

## DEEPAK KUMAR

**Office:** Computer Science Program Bryn  
Mawr College Bryn Mawr, PA 19010 (610)  
526-7485 dkumar@cs.brynmawr.edu  
<http://mainline.brynmawr.edu/~dkumar>

### Education

*Ph.D. in Computer Science,*

State University of New York at Buffalo, 1993.  
Advisor: Prof. Stuart C. Shapiro

*M.S. in Computer Science, State University of  
New York at Buffalo, 1988.*

*M.Sc. (Tech.) in Instrumentation, Birla Institute of Technology  
and Science, Pilani, India, 1983.*

### Research Interests

*Artificial Intelligence:* Intelligent agent architectures, knowledge representation and reasoning, planning and acting, cognitive modeling, computational linguistics, AI education, robotics, learning, evolutionary robotics, hybrid systems, developmental robotics.

*Computer Science Education:* Pedagogy of computer science, curriculum design, gender issues, computer uses in education.

*Programming Paradigms:* Functional, declarative, and object oriented programming; symbolic computation, software methodologies and environments for large systems.

*Programming Languages:* Theory and design of languages: data and control abstraction mechanisms, type inference, integrated programming environments.

## Employment

- **Professor of Computer Science**, Computer Science Program, Bryn Mawr College, (August 2007 – present).
- **Professor and Chair of Computer Science**, Computer Science Program, Bryn Mawr College, (August 2005 – 2007).
- **Associate Professor and Chair of Computer Science**, Computer Science Program, Bryn Mawr College (August 1999--2004).
- **Assistant Professor of Computer Science**, Department of Mathematics & Computer Science, Bryn Mawr College (August 1993--1999).
- **Adjunct Faculty**, Philosophy Department, Bryn Mawr College.
- **Faculty**, Neural and Behavioral Sciences Program, Bryn Mawr College.
- **Lecturer**, Millard Fillmore College, State University of New York at Buffalo (Spring 1986 to Summer 1991, September 1992--May 1993).
- **Teaching Assistant**, Department of Computer Science, SUNY at Buffalo (September 1984 to May 1987, and September 1990 to May 1991, September 1992-present).
- **Research Assistant**, Discussing, Using, and Recognizing Plans, North-East Artificial Intelligence Consortium sponsored project, SUNY at Buffalo (Summer 1987 to May 1990).
- **Lecturer**, National Institute for Information Technology, New Delhi, India (December 1983 to August 1984).
- **Lecturer**, Department of Computer Science, BITS, Pilani, India (Spring 1983).

## Publications

### Journal

1. with Douglas Blank, Lisa Meeden, and Holly Yanco: The Pyro Toolkit for AI and Robotics. *Artificial Intelligence Magazine* 27(1), American Association for Artificial Intelligence, AAAI Press. 2006.
2. with Douglas Blank, Lisa Meeden, and Holly Yanco: Pyro: A Versatile Environment for Robot Programming, *ACM Journal for Educational Resources in Computing (JERIC)*, 4(3) 2004. (Published in 2006)
3. with Douglas Blank, Lisa Meeden, and James Marshall: Bringing up robot: Fundamental Mechanisms for Creating a Self-motivated, Self-organizing Architecture. *International Journal of Cybernetics & Systems*, Taylor & Francis, 36(2), 2005.
4. with Robert Aiken, Giorgio Ingargiola, Judith Wilson, and Rebecca Thomas: Lessons learned: Tips From Conducting An NSF Faculty Enhancement Workshop. In *ACM SIGCSE (Association for Computing Machinery Special Interest Group on Computer Science Education) Bulletin*, Volume 28, Number 4, Pages 3--7, ACM Press, December 1996.
5. The SNePS BDI Architecture. In *Decision Support Systems: The International Journal*, Elsevier Science, Volume 16, Pages 3--19, 1996.

6. with Richard Wyatt: Book Review: Agency in Action (Coval and Campbell). In *Minds and Machines (Journal for Artificial Intelligence, Philosophy, and Cognitive Science)*, Volume 5, Number 2, Kluwer Academic (The Netherlands), May 1995.
- 1 with Stuart C. Shapiro: The OK BDI Architecture. In *IJAIT ---International Journal of Artificial Intelligence Tools*, Volume 3, Number 3, pages 349--366, World Scientific Publishing (Singapore), 1994.
- 2 with Stuart C. Shapiro: Deductive Efficiency, Belief Revision, and Acting. In *JETAI ---Journal of Experimental and Theoretical Artificial Intelligence*, Volume 5, Numbers 2 & 3, 1993, Taylor & Francis (London).

