

Christopher D. Kiekintveld

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Research Interests

Artificial intelligence, security, multi-agent systems, computational game theory, decision making, uncertainty, robustness, mechanism design, economics, optimization, cooperation

Education

University of Michigan Ann Arbor, MI
Ph.D. Computer Science and Engineering 2008

Thesis: Empirical Game-Theoretic Methods for Strategy Design and Analysis in Complex Games
Committee: Michael Wellman (chair), Satinder Singh Baveja, Yan Chen, Jeffrey K. MacKie-Mason

University of Michigan Ann Arbor, MI
M.S.E. Computer Science and Engineering May 2004

University of Michigan Ann Arbor, MI
B.S.E. Electrical Engineering and Computer Science May 2002
Graduated with honors, *Summa Cum Laude*.

Experience

University of Texas at El Paso El Paso, TX
Assistant Professor of Computer Science 09/2010–Present

University of Southern California Los Angeles, CA
Postdoctoral Research Associate (Milind Tambe) 06/2008–08/2010

University of Michigan Ann Arbor, MI
Research Assistant (Michael Wellman) 09/2005–05/2008

University of Michigan Ann Arbor, MI
STIET Fellow (Michael Wellman) 09/2002–08/2004

Honors and Awards

General

NSF CAREER Award (2012–2017)

Co-recipient of 2011 David Rist Prize, Military Operations Research Society (MORS)

Best Paper Award (Industry Track) at AAMAS 2011 Conference

Best Paper Award (Industry Track) at AAMAS 2009 Conference

Finalist, EURO Excellence in Practice Award EEPA-10

STIET Fellowship; “Socio-Technical Infrastructure for Electronic Transactions” (2002–2004)

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Trading Agent Competition Supply Chain Management Game (TAC/SCM)

I led agent development for the Deep Maize team, with great success in competitions:
First Place (2008, 2009), Second Place (2003), Third Place (2006, 2007)

TAC SCM Prediction Challenge

Supervised undergraduates in developing market forecasting methods for TAC SCM:
First Place (2007), Second Place (2008)

Ph.D Dissertation

1. Empirical Game-Theoretic Methods for Strategy Design and Analysis in Complex Games (C. Kiekintveld). University of Michigan, Ann Arbor, 2008.

Refereed Journal Publications

1. Improving Resource Allocation Strategies Against Human Adversaries in Security Games: An Extended Study (R. Yang, C. Kiekintveld, F. Ordonez, M. Tambe, R. John). *Artificial Intelligence Journal (AIJ)*, **195**: 440–469, 2013.
2. An Extended Study on Multi-Objective Security Games. Journal of Autonomous Agents and Multi-Agent Systems (M. Brown, B. An, C. Kiekintveld, F. Ordonez, M. Tambe). *Journal of Autonomous Agents and Multi-Agent Systems (JAAMAS)*. Online November 2012.
3. Game Theoretic Model of Strategic Honeypot Selection in Computer Networks (R. Pibil, V. Lisy, C. Kiekintveld, B. Bosansky, M. Pechoucek). *Lecture Notes in Computer Science, Decision and Game Theory for Security*, **7638**: 201–220, 2012.
4. Stackelberg vs. Nash in Security Games: An Extended Investigation of Interchangeability, Equivalence, and Uniqueness (D. Korzhyk, Z. Yin, C. Kiekintveld, V. Conitzer, M. Tambe). *Journal of Artificial Intelligence Research (JAIR)*, **41**: 297–327, 2011.
5. Towards Optimal Knowledge Processing: From Centralization Through Cyberinfrastructure To Cloud Computing (O. Lerma, E. Gutierrez, C. Kiekintveld, V. Kreinovich). *International Journal of Innovative Management, Information and Production (IJMIP)*, **2(2)**: 67–72, 2011.
6. Software Assistants for Patrol Planning at LAX and Federal Air Marshals Service (M. Jain, J. Tsai, C. Kiekintveld, J. Pita, S. Rathi, F. Ordóñez, and M. Tambe). *INFORMS Interfaces Journal*, **2010**, **40(4)**, 267–290. **Finalist, EURO Excellence in Practice Award EEPAA 2010**.
7. A Framework for Evaluating Deployed Security Systems: Is There a Chink in your ARMOR? (M. E. Taylor, C. Kiekintveld, C. Western, M. Tambe). *Informatica*, **34**: 129–139, 2010.
8. Forecasting Market Prices in a Supply Chain Game (C. Kiekintveld, J. Miller, P. R. Jordan, L. Callender, M. P. Wellman). *Electronic Commerce Research and Applications*, **8**: 63–77, 2009.
9. Strategic Interactions in a Supply Chain Game (M. P. Wellman, J. Estelle, S. Singh, Y. Vorobeychik, C. Kiekintveld, and V. Soni). *Computational Intelligence* **21**:1–26, 2005.

