

Eugene Fink

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Computer Science Department
Carnegie Mellon University
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EDUCATION:

Ph.D. in Computer Science (August 1999)

Carnegie Mellon University, Pittsburgh, PA

Research areas: Machine learning, artificial-intelligence problem solving, and planning

Thesis: Automatic representation changes in problem solving

M.S. in Computer Science, Honors (August 1992)

University of Waterloo, Waterloo, Ontario

Research areas: Machine learning and artificial-intelligence planning

Thesis: Justified plans and ordered hierarchies

B.S. in Computer Science and Mathematics, First Class Honors (May 1991)

Mount Allison University, Sackville, NB

RESEARCH EXPERIENCE:

Senior Systems Scientist, Carnegie Mellon University (2007–present)

Research in artificial intelligence, machine learning, optimization, reasoning under uncertainty, massive-data processing, and national security applications

Systems Scientist, Carnegie Mellon University (2004–2007)

Research in artificial intelligence, machine learning, optimization, reasoning under uncertainty, massive-data processing, e-commerce, national security applications, and computational geometry

Assistant Professor, University of South Florida (1999–2003)

Research in artificial intelligence, machine learning, data mining, e-commerce, medical applications, and computational geometry

Graduate Research Assistant, Carnegie Mellon University (1992–1998)

Research in machine learning, artificial-intelligence problem solving, and planning

Visiting Researcher, University of Waterloo (Summers 1993, 1994, 1995)

Research in artificial-intelligence planning and computational geometry

Graduate Research Assistant, University of Waterloo (1991–1992)

Research in artificial-intelligence planning and computational geometry

Software Engineer, Leningrad Polytechnic Institute, USSR (Summers 1986, 1987, 1988)

Development of PC applications, including database queries and numerical methods

TEACHING EXPERIENCE:

Senior Systems Scientist, Carnegie Mellon University (2007–present)

Systems Scientist, Carnegie Mellon University (2004–2007)

Taught the following course:

- Competition Programming (every semester since Spring 2005);
co-teaching with Greg Kesden (2005–present) and Daniel Sleator (2008–present)

Assistant Professor, University of South Florida (1999–2003)

Taught the following courses:

- Analysis of Algorithms (graduate and undergraduate)
- Artificial Intelligence (graduate and undergraduate)
- Automata Theory (undergraduate)
- Data Mining (graduate and undergraduate)
- Competition Programming

Teaching Assistant

Carnegie Mellon University (three courses, 1994–1995)

University of Waterloo (four courses, 1991–1992)

Mount Allison University (one course, 1990)

Volunteer work with gifted school students, Leningrad, USSR (1986–1988)

Taught classes in mathematics and computer science, and organized math competitions

PUBLICATIONS:

Books:

- Eugene Fink and Derick Wood. Restricted-orientation convexity. Springer-Verlag, Berlin, Germany, 2004.
- Eugene Fink. Changes of problem representation: Theory and experiments. Springer-Verlag, Berlin, Germany, 2003.

Book chapters:

- Eugene Fink and Kevin B. Pratt. Indexing of compressed time series. In Mark Last, Abraham Kandel, and Horst Bunke, editors, *Data Mining in Time Series Databases*, pages 43–65. World Scientific, Singapore, 2004.
- Eugene Fink and Manuela M. Veloso. Formalizing the Prodigy planning algorithm. In Malik Ghallab and Alfredo Milani, editors, *New Directions in AI Planning*, pages 261–271. IOS Press, Amsterdam, Netherlands, 1996.

Journal publications:

- Eugene Fink, Jianli Gong, and Josh M. Johnson. Exchange market for complex commodities: Search for optimal matches. *Journal of Experimental and Theoretical Artificial Intelligence*, 19(2), pages 91–117, 2007.
- Eugene Fink and Jim Blythe. Prodigy bidirectional planning. *Journal of Experimental and Theoretical Artificial Intelligence*, 17(3), pages 161–200, 2005.
- Eugene Fink. Automatic evaluation and selection of problem-solving methods: Theory and experiments. *Journal of Experimental and Theoretical Artificial Intelligence*, 16(2), pages 73–105, 2004.

