

## Curriculum Vita

Adele E. Howe

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### Education

- Ph.D. Computer and Information Science, University of Massachusetts, February 1993  
Dissertation: *Accepting the Inevitable: The Role of Failure Recovery in the Design of Planners*
- M.S. Computer and Information Science, University of Massachusetts, February 1987  
Master's Project: *A Constructive Approach to Decision Making*
- B.S.E. Computer Science and Engineering, University of Pennsylvania, May 1983  
Bachelor's Project: *HOW? A Customizable, Associative Network Based Help Facility*

### Honors and Awards

- Best paper award for GA track (first author L.D. Whitley) at *Genetic and Evolutionary Computation Conference (GECCO 2009)*, July 2009
- Faculty Excellence in Undergraduate Teaching Award given by Colorado State University, College of Natural Sciences, 2008-2009
- Honorable Mention for best student paper award (first author, Yui Man Lui) at *First Conference on Biometrics: Theory, Applications and Systems*, Sept. 2007
- Runner-up for best student paper award (first author, L. Barbulescu) at *14th International Conference on Automated Planning and Scheduling* for "Trading Places: How to Schedule More in a Multiple Resource Over-Subscribed Scheduling Problem", June 2004
- Best paper award (first author, J.P. Watson) at *First Multidisciplinary International Conference on Scheduling* for "A Dynamic Model of Tabu Search for the Job-Shop Scheduling Problem", Aug. 2003
- Paper entitled "Toward a Descriptive Model Of Local Search Cost in Job-Shop Scheduling" (first author, J.P. Watson) received PLANET (European network of excellence in AI planning) prize for research excellence in 2001
- *Defense Science Study Group*, Institute for Defense Analyses, DoD, 2000-2001
- National Science Foundation CAREER Award, 1996.
- University of Pennsylvania, Moore School Council Cwikla Award, 1983
- National Merit Scholarship, 1979

### Professional Experience

9/09 - 1/10: *Acting Dept. Chair*. Computer Science Department, Colorado State University, Ft. Collins, CO.  
7/03 - present: *Professor*. Computer Science Department, Colorado State University, Ft. Collins, CO.  
2008-2009: *Consultant*. First RF Corp., Boulder, CO.  
2006-2007: *Consultant*. (Occasional) DARPA, Arlington, VA.  
7/98 - 6/03: *Associate Professor*. Computer Science Dept., Colorado State University, Ft. Collins, CO.  
2000-2002: *Consultant*. (Occasional) Institute for Defense Analyses, Alexandria, VA.

8/92 - 6/98: *Assistant Professor*. Computer Science Dept., Colorado State University, Ft. Collins, CO.  
 9/85 - 8/92: *Research Assistant*. Experimental Knowledge Systems Lab, Univ. of Mass., Amherst, MA.  
 9/84 - 8/85: *Research Assistant*. AI in Mechanical Engineering Design, Univ. of Mass., Amherst, MA.  
 6/83 - 9/84: *Assistant Member Technical Staff*. ITT Advanced Technology Center, Shelton, CT.

## Professional Activities

- Editorial Service:
  - Editor, *Knowledge Engineering Review*, term: 1996 – 2006.
  - Book Reviews Editor, *AI Magazine*, 1997 – 1999.
  - Area Editor, *ACM SIGART Bulletin*, 1997 – 1999.
  - Associate Editor:
    - \* *IEEE Transactions on Knowledge and Data Engineering*, 1998 – 2002.
    - \* *Journal of Artificial Intelligence Research*, 2007-2010.
  - Member, Editorial Board, *Journal of Artificial Intelligence Research*, 2000 – 2003.
- Dissertation Examiner for University of South Africa, Spring 2009
- ADVANCE Eminent Scholar Mentor at University of Maryland Baltimore County, 2005-2007.
- Judge, Intel Science Fair 2004, representing AAAI
- Member, Strategic Planning Board for USGS Biological Resources Division and Mountain Research Center, Greater Yellowstone Area, 1996-1997.
- Script historian, National Science Foundation's Women and Science Conference, Computer Science segment, December 1995.
- Secretary of Conferences and Tutorials Board of the IEEE Computer Society, 1993 and 1994.
- Invitee, NSF Workshop on *Expanding Opportunities for Women in Computer Science*, Colorado Springs, CO, October 1992.
- Conference/workshop Organization:
  - Program committee co-chair, AAAI 1995 Spring Symposium on Integrated Planning Applications
  - Publicity chair, 11th Knowledge Based Software Engineering Conference, 1996.
  - Member, Steering Committee: Intelligent Data Analysis Conference, 1997-2005.
  - Member, Steering Committee: International Planning Competition, 2006-2007.
  - Local Arrangements chair, 5th International Conference on AI Planning Systems (AIPS-2000).
  - Workshops chair, Autonomous Agents 2001 conference.
  - Co-chair, Pre-Tenure track, 2003 CRA-W Career Mentoring Workshop at ACM FCRC.
  - Doctoral Consortium Co-chair, Int'l Conf. on Automated Planning and Scheduling (ICAPS) 2005.
  - Workshop Co-chair, Twentieth National Conference on Artificial Intelligence (AAAI) 2005.
  - Program Co-chair, Twenty-Second Conference on Artificial Intelligence (AAAI) 2007.
  - Teaching Forum Co-Chair, Twenty-Third Conference on Artificial Intelligence (AAAI) 2008.
  - Program Co-chair, Int'l Conf. on Automated Planning and Scheduling (ICAPS) 2009
  - Workshop chair, Int'l. Joint Conference on Artificial Intelligence (IJCAI) 2011.
- Member, Senior Program Committee:
  - Int'l Conference on Autonomous Agents and Multi-Agent Systems Conference (AAMAS-06)
  - National Conference on Artificial Intelligence (AAAI-06)

