

## John P. Dickerson

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9219 Gates-Hillman Center  
Carnegie Mellon University  
Pittsburgh, PA 15213

Email: dickerson at cs · cmu · edu  
Homepage: <http://gannon-house.com>

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- EDUCATION: **Carnegie Mellon University**, Pittsburgh, PA
- Ph.D. in Computer Science, expected May 2015
  - M.S. in Computer Science, expected May 2012
- University of Maryland**, College Park, MD
- B.S. in Computer Science, May 2008
  - B.S. in Mathematics, May 2008
  - Honors, Gemstone Citation
- SECURITY CLEARANCE: Department of Defense Top Secret - Sensitive Compartmented Information (TS/SCI) (polygraph, inactive)
- RESEARCH INTERESTS: Agent-based modeling, multi-agent systems, optimization, game theory, combinatorics and graph theory, predictive modeling, cultural modeling.
- BOOK CHAPTERS: Paulo Shakarian, V.S. Subrahmanian, John P. Dickerson. Geospatial Abduction with Adaptive Adversaries. *Geospatial Abduction*, pp. 93–146, Springer New York, 2011.
- JOURNAL PUBLICATIONS: Paulo Shakarian, John P. Dickerson, V.S. Subrahmanian. Adversarial Geospatial Abduction Problems. *ACM Transactions on Intelligent Systems and Technology (TIST)*, to appear.
- Rob Patro, John P. Dickerson, Sujal Bista, Amitabh Varshney, Satyandra K. Gupta. Speeding Up Particle Trajectory Simulations under Moving Force Fields using GPUs. *ASME Journal of Computing and Information Science in Engineering (JCISE)*, to appear.
- V.S. Subrahmanian and John P. Dickerson. What Can Virtual Worlds and Games do for National Security? *Science*, vol. 326, pp. 1201–02. 27 November 2009.
- CONFERENCE PUBLICATIONS: John P. Dickerson, Ariel D. Procaccia, Tuomas Sandholm. Optimizing Kidney Exchange with Transplant Chains: Theory and Reality. *Proc. Eleventh International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2012)*, Valencia, Spain, June 2012, to appear.
- John P. Dickerson, Aaron Mannes, V.S. Subrahmanian. Dealing with Lashkar-e-Taiba: A Multi-Player Game-Theoretic Perspective. *Proc. International Symposium on Open Source Intelligence & Web Mining (OSINT-WM 2011)*, pp. 354–359, Athens, Greece, Sep. 2011.

Gerardo I. Simari, John P. Dickerson, V.S. Subrahmanian. Cost-based Query Answering in Action Probabilistic Logic Programs. *Proc. 4th International Conf. on Scalable Uncertainty Management (SUM 2010)*, pp. 319–332, Toulouse, France, Sep. 2010.

John P. Dickerson, Gerardo Simari, V.S. Subrahmanian, Sarit Kraus. A Graph-Theoretic Approach to Protect Static and Moving Targets from Adversaries. *Proc. Ninth International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2010)*, pp. 299–306, Toronto, Canada, May 2010.

Emily Vargas-Baron, V.S. Subrahmanian, John P. Dickerson. Country Profiles on Early Childhood Development: Sub-Saharan Africa. *Proc. 2009 African International Conference on Early Childhood Development*, Dakar, Senegal, Nov. 2009.

John P. Dickerson, Maria Vanina Martinez, Diego Reforgiato, V.S. Subrahmanian. CIG: Cultural Islands and Games. *Proc. 2008 International Conference on Computational Cultural Dynamics*, pp. 26–31, AAAI Press, Menlo Park, CA, 2008.

THESIS: Undergraduate thesis defense, Classification of Perceived Emotion in Music using a Computational Model of the Auditory Cortex. *Gemstone Interdisciplinary Research Program*. University of Maryland, April 2008.

IN PROGRESS: Gerardo Simari, John P. Dickerson, Amy Sliva, V.S. Subrahmanian. Parallel Abductive Query Answering in Probabilistic Logic Programs. *Accepted with major revisions to ACM TOCL, October 2011*.

John P. Dickerson and Tuomas Sandholm. Sampling-Based Complete Tree Search. *Submitted January 2012; response forthcoming*.

John P. Dickerson and Tuomas Sandholm. Liver Exchange. *Submitted January 2012; response forthcoming*.

John P. Dickerson, Ariel D. Procaccia, Tuomas Sandholm. Dynamic Matching via Weighted Myopia with Application to Kidney Exchange. *Submitted January 2012; response forthcoming*.

