

Lisa Meeden  
Full Professor  
Computer Science Department  
Swarthmore College  
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## EDUCATION

- Ph.D.** Computer Science, Minor: Cognitive Science, 1994  
Indiana University, Bloomington, Indiana  
Dissertation: *Towards Planning: Incremental Investigations into Adaptive Robot Control*
- M.S.** Computer Science 1990  
Indiana University, Bloomington, Indiana
- B.A.** Mathematics 1985  
Grinnell College, Grinnell, Iowa

## PROFESSIONAL EXPERIENCE

- Full Professor** 2008–present  
Computer Science Department, Swarthmore College
- Associate Professor** 2000–2008  
Computer Science Department, Swarthmore College
- Assistant Professor** 1994–2000  
Computer Science Department, Swarthmore College
- Chair, Cognitive Science Program** 2005–present  
Swarthmore College
- Chair, Computer Science Department** 1999–2001, 2003–2004  
Swarthmore College
- Visiting Researcher** Spring 1997  
Navy Center for Applied Research in Artificial Intelligence, Washington, D.C.

## RESEARCH PUBLICATIONS (student co-authors indicated with an \*)

### Journals

1. D. Blank, J. Marshall, & L. Meeden (2007). Reply to Dialog: How can we assess open-ended development? entitled What is it like to be a developmental robot? *The Newsletter of the Autonomous Mental Development Technical Committee*, Vol. 4, No. 1.
2. L. Meeden and D. Blank (2006). Editorial: Introduction to developmental robotics. *Connection Science*, Vol. 18, No. 2 (pp. 93–96).
3. D. Blank and L. Meeden (2005). Reports on the 2005 AAAI Spring Symposium Series: Developmental Robotics. *AI Magazine*, Volume 26, Number 2.
4. D. Blank, D. Kumar, L. Meeden, & J. Marshall (2005). Bringing up robot: Fundamental mechanisms for creating a self-motivated, self-organizing architecture. *Cybernetics and Systems*, Volume 36, Number 2.

5. B. Maxwell, L. Meeden, N. Addo\*, P. Dickson\*, N. Fairfield\*, N. Johnson\*, E. Jones\*, S. Kim\*, P. Malla\*, M. Murphy\*, B. Rutter\*, & E. Silk\* (2001) REAPER: A Reflexive Architecture for Perceptive Agents. *AI Magazine*, Vol. 22, No. 1.
6. L. Meeden, A. Schultz, T. Balch, R. Bhargava, K. Zita Haigh, M. Bohlen, C. Stein, & D. Miller (2000). The AAAI 1999 Mobile Robot Competitions and Exhibitions. *AI Magazine*, Vol. 21, No. 3, (pp. 69-78).
7. H. Hexmoor, L. Meeden, & R. Murphy (1997). Robot Learning: A New Subfield?, *AI Magazine*, Vol. 18, No. 4 (pp. 149-152).
8. H. Hexmoor & L. Meeden (1997). Learning in Autonomous Robots: A Summary of the 1996 Robolearn Workshop. *Knowledge Engineering Review*, Vol. 11, No. 4 (pp. 361-364).
9. L. Meeden (1996). An incremental approach to developing intelligent neural network controllers for robots. *IEEE Journal on Systems, Man, and Cybernetics-Part B*, Vol. 26, No. 3 (pp. 474-485).

### Book Chapters

1. L. Meeden & D. Kumar (1998). Trends in Evolutionary Robotics. In *Soft Computing for Intelligent Robotic Systems*, edited by L.C. Jain & T. Fukuda, Physica-Verlag, New York, NY (pp. 215-233).
2. D. Blank, L. Meeden, & J. Marshall (1992). Exploring the Symbolic/Subsymbolic Continuum: A Case Study of RAAM. In *The Symbolic and Connectionist Paradigms: Closing the gap*, J. Dinsmore (editor), pp. 113-148. Lawrence Erlbaum Associates, Hillsdale, NJ.

### Encyclopedia Entries

1. L. Meeden (2002). Entry on Artificial Intelligence: Robotics. In *Von Nostrand's Scientific Encyclopedia*, Ninth Edition, edited by Glenn D. Considine, John Wiley and Sons, New York, NY.