- Member, Program Committee:
  - National Conference on Artificial Intelligence (AAAI-97, AAAI-98, AAAI-99, AAAI-00, AAAI-04, AAAI-05, AAAI-08).
  - International Conference on Artificial Intelligence Planning Systems (AIPS-98).
  - Florida AI Research Symposium (FLAIRS-98, FLAIRS-99, FLAIRS-01).
  - Thirteenth Annual International Conference on Industrial and Engineering Application of Artificial Intelligence and Expert Systems (IEA/AIE-2000).
  - International Conference on Autonomous Agents 2000.
  - International Conference on Autonomous Agents and Multi-Agent Systems Conference (AAMAS-2003, AAMAS-2004, AAMAS-2005).
  - Intelligent Data Analysis Conference (IDA-2001, IDA-2003, IDA-2005).
  - Eleventh International World Wide Web Conference (WWW2002).
  - 8th ACM SIGKDD International Conf. on Knowledge Discovery and Data Mining (KDD-2002).
  - International Conference on Automated Planning and Scheduling (ICAPS-2004, ICAPS-2005, ICAPS-2006, ICAPS-2008, ICAPS-2010)
  - The RoboCup 2002 International Symposium.
  - Workshop on MAS Problem Spaces and Their Implications to Achieving Globally Coherent Behavior at the AAMAS-2002.
  - Workshop on PDDL at International Conference on Automated Planning and Scheduling 2003
  - Workshop on Representations and Approaches for Time-Critical Decentralized Resource Allocation at AAMAS 2003
  - Workshop on “Challenges in the Coordination of Large Scale Multi-Agent Systems” at AAMAS 2004 and AAMAS 2005.
  - *Int’l Conference on Automated Planing and Scheduling Doctoral Consortium* 2006, 2007
  - IEEE/WIC/ACM Conference on Web Intelligence 2008.
  - Workshop on “Oversubscribed Planning & Scheduling” at ICAPS 2008.
  - International Joint Conference on Artificial Intelligence 2009.
  - SLS 2009 Workshop on Engineering Stochastic Local Search Algorithms
  - Workshop on “Heuristics for Domain-Independent Planning” at ICAPS 2009.
- Member, Planning Competition Committee for Fourth International Conference on Artificial Intelligence Planning Systems (AIPS-98)
- Reviewer: National Science Foundation (1994-1998, 2002-2004, 2009), CASI (1994-1998), AFOSR (1997, 2008), NASA (2000), University of California MICRO (2001, 2006), Grace Hopper Conference Travel Scholarships (2007-2008).
- Journal referee: *ACM Transactions on Information Systems; AI Communications; AI Magazine; Annals of Operations Research; Artificial Intelligence; Artificial Intelligence: Engineering, Design And Manufacturing; Autonomous Agents and Multi-Agent Systems Journal; Communications of the ACM; IEE Software; IEEE Computational Intelligence; IEEE Computer; IEEE Expert; IEEE Transactions on Knowledge and Data Engineering; IEEE Transactions on Reliability; IEEE Transactions on Software Engineering; IEEE Transactions on Systems, Man and Cybernetics; INFORMS Journal on Computing; Integrated Computer-Aided Engineering Journal; Intelligent Data Analysis Journal; Journal of Artificial Intelligence Research; Journal of Experimental and Theoretical Artificial Intelligence; Journal of Operations Research Society; Journal of Software Maintenance; Journal of Systems and Software; Logical Methods in CComputer Science; Management Science; Mathematical and Computer Modelling; Software Testing, Verification and Reliability; SCS Transactions on Simulation.*
- Conference referee: *International Joint Conference on Artificial Intelligence*, 1991, 1993, 1995, 1999,

2003, 2005; *International Symposium on Software Reliability Engineering* 1993; *International Software Metrics Symposium* 1993; *Artificial Intelligence Planning Systems Conference* 1996, 1998; *International ACM SIGIR Conference on Research and Development in Information Retrieval* 1999, 2001, 2003.

- Book reviewer: Benjamin Cummings Publisher; Harcourt Brace Jovanovich Publishers; McGraw Hill.

## Grants

- *Web Mining and Repository Organization for Climate Change Information*, U.S. Geological Survey, 8/09-7/10, \$32,000.
- *HCC-Medium: Intelligent Agents for Protecting Users in Cyberspace*, with Zinta Byrne and Indrajit Ray, National Science Foundation #0905232, 8/09-8/12, \$977,776.
- *Travel Support for Doctoral Consortium at International Conference on Artificial Intelligence Planning and Scheduling 2009 (ICAPS09)*, National Science Foundation, \$15,000, Fall 2009.
- *Landscape Analysis and Algorithm Development for Plateau Plagued Search Spaces*, with L. Darrell Whitley, Air Force Office of Scientific Research FA9550-08-1-0422, 8/08-11/10, \$302,775.
- *Model Justified Search Algorithms for Scheduling Under Uncertainty*, with L. Darrell Whitley, Air Force Office of Scientific Research FA9550-07-1-0403, 4/07-5/08, \$162,724.
- *Scheduling under Uncertainty: An Analysis of an Air Force Application*, with L. Darrell Whitley, Air Force Office of Scientific Research FA9550-06-1-0421, 6/06-11/06, \$25,000.
- *Support for Doctoral Consortium at International Conference on Artificial Intelligence Planning and Scheduling 2005 (ICAPS05)*, DARPA/IPTO # HR0011-05-1-0034, \$10,000, Summer 2005.
- *Travel Support for Doctoral Consortium at International Conference on Artificial Intelligence Planning and Scheduling 2005 (ICAPS05)*, National Science Foundation #0511705, \$14,000, Summer 2005.
- *Advancing Air Force Scheduling through Modeling Problem Topologies*, with L. Darrell Whitley, Air Force Office of Scientific Research F49620-03-1-0233, 4/03-3/06, \$405,000.
- *Modeling Domain Independent Planning to Advance Application*, National Science Foundation IIS-0138690, 8/15/02-7/31/05. \$205,972.
- *Interactive Anticipatory Scheduling for Two Military Applications*, co-PI with L. Darrell Whitley. Air Force Office of Scientific Research F49620-00-1-0144, \$345,000 for 1/1/00-12/31/02.
- *Adaptive Intelligent Methods for Distributed Learning and Data Mining*, L. Darrell Whitley, PI. TRW, Inc. \$161,309 for 5/5/00-12/31/01.
- *Flexible Automated Software Test Generation Using AI Planning Technology*, Co-PI with Anneliese von Mayrhauser. National Science Foundation grant #CCR-9619787. \$150,000 for 8/15/97-8/14/99.
- *Exploiting Problem Structure in Scheduling*, Co-PI with L. Darrell Whitley, Air Force Office of Scientific Research's New Vistas program F49620-97-1-0271, \$390,408 for 4/1/97-12/31/99.
- *Evaluation as the Basis for AI Agent Design*. National Science Foundation, Career Award IRI-9624058, \$209,494 for 8/96-8/00.
- *Evaluation Methods for Complex, Intelligent Information Driven Systems (CIIS)*. Subcontractor to Sterling Software on ARPA grant F30602-95-0257. \$93,576 for 9/95-9/97 (subcontractor portion).
- *Developing Reliable Plan Knowledge Bases*. National Science Foundation Research Initiation Award #RIA IRI-9308573. \$96,056. 9/1/93 – 2/28/97.