## Editorial/Columns

1. Editor of Book: Learning Computing with Robots. Text for Introductory Computer Science. In development. To appear 2008-09.
- 1 with Joe Turner (editors): Education for the 21st Century - Impact of ICT and Digital Resources, *Journal of Education and Information Technologies*. 12(3) Springer. 2007.
- 2 with A. Joe Turner (editors): Education for the 21st Century - Impact of ICT and Digital Resources, *Proceedings of IFIP 19th World Computer Congress, TC-3, Education*, August 21-24, 2006, Santiago, Chile Springer 2006.
4. Guest Editor of Special Issue of ACM JERIC (Journal of Educational Resources in Computing) on Robotics in Undergraduate Education, 4(2) and 4(3) 2004. Curriculum Descant: Predisciplinary AI, *ACM Intelligence*, Volume 12, Number 1, Spring 2001.
6. Curriculum Descant: How much programming? What kind? *ACM Intelligence*, Volume 11, Number 4, Winter 2000.
7. Curriculum Descant: The AI Education Repository, *ACM Intelligence*, Volume 10, Number 4, Winter 1999.
8. Curriculum Descant: Beyond Introductory AI, *ACM Intelligence*, Volume 10, Number 3, Fall 1999.
9. Curriculum Descant: A New Life for AI Artifacts, *ACM Intelligence*, Volume 10, Number 2, Summer 1999.
10. Curriculum Descant: Pedagogical Dimensions of Game Playing, *ACM Intelligence*, Volume 10, Number 1, Spring 1999.
11. Curriculum Descant: Nilsson's New Synthesis, *ACM SIGART Bulletin*, Volume 9, Numbers 3&4, Page 7, Winter 1998.
12. Curriculum Descant: Teaching About Embedded Agents, *ACM SIGART (Special Interest Group on Artificial Intelligence) Bulletin*, Volume 9, ACM Press, Summer 1998.
13. Curriculum Descant: Inaugural Installment, a column on AI Education in *ACM SIGART Bulletin*, Volume 8, Numbers 1--4, ACM Press, Fall 1997.
14. with Marti Hearst: Guest Editor, *ACM SIGART Bulletin Special Issue on AI Education*, Volume 6, Number 2, ACM Press, April 1995.
15. Member of the Editorial Board, *ACM SIGART Bulletin*, January 1995--present.
16. with Hans Chalupsky: Guest Editor, *JETAI ---Journal of Experimental and Theoretical Artificial Intelligence*, Volume 5, Numbers 2 & 3, Special Issue on Propositional Knowledge Representation, Taylor & Francis (London), 1993.

17. Current Trends in SNePS ---Semantic Network Processing System, Lecture Notes in AI, Volume 437, Springer-Verlag, 1990.

### Conferences/Book Chapters

1 with Tucker Balch, Jay Summet, Doug Blank, Mark Guzdial, Keith O'Hara, Daniel Walker, Monica Sweat, Gaurav Gupta, Stewart Tansley, Jared Jackson, Mansi Gupta, Marwa Nur Muhammad, Shikha Prashad, Natasha Eilbert, Ashley Gavin: Designing Personal Robots for Education: Hardware, Software, and Curriculum. *In IEEE Pervasive Computing*, Volume(7), Number(2), April-June 2008.

2 with Doug Blank, Tucker Balch, Keith O'Hara, Mark Guzdial, Stewart Tansley: Engaging Computing Students with AI and Robotics, *AAAI Spring Symposium on Using AI to Motivate Greater Participation in Computer Science*, Stanford University, Stanford, CA. AAAI Press. March 2008.

3 with Doug Blank and Dianna Xu: Games, Robots, and Robot Games: Complementary Contexts for Introductory Computing Education. *Conference on Game Development in Computer Science Education (GDCSE)*, February-March, 2008.

4. with Doug Blank, James Marshall, Lisa Meeden: Advanced Robotics Projects for Undergraduate Students, *AAAI Spring Symposium on Robots and Robot Venues: Resources for AI Education*, Stanford University, Stanford, CA. AAAI Press. March 2007.

1 with Douglas Blank, Lisa Meeden, and Holly Yanco: Pyro: An Integrated Environment for Robotics Education. *Proceedings of AAAI-2005*, Pittsburg, PA. pp 1718-1789. AAAI Press, 2005.

2 with Douglas Blank, Lisa Meeden, and Holly Yanco: Avoiding the Karel-the-Robot Paradox: A Framework for Making Sophisticated Robotics Accessible. *AAAI Spring Symposium on Accessible Hands-on Artificial Intelligence and Robotics Education*, Stanford University, CA, March 2004, AAAI Press Technical report SS-04-01.

7. with Douglas Blank, Lisa Meeden and Tia Newhall: Using Departmental Surveys to Assess Computing Culture: Quantifying Gender Differences in the Classroom. *In Proceedings of the ITiCSE-2003 Conference*, Thessaloniki, Greece, SIGCSE Bulletin, Volume 35, Number 3, ACM Press, September 2003.

8. with Douglas Blank and Lisa Meeden: Python Robotics: An Environment for Exploring Robotics Beyond LEGOs. *In Proceedings of the ACM SIGCSE-2003 Symposium*, Reno, NV, February 2003. ACM Press.

