
 - Developed and fielded an automated system for computing auction reserve prices.
- 2001 – 2005 **Research Staff Member, IBM T.J. Watson Research Center**, Hawthorne, NY
- Research on electronic markets for distributed computing resources.
 - Research on supply chain auctions and computational game theory.
- Sum. 1999 **Research Intern, NASA Jet Propulsion Laboratory**, Pasadena, CA
Research on market-based distributed coordination of Mars rovers.
- 1996 – 1998 **Graduate Student Research Assistant, University of Michigan**, Ann Arbor, MI
- Fall 1995 **Graduate Student Instructor, University of Michigan**, Ann Arbor, MI
Class: Introduction to Artificial Intelligence

Employment Status

U.S. Citizen

Honors and Awards

NASA/ Jet Propulsion Laboratory Graduate Student Researcher Fellowship, 1998- 2000

University of Michigan Distinguished Achievement Award in Computer Science and Engineering, 1998

NSF Graduate Research Fellowship Honorable Mention, 1995

Publications

Many available at: <http://wewalsh.com/papers.html>

Refereed Journal Papers

1. Incentive-compatible, budget-balanced, yet highly efficient auctions for supply chain formation (M. Babaioff and W.E. Walsh). *Decision Support Systems*, 39(1):123-149, 2005.
2. Decentralized supply chain formation: A market protocol and competitive equilibrium analysis (W.E. Walsh and M.P. Wellman). *Journal of Artificial Intelligence Research*, 19:513-567, 2003.
3. On market-inspired approaches to propositional satisfiability (W.E. Walsh, M. Yokoo, K. Hirayama, M.P. Wellman). *Artificial Intelligence*, 144(1-2):125-156, 2003.
4. Auction protocols for decentralized scheduling (M.P. Wellman, W.E. Walsh, P.R. Wurman, and J.K. MacKie-Mason). *Games and Economic Behavior*, 35:271-303, 2001.
5. A parametrization of the auction design space (P.R. Wurman, M.P. Wellman, and W.E. Walsh). *Games and Economic Behavior*, 35:304-338, 2001.
6. Designing the market game for a trading agent competition (M.P. Wellman, P.R. Wurman, K. O'Malley, R. Bangera, S. Lin, D. Reeves, W. Walsh). *IEEE Internet Computing*, 43-51, March-April 2000.
7. Flexible double auctions for electronic commerce: Theory and implementation (P.R. Wurman, W.E. Walsh, and M.P. Wellman) *Decision Support Systems* 24:17-27, 1998.

Refereed Conference and Workshop Papers

1. Automated channel abstraction for advertising auctions (W.E. Walsh, C. Boutilier, T. Sandholm, R. Shields, G. Nemhauser, D.C. Parkes). *Twenty-fourth AAAI Conference on Artificial Intelligence*, 2010. Previously appeared in *Fifth Workshop on Ad Auctions*, 2009.
2. Expressive banner ad auctions and model-based online optimization for clearing (C. Boutilier, D.C. Parkes, T. Sandholm, W.E. Walsh). *Twenty-third AAAI Conference on Artificial Intelligence*, 30-37, 2008.
3. New approaches to optimization and utility elicitation in autonomic computing (R. Patrascu, C. Boutilier, R. Das, J.O. Kephart, G. Tesauro, W. E. Walsh). *Twentieth National Conference on Artificial Intelligence*, 140-145, 2005.
4. A multi-agent systems approach to autonomic computing (G. Tesauro, D.M. Chess, W.E. Walsh, R. Das, A. Segal, I. Whalley, J.O. Kephart, and S. White). *Third International Joint Conference on Autonomous Agents and Multi Agent Systems*, 464-471, 2004.
5. Utility functions in autonomic systems (W.E. Walsh, G. Tesauro, J.O. Kephart, and R. Das). *International Conference on Autonomic Computing*, 70-77, 2004.
6. Incentive-compatible, budget-balanced, yet highly efficient auctions for supply chain formation (M. Babaioff and W.E. Walsh). *Fourth ACM Conference on Electronic Commerce*, 64-75, 2003.
7. Cooperative negotiation in autonomic systems using incremental utility elicitation (C. Boutilier, R. Das, J.O. Kephart, G. Tesauro, and W.E. Walsh). *Nineteenth Conference on Uncertainty in Artificial Intelligence*, 89-97, 2003.
8. On market-inspired approaches to propositional satisfiability (W.E. Walsh, M. Yokoo, K. Hirayama, M.P. Wellman). *Seventeenth International Joint Conference on Artificial Intelligence*, 2001.

9. Combinatorial auctions for supply chain formation. (W.E. Walsh, M.P. Wellman, and F. Ygge). *Second ACM Conference on Electronic Commerce*, 260-269, 2000.
10. MarketSAT: An extremely decentralized (but really slow) algorithm for propositional satisfiability (W.E. Walsh and M.P. Wellman). *Seventeenth National Conference on Artificial Intelligence*, 303-309, 2000.
11. Distributed quiescence detection in multiagent negotiation. (M.P. Wellman and W.E. Walsh.) *Fourth International Conference on Multi-Agent Systems*, 317-324, 2000.
12. Efficiency and equilibrium in task allocation economies with hierarchical dependencies (W.E. Walsh and M.P. Wellman). *Sixteenth International Joint Conference on Artificial Intelligence*, 520-526, 1999.
13. A control architecture for flexible internet auction servers (P.R. Wurman, M.P. Wellman, W.E. Walsh, and K.A. O'Malley). *First IAC Workshop on Internet Based Negotiation Technologies*, March, 1999.
14. Some economics of market-based distributed scheduling (W.E. Walsh, M.P. Wellman, P.R. Wurman, and J.K. MacKie-Mason). *Eighteenth International Conference on Distributed Computing Systems*, 612-621, 1998.
15. A market protocol for decentralized task allocation (W.E. Walsh and M.P. Wellman). *Third International Conference on Multi-Agent Systems*, 325-332, 1998.
16. The Michigan Internet AuctionBot: A configurable auction server for human and software agents. (P.R. Wurman, M.P. Wellman, and W.E. Walsh). *Second International Conference on Autonomous Agents*, 301-308, 1998.