- Eugene Fink, Princeton K. Kokku, Savvas Nikiforou, Lawrence O. Hall, Dmitry B. Goldgof, and Jeffrey P. Krischer. Selection of patients for clinical trials: An interactive web-based system. *Artificial Intelligence in Medicine*, 31(3), pages 241–254, 2004.
- Eugene Fink, Josh M. Johnson, and Jenny Hu. Exchange market for complex commodities: Theory and experiments. *Netnomics*, 6(1), pages 21–42, 2004.
- Eugene Fink and Derick Wood. Planar strong visibility. *International Journal of Computational Geometry and Applications*, 13(2), pages 173–187, 2003.
- Kevin B. Pratt and Eugene Fink. Search for patterns in compressed time series. *International Journal of Image and Graphics*, 2(1), pages 89–106, 2002.
- Eugene Fink and Michael Heath. Image-processing projects for an algorithms course. *International Journal of Pattern Recognition and Artificial Intelligence*, 15(5), pages 859–868, 2001.
- Eugene Fink and Derick Wood. Strong restricted-orientation convexity. *Geometriae Dedicata*, 69(1), pages 35–51, 1998.
- Eugene Fink and Derick Wood. Halfspaces in restricted-orientation convexity. *Journal of Geometry*, 62, pages 99–120, 1998.
- Eugene Fink and Qiang Yang. Automatically selecting and using primary effects in planning: Theory and experiments. *Artificial Intelligence Journal*, 89, pages 285–315, 1997.
- Eugene Fink and Derick Wood. Fundamentals of restricted-orientation convexity. *Information Sciences*, 92, pages 175–196, 1996.
- Manuela M. Veloso, Jaime G. Carbonell, Alicia Perez, Daniel Borrajo, Eugene Fink, and Jim Blythe. Integrating planning and learning: The Prodigy architecture. *Journal of Experimental and Theoretical Artificial Intelligence*, 7(1), pages 81–120, 1995.

Conference proceedings:

- Anatole Gershman, Eugene Fink, Bin Fu, and Jaime G. Carbonell. Analysis of uncertain data: Evaluation of given hypotheses. In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, 2009.
- Anatole Gershman, Eugene Fink, Bin Fu, and Jaime G. Carbonell. Analysis of uncertain data: Selection of probes for information gathering. In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, 2009.
- Eugene Fink, P. Matthew Jennings, Konstantin Salomatin, and Jaime G. Carbonell. Scheduling with uncertain resources: Representation of common knowledge. In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, 2009.
- Eugene Fink, Ankur Sarin, and Jaime G. Carbonell. Analysis of uncertain data: Smoothing of histograms. In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, 2009.
- Judith Gelernter, Dong Cao, Raymond Lu, Eugene Fink, and Jaime G. Carbonell. Creating and visualizing fuzzy document classification. In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, 2009.
- Steven Gardiner, Eugene Fink, and Jaime G. Carbonell. Scheduling with uncertain resources: Learning to make reasonable assumptions. In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, pages 2554–2559, 2008.
- Alexander Carpentier, Mehrbod Sharifi, Eugene Fink, and Jaime G. Carbonell. Scheduling with uncertain resources: Learning to ask the right questions. In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, pages 2543–2547, 2008.