9. with Lillian Cassel and others: Computing: The shape of an Evolving Discipline. Book chapter in *Informatics Curricula and Teaching Methods*, Edited by Lillian Cassel and Ricardo Reis, Kluwer Academic Press, 2003.

10. with Douglas Blank and Lisa Meeden: Bringing up robot: Fundamental mechanisms for creating a self-motivated, self-organizing architecture. *Workshop on Simulation of Adaptive Behavior (SAB-02)*, Edinburgh, Scotland, Fall 2002.

11. with Douglas Blank: Patterns of Curriculum Design, *IFIP Conference on Informatics Curricula, Teaching Methods, and Best Practices (ICTEM)*, Florianopolis, Brazil, Summer 2002. Reprinted as a book chapter in *Informatics Curricula and*

*Teaching Methods*, Edited by Lillian Cassel and Ricardo Reis, Kluwer Academic Press, 2003.

12. with Lillian Cassel: A State of the Course Report: Computer Organization and Architecture. *International Conference on Technology in Computer Science Education (ITiCSE) 2002*, Arhus, Denmark, June 2002. ACM Press
13. with Douglas Blank and Lisa Meeden: Bringing up robot: A Developmental Approach to Intelligence. *MAICS-2002 (13th Midwest Artificial Intelligence and Cognitive Science Conference)*, Chicago, Illinois, April 2002.
14. with Lillian Cassel and others: Distributed Expertise in Teaching. *International Federation on Information Processing (IFIP) World Conference on Computers & Education (WCCE) 2001*, Copenhagen, Finland, Spring 2002. Published as a book chapter in *Networking the Learner: Computers in Education*, Edited by Deryn Watson and Jane Anderson, Kluwer Academic Press, 2002.
15. with Lillian Cassel and others: Distributed Expertise for Teaching Computer Organization & Architecture. *International Conference on Technology in Computer Science Education (ITiCSE) 2000 Working Group Report*, Helsinki, Finland. ACM SIGCSE Bulletin, Volume 33, Number 2, ACM Press, June 2001.
16. with Lisa Meeden: Trends in Evolutionary Robotics. Book Chapter in *Soft Computing for Intelligent Robotic Systems*, L. C. Jain and T. Fukuda (editors), Series in Studies in Fuzziness and Soft Computing, Physica-Verlag (Germany), 1999.
17. with Lisa Meeden: A Hybrid Connectionist and BDI Architecture for Modeling Embedded Rational Agents. *AAAI (American Association for Artificial Intelligence) Fall Symposium on Cognitive Robotics*, Fall 1998.
18. with Lisa Meeden: Robots in the Undergraduate Curriculum. *Proceedings of the Third Annual CCSC (Consortium for Computing in Small Colleges) Northeastern Conference*, The Journal of Computing in Small Colleges, John G. Meinke (editor), Volume 13, Number 5, May 1998.
19. with Lisa Meeden: A Robot Laboratory for Teaching Artificial Intelligence. *Proceedings of the Twenty-ninth SIGCSE Technical Symposium on Computer Science Education*, ACM SIGCSE Bulletin, D. Joyce (editor), Volume 30, Number 1, Pages 341--344, ACM Press, March 1998.
20. with Richard Wyatt: Undergraduate AI and its Non-Imperative Prerequisite. *ACM SIGART Bulletin Special Issue on AI Education*, Volume 6, Number 2, ACM, April 1995. (This is a revised version of the publication that follows.)
21. with Richard Wyatt: Undergraduate AI and its Non-Imperative Prerequisite. *Proceedings of the AAAI Fall Symposium on Improving the Instruction of Artificial Intelligence*, New Orleans, AAAI Press, November 1994.
22. with Stuart C. Shapiro: The OK BDI Architecture. *Intelligent Systems: Third Golden West International Conference*, (edited by E. A. Yfantis), Volume 1, Pages 307--317, Kluwer Academic, 1995.
23. with Stuart C. Shapiro: Acting in Service of Inference (and *vice versa*). *Proceedings of the Seventh Florida Artificial Intelligence Research Symposium (FLAIRS 94)*, D. Dankel (editor), Florida AI Research Society, May, 1994.
24. with Syed S. Ali and Susan Haller: Towards a Uniform AI Formalism. *Proceedings of HICSS-27, Hawaii International Conference on System Sciences*, ACM/IEEE. January 1994.