- *Experimental Methods for Evaluating Planning Systems*. Subcontractor to University of Massachusetts on ARPA Grant #F30602-93-C-0100. \$240,385 for 7/30/93 – 1/11/97 (subcontractor portion).
- *Multiprocessor and Sensor Hardware for Vision, Learning, Planning and Parallel Processing Research*. Co-PI with J.R. Beveridge, C.W. Anderson, A.P. Bohm, M.E. Goss, and L.D. Whitley. National Science Foundation CISE Instrumentation Grant #CDA-9422007. \$59,144. 1/1/95 – 12/31/95.

### Travel and Other Small Grants

- Colorado State University TILT program. Funding for summer students to develop course software for testing programs.
- CRA/NSF Mentor for Summer 2004. Funding for two undergraduates for summer research project.
- CRA/NSF Mentor for Summer 2001. Funding for two undergraduates for summer research project.
- CRA/NSF Mentor for Summer 1994. Funding for an undergraduate for summer research project.
- *Artificial Intelligence Planning Research Infrastructure*. Colorado State University Diversity Career Enhancement Proposal. \$4,200. Spring 1993.
- Travel grant, Workshop on Academic Careers for Women in Computer Science, San Diego, CA, 5/93.

# Publications

## Journal Articles Under Review

1. Doug Hains, L. Darrell Whitley, Adele E. Howe. "Revisiting the Big Valley Search Space Structure in the TSP", submitted to *Journal of Operations Research Society*.
2. A. Sutton, L.D. Whitley and A. Howe. "Computing the moments of  $k$ -bounded pseudo-Boolean functions over Hamming spheres of arbitrary radius in polynomial time", submitted to *Theoretical Computer Science journal*.

## Journal Articles

1. M. Roberts and A.E. Howe. 2009. "Learning from Planner Performance," *Artificial Intelligence*, Vol. 173, Issues 5-6, pp. 536-561, April.
2. B.M. Kim, Q. Li, A.E. Howe and Y.P. Chen, 2008, "Collaborative Web Agent based on Friend Network", *Applied Artificial Intelligence*, Vol. 22, No. 3.
3. L. Barbulescu, A.E. Howe, L. Darrell Whitley, M. Roberts. 2006. "Algorithm Performance Factors for an Oversubscribed Scheduling Application", *Journal of Artificial Intelligence Research*, Vol. 27, December, pp. 577-615.
4. L. Barbulescu, A.E. Howe and L.D. Whitley. 2006. "AFSCN Scheduling: How the Problem and Solution Have Evolved", in *Mathematical and Computer Modelling*, Vol. 43, No. 9-10, pp. 1023-1037, May.
5. J.P. Watson, A.E. Howe and L.D. Whitley. 2006. "Deconstructing Nowicki and Smutnicki's  $i$ -TSAB Tabu Search Algorithm for the Job-Shop Scheduling Problem", in *Computers and Operations Research*, Vol. 33, No. 9, pp. 2623-2644, September.
6. J.P. Watson, L.D. Whitley, and A.E. Howe. 2005. "Linking Search Space Structure, Run-Time Dynamics and Problem Difficulty: A Step Toward Demystifying Tabu Search", in *Journal of Artificial Intelligence Research*, Volume 24, pp. 221-261, August.
7. L. Barbulescu, J.P. Watson, L.D. Whitley, A.E. Howe. 2004. "Scheduling Space-Ground Communications for the Air Force Satellite Control Network", *Journal of Scheduling*, Vol. 7, Issue 1, pp. 7-34, January.
8. J.P. Watson, J.C. Beck, A.E. Howe, L.D. Whitley. 2003. "Problem Difficulty for Tabu Search in Job-Shop Scheduling", In *Artificial Intelligence*, Vol. 143, No. 2, pp. 189-217, February.
9. A.K. Amschler Andrews, C. Zhu, M. Scheetz, E. Dahlman, A. Howe. 2002. "AI Planner Assisted Test Generation", In *Software Quality Journal*, Vol. 10, No. 3, pp. 225-259, November.
10. R.S. Sojda, D. Dean, D.B. Hamilton, and A.E. Howe. 2002. "Development of an expert system for assessing trumpeter swan breeding habitat in the Northern Rocky Mountains", In *Waterbirds*, 25, Special Edition 1.