Anna Fisher, Karrie Godwin, Heidi Kloos, John P. Dickerson. Mechanisms of Focused Attention in 3- to 5-Year-Old Children: Evidence from a New Object Tracking Task. *To be submitted to a Developmental Psychology journal*.

John P. Dickerson and Tuomas Sandholm. Fast Channel Abstraction in Advertising Auctions.

ACADEMIC  
EMPLOYMENT:

**Agent-Mediated Electronic Marketplaces Lab (AMEM)**, Carnegie Mellon

*Graduate Research Assistant, (2010-Present)*

Exploring new techniques for decreasing search tree complexity with respect to combinatorial optimization and computational game theory.

**Laboratory for Computational Cultural Dynamics (LCCD)**, U. of Maryland

*Faculty Research Assistant, (2008-Present)*

Agent-based adversarial modeling, specifically preventing adversarial “attack” on a set of static or dynamic targets. Recent work in applying machine learning techniques and predictive models to geo-social-cultural data to effect real-world change. For two years prior, served as lead developer on the Cultural Island Games project; explored environments in which users can interact with computational models of different geopolitical groups.

**Graphics and Visual Informatics Laboratory (GVIL), University of Maryland**

*Graphics and Visualization Researcher, (2007)*

Graphical programmer for joint projects in computer vision and AI. Used 57 megapixel tiled wall display in conjunction with OpenGL and OpenSG to design multithreaded, efficient and appealing visualizations. Procedurally and manually generated 3-D models. Explored novel ideas involving high resolution, real-time multi-GPU visualizations.

**Computer Science Department, University of Maryland**

*Undergraduate Teaching Assistant, (2006-2008)*

Served as an assistant to the professor for four semesters: once in a low-level C programming class, once in an organization of programming class, twice in a computer architecture course. Wrote and graded quizzes, worksheets. Held office hours, study sessions. Edited and graded programming projects. Led discussions online via class forums and webpages.

INDUSTRY  
EMPLOYMENT:

**Center for Advanced Transportation Technologies, College Park, MD**

*Developer (2006)*

Augmented a highly interactive and dynamic OpenGL-based 3-D visualization program of traffic in the DC area. Interacted with real-time traffic databases. Used traffic statistics to form predictive algorithms detailing potentially congested and high-risk highway zones.

**International Business Machines (IBM), Bethesda, MD**

*Application Tester/Debugger (2005)*

Wrote and executed test cases for GCPS, an international contract monitoring tool IBM released in early 2006. Also used JavaScript in conjunction with the database tool Brio to create a user-friendly database query tool for the program.

**National Security Agency (NSA), Ft. Meade, MD**

*Student Research Intern (2003-2004)*

Directed my own project for two summers in a research lab specializing in optical and fingerprint scanning, along with 3-D facial recognition. Created a real-time, realistic human face to be compared with 2-D face databases for use with video surveillance.

MEDIA  
COVERAGE:

### **Kidney Paired Donation**

The first nationwide kidney paired donation took place in November, 2010, and was covered by the *International Business Times*, the CMU homepage, and others. I am currently lead developer for this project, spearheaded by my advisor Tuomas Sandholm. See the CMU press releases in [November](#) and [December](#).

### **IED Cache Detection**

*Nature*, *Popular Science*, *The Baltimore Sun*, and many others covered the Spatial-Cultural Abductive Reasoning Engine (SCARE), a project I helped develop that analyzes patterns of improvised explosive device (IED) attacks in a war zone. See the articles in *Popular Science* ([link](#)) and *The Baltimore Sun* ([link](#)). The *Nature* article can be found [here](#).

### **Virtual Worlds & National Security**

*Science*, *Scientific American*, *The Register*, *R&D Magazine*, and many others covered my work on how virtual worlds can be used to help policy and defense analysts. See my coauthored paper in *Science* ([link](#)), my interview in *Scientific American* ([link](#)), or coverage in the satirical magazine *The Register* ([link](#)).

TEACHING  
EXPERIENCE:

### **Carnegie Mellon University, Pittsburgh, PA**

Teaching Assistant, 15-780, Spring 2012  
Graduate Artificial Intelligence  
Martial Hebert and Ariel Procaccia

### **University of Maryland, College Park, MD**

Teaching Assistant, CMSC311, Fall 2007, Spring 2008  
Computer Organization  
Michelle Hugue

Teaching Assistant, CMSC330, Spring 2007  
Organization of Programming Languages  
Larry Herman

Teaching Assistant, CMSC212, Fall 2006  
Introduction to Low-Level Programming Concepts  
Alan Sussman and Larry Herman

COMMUNITY  
EXPERIENCE:

### **Resident Assistant**

*Ellicott Residence Hall (2006-2007)*

As an upperclassman, supervised approximately sixty freshman males in the Ellicott Residence Hall. Served as a peer mediator, educational advisor, mentor, and liaison between faculty and students. Handled situations ranging from alcohol abuse and roommate conflicts to drug abuse and severe depression in students.