### Conference Proceedings

1. J. Marshall, D. Blank, & L. Meeden (2004). An Emergent Framework for Self-Motivation in Developmental Robotics. *Proceedings of the The Third International Conference on Development and Learning*.
2. D. Blank, D. Kumar, & L. Meeden (2002). Bringing up robot: Fundamental mechanisms for creating a self-motivated, self-organizing architecture. Proceedings of the Workshop *On Growing up Artifacts that Live* at the Conference on Simulation and Adaptive Behavior.
3. D. Blank, D. Kumar, & L. Meeden (2002). A Developmental Approach to Intelligence. *Proceedings of the Thirteenth Annual Midwest Artificial Intelligence and Cognitive Science Society Conference*, S. Conlon (editor).
4. M. Potter, L. Meeden, & A. Schultz (2001). Heterogeneity in the co-evolved behaviors of mobile robots: The emergence of specialists. *Proceedings of the Seventeenth International Joint Conference on Artificial Intelligence*, Morgan Kaufmann.
5. L. Meeden, J. Wales\*, & J. Wells\* (2000). Nature versus Nurture in Evolutionary Computation: Balancing the Roles of the Training Environment and the Fitness Function in Producing Behavior. *GECCO Late Breaking Papers*.
6. L. Meeden (1998). Bridging the gap between simulations and reality with improved models of sensor noise. In *Genetic Programming 1998: Proceedings of the Third Annual Conference*, J. Koza et. al. editors (pp. 824-831). Morgan Kaufmann, San Francisco, CA.

7. D. Bruemmer\*, R. Dickson\*, J. Dilatush\*, D. Lewis\*, H. Mateyak\*, M. Mirarchi\*, M. Morton\*, J. Tracy\*, A. Vorobiev\*, & L. Meeden (1997). A Situated Vacuuming Robot, *Proceedings of the American Association of Artificial Intelligence 1997 Conference* (pp.783–784). MIT Press, Cambridge, MA.
8. L. Meeden, G. McGraw, & D. Blank (1993). Emergence of control and planning in an autonomous vehicle. In the Proceedings of the *Fifteenth Annual Meeting of the Cognitive Science Society* (pp. 735–740). Lawrence Erlbaum Associates, Hillsdale, NJ.

## Posters

1. M. Fiedler\*, E. Moses\*, J. Stober\*, & L. Meeden (2004). Developmental Robotics: Dynamic Sampling of Perceptions with Governed Neural Networks. Presented at CCSCNE in Schenectady, NY.

## COMPUTER SCIENCE EDUCATION PUBLICATIONS

### Journals

1. D. Blank, D. Kumar, L. Meeden & H. Yanco (2006). The Pyro toolkit for AI and robotics. *AI Magazine*, Vol. 27, No. 1 (pp.39–50).
2. D. Blank, D. Kumar, L. Meeden & H. Yanco (2004). Pyro: A Python-based Versatile Programming Environment for Teaching Robotics. *ACM Journal on Educational Resources in Computing*, Vol. 3, No. 4.
3. B. Maxwell & L. Meeden (2001). Integrating Robotics Research with Undergraduate Education. *IEEE Intelligent Systems*, Vol. 15, No. 6.
4. D. Kumar & L. Meeden (1998). Robots in the Undergraduate Curriculum. *The Journal of Computing in Small Colleges*, Vol. 13, No. 5 (pp. 105–112).
5. L. Meeden & D. Blank (1998). Robot Competitions as Class Projects. *SIGART Bulletin*, Vol. 9, No. 2 (pp. 5).

### Conference Proceedings

1. D. Blank, D. Kumar, J. Marshall & L. Meeden (2007). Advanced Robotics Projects for Undergraduate Students. *Proceedings of the AAAI Spring Symposium Workshop on Robots and Robot Venues: Resources for AI Education*.
2. Blank, D., Yanco, H., Kumar, D., & Meeden, L. (2004). Avoiding the Karel-the-Robot Paradox: A framework for making sophisticated robotics accessible. *Proceedings of the AAAI Spring Symposium Workshop on Accessible Hands-On Artificial Intelligence and Robotics Education*.
3. Blank, D., Meeden, L., & Kumar, D. (2003). Python robotics: An Environment for Exploring Robotics Beyond LEGOs. *Proceedings of the Thirty-Fourth SIGCSE Technical Symposium on Computer Science Education*, ACM Press, New York, NY.
4. Meeden, L., Newhall, T., Blank, D., & Kumar, D. (2003). Using departmental surveys to assess computing culture: Recognizing and addressing gender differences. *Proceedings of the conference Innovation and Technology in Computer Science Education 2003*.
5. T. Newhall & L. Meeden (2002) A comprehensive project for CS2: Combining key data structures and algorithms into an integrated web browser and search engine. *Proceedings of the Thirty-Third SIGCSE Technical Symposium on Computer Science Education*, ACM Press, New York, NY.
6. D. Kumar & L. Meeden (1998). A Robot Laboratory for Teaching Artificial Intelligence. *Proceedings of the Twenty-Ninth SIGCSE Technical Symposium on Computer Science Education* (pp. 341–344). ACM Press, New York, NY.