11. A.E. Howe and E. Dahlman. 2002. "A Critical Assessment of Benchmark Comparison in Planning", In *Journal of Artificial Intelligence Research*, Vol. 17, pp. 1-33, July.
12. J.P. Watson, L. Barbulescu, L.D. Whitley, A.E. Howe. 2002 "Contrasting Structured and Random Permutation Flow-Shop Scheduling Problems: Search Space Topology and Algorithm Performance", In *INFORMS Journal on Computing*, Vol. 14, No. 1, Spring.
13. L.D. Pyeatt and A.E. Howe. 2000. "Evaluating Robustness in a Two Layer Simulated Robot Architecture", In *Journal of Experimental and Theoretical Artificial Intelligence*, Vol. 12, No. 2, pp. 213–234.
14. J. P. Watson, S. Rana, L. D. Whitley and A. E. Howe. 1999. "The Impact of Approximate Evaluation on the Performance of Search Algorithms for Warehouse Scheduling", In *Journal of Scheduling*, Vol. 2, pp. 79-98.
15. A. von Mayrhauser, A.M. Vans, and A.E. Howe. 1997. "Program Understanding Behavior During Enhancement of Large-Scale Software". In *Journal of Software Maintenance*, Vol. 9, pp. 299-327.
16. D. Dreilinger and A.E. Howe. 1997. "Experiences with Selecting Search Engines using Meta-Search". In *ACM Transactions on Information Systems*, Vol. 15, No. 3, pp. 195–222.
17. S. Rana, A.E. Howe, L.D. Whitley, K. Mathias. 1997. "A Genetic Algorithm Scheduler: Assessing the Contribution of Search, Heuristics and the Objective Function". In *Engineering Design and Automation Journal*, Vol. 3, No. 2, pp. 107-118.
18. A.E. Howe, A. von Mayrhauser, R.T. Mraz. 1997. "Test Case Generation as an AI Planning Problem". In *Automated Software Engineering*, Vol.4, No.1, pp. 77-106.
19. A.E. Howe and P.R. Cohen. 1995. Understanding Planner Behavior. In *Artificial Intelligence*, Special Issue on Planning. Vol. 76, No. 1-2, pp. 125–166.
20. A.E. Howe. 1995. Improving the Reliability of AI Planning Systems by Analyzing their Failure Recovery. In *IEEE Transactions on Knowledge and Data Engineering*, Special Issue on Dependability of AI Systems. Vol. 7, No. 1, pp. 14-25.
21. A.E. Howe, D.M. Hart, and P.R. Cohen. 1990. Addressing Real-Time Constraints in the Design of Autonomous Agents. In *Real-Time Systems Journal*. Vol. 2, No. 1/2, pp. 81-97.
22. A.E. Howe and P.R. Cohen. 1990. Steps Toward Automating Decision Making. In *Information and Decision Technologies*. Vol. 16, pp. 161-182.
23. P.R. Cohen and A.E. Howe. 1989. Toward AI Research Methodology: Three Case Studies in Evaluation. In *IEEE Transactions in Systems, Man and Cybernetics*. Vol. 19, No. 3. pp. 634-646.
24. J.R. Dixon, A.E. Howe, P.R. Cohen, and M.K. Simmons. 1987. DOMINIC I: Progress Towards Domain Independence in Design by Iterative Redesign. In *Engineering with Computers*, Vol. 2, No. 3, September.
25. A.E. Howe, P.R. Cohen, J.R. Dixon, and M.K. Simmons. 1986. DOMINIC: A Domain-Independent Program for Mechanical Engineering Design. In *International Journal for Artificial Intelligence in Engineering*, Vol. 1, No. 1, pp. 23-28. Also, Reprinted in *Expert Systems in Engineering*, D.T. Pham (Ed.), Springer-Verlag, NY 1988.

## Refereed Magazine Articles

1. A.E. Howe and D. Dreilinger. 1997. "SavvySearch: A Meta-Search Engine that Learns Which Search Engines to Query". In *AI Magazine*, Vol. 18, No. 2, pp. 19–25.
2. P.R. Cohen, M.L. Greenberg, D.M. Hart and A.E. Howe. 1989. Trial by Fire: Understanding the Design Requirements for Agents in Complex Environments. *AI Magazine*. Vol. 10, No. 3, pp. 34-48. Reprinted in *Nikkei Artificial Intelligence*, Nikkei Business Publications, Inc., pp. 102-119. 1990.
3. P.R. Cohen and A.E. Howe. 1988. How Evaluation Guides AI Research. In *AI Magazine*, Winter, 1988. Vol. 9, No. 4, pp. 35-43. Also, Reprinted in *A Sourcebook of Applied Artificial Intelligence*, Gerald Hopple and Stephen Andriole (Eds.) TAB Books, Inc. 1990.

## Refereed Conference Proceedings

### Under Review:

1. A. Sutton, A. Howe and L.D. Whitley. "Directed Plateau Search for MAX-SAT", submitted to AAAI-2010 Conference.

### Published:

1. C. Redman and A. Howe. "Evaluating Multi-Agent Traffic Controllers", to appear in *Proceedings of FLAIRS-2010 Conference*, May 2010.
2. A.M. Sutton, L.D. Whitley and A.E. Howe, "A polynomial time computation of the exact correlation structure of k-satisfiability landscapes", In *Proceedings of Genetic and Evolutionary Computation Conference (GECCO 2009)*, Montreal, Canada, July 2009.
3. L.D. Whitley, D. Hains and A.E. Howe, "Linking Local Optima: Partition Crossover for the TSP", in *Proceedings of Genetic and Evolutionary Computation Conference (GECCO 2009)*, Montreal, Canada, July 2009.
4. A.E. Howe and R.D. Forbes, "Re-Considering Neighborhood-Based Collaborative Filtering Parameters in the Context of New Data", poster paper in *ACM Conference on Information and Knowledge Management 2008*, Napa, CA, October.
5. M. Roberts, A.E. Howe, M. desJardins and B. Wilson, "What Makes Planners Predictable?", In *Proc. of the International Conference on Artificial Intelligence planning and Scheduling Systems*, Sydney, Australia, September 2008.
6. L.D. Whitley, A.M. Sutton and A.E. Howe. "Understanding Elementary Landscapes", In *Proc. of the Genetic and Evolutionary Computation Conference (GECCO-08)*, Atlanta, GA, July 2008.
7. A. Sutton, A.E. Howe and L.D. Whitley. "Using Adaptive Priority Weighting to Direct Search in Probabilistic Scheduling", in *Proc. of International Conference on Automated Planning and Scheduling 2007*, Providence, RI.