Refereed Conference Publications

1. Security Games with Interval Uncertainty (C. Kiekintveld, T. Islam, V. Kreinovich). *12th International Conference on Autonomous Agents and Multiagent Systems*, May 2013.
2. Double-Oracle Algorithm for Computing an Exact Nash Equilibrium in Zero-sum Extensive-form Games (B. Bosansky, C. Kiekintveld, V. Lisy, J. Cermak, M. Pechoucek). *12th International Conference on Autonomous Agents and Multiagent Systems*, May 2013.

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3. Security Games with Contagion: Handling Asymmetric Information (J. Tsai, Y. Qian, Y. Vorobeychik, C. Kiekintveld, M. Tambe). *12th International Conference on Autonomous Agents and Multiagent Systems (Short Paper)*, May 2013.
4. Multi-Objective Optimization for Security Games (M. Brown, B. An, C. Kiekintveld, F. Ordonez, M. Tambe). *11th International Conference on Autonomous Agents and Multiagent Systems*, June 2012.
5. Iterative Algorithm for Solving Two-player Zero-sum Extensive-form Games with Imperfect Information (B. Bosansky, C. Kiekintveld, V. Lisy, and M. Pechoucek). *20th European Conference on Artificial Intelligence (ECAI)*, 2012.
6. Security Games with Limited Surveillance (B. An, D. Kempe, C. Kiekintveld, E. Shieh, S. Singh, M. Tambe, Y. Vorobeychik). *Conference on Artificial Intelligence (AAAI)*, 2012.
7. TRUSTS: Scheduling Randomized Patrols for Fare Inspection in Transit Systems (Z. Yin, A. Jiang, M. Johnson, M. Tambe, C. Kiekintveld, K. Leyton-Brown, T. Sandholm, J. Sullivan) *Innovative Applications of Artificial Intelligence (IAAI)*, 2012.
8. Towards Optimal Placement of Bio-Weapon Detectors (C. Kiekintveld, O. Lerma). *North American Fuzzy Information Processing Society*, 2011.
9. Refinement of Strong Stackelberg Equilibria in Security Games (B. An, C. Kiekintveld, M. Tambe, F. Ordonez, E. Sheih). *Conference on Artificial Intelligence (AAAI)*, 2011.
10. Improving Resource Allocation Strategy Against Human Adversaries in Security Games (R. Yang, C. Kiekintveld, F. Ordonez, M. Tambe, R. John). *International Joint Conference on Artificial Intelligence (IJCAI)*, 2011.
11. Optimizing Trajectories for Unmanned Aerial Vehicles (UAVs) Patrolling the Border (C. Kiekintveld, V. Kreinovich, O. Lerma). *World Conference on Soft Computing*, 2011.
12. Approximation Methods for Infinite Bayesian Stackelberg Games: Modeling Distributional Pay-off Uncertainty (C. Kiekintveld, J. Marcki, and M. Tambe). *Tenth International Conference on Autonomous Agents and Multiagent Systems*, May 2011.
13. GUARDS - Game Theoretic Security Allocation on a National Scale (J. Pita, M. Tambe, C. Kiekintveld, S. Cullen, E. Steigerwald). *Tenth International Conference on Autonomous Agents and Multiagent Systems (Industry Track)*, May 2011.
14. Quality-bounded Solutions for Finite Bayesian Stackelberg Games: Scaling up (M. Jain, C. Kiekintveld, and M. Tambe). *Tenth International Conference on Autonomous Agents and Multiagent Systems*, May 2011.
15. Improved Computational Models of Human Behavior in Security Games (Short Paper) (R. Yang, C. Kiekintveld, F. Ordóñez, M. Tambe, and R. John). *Tenth International Conference on Autonomous Agents and Multiagent Systems*, May 2011.
16. Methods and Algorithms for Infinite Bayesian Stackelberg Security Games (Short Paper) (C. Kiekintveld, J. Marecki, and M. Tambe). *Conference on Decision and Game Theory for Security*, 2010.
17. Security Games with Arbitrary Schedules: A Branch and Price Approach (M. Jain, E. Kardes, C. Kiekintveld, M. Tambe, and F. Ordóñez). *Twenty-Fourth Conference on Artificial Intelligence (AAAI 2010)*, July 2010.
18. Urban Security: Game-Theoretic Resource Allocation in Networked Physical Domains (J. Tsai, Z. Yin, J. Kwak, D. Kempe, C. Kiekintveld, and M. Tambe). *Twenty-Fourth Conference on Artificial Intelligence (AAAI 2010)*, July 2010.
19. Asynchronous algorithms for approximate distributed constraint optimization with quality bounds (C. Kiekintveld, Z. Yin, A. Kumar, and M. Tambe). *Ninth International Conference on Autonomous Agents and Multiagent Systems*, May 2010.