- Bin Fu, Eugene Fink, and Jaime G. Carbonell. Analysis of uncertain data: Tools for representation and processing. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 3256–3260, 2008.
- Eugene Fink. Evaluation of representations in AI problem solving. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 349–353, 2007.
- Eugene Fink and Harith Suman Gandhi. Important extrema of time series. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 366–372, 2007.
- Eugene Fink, Ulas Bardak, Brandon Rothrock, and Jaime G. Carbonell. Scheduling with uncertain resources: Collaboration with the user. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 11–17, 2006.
- Eugene Fink, P. Matthew Jennings, Ulas Bardak, Jean Oh, Stephen F. Smith, and Jaime G. Carbonell. Scheduling with uncertain resources: Search for a near-optimal solution. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 137–144, 2006.
- Ulas Bardak, Eugene Fink, and Jaime G. Carbonell. Scheduling with uncertain resources: Representation and utility function. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 1486–1492, 2006.
- Ulas Bardak, Eugene Fink, Chris R. Martens, and Jaime G. Carbonell. Scheduling with uncertain resources: Elicitation of additional data. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 1493–1498, 2006.
- Eugene Fink, Aaron Goldstein, Philip J. Hayes, and Jaime G. Carbonell. Search for approximate matches in large databases. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 1431–1435, 2004.
- Hong Tang, Yelena Mukomel, and Eugene Fink. Diagnosis of ovarian cancer based on mass spectra of blood samples. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 3444–3450, 2004.
- Eugene Fink, Jianli Gong, and John Hershberger. Multi-attribute exchange market: Search for optimal matches. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 4140–4146, 2004.
- Eugene Fink, Josh M. Johnson, and John Hershberger. Fast-paced trading of multi-attribute goods. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 4280–4287, 2003.
- Eugene Fink, Lawrence O. Hall, Dmitry B. Goldgof, Bhavesh D. Goswami, Matthew Boonstra, and Jeffrey P. Krischer. Experiments on the automated selection of patients for clinical trials. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 4541–4545, 2003.
- Eugene Fink, Kevin B. Pratt, and Harith Suman Gandhi. Indexing of time series by major minima and maxima. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 2332–2335, 2003.
- Eugene Fink, Josh M. Johnson, and John Hershberger. Multi-attribute exchange market: Theory and experiments. In Proceedings of the Sixteenth Canadian Conference on Artificial Intelligence, pages 603–610, 2003.
- Eugene Fink, Josh M. Johnson, and John Hershberger. Multi-attribute exchange market: Representation and indexing of orders. In Proceedings of the ACM Conference on Electronic Commerce, 2003.

- Savvas Nikiforou, Eugene Fink, Lawrence O. Hall, Dmitry B. Goldgof, and Jeffrey P. Krischer. Knowledge acquisition for clinical-trial selection. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 66–71, 2002.
- Princeton K. Kokku, Lawrence O. Hall, Dmitry B. Goldgof, Eugene Fink, and Jeffrey P. Krischer. A cost-effective agent for clinical trial assignment. In Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics, pages 60–65, 2002.
- Eugene Fink. How to solve it automatically: Selection among problem-solving methods. In Proceedings of the Fourth International Conference on Artificial Intelligence Planning Systems, pages 128–136, 1998.
- Eugene Fink and Jim Blythe. A complete bidirectional planner. In Proceedings of the Fourth International Conference on Artificial Intelligence Planning Systems, pages 78–84, 1998.
- Eugene Fink and Derick Wood. Computational problems in strong visibility. In Proceedings of the Vision Geometry VI Conference, pages 95–105, 1997.
- Eugene Fink and Derick Wood. Generalizing halfspaces. In Proceedings of the Eighth Canadian Conference on Computational Geometry, pages 211–216, 1996.
- Eugene Fink and Derick Wood. Three-dimensional restricted-orientation convexity. In Proceedings of the Eighth Canadian Conference on Computational Geometry, pages 258–263, 1996.
- Eugene Fink and Derick Wood. Restricted-orientation halfspaces. In Proceedings of the Vision Geometry V Conference, pages 24–33, 1996.
- Eugene Fink and Derick Wood. Three-dimensional strong convexity and visibility. In Proceedings of the Vision Geometry IV Conference, pages 61–72, 1995.
- Eugene Fink and Qiang Yang. Planning with primary effects: Experiments and analysis. In Proceedings of the Fourteenth International Joint Conference on Artificial Intelligence, pages 1606–1611, 1995.
- Eugene Fink and Qiang Yang. Characterizing primary effects in planning. In Proceedings of the Thirteenth International Joint Conference on Artificial Intelligence, pages 1374–1379, 1993.
- Eugene Fink and Qiang Yang. Formalizing plan justifications. In Proceedings of the Ninth Conference of the Canadian Society for Computational Studies of Intelligence, pages 9–14, 1992.
- Eugene Fink and Qiang Yang. Automatically abstracting effects of operators. In Proceedings of the First International Conference on Artificial Intelligence Planning Systems, pages 243–251, 1992.