7. L. Meeden (1996). Using Robotics as an Introduction to Computer Science. In J.H. Stewman (Ed.), *Proceedings of the Ninth Florida Artificial Intelligence Research Symposium* (pp. 473–477). Florida AI Research Society, St. Petersburg, FL.

## INVITED LECTURES

Overview of the emerging field of developmental robotics. Panel on *Can the development on intelligent robots be benchmarked? Concepts and issues from epigenetic robotics* at the conference *Performance Metrics for Intelligent Systems*, Washington, DC, August, 2007.

Bringing up robot: The development of self-motivated control, Union College, January, 2005.

Creating intrinsic value systems for reinforcement learning in developmental robotics, Rutgers University, December, 2004.

Self-motivated, task-independent reinforcement learning for robots. *AAAI Fall Symposium on Real-Life Reinforcement Learning*, Washington D.C., October, 2004.

Heterogeneity in the behaviors of co-evolved mobile robots: The emergence of specialists. *Computer Science Colloquium*, Claremont Colleges, December, 2001.

Evolving control strategies for a team of cooperating agents. *Computer Science Colloquium*, University of Dayton, Dayton, Ohio, November, 2000.

Trends in evolutionary robotics. *Midwest Artificial Intelligence and Cognitive Science Conference*, Fayetteville, Arkansas, April, 2000.

Adaptive robots: Learning from scratch vs Learning with existing knowledge. *Inquiry-Based Learning in Humans and Machines Series*, Hampshire College, December, 1997.

Learning to Plan with an Adaptive Robot. University of Hawaii at Hilo, November, 1997.

Integrating reaction and deliberation: Using learned strategies to bootstrap planning. *ACM Lecture Series*, Moravian College, February, 1997.

An incremental approach to developing intelligent neural network controllers for robots. *Naval Research Laboratory, Machine Learning Group*, Washington D.C., August, 1996.

Integrating reaction and deliberation: Using learned strategies to bootstrap planning. *Villanova University Computer Science Colloquium Series*, Villanova University, October, 1995.

A connectionist approach to building plans from the ground up. *Spring Colloquium Series*, Computer Science Department, Indiana University, March, 1995.

## GRANTS AND AWARDS

NSF CCLI Education Materials Development and National Dissemination Grant. Principle Investigators: Douglas S. Blank, Kurt G. Konolige, Deepak Kumar, Lisa A. Meeden, and Holly Yanco. Beyond LEGOs: Hardware, Software and Curriculum for the Next Generation Robot Laboratory, \$400,194. 2003-2006.

NEEDS 2005 Premier Award for Excellence in Engineering Education Courseware. Awarded to the Pyro software, which was developed through the support of NSF by Douglas S. Blank, Kurt G. Konolige, Deepak Kumar, Lisa A. Meeden, and Holly Yanco.

NSF ILI Grant. Principle Investigators: Deepak Kumar and Lisa Meeden. A robot-based laboratory for teaching Artificial Intelligence, \$57,758. 1996-1998.

Mellon Trico Faculty Forum Award, \$4,000. April 2002. Funds to create a *Developmental Robotics* course to be taught at both Bryn Mawr and Swarthmore in Spring 2003. Submitted with Douglas Blank and Deepak Kumar of Bryn Mawr College.

James A. Michener Faculty Fellowship, for second semester sabbatical support, 2004.

Eugene M. Lang Faculty Fellowship, for second semester sabbatical support, 1998.

Lindback Award for excellence in teaching, \$4,000. June 2001.

First Place in the *Hors d'oeuvres Anyone?* and in the *Urban Search and Rescue* robot competitions held at AAI, July 2000. Co-led (with Bruce Maxwell) a team of ten undergraduate students in creating the robot entries Alfredo, Santino, and Mario. Our team was also awarded the *Best Integrative Effort*.

First Place in the *Hors d'oeuvres Anyone?* robot competition held at AAI, July 1999. Co-led (with Bruce Maxwell) a team of seven undergraduate students in creating the robot entry Alfred. Our team was also awarded the *Best Integrative Effort*.