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20. Stackelberg vs. Nash in security games: Interchangeability, equivalence, and uniqueness (Z. Yin, D. Korzhuk, C. Kiekintveld, V. Conitzer, and M. Tambe). *Ninth International Conference on Autonomous Agents and Multiagent Systems*, May 2010.
21. Robust Bayesian methods for Stackelberg security games (Extended Abstract) (C. Kiekintveld, J. Marecki, and M. Tambe). *Ninth International Conference on Autonomous Agents and Multiagent Systems*, May 2010.
22. How to protect a city: Strategic security placement in graph-based domains (Extended Abstract) (J. Tsai, Z. Yin, J. Kwak, D. Kempe, C. Kiekintveld, and M. Tambe). *Ninth International Conference on Autonomous Agents and Multiagent Systems*, May 2010.
23. Computing optimal randomized resource allocations for massive security games (C. Kiekintveld, M. Jain, J. Tsai, J. Pita, F. Ordóñez, and M. Tambe). *Eighth International Conference on Autonomous Agents and Multiagent Systems*, May 2009.
24. IRIS - A tool for strategic security allocation in transportation networks (J. Tsai, S. Rathi, C. Kiekintveld, F. Ordóñez, and M. Tambe). *Eighth International Conference on Autonomous Agents and Multiagent Systems (Industry Track)*, May 2009. **Winner of Best Industry Track Paper Award**
25. Selecting strategies using empirical game models: An experimental analysis of meta-strategies (C. Kiekintveld and M. P. Wellman). *Seventh International Joint Conference on Autonomous Agents and Multiagent Systems*, pages 1095–1102, May 2008.
26. Forecasting market prices in a supply chain game (C. Kiekintveld, J. Miller, P. Jordan, and M. P. Wellman). In *Sixth International Joint Conference on Autonomous Agents and Multiagent Systems*, pages 1323–1330, May 2007.
27. Empirical game-theoretic analysis of the TAC supply chain game (P.R. Jordan, C. Kiekintveld, and M.P. Wellman). In *Sixth International Joint Conference on Autonomous Agents and Multiagent Systems*, pages 1196–1203, May 2007.
28. Controlling a supply chain agent using value-based decomposition (C. Kiekintveld, P. R. Jordan, J. Miller, and M. P. Wellman). In *Seventh ACM Conference on Electronic Commerce*, pages 208–217, June 2006.
29. Empirical mechanism design: Methods, with application to a supply-chain scenario (Y. Vorobeychik, C. Kiekintveld, and M. P. Wellman). In *Seventh ACM Conference on Electronic Commerce*, pages 306–315, June 2006.
30. Strategic interactions in the 2003 TAC supply chain tournament (J. Estelle, Y. Vorobeychik, M. P. Wellman, S. Singh, C. Kiekintveld, and V. Soni). In *Fourth International Conference on Computers and Games*, pages 316–331, July 2004.
31. Distributed feedback control for decision making on supply chains (C. Kiekintveld, M. P. Wellman, S. Singh, J. Estelle, Y. Vorobeychik, V. Soni, and M. Rudary). In *Fourteenth International Conference on Automated Planning and Scheduling*, pages 244–252, June 2004.

Refereed Workshops and Other Publications

1. An Initial Exploration of Machine Learning to Predict Customer Demand in an Energy Market Simulation (J Parra, C. Kiekintveld). *Workshop on Trading Agent Design and Analysis*, 2013.
2. TRUSTS: Scheduling Randomized Patrols for Fare Inspection in Transit Systems Using Game Theory (NPR) (Z. Yin, A. Jiang, M. Tambe, C. Kiekintveld, K. Leyton-Brown, T. Sandholm, J. Sullivan). *AI Magazine*, 2012.
3. Security Games with Limited Surveillance: An Initial Report (B. An, D. Kempe, C. Kiekintveld, E. Shieh, S. Singh, M. Tambe, Y. Vorobeychik). *AAAI Spring Symposium on Game Theory for Security, Sustainability and Health*, 2012.