Workshop proceedings:

- Gregory Kesden, Eugene Fink, and Daniel Sleator. Training of the Carnegie Mellon teams for the ACM Programming Competition. In Proceedings of the Competitive Learning Institute Symposium, 2009.
- Jaime G. Carbonell, Eugene Fink, Chun Jin, B. Cenk Gazen, Johnny Mathew, Abhay Saxena, Vini Satish, Santosh Ananthraman, Dwight Dietrich, and Ganesh Mani. Scalable data exploration and novelty detection. In Proceedings of the NIMD Principal Investigator Meeting, 2006.
- Jaime G. Carbonell, Eugene Fink, Chun Jin, B. Cenk Gazen, Santosh Ananthraman, Philip J. Hayes, Ganesh Mani, and Dwight Dietrich. Exploring massive structured data in ARGUS. In Proceedings of the NIMD Principal Investigator Meeting, 2005.
- B. Cenk Gazen, Jaime G. Carbonell, Philip J. Hayes, Chun Jin, and Eugene Fink. Hypothesis formation and tracking in ARGUS. In Proceedings of the NIMD Principal Investigator Meeting, 2004.
- Bhavesh D. Goswami, Lawrence O. Hall, Dmitry B. Goldgof, Eugene Fink, and Jeffrey P. Krischer. Using probabilistic methods to optimize data entry in accrual of patients to clinical trials. In

Proceedings of the Seventeenth IEEE Symposium on Computer-Based Medical Systems, pages 434–439, 2004.

- Eugene Fink and Derick Wood. Generalized convexity in three dimensions. In Proceedings of the Twelfth European Workshop on Computational Geometry, pages 7–10, 1996.
- Eugene Fink and Derick Wood. Restricted-orientation halfspaces. In Proceedings of the Fifth MSI Stony Brook Workshop on Computational Geometry, pages 31–32, 1995.
- Eugene Fink. Systematic approach to the design of representation-changing algorithms. In Proceedings of the Symposium on Abstraction, Reformulation, and Approximation, pages 54–61, 1995.
- Eugene Fink and Qiang Yang. Search reduction in planning with primary effects. In Proceedings of the Symposium on Theory Reformulation and Abstraction, pages 39–55, 1994.
- Eugene Fink and Qiang Yang. A spectrum of plan justifications. In Proceedings of the AAAI 1993 Spring Symposium, pages 29–33, 1993.
- Eugene Fink and Qiang Yang. Forbidding preconditions and ordered abstraction hierarchies. In Proceedings of the AAAI 1993 Spring Symposium, pages 34–38, 1993.
- Eugene Fink and Derick Wood. Restricted-orientation convexity in higher-dimensional spaces. In Proceedings of the Seventh Graduate Conference in Computer Science, pages 128–136, 1992.

Technical reports:

- Eugene Fink. Automatic representation changes in problem solving. PhD thesis, Computer Science Department, Carnegie Mellon University, 1999. Technical Report CMU-CS-99-150.
- Eugene Fink. Statistical selection among problem-solving methods. Computer Science Department, Carnegie Mellon University, 1997. Technical Report CMU-CS-97-101.
- Eugene Fink. Design of representation-changing algorithms. Computer Science Department, Carnegie Mellon University, 1995. Technical Report CMU-CS-95-120.
- Eugene Fink and Manuela Veloso. Prodigy planning algorithm. Computer Science Department, Carnegie Mellon University, 1994. Technical Report CMU-CS-94-123.
- Eugene Fink. Justified plans and ordered hierarchies. Master’s thesis, Department of Computer Science, University of Waterloo, 1992. Technical Report CS-92-42.
- Eugene Fink. A survey of sequential and systolic algorithms for the algebraic path problem. Department of Computer Science, University of Waterloo, 1992. Technical Report CS-92-37.

PATENTS:

- Eugene Fink, Ganesh Mani, Dwight Dietrich, Josh M. Johnson, Steven V. Fischetti, and Jaime G. Carbonell. Method and system for multi-dimensional trading. US Patent 7406443, published on July 29, 2008.