## PROFESSIONAL ACTIVITIES

### Workshop Co-Chair:

*Developmental Robotics*: Research workshop in the *AAAI Spring Symposium Series*, Stanford University, March 2005.

*Pyro*: Teaching workshop on integrating robotics into the computer science curriculum, Swarthmore College, August 2005; Bryn Mawr College, August 2004; and University of Massachusetts at Lowell, August 2003.

*Robolearn*: Research workshop on learning for autonomous robots, Key West, FL, May 1996.

**Journal Co-Editor:** Special Issue of *Connection Science* on Developmental Robotics, Vol. 18, No. 2, 2006.

**News Editor:** For the quarterly magazine *Intelligence: New Visions of AI in Practice*, 1999.

**Conference Presenter:** SIGCSE 2001 and 2002, panelist for a special session on *The Nuts and Bolts of Academic Careers*; GECCO 2000; AAI 1998, *Robot Competition Workshop*; GP 1998; CCSCNE 1998; AAI Spring Symposium 1998, workshop on *Integrating Robotics Research*; SIGCSE 1998.

**Program Committee:** SICCS 2009 Birds of a Feather Co-Chair, International Symposium on Intelligent Automation and Control 2008, SIGCSE 2008 Panels and Special Sessions Chair, FLAIRS Conference, Special track on Artificial Intelligence Education, 2004 and 2005; GECCO Conference, Undergraduate Student Workshop, 2003; SIGCSE Workshop Chair, 2001; Special Issue of *Autonomous Robots Journal*, entitled *Learning in Autonomous Robots*, 1998; Genetic and Evolutionary Computation Conference, 1999; IEEE International Symposium on Computational Intelligence in Robotics and Automation, 1999.

**External Departmental Review:** Grinnell College Computer Science, 2008; Bowdoin College Computer Science, 2002 (Chair).

**Robot Competition Chair:** AAI Conference, 1999 and 2000.

**Robot Competition Rules Committee:** AAI Conference, 1998.

**Instructor:** NSF Summer Faculty Enhancement Workshop on Teaching Undergraduate Artificial Intelligence. Temple University, June 1995, June 1996, and June 1997.

**Editorial Board:** *International Journal on Knowledge-Based Intelligent Engineering Systems*, 2005-present; Special Issue of *Robotics and Autonomous Systems Journal*, entitled *Robot Learning: The New Wave*, 1996.

**Advisory Board:** *Machine Learning Laboratory Experiences for Introducing Undergrads to Artificial Intelligence*, \$116,469 NSF grant, University of Hartford; *Agents for Change: Robotics for Girls*, \$1,184,769 NSF Gender Equity grant, Institute for Research in Cognitive Science, University of Pennsylvania.

**Grant Reviewer:** National Science Foundation, *REU Site Competition* in the Directorate for Computer and Information Science, 2004; National Science Foundation, *Course, Curriculum, and Laboratory Improvement* Program, 1999.

**Fellowship Reviewer:** American Society for Engineering Education, Postdoctoral applications to the Office of Naval Research, 1996, 1997, and 2004.

**Paper Reviewer:** *American Association of Artificial Intelligence Conference; Adaptive Behavior; Cognitive Science; Computational Intelligence in Robotics and Automation Conference; Connection Science; Connection Science Special Issue on BioRobotics; Connection Science Special Issue on Developmental Robotics; Consortium for Computing in Small Colleges Northeastern Conference; FLAIRS 1999-2001 and 2004-2006* Special track on Neural Networks; *GECCO 01 and 02, IEEE Journal on Systems, Man, and Cybernetics; Informatica; International Conference on Artificial Neural Networks; International Joint Conference on Artificial Intelligence; Joint Conference on the Science and Technology of Intelligent Systems; Journal of Experimental and Theoretical Artificial Intelligence; Journal of Intelligent Systems; and Northeastern Conference of the Consortium of Computing in Small Colleges; SIGCSE 2003-2006.*

**Member:** The American Association of Artificial Intelligence, The Association of Computing Machinery, Cognitive Science Society, and Sigma Xi.

## OUTREACH

Science for kids, Chester Children's Choir

Co-taught a five week session on building and programming Lego robots,  
Swarthmore College, Summer 2007.

Robot demonstration for pre-school children

Trinity Cooperative Day Nursery, Swarthmore PA, Fall 2006 and Summer 2007.