25. From Beliefs and Goals to Intentions and Actions: An Amalgamated Model of Inference and Acting. PhD Thesis, Department of Computer Science, State University of New York at Buffalo, UMI Order No. 9420177, 1993.
26. An AI Architecture Based on Message Passing. *Proceedings of The 1993 AAAI Spring Symposium on Innovative Applications of Massively Parallel Architectures*, James Geller (ed.), AAAI Press, March 1993.
27. Rational Engines for BDI Architectures. *Proceedings of The 1993 AAAI Spring Symposium on Foundations of Automatic Planning*, Amy Lansky (ed.), AAAI Press, March 1993.
28. A Unified Model of Acting and Inference. *Proceedings of HICSS-26 Hawaii International Conference on System Sciences*, Jay Nunamaker and Ralph Sprague (eds.), Volume III, pages 483--492, IEEE/ACM, 1993.
29. with Stuart C. Shapiro: Deductive Efficiency + Belief Revision: How they affect an ontology of actions and acting. *Proceedings of the 1992 AAAI Spring Symposium on Propositional Knowledge Representation*, Stanford, CA, March 1992.
30. with Stuart C. Shapiro: Modeling a Rational Cognitive Agent in SNePS. *Proceedings of EPIA91: 5th Portuguese Conference on Artificial Intelligence*, P. Barahona, L. Moniz Pereira, and A. Porto (editors), Lecture Notes in AI, Volume 541, pages 120--134, Springer Verlag, Heidelberg, 1991.
31. with Stuart C. Shapiro: Architecture of an Intelligent Agent in SNePS. *Proceedings of the 1991 AAAI Spring Symposium on Integrated Intelligent Architectures*, SIGART Bulletin, Volume 2, Number 4, pages 89--92, August 1991.
32. with Syed S. Ali, Juergen Haas, and Stuart S. Shapiro: The SNePS Acting System. *Proceedings of the Fifth Annual University at Buffalo Graduate Conference on Computer Science*, Keith E. Bettinger (editor), Department of CS Technical Report, March, 1990.
33. An Integrated Model of Acting and Inference. *Current Trends in SNePS --Semantic Network Processing System*, Deepak Kumar (editor), Lecture Notes in AI, Number 437, Springer-Verlag, 1990.
34. with Zuzana Dobes and Russ Miller: Distributing Data Structures on Medium-Grained Hypercubes. *Proceedings of the 1989 Hypercubes Conference*, 1989.
35. with Syed S. Ali and Stuart C. Shapiro: A Propositional Network Approach to Plans and Plan Recognition. *Proceedings of the AAAI88 Workshop on Plan Recognition*, AAAI88, St. Paul, MN, 1988.
36. with Syed S. Ali and Stuart C. Shapiro: Discussing, Using, and Recognizing Plans in SNePS: SNACTOR-A Preliminary Report. *Modern Trends in Information Technology--Proceedings of the Seventh Biennial Convention of South East Asia Regional Computer Confederation*, P. V. S. Rao and P. Sadanandan (editors), Tata McGraw Hill, New Delhi, India, 1988.
37. with Syed S. Ali and Stuart C. Shapiro: Discussing, Using, and Recognizing Plans in SNePS: SNACTOR-A Preliminary Report. *Proceedings of the Third Annual University at Buffalo Graduate Conference on Computer Science*, Scott Campbell and Paul Palumbo (editors), Dept of CS Technical Report, 1988.
38. with William J. Rapaport and Sargur Srihari: Knowledge Representation in SNePS and Sanskrit. Invited Talk at the *First International Conference on Knowledge Representation and Sanskrit*, 1987. Also Dept. of CS Technical Report, SUNY at

Buffalo. Also NAIC Tech Report, 1988. Also part of RADC-TR-88-324, Vol II (of nine), Part B.

39. with Bharat L. Madhyani: The SARAL Programming Language: Programming in Devnagiri Script. *Proceedings of the Second All India Academic Week*, BITS, Pilani, 1983.

40. BTEX - A Flexible, Portable, and Reconfigurable Word Processor. *Proceedings of the 18th Annual Convention of the Computer Society of India*, 1983. Won the Best Paper Prize and Gold Medal for the Student Paper Contest.

## Conference Reports

1 Introduction to the Minitrack on Emerging Paradigms for Intelligent Systems, Twenty-Seventh Hawaii International Conference on System Sciences, Volume III: Information Systems: Decision Support and Knowledge-Based Systems, Jay Nunamaker Jr. and Ralph Sprague, Jr. (editors), IEEE Computer Society Press, 1994.

2 with Hans Chalupsky and Stuart C. Shapiro: Report on the 1992 AAAI Spring Symposium on Propositional Knowledge Representation}. *AI Magazine*, Fall 1992.

3 with Ganesh Mani (University of Wisconsin): Report on the 1991 AAAI Spring Symposium on Integrated Intelligent Architectures, *IEEE Expert*, December 1991.

## World Wide Web Materials

1 Myro Curricular materials

([www.cbl.edu/~myro/](http://www.cbl.edu/~myro/) web) Pyro Documentation

(<http://emergent.brynmawr.edu/wiki/index.cgi/PyroTutorial>), 2002 to present.

3. with Lisa Meeden: A Robot Laboratory for Teaching Artificial Intelligence: Resource Kit. ACM SIGCSE Computer Science Education Links (<http://www.acm.org/sigcse>). Follow links to Artificial Intelligence. 1998. Also available at <http://mainline.brynmawr.edu/Robots/ResourceKit>. Also in the AAAI Educational Repository, Robotics Resources (see below).