PRESENTATIONS:

- Analysis of uncertain data: Selection of probes for information gathering. Invited talk in the Department of Computer Science and Engineering at the University of South Florida, May 27, 2009.
- Reasoning under uncertainty. Invited talk in the Department of Computer Science and Engineering at the University of South Florida, May 9, 2008.
- Scheduling with uncertain resources. Invited talk in the Department of Computer Science and Engineering at the University of South Florida, May 30, 2006.
- ARGUS: Novelty detection and profile tracking from massive data. Presented at the Sixth SIAM International Conference on Data Mining, April 21, 2006.
- CUBIT research at the University of South Florida. Presentation at the Twelfth International Meshing Roundtable, September 15, 2003.
- Representation changes in AI problem solving. Invited talk in the Department of Computer Science at Hong Kong University of Science and Technology, September 14, 1995.

SERVICE:

Departmental committees (Carnegie Mellon University):

Programming Competition (2004–present): Prepared teams for the ACM programming competition

Graduate Admission (2005–present): Evaluated applications for the LTI graduate program

Student Research Symposium (2007, 2008): Evaluated student submissions

Wiki Maintenance (2004–2007): Served as an administrator of the Wiki Web for CSD Faculty,
and Wiki pages for the Undergraduate Review Committee and the CS-4-ALL Initiative

Preparation to Advisory Board (2005): Participated in preparing materials for the LTI Advisory Board

Departmental committees (University of South Florida):

Programming Competition (Chair, 2002–2003): Prepared teams for the ACM programming competition

ACM Student Chapter (2002): Served as a faculty advisor

Graduate Examinations (1999–2003): Prepared and graded comprehensive exams in algorithms

Graduate Admission (1999–2003): Evaluated applications for the graduate program

Planning M.S. in Bioinformatics (Chair, 1999): Prepared a plan for a masters program in bioinformatics

Conference program committees:

IASTED International Conference on Advances in Computer Science and Engineering (2009)

IASTED International Conference on Computer Science and Technology (2003–2008, every year)

IEEE International Conference on Systems, Man, and Cybernetics (2003, 2004)

International Conference on Bio-Inspired Systems and Signal Processing (2008)

International Conference on Computational Intelligence and Security (2008)

National Conference on Artificial Intelligence (2000)

ACM programming competitions

Preparing Carnegie Mellon University teams for the ACM programming competitions (2004–present); the teams have advanced to the World Finals every year and their results have been as follows:

- 2005: Top sixty (among 4109 teams)
- 2006: Top sixty (among 5606 teams)
- 2007: Top sixty (among 6099 teams)
- 2008: Top forty (among 6700 teams)
- 2009: Twelfth place and bronze medal (among 7109 teams)

Other programming and linguistic competitions:

Preparing University of South Florida teams for the ACM programming competitions (2002–2003)
Organizing the invitational programming competitions for second-tier teams (2004–present)
Organizing the ACM regional programming competition for first-tier teams (2004)
Organizing the North American Computational Linguistics Competition (2007–present)
Serving as Judge for the Computer Society International Design Competition (2002, 2003, 2006)
Serving as Judge for the IEEE Computer Society Web Programming Competition (2007)

Reviewing journal articles:

Annals of Mathematics and Artificial Intelligence (2009)
Artificial Intelligence Journal (2001)
Computational Intelligence (2007)
Data and Knowledge Engineering Journal (2005–2009, every year)
Electronic Commerce Research Journal (2003)
IEEE Transactions on Knowledge and Data Engineering (2005, 2006)
IEEE Transactions on Mobile Computing (2005, 2006)
IEEE Transactions on Neural Networks (2003)
IEEE Transactions on Systems, Man, and Cybernetics (1999, 2001, 2003, 2004, 2005, 2007)
Image and Vision Computing Journal (2003, 2004)
International Journal on Pattern Recognition and Artificial Intelligence (2000)
Journal of Experimental and Theoretical Artificial Intelligence (2006)
Journal of Geometry (2009)
Mathematics and Computers in Simulation (2008)

Reviewing conference papers:

AAAI Constraint-Based Reasoning Workshop (1994)
Annual ACM Symposium on Applied Computing (2003–2007, every year)
Annual Conference of the IEEE Industrial Electronics Society (2007)
IEEE Conference on Computer Vision and Pattern Recognition (2002, 2003)
IEEE International Conference on Data Mining (2003)
IEEE International Conference on Emerging Technologies and Factory Automation (2008)
IEEE International Conference on Human System Interaction (2009)
IEEE International Conference on Industrial Informatics (2009)
IEEE International Conference on Industrial Technologies (2008)
IEEE International Conference on Systems, Man, and Cybernetics (2008, 2009)
International Conference on Artificial Intelligence Planning Systems (1994)
International Conference on Bio-Inspired Systems and Signal Processing (2008)
International Conference on Computational Intelligence and Security (2007)
International Conference on Machine Learning (1995, 1996)
International Conference on Networked Digital Technologies (2009)
International Conference on Pattern Recognition (2002)
International Conference on Tools with Artificial Intelligence (1999)
International Joint Conference on Artificial Intelligence (1995, 1999, 2006)
International Joint Conference on Biomedical Engineering Systems and Technologies (2007)
KBCS International Conference on Artificial Intelligence (2004)
National Conference on Artificial Intelligence (1994, 1996, 1999, 2000, 2008)

STUDENTS:

Ph.D. students (Carnegie Mellon University)

Bin Fu (current)

Ulas Bardak, Information elicitation in scheduling problems (August 2007)

Masters students (Carnegie Mellon University)

Diwakar Punjani (current)

Mehrbod Sharifi (August 2009)

Steven Gardiner (August 2008)

Konstantin Salomatina (August 2007)

Masters students (University of South Florida)

Harith Suman Gandhi, Important extrema of time series: Theory and applications (Spring 2004)

Rohan V. Malkhare, Scavenger: A junk mail classification program (Spring 2004)

John Hershberger, Exchanges for complex commodities: Toward a general-purpose system (Fall 2003)

Hong Tang, Diagnosis of ovarian cancer based on mass spectrum of blood samples (Summer 2003)

Jianli Gong, Exchanges for complex commodities: Search for optimal matches (Summer 2002)

Jenny Hu, Exchanges for complex commodities: Representation and indexing of orders (Spring 2002)

Savvas Nikiforou, Selection of clinical trials: Knowledge representation and acquisition (Spring 2002);
recipient of the *University Best M.S. Thesis Award*

Josh M. Johnson, Exchanges for complex commodities: Theory and experiments (Summer 2001)

Kevin B. Pratt, Locating patterns in discrete time series (Spring 2001)

Thesis committee member (University of South Florida)

Bhavesh Goswami (M.S., Fall 2003)

Jing Lin (M.S., Fall 2001)

Steven Eschrich (Ph.D., Spring 2003)

Nikhil Kelshikar (M.S., Fall 2001)

Jonathan Roy (M.S., Fall 2002)

Mark Satterfield (M.S., Fall 2000)

Sorin Anton (M.S., Fall 2002)

Jamie Malloy (M.S., Summer 2000)

Issidro Robledo-Vega (Ph.D., Fall 2002)

Jimmy Chao (M.S., Spring 2000)

Princeton Kokku (M.S., Summer 2002)

Zornitza Genova (M.S., Fall 1999)

Girish Keswani (M.S., Summer 2002)

GRANTS:

Carnegie Mellon University, Berkman Faculty Development Fund,
Compression and indexing of time series, \$3,600 (2009)

Intelligence Advanced Research Project Activity,
RAPID: Representation and analysis of probabilistic intelligence data, \$600,000 (2007–2009),
with Jaime G. Carbonell

Sandia National Laboratories,
Indexing, repair, and simplification of faceted surfaces, \$130,000 (2003),
with Sunil Saigal

National Science Foundation,
Compute-Intensive Sensor-Based Environment for Computer Vision and AI, \$213,000 (2002),
with Sudeep Sarkar, Dmitry B. Goldgof, and Lawrence O. Hall

University of South Florida, Research and Creative Scholarship Grant Program,
Identification of Brain Tumors without a Contrast Agent, \$4,150 (2001)

PowerLoom Corporation, *Web-Commerce System for Matching Buyers and Sellers*, \$50,000 (2000)

University of South Florida, Research and Creative Scholarship Grant Program,
Automated Selection of Problem-Solving Algorithms, \$7,500 (1999)