8. D.S. Bolme, J.R. Beveridge and A. Howe. "Person Identification using Text and Image Data", in *Proceedings of the First Conference on Biometrics: Theory, Applications and Systems*, Washington, D.C., September 2007.
9. Y.M. Lui, J.R. Beveridge, A.E. Howe and L.D. Whitley. "Evolution Strategies for Matching Active Appearance Models to Human Faces", in *Proceedings of the First Conference on Biometrics: Theory, Applications and Systems*, Washington, D.C., September 2007. *Honorable Mention Best Student Paper*
10. A. Sutton, D. Whitley, M. Lunacke and A. Howe. 2006. "PSO and Multi-Funnel Landscapes: How Cooperations Might Limit Exploration", *Proc. of Genetic and Evolutionary Computation Conference*, July, pp. 75-81. (Nominated for a Best Paper Award).
11. M. Rogers, A.E. Howe, and L.D. Whitley."Looking for Shortcuts: Infeasible Search Analysis for Oversubscribed Scheduling Problems", in *Proceedings of ICAPS 2006*, June, pp. 314-323.
12. A. Sutton, L.D. Whitley and A.E. Howe. 2006. "Spacetrack: Trading off Quality and Utilization in Oversubscribed Schedules", in *Proceedings of ICAPS 2006 short paper*, June, pp. 430-433.
13. B.M. Kim, W. Li and A.E. Howe. "A Decentralized CF Approach Based on Cooperative Agents", abstract in *poster Proceedings of WWW 2006*, Edinburgh, Scotland, 2006.
14. E.S. Boese and A.E. Howe. "Effects of Web Document Evolution on Genre Classification," in *Proceedings of ACM Fourteenth Conference on Information and Knowledge Management*, pp. 632-639, Bremen, Germany, October 2005.
15. M. Roberts, L.D. Whitley, A.E. Howe and L. Barbulescu. "Random Walks and Neighborhood Bias in Oversubscribed Scheduling". in *Proceedings of MISTA 2005*, NY, NY, July 2005.
16. M. Roberts, A. Howe and L.D. Whitley. "Modeling Local Search: A First Step Toward Understanding Hill-Climbing in Oversubscribed Scheduling", extended abstract in *Poster Proceedings of International Conference on Automated Planning and Scheduling (ICAPS 2005)*, Monterey, CA, June 2005.
17. G. Somlo, A.E. Howe. "Filtering for Personal Web Agents", extended abstract in *Proceedings of the 27th International ACM SIGIR Conference*, Sheffield, UK, pp. 588-589, July 2004.
18. L. Barbulescu, L.D. Whitley and A.E. Howe. "Leap Before You Look: An Effective Strategy for Oversubscribed Scheduling", in *Proceedings of the Nineteenth National Conference on Artificial Intelligence*, San Jose, CA, July 2004.
19. G. Somlo, A.E. Howe. "QueryTracker: An Agent for Tracking Persistent Information Needs", in *Proceedings of Autonomous Agents and Multi-Agent Systems Conference*, NY, NY, July 2004.
20. L. Barbulescu, A.E. Howe, L.D. Whitley and M. Roberts. "Trading Places: How to Schedule More in a Multiple Resource Over-Subscribed Scheduling Problem", In *Proceedings of 14th International Conference on Automated Planning and Scheduling*, Whistler, British Columbia, June 2004.
21. J.P. Watson, A.E. Howe and L.D. Whitley. "An Analysis of Iterated Local Search for Job-Shop Scheduling", In *Fifth Metaheuristics International Conference (MIC 2003)*, Japan, September 2003.

22. J.P. Watson, L.D. Whitley, and A.E. Howe. "A Dynamic Model of Tabu Search for the Job-Shop Scheduling Problem", In the *First Multidisciplinary International Conference on Scheduling*, Nottingham, England. August 2003
23. G. Somlo, A.E. Howe. "Using Web Helper Agent Profiles in Query Generation", In *Proceedings of Autonomous Agents and Multi-Agent Systems (AAMAS) 2003 Conference*, Melbourne, Australia, July 2003.
24. L. Barbulescu, A.E. Howe, J.P. Watson and L.D. Whitley. "Satellite Range Scheduling: A Comparison of Genetic, Heuristic and Local Search", In *Proceedings of The Seventh International Conference on Parallel Problem Solving from Nature(PPSNVII)*, Granada, Spain, September 2002.
25. J.P. Watson, J.C. Beck, A.E. Howe, and L.D. Whitley. "Toward a Descriptive Model Of Local Search Cost in Job-Shop Scheduling", In *Sixth European Conference on Planning (ECP'01)*, Toledo, Spain, September 2001.
26. G. Somlo and A.E. Howe. "Adaptive Lightweight Text Filtering", In *Fourth International Symposium on Intelligent Data Analysis*, pp. 319–329, Lisbon, Portugal, September, 2001.
27. G. Somlo and A.E. Howe. "Incremental Clustering for Profile Maintenance in Information Gathering Web Agents", In *Fifth International Conference on Autonomous Agents*, pp. 262-269, Montreal, Canada, May 2001.
28. L. Pyeatt and A.E. Howe. "Decision Tree Function Approximation in Reinforcement Learning", In *Proceedings of International Symposium on Adaptive Systems*, Cuba, March 2001.
29. R.S. Sojda, D. Dean, D.B. Hamilton, and A.E. Howe. "Development of an expert system for assessing trumpeter swan breeding habitat in the Northern Rocky Mountains", *Fourth International Swan Symposium*, Airlie, VA, USA, February 13-18, 2001.
30. A. von Mayrhauser, M. Scheetz, E. Dahlman, A. E. Howe. "Planner Based Error Recovery Testing", *Proceedings of International Symposium on Software Engineering*, October 2000.
31. M. Scheetz, A. von Mayrhauser, R. France, E. Dahlman, A. Howe; "Generating Test Cases from an OO Model with an AI Planning System", *Proceedings of International Conference on Software Reliability Engineering '99*, November 1999, Boca Raton, FL.
32. L.D. Pyeatt and A.E. Howe. "A Parallel Algorithm for POMDP Solution", In *Proceedings of Fifth European Conference on Planning (ECP-99)*, Durham, England, September 1999. Also published in *Recent Advances in Planning*, Lecture Notes in Computer Science, Vol. 1809/2000, pp. 73-83, 2000.
33. A.E. Howe, E. Dahlman, C. Hansen, A. von Mayrhauser and M. Scheetz. "Exploiting Competitive Planner Performance", In *Proceedings of Fifth European Conference on Planning (ECP-99)*, Durham, England, September 1999. Also published in *Recent Advances in Planning*, Lecture Notes in Computer Science, Vol. 1809/2000, pp. 62-72, 2000.
34. R.S. Sojda, J.E. Cornely, L.H. Fredrickson, and A.E. Howe. "Current research efforts in decision support system technology as applied to trumpeter swan management". In *Proceedings of the 17th Trumpeter Swan Society Conference*. The Trumpeter Swan Society. Maple Plain, Minnesota. 1999.
35. J.P. Watson, L. Barbulescu, A.E. Howe, and L. D. Whitley. "Algorithm Performance and Problem Structure for Flow-shop Scheduling", In *Proceedings of the Sixteenth National Conference on Artificial Intelligence (AAAI-99)*, Orlando, FL July 1999.