4. Knowledge Representation: Tutorial. AAAI Educational Repository (<http://www.aaai.org>). Follow links to Resources, to AAAI Educational Repository, to Knowledge Representation, 1996.

5. The following materials at the NSF Sponsored Teaching Undergraduate AI Workshop lectures

(<http://www.cis.temple.edu/ugai/ugai97.html>):

- o with Lisa Meeden: Using Robots in an AI Course.
- o Knowledge Representation.
- o AI Planning.

1 Learning Java Server Pages: A Tutorial

(<http://mainline.brynmawr.edu/~dkumar/JSP>)

2 Additional learning materials on three WWW sites: Blackcat ([blackcat.brynmawr.edu](http://blackcat.brynmawr.edu)), Serendip ([serendip.brynmawr.edu](http://serendip.brynmawr.edu)), and Mainline ([mainline.brynmawr.edu](http://mainline.brynmawr.edu)).

## Technical Reports

- 1 with Syed S. Ali and Hans Chalupsky (Editors): *Proceedings of the 1990 SNePS Workshop*. Department of Computer Science Technical Report, SUNY at Buffalo, 1991.
- 2 (Editor) *Proceedings of the First Annual SNePS Workshop*, Department of Computer Science Technical Report, SUNY at Buffalo, December, 1989.
- 3 with Scott Anderson, Syed S. Ali, David Forster, James Pustejovsky, Stuart C. Shapiro, Penelope Sibun and Beverly Woolf: *Discussing, Using, and Recognizing Plans*. Final Technical Report, RADC-TR-90-404, Vol II, 1989, RADC Griffiss Air Force Base, NY, December 1990.
- 4 with Scott Anderson, Syed S. Ali, David Forster, Stuart C. Shapiro, Penelope Sibun and Beverly Woolf: *Discussing, Using, and Recognizing Plans*. NAIC Annual Report 1988, RADC-TR-89, Volume II, RADC Griffiss Air Force Base, NY.
- 5 with Scott Anderson, Syed S. Ali, David Forster, Stuart C. Shapiro, Penelope Sibun and Beverly Woolf: *Discussing, Using, and Recognizing Plans*. NAIC Annual Report 1987, RADC-TR-88-324, Vol II(of nine) Part B, RADC Griffiss Air Force Base, NY.
- 6 A Friendly User Interface for Multi-variable, Non-linear Regression Analysis. National Council for Applied Economic Research Technical Report, New Delhi, India, 1983.
- 7 Programming in Devnagiri using SARAL. In A. P. Mathur (ed) *Final Report of the Devnagiri Project*, Dept. of CS Technical Report, BITS, Pilani, 1983.
- 8 Wordprocessing in Devnagiri. In A. P. Mathur (ed) *Final Report of the Devnagiri Project*, Dept. of CS Technical Report, BITS, Pilani, 1983.
- 9 Extending the Sirpur Paper Mills Payroll Application Package. BITS Practice School-I Technical Report, BITS, Pilani, 1981.

## Instructional Materials

- 1 Learning Computing with Robots (Textbook for CS1)
- 2 Pyro Modules
- 3 Getting Wired with Java: A Laboratory Manual for CS 110
- 4 Laboratory Manual for the AI Robot Laboratory
- 5 Laboratory Manual for CS 110
- 6 Hello, Ada! A Laboratory-Based Introduction to Ada.

## Professional Activities

**Affiliations:** AAAI (member for life), ACM, SIGART, SIGPLAN, SIGCSE, SIGCAS.

## Conference/Workshop organization

- Organizing Committee Member, Pyro Workshop for Faculty (2003, 2005), Bryn Mawr College, UMASS-Lowell, and Swarthmore College.
- Member, Program Committee, AAAI Spring Symposium Series Symposium on Developmental Robotics, Stanford, CA, 2005.
- Member, Program Committee, FLAIRS-2004, and FLAIRS-2005 Track on Artificial Intelligence Education, Florida.
- Member of Organizing Committee, Pyro Workshop 2003 (U. Mass.-Lowell, MA) and 2004 (Bryn Mawr College, PA).
- Member, Program Committee, ICCS-2002 (International Conference on Conceptual Structures), Bulgaria.
- Member, Program Committee of AAAI Workshop on Effective Interactive Teaching Resources, IJCAI 2001 (Seattle, WA) and AAAI-2002 (Edmonton, Canada).
- Member, Program Committee of ACM SIGCSE 2000, 2001, and 2002 (Special Interest Group on Computer Science Education)
- Member, Program Committee, AAAI 1999 (Orlando, FL)..
- Lecturer and Coordinator of the two-week 1998 Chaos and Computers Summer Institute for Philadelphia school teachers, sponsored by HHMI, June 1998.
- Lecturer and Coordinator of the two-week 1997 Chaos and Computers Summer Institute for Philadelphia school teachers, sponsored by HHMI, June 1997.
- Member, Program Committee of Principles of Knowledge Representation and Reasoning: Fifth International Conference (KR 1996).
- Coordinator of a Special Track on AI Education, Florida AI Research Symposium, 1996.
- Co-Coordinator of a Special Track on Emerging Paradigms for Intelligent Systems, HICSS-29, 1996.
- Coordinator of a Special Track on Emerging Paradigms for Intelligent Systems, HICSS-28, 1995.
- Coordinator of a Special Track on Emerging Paradigms for Intelligent Systems, HICSS-27, 1994.
- Member of the organizing committee of the 1992 AAAI Spring Symposium on Propositional
- Knowledge Representation, Stanford University, CA, March 1992.
- Chair of the 1990 SNePS Workshop, Buffalo, NY, October 1990.
- Chair of the 1989 SNePS Workshop, Buffalo, NY, November 1989.