Book Articles

1. Choosing samples to compute heuristic-strategy Nash equilibrium (W.E. Walsh, D. Parkes, and R. Das). In *Agent-Mediated Electronic Commerce V*, volume 3048 of *Lecture Notes in Artificial Intelligence*. Springer-Verlag, 2004.
2. Modeling supply chain formation in multiagent systems (W.E. Walsh and M.P. Wellman). In *Agent Mediated Electronic Commerce II*, volume 1788 of *Lecture Notes in Artificial Intelligence*. Springer-Verlag, 2000.

Miscellaneous Publications

1. Computing reserve prices and identifying the value distribution in real-world auctions with market disruptions (W.E. Walsh, D.C. Parkes, T. Sandholm, C. Boutilier). Short paper in *Twenty-third AAAI Conference on Artificial Intelligence*, 1499-1502, 2008.
2. An artificial intelligence perspective on autonomic computing policies (J.O. Kephart and W.E. Walsh). *IEEE 5th International Workshop on Policies for Distributed Systems and Networks*, 3-12, 2004.
3. Analyzing complex strategic interactions in multi-agent games (W.E. Walsh, R. Das, G. Tesauro, and J.O. Kephart). *AAAI Workshop on Game Theoretic and Decision Theoretic Agents*, 109-118, 2002.
4. Specifying rules for electronic auctions (P. R. Wurman, M. P. Wellman, and W. E. Walsh). *AI Magazine*, 23 (3): 15-23, 2002.
5. Survivability through market-based adaptivity: The MARX Project (J.E. Eggleston, S. Jamin, T.P. Kelly, J.K. MacKie-Mason, W.E. Walsh, and M.P. Wellman). *DARPA Information Survivability Conference*, January 2000.

Edited Volumes

1. *Lecture Notes in Artificial Intelligence: Agent-Mediated Electronic Commerce V* (J.A. Rodriguez, P. Faratin, D. Parkes, W.E. Walsh, eds.), 3048, Springer-Verlag, 2004.
2. *Lecture Notes in Artificial Intelligence: Agent-Mediated Electronic Commerce IV: Designing Mechanisms and Systems* (J. Padget, D. Parkes, N. Sadeh, O. Shehory, and W. Walsh, eds.), 2531, Springer-Verlag, 2002.

Invited Talks

- 2008 Guest class lecture: *Real-world Expressive Auctions*. Yale University, New Haven, CT.
- 2007 Guest class lecture: *Expressive Auction Technology*. Carnegie Mellon University, Pittsburgh, PA
- 2005, 2006 Guest class lecture: *A Bit of Auction Theory and Auctions at CombineNet*. Carnegie Mellon University, Pittsburgh, PA
- 2004 Talk: *Utility Functions in Autonomic Systems*. Center for Discrete Mathematics & Theoretical Computer Science (DIMACS), Piscataway, NJ.
- 2003 Panel: *AAMAS-03 Panel on Electronic Commerce*.
- 2000 Talk: *Market Protocols for Decentralized Supply Chain Formation*. Ford Scientific Research Lab, Dearborn, MI.
- 2000 Talk: *Market Protocols for Decentralized Supply Chain Formation*. Honeywell Research, Minneapolis, MN.
- 1999 Panel: *Theoretical Aspects of Agent-Mediated Electronic Commerce*. IJCAI-99 Workshop on Agent Mediated Electronic Commerce, 1999.
- 1999 Talk: *A Market Model for Distributed Mars Rover Scheduling*. NASA Jet Propulsion Laboratory, Pasadena, CA.
- 1998 Talk: *A Market Protocol for Decentralized Task Allocation and Scheduling*. NASA Jet Propulsion Laboratory, Pasadena, CA.

Professional Activities

Conference and Workshop Organization

- 2008 Co-organizer: *Workshop on Trading Agent Design and Analysis (TADA-08)*.
- 2005 Sponsorship Co-chair: *Fourth International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS-05)*.
- 2004 – 2005 Steering committee member for *Workshop on Agent-Mediated Electronic Commerce* series.
- 2003 Co-organizer: *IJCAI-03 Workshop on AI and Autonomic Computing: Developing a Research Agenda for Self-Managing Computer Systems*.
- 2003 Co-organizer: *AAMAS-03 Workshop on Agent-Mediated Electronic Commerce V*.
- 2002 Co-organizer: *AAMAS-02 Workshop on Agent-Mediated Electronic Commerce IV: Designing Mechanisms and Systems*.

Reviewing

Frequent reviewing for major journals, including: *Artificial Intelligence*, *Journal of Artificial Intelligence Research*, *Journal of Autonomous Agents and Multiagent Systems*, *Management Science*, and *Decision Support Systems*.

Frequent reviewing for major conferences and workshops, including: *ACM Conference on Electronic Commerce*, *International Joint Conference on Artificial Intelligence (IJCAI)*, *International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, *AAAI Conference on Artificial Intelligence (AAAI)*, and *Workshop on Agent-Mediated Electronic Commerce*.

Memberships

American Association for Artificial Intelligence

Association for Computing Machinery