36. L.D. Pyeatt and A.E. Howe. "Integrating POMDP and Reinforcement Learning for a Two Layer Simulated Robot Architecture", In *Third International Conference on Autonomous Agents*, Seattle, WA, May 1999. Revised version of paper that appeared in *AAAI 1998 Fall Symposium Series – Planning with Partially Observable Markov Decision Processes: Working Notes*, October 1998.
37. A. von Mayrhauser, M. Scheetz, E. Dahlman, A. E. Howe. "Trade-offs in Planner Representation for Automated Software Testing", In *Proceedings of IEEE Aerospace Conference*, March 1999, Snowmass, CO.
38. J. Watson, C. Ross, V. Eisele, J. Denton, J. Bins, C. Guerra, D. Whitley, A. Howe. "The Traveling Salesrep Problem, Edge Assembly Crossover, and 2-opt", In *Proceedings of Parallel Problem Solving from Nature (PPSN-V)*, Amsterdam, Netherlands. October, 1998.
39. L. D. Whitley, A. E. Howe, S. Rana, J. P. Watson and L. Barbulescu. "Comparing Heuristic Search Methods and Genetic Algorithms for Warehouse Scheduling", In *Proceedings of the IEEE International Conference on Systems, Man and Cybernetics*, San Diego, CA. October, 1998.
40. L.D. Pyeatt and A.E. Howe. "Learning to Race: Experiments with a Simulated Race Car". In *Proceedings of the Eleventh International Florida AI Research Society Conference*, Sanibel Island, Florida, May 1998.
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## Book Chapters

1. D. Whitley, A. Sutton, A. Howe and L. Barbulescu. Resource Scheduling with Permutation Based Representations: Three Applications. In *Evolutionary Computation in Practice*, T. Yu and L. Davis, Eds., Springer Berlin, pp. 219-243, 2008.
2. A.E. Howe. Detecting Imperfect Patterns in Event Streams Using Local Search. In *Learning from Data: Artificial Intelligence and Statistics V*, D. Fisher and H. Lenz (Ed.), pp. 155-164, Springer-Verlag, 1996.
3. A.E. Howe and P.R. Cohen. Detecting and Explaining Dependencies. In *Preliminary Papers of the Fourth International Workshop on AI and Statistics*. Ft. Lauderdale, FL. January 3-6, 1993. Also in *Selecting Models from Data: Artificial Intelligence and Statistics IV*, P. Cheeseman and R.W. Oldford, Eds., pp. 161-182, Springer-Verlag, 1994.

## Refereed Workshops

1. A.M. Sutton, A.E. Howe and L.D. Whitley, "A theoretical analysis of the k-satisfiability search space", in *Proceedings of Stochastic Local Search 2009 Workshop* and *Lecture Notes in Computer Science*, Vol. 5752, pp.46-60, Brussels, Belgium, September 2009.
2. A.M. Sutton, A.E. Howe and L.D. Whitley, "Estimating Bounds on Expected Plateau Size in MAXSAT Problems", in *Proceedings of Stochastic Local Search 2009 Workshop* and *Lecture Notes in Computer Science*, Vol. 5752, pp.31-45, Brussels, Belgium, September 2009.
3. M. Roberts and A.E. Howe. "Local Search Topology: Implications for Planner Performance", in *Working Notes of ICAPS2007 Workshop on Heuristics for Domain-independent Planning: Progress, Ideas, Limitations, Challenges*, Providence, RI, September 2007.
4. M. Roberts and A.E. Howe. "Learned Models of Performance for Many Planners", in *Working Notes of ICAPS2007 Workshop on Artificial Intelligence Planning and Learning*, Providence, RI, September 2007.
5. M. Roberts and A.E. Howe. "Directing a Portfolio with Learning", in *Working Notes of AAAI2006 Workshop on Learning for Search*, Boston, MA, July 2006.
6. E.S. Boese and A.E. Howe."Genre Classification of Web Documents", abstract in *Student Abstract Proceedings of AAAI 2005*, Pittsburgh, PA, August 2005.
7. J.P. Watson, J.C. Beck, A.E. Howe and L.D. Whitley. Toward a Descriptive Model of Local Search Cost in Job-Shop Scheduling, In *Working Notes of IJCAI-01 Workshop on Stochastic Search Algorithms*, Seattle, WA, August 2001.
8. J.P. Watson, A.E. Howe. Focusing on the Individual - Why We Need New Methods for Characterizing Problem Difficulty, In *Working Notes of ECAI 2000 Workshop on Empirical Methods in Artificial Intelligence*, Berlin, Germany, August 2000.
9. A.E. Howe, L.D. Whitley, L. Barbulescu, J.P. Watson. Mixed Initiative Scheduling for the Air Force Satellite Control Network, *Second International NASA Workshop on Planning and Scheduling for Space*, March 2000.
10. G.L. Somlo and A.E. Howe. Agent-Assisted Internet Browsing, In *Working Notes of AAAI-99 Workshop on Intelligent Information Systems*, Orlando, FL, July 1999.
11. R.S. Sojda and A.E. Howe. Applying Cooperative Distributed Problem Solving Methods to Trumpeter Swan Management. In *Working Notes of AAAI '99 Workshop on Environmental Decision Support Systems and Artificial Intelligence*, Orlando, FL, July 1999.
12. L.D. Pyeatt and A.E. Howe. Testing Generalization in Learned Simulated Robot Behaviors. In *Working Notes of Agents '99 Workshop on Autonomy Control Software*, Seattle, WA, May 1999.
13. L. Pyeatt and A.E. Howe. Reinforcement Learning for Coordinated Reactive Control. In *Fourth World Congress on Expert Systems: Workshop on Artificial Neural Networks: Current Trends and Applications* Mexico City, Mexico, March 1998.