**Curriculum Development (at Bryn Mawr College):** Responsible for creating and coordinating a new undergraduate Computer Science program in conjunction with Haverford College (1993--present). Several new courses and methodologies have been developed and incorporated into the curriculum/courses. Some specifics include:

- with Douglas Blank: Design and creation of a new *Minor in Computational Methods*.
- Creation of a new course, *Algorithms: Design & Practice*, Spring 2004.
- Creation of a new course (with Panama Geer) called, *Emergence*, Spring 2003.

- Creation of a new College Seminar titled, *Weaving the Web*, Spring 2000, and Fall 2002.
- Creation of a new course titled, *Evolutionary Robotics* with Lisa Meeden of Computer Science (Swarthmore College), Spring 1999.
- Using robots to teach introductory computer science, Spring 1999.
- Using a graphical approach to teaching introductory computer science.
- Introduction of several new courses, technologies, and programming languages in the computer science curriculum.
- Introducing the use of robots in the AI course.
- Creation of a multi-disciplinary course titled, *Biologically Inspired Computational Models of Learning* with Paul Grobstein of Biology, Lisa Meeden of Computer Science (Swarthmore College), and Robert Dufour of Psychology (Swarthmore College).

## Referee

- External reviewer of programs and tenure and promotion reviews of computer science faculty at Bard College, Colby College, Drexel University, Franklin & Marshall College, Hamilton College, Haverford College, Lafayette College, Lehigh University, Macalester College, Swarthmore College, West Chester University, Vassar College, Villanova University.
- Panel member for review of grant proposals to NSF's flagship SLC (Science of Learning Centers) Program: Catalyst as well as full center proposals. 2003.
- Panel Member for reviews of grant proposals to NSF's DUE CCLI Program, 2003, 2004.
- Panel Chair for reviews of grant proposals to NSF's DUE CCLI Program, 2002.
- FLAIRS-2000, 2001, 2002, 2003, 2004, 2005 (Florida AI Research Symposium).
- ACM SIGCSE 2000--present
- ACM ITiCSE 2004--present
- AAI 1999
- The Computer Journal (1998).
- Panel member for reviews of grant proposals to NSF's ILI Program, 1998.
- CCSC-1998 (Consortium for Computing in Small Colleges).
- FLAIRS-1997 (Florida AI Research Symposium).
- TAI-1997 (International Conference on Tools for AI).
- SIGCSE-1995 \& 1996 \& 1997---ACM Special Interest Group on Computer Science Education.
- ICDAR-1995 (International Conference on Document Analysis and Recognition).
- AAI FSS-94 ---AAAI Fall Symposium on Knowledge Representation for Natural Language Processing in Implemented Systems.
- JETAI ---Journal of Experimental and Theoretical Artificial Intelligence.
- HICSS ---Hawaii International Conference on System Sciences.
- International Conference on Parallel Processing (1988--present).
- Indian Conference on Knowledge-Based Computer Systems (1990).
- IEEE Transactions on Parallel and Distributed Systems (1991).
- Reviewer for the following publishers:

Addison Wesley Publishing Company Morgan Kaufmann Publishers  
Benjamin Cummings Publishing Prentice Hall, Inc.  
Company DC Heath and Company Wadsworth, Inc. John Wiley  
and Sons W. W. Norton and Company McGraw Hill Publishing  
Company