### **Community Assistant**

*La Plata, Queen Anne's Residence Halls (2005-2006)*

Facilitated positive relationships between students, staff, and faculty within the residence halls. Served as an information point for students and visitors. Maintained full knowledge of emergency and evacuation procedures for the hall.

## Eagle Scout

*Boy Scouts of America*

Served in a variety of leadership and community service roles over the course of nearly two decades, primarily through Troop 264. Planned and executed my own Eagle Project involving the placement, tracking, and upkeep of many wood duck boxes in the greater Triadelphia, MD area.

## HONORS AND AWARDS:

2010: Departmental Fellowship *Offered by CS @ U. Illinois at Urbana-Champaign*  
2010: MCD Fellowship *Offered by CS @ U. Texas at Austin*  
2010: Provost's Ph.D. Fellowship *Offered by U. Southern California*  
2007: Gannon Scholar, *CS @ University of Maryland*  
2007: Undergraduate TA of the Year, *CS @ University of Maryland*  
2007: Professional Writing Contest in Alternate Media, *English Dept. @ UMD*  
2006: Writing Program Gifts and Awards Fund, *University of Maryland*  
2006: Book Scholar, *Chevy Chase Bank*  
2005: Professor's Fund, *University of Maryland*  
2005: Honors Citation, *University of Maryland*  
2004-08: Dean's List, *University of Maryland*  
2004-08: Senatorial Scholarship, *State of Maryland*  
2004-08: Delegate's Scholarship, *State of Maryland*  
2004: Salutatorian, *Sherwood High School*  
2003: Eagle Scout, *Boy Scouts of America*

## RELEVANT CLASSWORK:

### At Carnegie Mellon University

*Graduate Coursework*

15-812: *Semantics of Programming Languages*. S. Brookes (S12)  
15-744: *Computer Networks*. P. Steenkiste (F11)  
15-892: *Foundations of Electronic Marketplaces*. T. Sandholm (F11)  
15-780: *Graduate Artificial Intelligence*. G. Gordon & T. Sandholm (S11)  
15-859: *Mathematical Games*. D. Sleator & A. Frieze (S11)  
15-887: *Planning, Execution, and Learning*. M. Veloso & R. Simmons (F10)  
15-853: *Algorithms in the Real World*. G. Blelloch & J. Fineman (F10)

### At University of Maryland

*Undergraduate C.S. Theory*

Algorithms, Advanced Algorithms, Logic, Robotic Motion Planning, Graph Theory, Organization of Programming Languages, Artificial Intelligence

*Undergraduate C.S. Applied*

Low-Level Programming, Graphics, Advanced Graphics, Computer Organization and Architecture, Artificial Intelligence, Game Programming, Networking, Object-Oriented Programming, Data Structures, Scientific Computing on GPUs

*Undergraduate Mathematics*

Differential Geometry, Linear Algebra (Theory), Linear Algebra (Applied), Advanced Calculus, Statistics, Probability, Graph Theory, Combinatorics

*Other*

Technical Writing, Team Dynamics and Research Methods

TECHNICAL  
SKILLS:

**Programming**

*Fluent in:* Java, C++, C, Python

*Experience in:* Ruby (Rails, Sinatra), MatLab, OpenGL, CUDA, Flex, Action-Script, HTML, CSS, XML, L<sup>A</sup>T<sub>E</sub>X

**Operating Systems**

Linux, Windows

**Software**

Emacs, Eclipse, Visual Studio, 3d Studio Max, Adobe Creative Suite, Gimp

REFERENCES:

Tuomas Sandholm, Ph.D.  
Professor, Computer Science  
9205 Gates-Hillman Center  
Carnegie Mellon University  
Pittsburgh, PA 15213

V.S. Subrahmanian, Ph.D.  
Professor, Computer Science  
2119 A.V. Williams Building  
University of Maryland  
College Park, MD 20742

Amitabh Varshney, Ph.D.  
Director, UMIACS; Professor, Computer Science  
4407 A.V. Williams Building  
University of Maryland  
College Park, MD 20742

Sarit Kraus, Ph.D.  
Professor, Computer Science  
Bar-Ilan University  
Ramat Gan, Israel

*Extra academic and personal references available upon request!*

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