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4. Efficient Approximation for Security Games with Interval Uncertainty (C. Kiekintveld, V. Kreinovich). *AAAI Spring Symposium on Game Theory for Security, Sustainability and Health*, 2012.
5. Towards Optimal Patrol Strategies for Fare Inspection in Transit Systems (A. Jiang, Z. Yin, M. Johnson, C. Kiekintveld, K. Leyton-Brown, T. Sandholm, M. Tambe). *AAAI Spring Symposium on Game Theory for Security, Sustainability and Health*, 2012.
6. Linear-Time Resource Allocation in Security Games with Identical Fully Protective Resources (O. Lerma, V. Kreinovich, C. Kiekintveld). *AAAI Workshop on Applied Adversarial Reasoning and Risk Modeling (AARM)*, 2011.
7. Towards the Integration of Multi-Attribute Optimization and Game Theory for Border Security Patrolling Strategies (O. Aguirre, N. Lopez, E. Gutierrez, H. Taboada, J. Espiritu, C. Kiekintveld). *AAAI Workshop on Applied Adversarial Reasoning and Risk Modeling (AARM)*, 2011.
8. Mixed-Initiative Optimization in Security Games: A Preliminary Report (B. An, M. Jain, M. Tambe, C. Kiekintveld). In *AAAI Spring Symposium on Help me help you: Bridging the Gaps in Human-Agent Collaboration*, 2011.
9. Two Decades of Multiagent Teamwork Research: Past, Present, and Future (M. Taylor, M. Jain, C. Kiekintveld, J. Kwak, R. Yang, Z. Yin, and M. Tambe). In *Postproceedings of Collaborative Agents REsearch and Development (CARE) 2010 workshop*, 2011.
10. Towards Optimal Placement of Bio-Weapon Detectors (C. Kiekintveld, O. Lerma) In *Proceedings of the North American Fuzzy Information Processing Society*, 2011.
11. Randomizing Security Activities with Attacker Circumvention Strategies (J Pita, C Kiekintveld, M Scott, and M Tambe). In *AAMAS-10 Workshop on Optimization in Multi-Agent Systems (OPTMAS)*, May 2010.
12. Game-Theoretic Allocation of Security Forces in a City (J Tsai, Z Yin, J Kwak, D Kempe, C Kiekintveld, M Tambe). In *AAMAS-10 Workshop on Optimization in Multi-Agent Systems (OPTMAS)*, May 2010.
13. Optimal Defender Allocation for Massive Security Games: A branch and price approach (M Jain, E Kardes, C Kiekintveld, M Tambe, F Ordonez). In *AAMAS-10 Workshop on Optimization in Multi-Agent Systems (OPTMAS)*, May 2010.
14. Is there a chink in your ARMOR? Towards robust evaluations for deployed security systems (M. E. Taylor, C. Kiekintveld, C. Western, and M. Tambe). In *IJCAI-09 Workshop on Quantitative Risk Analysis for Security Applications*, July 2009.
15. Strategic security placement in network domains with applications to transit security (J. Tsai, Z. Yin, J. Kwak, D. Kempe, C. Kiekintveld, M. Tambe). In *IJCAI-09 Workshop on Quantitative Risk Analysis for Security Applications*, July 2009.
16. Local optimal solutions for DCOP: New criteria, bound, and algorithm (Z. Yin, C. Kiekintveld, A. Kumar and M. Tambe). In *AAMAS-09 Workshop on Optimization in Multi-Agent Systems*, May 2009.
17. Empirical game-theoretic analysis of Chaturanga (C. Kiekintveld, M. P. Wellman, and S. Singh). In *AAMAS-06 Workshop on Game Theoretic and Decision Theoretic Agents*, May 2006.
18. Empirical game-theoretic analysis of the TAC market games (M. P. Wellman, P. R. Jordan, C. Kiekintveld, J. Miller, and D. M. Reeves). In *AAMAS-06 Workshop on Game Theoretic and Decision Theoretic Agents*, May 2006.
19. Market efficiency, sales competition, and bullwhip effect in the TAC SCM tournaments (P. R. Jordan, C. Kiekintveld, J. Miller, and M. P. Wellman). In *AAMAS-06 Workshop on Trading Agent Design and Analysis*, May 2006.