Workshop co-leader at the *Expanding Your Horizons* Conference

Swarthmore College, March, 2007.

Keynote speaker at the *Expanding Your Horizons* Conference

Swarthmore College, March, 2006.

Robotics for Girls Program at the University of Pennsylvania

Philadelphia, PA, June 2000

Agnes Irwin School's *Real Life, Real Women, Real Math*

Philadelphia, PA, June 1997.

Lego robots with 5th grade class from Swarthmore Rutledge School

Swarthmore, PA, January 1996.

Girl Scout Troop 272, *Women in Technology*

Swarthmore, PA, November 1995.

## SWARTHMORE COLLEGE ACTIVITIES

### Tri-College Presentations

Creating a self-motivated robot. *Faculty Lunch Series*, Swarthmore College, March, 2006.

Memory, representation, and abstraction in ANN-controlled mobile robots. *Emergent Phenomena Research Group*, Bryn Mawr College, March, 2005.

Self-motivated, task-independent reinforcement learning for robots. *Cognitive Science Lunch Series*, Swarthmore College, October, 2004.

On-line, self-regulating robot development. *Emergent Phenomena Research Group*, Bryn Mawr College, June, 2004.

Bringing up robot: A developmental approach to artificial intelligence. Talk for Swarthmore College Alumni, Berkeley, California, November, 2003.

Will we meet HAL in 2001? *Alumni College*, Swarthmore College, June, 2000.

Integrating reaction and deliberation: A hybrid model for robot control. *Tri-College Research Symposium for the Cognitive Sciences*, Swarthmore College, November, 1996.

Incremental investigations into adaptive robot control. *Bryn Mawr and Haverford Colleges Mathematics and Computer Science Colloquium Series*, Bryn Mawr College, February, 1995.

### College Service

Council on Educational Policy, 2006-2008.

Sigma Xi President 2006-2007; Vice President 2005-2006.

Science Center User's Group Committee, 1999-2001, 2003-2004.

Co-chair of the Classroom Committee for the Unified Science Center, 2000-2001.

Property Committee, 2000-2001.

Proposed Cognitive Science Concentration, 1997, with R. Dufour, F. Durgin and T. Fernald.

Co-chair of Tri-College Research Symposium for the Cognitive Sciences, Fall 1996.

Co-chair of the Cognitive Science Colloquia Series, Spring 1996.

Computer Services Committee, 1996.

Physical Education and Athletics Committee, 1995-1996, 1998-1999, 2003-2004.

### Summer Research Students

2007: George Dahl

2005: Ethan Jucovy and Ben Turner

2003: Matt Fiedler, Andrew John (high school student), Evan Moses, and Jeremy Stober

2002: Evan Moses, Daniel Sproul, and Cassandra Telenko (high school student)

2000: Ben Newman, Tom Stepleton, Gil Jones, and Nathaniel Fairfield

1999: Nii Saka Addo and Seth Olshfski

1997: Dave Bruemmer

1996: Ben Vigoda

1995: Sam Weiler

### Honors Theses Supervised

George Dahl (2008) *An Online Variant of Cascade Correlation*

Evan Moses (2004) *Developmental Robotics and the Governor Architecture*

Jeremy Stober (2004) *The Governor Architecture: Avoiding Catastrophic Forgetting in Robot Learning*  
Chris Cutler (2002) *The Design and Implementation of a Web Language to Facilitate Two Dimensional Layout*  
Nathaniel Fairfield (2001) *Simple Landmark Localization on a Three-Layer Mobile Robot Architecture*  
Martin Krafft (2001) *A Neural Optimal Controller Architecture for Wayfinding Behavior*  
Benjamin Newman (2001) *In Search of the Elusive "Emergent Concept"*  
Edward Gilkison Jones (2001) *HYTE: A HYbrid System for Thorough Exploration*

## **Courses Taught**

**COGS 1** Introduction to Cognitive Science  
**CPSC 10** Great Ideas in Computer Science  
**CPSC 21** Introduction to Computer Science  
**CPSC 35** Algorithms and Object-Oriented Programming  
**CPSC 37** The Structure and Interpretation of Computer Programs  
**CPSC 41** Analysis of Algorithms  
**CPSC 63** Artificial Intelligence  
**CPSC 75** Principles of Compiler Design and Construction  
**CPSC 81** Adaptive Robotics  
**CPSC 97** Senior Conference  
**CPSC 128** Computational Models of Learning  
**CPSC 129** Computational Models of Language