14. A.E. Howe and E. Dahlman. Structural Analysis of POP Domains. In *Working Notes of AIPS Workshop on Planning as Combinatorial Search: Propositional, Graph-Based, and Disjunctive Planning Methods*, Pittsburgh, PA, June 1998.
15. A.E. Howe. "Statement of Interest: Comparing Apples and Oranges". In *Working Notes from Workshop on Empirical AI*, Nagoya, Japan, August 1997.
16. A. E. Howe and G. Somlo. "Modeling Intelligent System Execution as State Transition Diagrams to Support Debugging". In *Proceedings of the Second International Workshop on Automated Debugging*, Linkoping, Sweden, May 1997.
17. A.E. Howe and D. Peterson. Validation and Verification in the Planner Life Cycle. (Extended abstract) *IJCAI'95 Workshop on Validation & Verification of Knowledge-Based Systems*, August 1995.
18. A.E. Howe, R.T. Mraz and A. von Mayrhauser. Goal-Directed Test Generation of Command Language Interfaces Using an AI Planner. In *Working Notes of the Third Workshop on AI and Software Engineering* at IJCAI, August 1995.
19. A.E. Howe. Finding Dependencies in Event Streams Using Local Search. In *Preliminary Papers of the Fifth International Workshop on AI and Statistics*. Jan. 4-7, 1995. Ft. Lauderdale, FL.
20. A.E. Howe. Integrating Failure Recovery with Planner Debugging. In *Working Notes of AAAI Spring Symposium on Detecting and Resolving Errors in Manufacturing Systems*. Palo Alto, CA. March 1994.
21. A.E. Howe. Evaluating Planning Through Simulation: An Example Using Phoenix. In *Working Notes of AAAI Spring Symposium on Foundations of Automatic Planning*. Palo Alto, CA. March 23-25, 1993.
22. A.E. Howe. Failure Recovery Analysis as a Tool for Plan Debugging. In *Proceedings of AAAI Spring Symposium on Computational Considerations in Supporting Incremental Modification*. Palo Alto, CA. March 26-27, 1992.
23. A.E. Howe and P.R. Cohen. Responding to Environmental Change. In *Proceedings of Workshop on Innovative Approaches to Planning, Scheduling and Control*. San Diego, CA. November, 1990.
24. A.E. Howe, D.M. Hart, and P.R. Cohen. Designing Agents to Plan and Act in Their Environments. In *Working Notes of AAAI-90 Workshop on Automated Planning for Complex Domains*. Boston, MA. July 30, 1990.
25. A.E. Howe. Integrating Adaptation with Planning to Improve Behavior in Unpredictable Environments. In *Proceedings of AAAI Spring Symposium on Planning in Uncertain, Unpredictable or Changing Environments*. March 27-29, 1990. Palo Alto, CA.
26. P.R. Cohen, M.L. Greenberg, D.M. Hart, and A.E. Howe. Real-time Problem Solving in the Phoenix Environment. In *Proceedings of the IJCAI-89 Workshop on Realtime AI Problems*. Detroit, MI. August, 1989.
27. P.R. Cohen, M.L. Greenberg, D.M. Hart, and A.E. Howe. The Phoenix Project: Problem Solving in a Crisis Management Environment. 1989. (Extended abstract) *Proceedings of the IJCAI-89 Workshop on Symbolic Problem Solving in Noisy, Novel, and Uncertain Task Environments*. Detroit, MI. August 1989.

28. P.R. Cohen, M.L. Greenberg, D.M. Hart, and A.E. Howe. The Phoenix Project: Simulating a Complex, Real-time Environment for Autonomous Agents. (Extended abstract) In *Proceedings of the Fourth AI and Simulation Workshop*. Detroit, MI. August, 1989.

## Unrefereed Papers and Unpublished Technical Reports

1. M. Roberts and A.E. Howe. "A Call for Participation: Supporting Large Scale Studies of Planning Systems", (position paper) in *Working Notes of ICAPS2007 Workshop on International Planning Competition*, Providence, RI, September 2007.
2. L.D. Whitley, J.P. Watson, A.E. Howe and L. Barbulescu. Testing, Evaluation and Performance of Optimization and Learning Systems. *Adaptive Computing in Design and Manufacture V*, pp. 27-39. Sept. 2002.
3. L.D. Whitley, J.P. Watson, A. Howe and L. Barbulescu. 2002. "Testing, Evaluation and Performance of Optimization and Learning Systems", Keynote Address at *Fifth International Conference on Adaptive Computing in Design and Manufacturing (ACDM 2002)*, Exeter, England, April.
4. A. E. Howe. 2002. Defense and Intelligence Applications of Knowledge Synthesis Technology. *Collected Papers of DSSG-7*. Institute for Defense Analyses.
5. A.E. Howe, L.D. Whitley, J.P. Watson, L. Barbulescu. "A Study of Air Force Satellite Access Scheduling", In *Proceedings of the World Automation Conference*, Maui, HI, June 2000.
6. S. Parsons and A. Howe. Special Issue: Perspectives on Intelligent Agents Research ... One Year Later. *Knowledge Engineering Review*, Vol. 14, No. 2, pp. 105-107, 1999.
7. L. Barbulescu, J.P. Watson, A.E. Howe and L.D. Whitley. "Problem Structure and Flowshop Scheduling", *Proceedings of Sixteenth Congress de Ecuaciones Diferenciales y Aplicaciones (CEDYA 99)*, Las Palmas de Gran Canaria. 1999.
8. A. Howe. "Evaluating Robot Planning Systems: Some Issues and Successes", in *IJCAI-99 Workshop on Robot Action Planning*, Stockholm, Sweden, July 1999.
9. A. Howe and S. Parsons. Special Issue: Perspectives on Recent Intelligent Agents Research as Viewed through Two Conferences. *Knowledge Engineering Review*, Vol. 13, No. 2, pp. 129-130, June 1998.
10. A. Howe and E. Dahlman. Characterizing domain specific effects in flaw selection for partial order planners. Colorado State University, Computer Science Dept. TR 97-112, June 1997.
11. S. Rana, A.E. Howe, L.D. Whitley and K. Mathias. Genetic Scheduling with Approximate Evaluation. Abstract and presented paper at *INFORMS Conference*, Washington, DC, May 4-7, 1996.
12. D. Dreilinger and A.E. Howe. An Information Gathering Agent for Querying Web Search Engines. Colorado State University, Computer Science Dept. TR 96-111. April 1996.
13. A. Borg, A. Howe, and M.J. Irwin. Women's Science Contributions Celebrated. In *Computing Research News*, Vol. 8, No. 2, March 1996.
14. A.E. Howe. 1995 Spring Symposia Report: Integrated Planning Applications. In *AI Magazine*, Vol. 16, No. 3, Fall 1995.