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20. An analysis of the 2004 supply chain management trading agent competition (C. Kiekintveld, M. P. Wellman, and Y. Vorobeychik). In *IJCAI-05 Workshop on Trading Agent Design and Analysis*, July 2005.
21. Value-driven procurement in the TAC supply chain game (C. Kiekintveld, M. P. Wellman, S. Singh, V. Soni). *SIGecom Exchanges* 4(3), 2004.

Chapters in Books

1. Co-authored chapters 5,6,8,9,11,12,13 in *Security and Game Theory: Algorithms, Deployed Systems, Lessons Learned* (M. Tambe). Cambridge University Press, 2011.
2. Deployed Security Games for Patrol Planning (F. Ordonez, M. Tambe, J. Jara, M. Jain, C. Kiekintveld, J. Tsai). In *Handbook on Operations Research for Homeland Security, International Series in Operations Research & Management Science* Volume 183, 2013, pp 45-72. Edited by J. Herrmann.

Deployed Multi-Agent Systems

IRIS (Intelligent Randomization In Scheduling)

I led a project to develop a software tool that uses game theory to randomize flight schedules for the **Federal Air Marshals Service**; deployed since October 2009 to schedule international flights after extensive internal review.

GUARDS (Game-theoretic Unpredictable and Randomly Deployed Security)

I am currently leading a project to apply game-theoretic randomization to airport security operations for the **Transportation Security Administration**. Phase I is currently deployed for evaluation at two major U.S. airports, and it is expected to be deployed across the U.S. in the near future.

Teaching Experience

Courses Taught

CS 5392 Graduate Research Methods. University of Texas at El Paso, Fall 2013.

CS 2401 Elementary Data Structures and Algorithms. University of Texas at El Paso, Fall 2013.

CS 2401 Elementary Data Structures and Algorithms. University of Texas at El Paso, Spring 2013.

CS 2401 Elementary Data Structures and Algorithms (2 sections). University of Texas at El Paso, Fall 2012.

CS 4320/5314 Artificial Intelligence. University of Texas at El Paso, Spring 2012. Cross-listed graduate and undergraduate.

CS 2401 Elementary Data Structures and Algorithms. University of Texas at El Paso, Fall 2011.

CS 4365/5390 Special Topics: Computational Strategic Reasoning. University of Texas at El Paso, Spring 2011. Cross-listed graduate and undergraduate.

CS 2401 Elementary Data Structures and Algorithms. University of Texas at El Paso, Fall 2010.

Teaching Assistantships

EECS 496 Ethics and Professionalism. University of Michigan (Farnam Jahaniam), Fall 2007.

EECS 281 Data Structures and Algorithms. University of Michigan (Sugih Jamin), Winter 2007.

EECS 496 Ethics and Professionalism. University of Michigan (David Chesney), Winter 2006.

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Students Supervised

Doctoral Students

Anjon Basak (2013–present)
Oscar Veliz (2011–present)
Manish Jain (2008–2011, with Milind Tambe)
James Pita (2008–2011, with Milind Tambe)
Jason Tsai (2008–2011, with Milind Tambe)
Zhengyu Yin (2008–2011, with Milind Tambe)

Master's Students

Richard Klima (2013–present)
Eric Gutierrez (2011–present)
Towhidul Islam (2011–2013)
Jaime Parra Jr. (2012–2013)
Rogelio Long (2012)
Shyamsunder Rathi (2008–2009, with Milind Tambe)
Atul Kumar (2008–2009, with Milind Tambe)
Harish Bellamane (2009–2011, with Milind Tambe)
Bharat Patel (2009–2011, with Milind Tambe)

Undergraduate Students

Miguel Pagan (2013)
Curtis Chambers (2011–2013)
Jonathan Juett (2011–2012)
Daniel Grajeda (2012)
Carlos Montijo (2012)
Alex McClain (2012)
Miguel Gaspar de Alba (2012)
Ricardo Bribiescas (2011–2012)
Alyssa Gottlieb (2009–2010, with Milind Tambe)
Michael Scott (2009–2011, with Milind Tambe)
Prakhar Garg (Summer 2009, with Milind Tambe)
Rahul Saxena (Summer 2009, with Milind Tambe)
Craig Western (2008–2010, with Milind Tambe)
Michelle Filiba (Summer 2008, with Milind Tambe)
Lee Callender (2007–2008, with Michael Wellman)
Zeke Tan (Summer 2006, with Michael Wellman)
Jason Miller (2005–2006, with Michael Wellman)
Jason Roselander (Summer 2004, with Michael Wellman)
Anju Khetan (Summer 2003, with Michael Wellman)

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Funded Research

Kiekintveld, C. (PI), CAREER: Robust Strategic Reasoning for Multi-Agent Systems, Sponsored by NSF, Federal, \$488,288. Feb 2013–Feb 2018.