## Other Research Activities

- External Program Evaluator for the European Commission (2005-present)
- Member of IPRE (Institute for Personal Robots in Education – [www.roboteducation.org](http://www.roboteducation.org))
- **Organizer** of the Computing History Month (April 2003) at Bryn Mawr College. Activities included invited talks by George Dyson (on John von Neumann), USA premier of the documentary, *To Dream Tomorrow: A Portrait of Ada Lovelace* followed by a Q&A session with the director/producers, and screening of the film, *Breaking the Code* (Alan Turing).
- **Member** of the Emergence research Group, 2002 to present.
- **Member** of the Developmental Robotics Research Group (<http://emergent.brynmawr.edu/wiki/index.cgi/DevelopmentalRobotics>), 2001 to present.
- **Rapporteur** for special invited sessions at ITiCSE 2001 (Helsinki, Finland), IFIP WCCE 2001 (Copenhagen, Denmark), and IFIP ICTEM (Florianopolis, Brazil).
- **Member of the Steering Committee**, Center for Science in Society, Bryn Mawr College.
- **Member** of the Serendip Team (<http://serendip.brynmawr.edu>), 1994 to present.
- **Member** of the SNePS Research Group (SNeRG), Department of Computer Science, SUNY at Buffalo, January 1987 to present.
- **Member** of the Computer Aided Instruction Research Cell of the National Institute for Information Technology, New Delhi, India, December 1983 to July 1984.
- **Research Trainee** at the National Council for Applied Economic Research, for a 6-month practice school, Summer 1983 to December 1984.
- **Member** of the team responsible for developing India's first Devnagiri (and later multi-lingual) computer at the Department of Computer Science, BITS, Pilani, Summer 1981 to Summer 1983.
- **Consultant** to the Research and Development group of DCM Data Products, New Delhi, India, Summer 1979 to December 1983.

## Grants

1. Bryn Mawr College Faculty Research Grant for *A Mobile Workstation for Robotics Research & Education*, 2007-08 (\$4200).
2. Institute for Personal Robots in Education. Grant from Microsoft Research Corp. with Doug Blank (Bryn Mawr College), Tucker Balch (GeorgiaTech), Mark

- Guzdial (GeorgiaTech). Development of a personal robot for introductory computer science education, hardware software, and curricular materials. July 2006-June 2009 (\$1.0 million).
3. Bryn Mawr College Faculty Research Grant for *Robotics Research & Education*, 2005-2006 (\$3500).
  4. Bryn Mawr College Faculty Development Grant for developing the course on Computational Linguistics, 2005-06 (\$2000).
  5. Howard Hughes Medical Institute Institutional Grant (P. Brodfeuhner, PI). Support includes research on Computational Modeling, the development of an interdisciplinary Minor in Computational Methods, and new courses in computer science. June 2004 to 2008 (\$1.2 million).
  6. NSF CCLI Grant (with University of Massachusetts (Lowell), Swarthmore College, and Stanford University) for *Beyond LEGOs: Hardware, Software, and Curriculum for the Next Generation Robot Laboratory*. Douglas Blank Co-Pi. 2003-2005 (\$400,000).
  7. Tri-College Mellon Fellow for 2002-03 on a collaborative project: *Developmental Robotics*, with Douglas Blank (Bryn Mawr College) and Lisa Meeden (Swarthmore College).
  8. Bryn Mawr College Faculty Research Grant for *Robotics Research & Education*, 2001-2002 (\$3500).
  9. NSF CCLI Grant (awarded to The George Washington University) for development of an Electronic Commerce Curriculum. 1999-2001. Supported two month summer salary in 2001 (\$18000).
  10. NSF CCLI Grant (awarded to Villanova University) for Distributed Expertise in Teaching Computer Organization and Architecture) 1998-2001. Summer salary for two summers, travel to several conferences.
  11. Mellon Foundation Grant for "Evolutionary Robotics". Activities supported included summer stipend for course development, course materials, and course release. AY 1998-99.
  12. Travel Grant from ACM SIGCSE/NSF for participating in NSF sponsored activities at ACM SIGCSE-1998, Atlanta, GA, February 1998.
  13. Mellon Foundation Grant for "Biologically Inspired Computational Models of Learning". Activities supported included course release, summer stipend for course development, and funds for attending a summer workshop on Robotics at MIT. AY 1996-97.
  14. Howard Hughes Medical Institute Institutional Grant (P. Grobstein, PI) for *Undergraduate Biological Sciences Education Program*. Support includes research on Computational Modeling, the development of an Advanced Computational Laboratory, and summer outreach activities in Computational Modeling for Philadelphia school teachers. June 1996 to 2000 (\$1,000,000).
  15. Ecole Navale, France, grant for supervising two Navy midshipmen for summer research on "Learning in Embedded Systems". Covered costs for travel and expenses for students and supervisor. Summer 1997.
  16. NSF Instructor for the 1997 Faculty Enhancement Summer School on Teaching Undergraduate Artificial Intelligence courses, June 1997 (\$2,500).