15. R. Srinivasan and A.E. Howe. New Methods for Plan Selection and Refinement in a Partial-Order Planner. Colorado State University, Computer Science Dept. Technical Report CS-95-103. July 1995.
16. R.S. Sojda, D. J. Dean, and A.E. Howe. Development of a Decision Support System for Wetland Management on National Wildlife Refuges. In *AI Applications*, 8(2):44-50, 1994.
17. A.E. Howe. Pipeline Issues and Visibility of Women in CS: Increasing the Number of Role Models. Invited paper for *NSF Workshop on Improving the Status of Women in Computing Sciences*, October 1992, Colorado Springs, CO.
18. P.R. Cohen and A.E. Howe. Benchmarks Are Not Enough; Evaluation Metrics Depend on the Hypothesis. In *Collected Notes from on Benchmarks and Metrics Workshop*, NASA Ames, June 25, 1990.
19. P.R. Cohen, A.E. Howe, and D.M. Hart. Intelligent Real-Time Problem Solving: Issues and Examples. In *Intelligent Real-Time Problem Solving (IRTPS): Workshop Report*, L.D. Erman (Ed.) December, 1989.
20. A.E. Howe. 1987. A Constructive Approach to Decision Making. Unpublished Master's project.
21. A.E. Howe and P.R. Cohen. Dynamic Construction of Decisions. *COINS Technical Report 87-62*, University of Massachusetts. February, 1987.
22. A.E. Howe. Learning to Design Mechanical Engineering Problems. *EKSL Working Paper 86-01*, University of Massachusetts. January, 1986.
23. A.E. Howe. HOW? A Customizable, Associative Network Based Help Facility, *CIS Technical Report MS-CIS-83-14*, University of Pennsylvania. July, 1983.

## Teaching, Advising and University Service

### Courses Taught

- Freshman Seminar (CS192, undergraduate)
- Foundations in Programming (CS160, undergraduate)
- Data Structures and Algorithms (CS200, undergraduate)
- Programming Languages (CS253, undergraduate)
- Foundations of Computer Science (CS301, undergraduate)
- Introduction to Artificial Intelligence (CS440, undergraduate)
- Artificial Intelligence (CS540, graduate)
- Empirical Methods in Computer Science (CS580, experimental graduate course)
- Building Web-based Information Systems (CS580, experimental graduate course)
- Topics in Artificial Intelligence (CS640/641, graduate)
- Multimedia Information Retrieval (CS696V, experimental graduate course)

### Graduate Advisees

**Keith Freedman, M.S.** Fall 1994, Thesis: “A System for Ground-Based Radar Placement with Airborne Radar Flight Track Generation”

**Raghavan Srinivasan, M.S.** Fall 1995, Thesis: “Improving the Search Efficiency of a Partial Order Planner”

**Daniel Dreilinger, M.S.** Summer 1996, Thesis: “Description and Evaluation of a Meta-Search Agent”

**Thomas Thorpe, M.S.** Spring 1997 (with C. Anderson), Project: “Vehicle Traffic Light Control Using SARSA”

**Gabriel Somlo, M.S.** Fall 1997, Thesis: “State Transition Dependency Detection”

**Larry D. Pyeatt, Ph.D.** Summer 1999, Dissertation: “Integration of POMDP Planning and Reinforcement Learning for a Simulated Robotic Environment”

**Jean-Paul Watson, M.S.** Fall 1999 (with D. Whitley). Thesis: “The Impact of Approximate Evaluation on the Performance of Search Algorithms for Warehouse Scheduling”

**Laura Barbulescu, M.S.** Fall 1999 (with D. Whitley). Thesis: “Lower Bound Computation for Structured Flowshop Scheduling”

**Ming Bao, M.S.** Fall 2003: Project: “Tabletop Robot”

- Jean-Paul Watson, Ph.D.** Fall 2003 (with D. Whitley). Thesis: “Empirical Modeling and Analysis of Local Search Algorithms for the Job-Shop Scheduling Problem”
- Elizabeth Boese, M.S.** Spring 2005. Thesis: “Stereotyping The Web: Genre Classification of Web Documents”
- Laura Barbulescu, Ph.D.** Fall 2005 (with D. Whitley). Thesis: “Analysis of Algorithm Performance for an Oversubscribed Scheduling Problem”
- Gabriel Somlo, Ph.D.** Fall 2005. Thesis: “Agents for Personalized Client-Side Information Gathering From the Web”
- Mark Roberts, M.S.** Fall 2005. Thesis: “Modeling Choices in Two Oversubscribed Scheduling Problems”
- Mark Rogers, M.S.** Fall 2006. Thesis: “Infeasible Search in Oversubscribed Satellite Scheduling”
- Andrew Sutton, M.S.** Fall 2006. Thesis: “A Two-Phase Dynamic Local Search Algorithm for Maximizing Expected Success in On-Line Orbit Track Scheduling”
- Landon Flom, M.S.** Spring 2008. Thesis: “Comparison of the Behavior and Performance of Supervised and Unsupervised Tree-Like Hybrid Models”
- Ryan Forbes, M.S.** Summer 2008. Thesis: “An Evaluation of Collaborative Filtering Baseline Parameterization on Multiple Data Sets”
- Crystal Redman, M.S.** Spring 2009. Thesis: “Performance Trade-Offs in Multi-Agent Urban Traffic Control”