Kiekintveld, C., (PI), STIR: Scalable Algorithms Based on Abstraction for Adversarial Reasoning Under Uncertainty, Sponsored by ARO, Federal, \$48,374. Oct 2013–June 2014.

Pechoucek, M. (PI) and Kiekintveld, C. (Co-PI), Attacker Detection and Strategic Honeypot Allocation in Intrusion Detection System, Sponsored by ONRG, Federal, \$150,000 (Kiekintveld: \$30,000). March 2011–Sept 2013.

Kiekintveld, C., (PI) and Hendler, J. (Co-PI), Agents and the Semantic Web, Sponsored by SMDC through HPI, Federal, \$283,095 (Kiekintveld: \$97,815). May 2011–May 2012.

Jimenez, H. (PI), Espiritu, J. (Co-PI), Tambe, M. (Co-PI), Kiekintveld, C. (Co-PI), Scheduling Security Operations in Uncertainty Adversarial Domains. Sponsored by DHS, Federal, \$139,000 (Kiekintveld: \$10,000). Aug 2011–Dec 2011.

Professional Activities

Organizing

Chair: AAMAS 2012 Workshop on *Trading Agent Design and Analysis*.

Co-Chair: AAAI 2011 Workshop on *Applied Adversarial Reasoning and Risk Modeling*.

Advisory Board: Association for Trading Agent Research, 2010–present.

Organizer: IJCAI 2009 Workshop on *Quantitative Risk Analysis for Security Applications*.

Game Master: Trading Agent Competition Supply Chain Management Game (2009).

Tutorials

ACM EC 2012: Security Games

AAMAS 2011: Security Games

AAAI 2011: Security Games

UAI 2011: Security Games

Journal Reviewing

Journal of Artificial Intelligence Research (JAIR): 2009, 2011, 2013.

Journal of Autonomous Agents and Multi-Agent Systems (JAAMAS): 2009, 2010, 2011, 2012.

Artificial Intelligence Journal (AIJ): 2008, 2010, 2011, 2012, 2013.

Electronic Commerce Research and Applications (ECRA): 2007, 2009.

Machine Learning Journal (MLJ): 2006.

Computational Intelligence: 2010.

OMEGA Journal: 2012.

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Conference/Workshop Program Committees and Reviewing

International Joint Conference on Autonomous Agents and Multi-Agent Systems (AAMAS): 2006, 2007, 2008, 2009 (PC), 2010 (PC), 2011 (SPC), 2012 (PC), 2013 (PC).

International Joint Conference on Artificial Intelligence Conference (IJCAI): 2005, 2007, 2009 (PC), 2011 (PC).

Conference on Artificial Intelligence (AAAI): 2011 (PC), 2012 (SPC), 2012 (PC).

ACM Electronic Commerce Conference (ACM EC): 2007, 2008.

Conference on Uncertainty in Artificial Intelligence (UAI): 2007, 2008.

Quantitative Risk Analysis for Security Applications Workshop (QRASA): 2009 (PC).

Trading Agent Design and Analysis Workshop (TADA): 2005, 2006.

North American Fuzzy Information Processing Society (NAFIPS): 2010 (PC).

International Conference on Electronic Commerce (ICEC): 2011 (PC).

NSF Proposal Review Panels: 2012

Departmental and University Service

University Faculty Senate, 2012–present.

Faculty Search Committee, 2012–2013.

ACM Faculty Advisor, 2011–present.

Organizer for Departmental Seminars, 2010–present.

Professional Organizations

Socio-Technical Infrastructure for Electronic Transactions Fellow (STIET)

Association of Computing Machinery (ACM), 2007–present.

Association for the Advancement of Artificial Intelligence (AAAI), 2008–present.

INFORMS Society, 2010–present.

Sigma Xi Member, 2010–present.