

# MATTHEW P. JOHNSON • mpjohnson@gmail.com

The Graduate Center of the City University of New York  
Department of Computer Science • 365 Fifth Avenue • New York, NY 10016  
917-648-9706 • [www.columbia.edu/~mpj9/](http://www.columbia.edu/~mpj9/)

- Education**
- CUNY Graduate Center, New York, NY, 2005-present  
Ph.D. in Computer Science, GPA: 4.00  
Received a prestigious CUNY Science Fellowship.  
Scored 99.75/100 (average score: 67/100) on Qualifying Exam (rank: 1 out of 25).  
Coursework: Optimization, Topics in Complexity (NYU), Combinatorics, Tournament Ranking Project.
- Columbia University, New York, NY 1998-2002  
M.S. in Computer Science, GPA: 3.73  
Received a fully funded MS-TA-ship.  
Coursework: Machine Learning, Crypto, Mathematical Logic, Computational Genomics.
- Columbia University, New York, NY 1998-2002  
B.S. in Computer Science  
Coursework: Information Theory, Graph Theory, Set Theory, Modern Geometry, AI, Philosophy of Math.
- Lawrence University, Appleton, WI, 1995-1998  
B.A. double major in Math and Philosophy  
Coursework: Foundations of Algebra, Real Analysis, Philosophy of Mind.
- Research**
- Sensor Assignment, at CUNY GC/IBM/ITA with Prof. Amotz Bar-Noy  
Modeled the problem of optimally assigning multiple sensors to multiple missions in terms of weighted bipartite semi-matching and maximum flows.  
Proved that certain problem variants are strongly NP-Hard and APX-Hard.  
Found and implemented (in Java) efficient heuristic-based algorithms, including naive greedy algorithms, LP-rounding, and distributed bidding algorithms.  
Currently seeking efficient algorithms with provable approximation ratios.
- Energy Demand-Smoothing, at CUNY GC/CISDD/Gaia with Prof. Amotz Bar-Noy  
Studied the online problem of smoothing peaks in energy demand curves, by storing surplus energy in a battery.  
Adapted the optimal offline algorithm to the online setting, producing a simple linear-time online algorithm with excellent empirical performance.  
Currently adapting an existing controller system (written in C) into a simulation engine for testing algorithms on historical data.
- Computational Finance at Columbia with Dr. German Creamer  
Studied constant rebalanced portfolios and the underlying information theory.  
Implemented Cover's Universal Portfolio algorithm.
- Genetic Algorithms, at Columbia with Prof. Andrew Kosoresow  
Applied genetic algorithms (GAs) to the empirical analysis of algorithms, including NP-Complete problems and online algorithms.  
Developed a GA that finds worst-case instances of optimization problem instances.

Confirmed a conjectured bound on a competitive algorithm for the Taxi Cab Problem.

- Teaching
- City College of New York, CS Department, New York, NY, Spring 2005—Present  
Adjunct Lecturer
- Intro to Programming & Computer Science, Fall 2005 & Fall 2006
  - Data Structures, Spring 2005
- NYU Stern School of Business, IS Department, New York, NY, Spring 2004—Spring 2006  
Adjunct Assistant Professor
- Database Management Systems, Spring 2004, Spring 2005, Spring 2006
- CUNY Institute for Software Development & Design, New York, NY, 2004-2005  
Instructor
- Oracle 10g: SQL & PL/SQL: October 2004, January 2005, June 2005, September 2005
- Columbia University, CS Department, New York, NY, 2002—2004  
Instructor
- Programming Languages. C++, Spring & Fall 2003
  - Data Structures and Algorithms, Summer 2004
  - Programming Languages: C, Spring & Fall 2003
  - Discrete Math, Summer 2003
  - Intro to Computer Programming in Java, Spring 2003
  - Intro to Computer Programming in C, Fall 2002
  - Introduction to Computational Complexity (CVN), Spring 2002—Fall 2003
- Industry Experience
- Information Builders, New York, NY, May, 2002—January, 2004  
Software Developer, WebFocus Division
- Analyzed SSH and S/MIME security protocols, and implemented load-balancing in the project's job-handling server.
  - Technologies: Java, JDBC, SQLServer, BouncyCastle, Ant, Eclipse, SourceSafe.
- Random Walk Computing, New York, NY, February, 2001—March, 2002  
Associate Consultant
- In a team of five, developed a Lehman Brothers trading system, which supported various financial instruments.
  - Technologies: Java, XML, Oracle, JMS, TIB/Rendezvous, FIX, cvs, Ant, JUnit.
- Konsult, Inc., Oshkosh, WI, June, 1995—December, 2000  
Programmer
- Lead developer for the first Windows version of the AADR expert system.
- Publications
- Conference Papers
- "A Survey of Sensor Selection Schemes in Wireless Sensor Networks" (with Hosam Rowaihy, Sharanya Eswaran, Amotz Bar-Noy, Alun Preece, Ted Brown, Dinesh Verma, Tom La Porta). SPIE Unattended Ground, Sea, and Air Sensor Technologies and Applications IX, Orlando, FL. To appear.
  - "Finding Worst-Case Instances of, and Lower Bounds for, Online Algorithms Using Genetic Algorithms" (with Andrew P. Kosoresow) in AI 2002: Advances in Artificial Intelligence: 15th Australian Joint Conference on Artificial Intelligence, Proceedings. LNAI 2557. Springer Verlag, 2002.
  - "Finding Worst-Case Instances, and Lower Bounds, for NP-Complete Problems Using Genetic Algorithms" (with Andrew P. Kosoresow) in Proceedings of the 4th Asia-Pacific Conference on Simulated Evolution And Learning. 2002.

Technical Reports

“A Survey of Sensor Selection Schemes in Wireless Sensor Networks” (with Hosam Rowaihy, Sharanya Eswaran, Dinesh Verma, Amotz Bar-Noy, Theodore Brown, & Thomas La Porta). PSU NSRC Tech Report NAS-TR-0055-2006.

“Geometric Considerations for Distribution of Sensors in Ad-hoc Sensor Networks” (with Ted Brown, Deniz Sariöz, Amotz Bar-Noy, Tom LaPorta, Dinesh Verma, & Hosam Rowaihy). CUNY CS Tech Report TR-2006014.

Presentation

“Demand Smoothing Through Energy Buffering” (with Amotz Bar-Noy, Ted Brown & Ib Olson) at the CUNY Sustainability Conference, CUNY Grad Center, 12/8/06.

Book Chapter

“Lower Bounds via Worst-Case Instances via Genetic Algorithms” (with Andrew P. Kosoresow) in *Recent Advances in Simulated Evolution and Learning*, Kay Chen Tan, et al. eds. World Scientific series on Advances in Natural Computation. 2004.

References

Amotz Bar-Noy of CUNY; [amotz@sci.brooklyn.cuny.edu](mailto:amotz@sci.brooklyn.cuny.edu)

German Creamer of Columbia and American Express; [gcreamer@cs.columbia.edu](mailto:gcreamer@cs.columbia.edu)