17. NSF Instrumentation and Laboratory Improvement (ILI-IP) grant for "A Robot Based Artificial Intelligence Laboratory". Collaborative grant with Swarthmore College, June 1996 to June 1998, (\$58,000)
18. Bryn Mawr College Faculty Research Grant on "Robotics Research: A Pilot Study". AY 1996-97 (\$2,900).
19. NSF Instructor for the 1996 Faculty Enhancement Summer School on Teaching Undergraduate Artificial Intelligence courses, June 1996 (\$2,500).
20. Summer Faculty Enhancement Grant to attend the 1995 Summer School on Ada in the Computer Science Curriculum, at Clemson University, Clemson, SC., June 1995.
21. NSF Instructor for the 1995 Faculty Enhancement Summer School on Teaching Undergraduate Artificial Intelligence courses, June 1995 (\$3,000).
22. NSF Travel Award (through the AI Lab at MIT) for presenting a paper at the AAAI Fall Symposium on Improving the Instruction of Artificial Intelligence (\$700.00).
23. Sun Microsystems for approximately \$12,000.00 worth of software for instructional use in the computer science curriculum.
24. NSF Summer Faculty Enhancement Grant to attend the 1994 Summer School on Teaching Undergraduate Artificial Intelligence courses, June 1994.

### Invited Talks

- *Promising Practices in CS1* (Panelist), Grace Hopper Celebration of Women in Computing. Orlando, FL. October 2007.
- *Rethinking Computer Science Education*, Computer Science Colloquium at the New Jersey Institute of Technology. Newark, NJ. October 2007.
- *New Approaches to CS1* (Panelist), Microsoft Faculty Summit, Seattle, WA. July 2007.
- *IPRE-One Year On*: with Stewart Tansley (Microsoft Research) & Tucker Balch (Georgia Tech), Microsoft Faculty Summit, Seattle, WA. July 2007.
- *Rethinking Computer Science Education*, Invited talk at the University of Buffalo Department of Computer Science's 40<sup>th</sup> Anniversary Symposium. Buffalo, NY. April 2007.
- Presentation on IPRE (Institute for Personal Robots in Education) at ACM SIGCSE 2007 (with Stewart Tansley, Tucker Balch, Doug Blank, and Mark Guzdial). Cincinnati, OH. March 2007.
- *The New Face of Computing Education* (Panelist), at The New Face of Computing Symposium, Georgia Institute of Technology, Atlanta, GA. March 2007. Non-traditional projects in the AI course (panelist), with Amruth Kumar (Ramapo College) and Ingrid Rissell (University of Connecticut), ACM SIGCSE 2006. March 2006.
- *Robotics in the Undergraduate Curriculum*, Invited Panel at the AAAI Spring Symposium on Accessible, Hands-on Artificial Intelligence and Robotics Education. Stanford University, CA. Spring 2004.
- *Writing in the Computer Science Curriculum*, Invited Panel at the ACM SIGCSE 2004 Conference. Norfolk, VA. 2004.

- *Patterns of Curriculum Design*, Colloquium at Villanova University, Fall 2002.
- *Encouraging more Women into Computer Science*, at PKAL Summer Institute 2002, Williamsburg, VA, June 2002.
- *Using Active Learning with Digital Media*. At PKAL Summer Institute 2002, Williamsburg, VA, June 2002.
- *Intelligent Robotics: From BDI Architectures to a Developmental Approach*, Bryn Mawr College Faculty Research Talk, Spring 2002.
- *Rethinking Engineering Education*, Panel at Mindfest: A Gathering of Playful Inventors, hosted by MIT Media Lab, Boston, MA, October 1999.
- *Robots in the Undergraduate Curriculum*, Department of Computer Science Colloquium, University of Wisconsin-Parkside, Kenosha, WI, May 1998. with Lisa Meeden: *A Robot Laboratory for Teaching Artificial Intelligence*, Demonstration for National Science Foundation at ACM SIGCSE-1998, Atlanta, GA, February, 1998.
- *Computers: Artificial Intelligence*, HHMI Summer Institute on Brain and Behavior, Summer 1997.
- *Computers: The Internet and WWW*, HHMI Summer Institute on Brain and Behavior, Summer 1997.
- *Computers: Artificial Intelligence*, HHMI Summer Institute on Brain and Behavior, Summer 1996.
- *The Evolution of an Embedded Agent Architecture*, Swarthmore College, March 1996.
- *Acting In Service of Inference (and vice versa)*, University of Southern California/Information Sciences Institute, Marina del Rey, CA, February 1996.
- with Ann Dixon and Paul Grobstein, *The World Wide Web, Serendip, and the emerging mind/brain*, Parents Day Weekend, Bryn Mawr College, Bryn Mawr, PA., October 1995.
- *Acting In Service of Inference (and vice versa)*, Department of Computer Science Colloquium Series, Villanova University, Villanova, PA., September 1995. *Emerging Paradigms for Intelligent Systems*, HHMI Summer Lectures Series, Bryn Mawr College, Bryn Mawr, PA., June 1995.
- with Ann Dixon and Paul Grobstein, *The World Wide Web and Serendip*, Bryn Mawr College, Bryn Mawr, PA., Spring 1995.
- *Emerging Paradigms for Intelligent Systems*, Parents Day Weekend, Bryn Mawr College, Bryn Mawr, PA., October 1994.
- *The SNePS BDI Architecture*, at CIS Department, University of Pennsylvania, Philadelphia, February 1994.
- *Rational Agent Architectures*, at Paramax Systems, Paoli, PA, October 1993.