

Eugene Nudelman

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Research Interests

Artificial Intelligence, Empirical Algorithmics, Typical-case Complexity, Computational Game Theory, Multiagent Systems.

Current Research Projects

- *Empirical hardness of non-random SAT*: using statistical techniques to understand the structural differences among non-random SAT instance distributions that affect hardness.
- *Understanding structural features of normal form games*: using machine learning to identify features of normal form games relevant to the behavior of game-theoretic algorithms.
- *Compact subclasses of congestion games*: the goal is to identify efficient algorithms for computing Nash equilibria and characterize behavior of best-response dynamics in some natural compactly-representable classes of congestion games.

Education

Stanford University

- Ph.D. in Computer Science. Expected August 2005.
Supervisor: Yoav Shoham
- M.S. in Computer Science. May 2003

University of Toronto

- Hon. B. Sc. in Computer Science and Mathematics, with High Distinction.
May 2000

Experience

Teaching Experience

- Teaching Assistant. CS221 Artificial Intelligence: Principles and Techniques, Stanford University, 2001.
- Teaching Assistant. CS224m Multi-Agent Systems, Stanford University, 2003
- Teaching Assistant. CS227 Reasoning Methods in Artificial Intelligence, Stanford University, 2005

Industry Experience

- *IBM Almaden Research Center*. Summer Intern in Theory Group.
June 2004 – September 2004.
- *Bank of Montreal*. Junior Analyst in Global Financial Products Innovations, Global Treasury Group.
May 1999 – August 1999.
- *Canadian Imperial Bank of Commerce*. Junior Analyst in Market Risk Management Division, Risk Management Information Systems.
May 1997 – August 1997, May 1998 – August 1998.

Publications

Journals Articles

- Ryan Porter, Eugene Nudelman, Yoav Shoham. *Simple Search Methods for Finding a Nash Equilibrium*. Games and Economic Behavior. Accepted for publication.

Book Chapters

- Kevin Leyton-Brown, Eugene Nudelman, Yoav Shoham. *Empirical Hardness Models for Combinatorial Auctions*. Chapter 19 in *Combinatorial Auctions*. Peter Cramton, Yoav Shoham, Richard Steinberg (editors). MIT Press. Forthcoming.

Refereed Conferences

- Samuel Yeung, Robert McGew, Eugene Nudelman, Yoav Shoham, Qixiang Sun. *Fast and Compact: A Simple Class of Congestion Games*. Twentieth National Conference on Artificial Intelligence (AAAI-05), Pittsburgh, PA, 2005.
- Eugene Nudelman, Kevin Leyton-Brown, Holger Hoos, Alex Devkar, Yoav Shoham. *Understanding Random SAT: Beyond the Clauses-to-Variables Ratio*. Tenth International Conference on Theory and Practice of Constraint Programming (CP-04). Toronto, Canada, 2004.
- Eugene Nudelman, Jennifer Wortman, Yoav Shoham, Kevin Leyton-Brown. *Run the GAMUT: A Comprehensive Approach to Evaluating Game-Theoretic Algorithms*. Third International Joint Conference on Autonomous Agents and Multi Agent Systems (AAMAS-04). New York, NY, 2004.
- Ryan Porter, Eugene Nudelman, Yoav Shoham. *Simple Search Methods for Finding a Nash Equilibrium*. Nineteenth National Conference on Artificial Intelligence (AAAI-04). San Jose, CA, 2004.
- Kevin Leyton-Brown, Eugene Nudelman, Galen Andrew, James McFadden, Yoav Shoham. *Boosting as a Metaphor for Algorithm Design*. Ninth International Conference on Theory and Practice of Constraint Programming (CP-03). Kinsale, Ireland, 2003.
- Kevin Leyton-Brown, Eugene Nudelman, Galen Andrew, James McFadden, Yoav Shoham. *A Portfolio Approach to Algorithm Selection*. Eighteenth International Joint Conference on Artificial Intelligence (IJCAI-03). Acapulco, Mexico, 2003.
- Kevin Leyton-Brown, Eugene Nudelman, Yoav Shoham. *Learning The Empirical Hardness of Optimization Problems: the Case of Combinatorial Auctions*. Eighth International Conference on Theory and Practice of Constraint Programming (CP-03). Ithaca, NY, 2002.

Conference Presentation Abstracts

- Eugene Nudelman, Jennifer Wortman, Yoav Shoham, Kevin Leyton-Brown. *Understanding Game-Theoretic Algorithms: The Game Matters*.

- Game Theory Society World Congress, 2004.
 - Stonybrook Game Theory Festival of the Game Theory Society, 2004.
- Ryan Porter, Eugene Nudelman, Yoav Shoham. *Simple Search Methods for Finding a Nash Equilibrium*.
 - Game Theory Society World Congress, 2004.
 - Stonybrook Game Theory Festival of the Game Theory Society, 2004.

Unrefereed Publications

- Eugene Nudelman, Alex Devkar, Yoav Shoham, Kevin Leyton-Brown, Holger Hoos. *SATzilla: An Algorithm Portfolio for SAT*. In Seventh International Conference on Theory and Applications of Satisfiability Testing (SAT-04), SAT Solver Competition Report. Vancouver, Canada, 2004

Technical Reports

- Arie Gurfinkel and Eugene Nudelman. *SHADOW: A Framework for Creating High-level Program Analysis Tools*. University of Toronto, 2000. TR-CSR-414.

Invited Seminars

- *Simple Search Methods for Finding a Nash Equilibrium*. Session on New Algorithmic and Complexity Insights into the Nash Equilibrium. INFORMS Annual Meeting, Denver, CO, October 2004.
- *Understanding Random SAT: Beyond the Clauses-to-Variables Ratio*. IBM Almaden Research Center, San Jose, CA, June 2004.
- *Boosting As a Metaphor for Algorithm Design*. PARC, Palo Alto, CA, July 2003.
- *Boosting As a Metaphor for Algorithm Design*. CSLI Seminar on Computational Learning and Adaptation, Stanford, CA, June 2003.

Developed Software

This list only includes major software projects related to my research.

- *GAMUT*: a large suite of generators designed for testing game-theoretic algorithms, based on extensive literature survey.
- *Search-based Algorithm for finding a Nash Equilibrium*. Subsequently rolled into the Gambit library of game-theoretic algorithms.
- *SATzilla*: a portfolio SAT solver that uses state-of-the-art solvers together with statistical models to robustly solve instances from a wide variety of distributions.
- *SHADOW*: a framework for recording both static and runtime information about Java programs, facilitating development of custom program analysis tools.

Honors

- Siebel Scholars Fellowship. Siebel Systems, Stanford University, 2001
- Norman Stuart Robertson Scholarship in Mathematics. University of Toronto, 1998-1999.
- J.J. Stren Scholarship, University of Toronto, 1999.
- Later Life Learning Scholarship. University of Toronto, 1997-1999.
- Innis College Academic Scholarship, University of Toronto, 1997-1999.

- University of Toronto Scholar. University of Toronto, 1997-2000.
- Faculty of Arts and Science Dean's List Scholar. University of Toronto, 1997 - 2000.

Professional Service

Reviewing

- Conferences: ACM EC, IJCAI, AAI, UAI
- Journals: JAIR, AIJ, JACM

University Service

- Ph.D. Admissions Committee member, Computer Science Department, Stanford University, 2004.