

CURRICULUM VITAE

University of Idaho

NAME: Heckendorn, Robert B.

DATE: Sep 15, 2007

RANK OR TITLE: Associate Professor

DEPARTMENT: Computer Science

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DATE OF FIRST EMPLOYMENT AT UI: August 1999

DATE OF TENURE: May 2006

DATE OF PRESENT RANK OR TITLE: May 2006

EDUCATION BEYOND HIGH SCHOOL:

Degrees:

Ph.D., Computer Science, Colorado State University, Fort Collins, Colorado, 1999,
Dissertation Title: *Patterns of Epistasis and Optimization Problem Difficulty for Evolutionary Algorithms*, Major Professor: Dr. Darrell Whitley

M.S., Computer Science, University of Arizona, Tucson, Arizona, 1979

B.A., Mathematics, University of Oklahoma, Norman, Oklahoma, 1977,

EXPERIENCE:

Teaching, Extension and Research Appointments:

Associate Professor in Computer Science University of Idaho, Moscow, Idaho (May 2006-present)

Assistant Professor in Bioinformatics and Computational Biology University of Idaho, Moscow, Idaho (2002-2006, appointment via the BCB program)

Assistant Professor in Computer Science University of Idaho, Moscow, Idaho (Aug 1999-present)

Teaching Assistant Colorado State University, Fort Collins, Colorado (1999)

Research Assistant Colorado State University, Fort Collins, Colorado (1995-1998)

Teaching Assistant University of Arizona, Tucson, Arizona (Aug 1977-Jul 1979)

Student Consultant University of Oklahoma, Norman, Oklahoma (Aug 1972-Jul 1977)

Summer Student (Computer Lab Assistant) University of Oklahoma, Norman, Oklahoma (1971)

Non-academic Employment:

Research and Development Engineer Hewlett-Packard Corporation (Calculator Div., Corvallis, Oregon; Lisp Div., Software Development Div., Fort Collins, Colorado) (Jul 1979-Jan 1995)

Summer Student Amoco Research Lab, Tulsa, Oklahoma (Jun 1978-Aug 1978)

Consulting:

Private Consulting Chrysalis Software, Fort Collins, Colorado (Jan 1995-Jul 1999)

Affiliations (University of Idaho):

Initiative for Bioinformatics and Evolutionary Studies (IBEST)
 Center for Secure and Dependable Systems (CSDS)
 Bioinformatics and Computational Biology degree program (BCB)

TEACHING ACCOMPLISHMENTS:

Areas of Specialization: Evolutionary Computation, Epistasis and Evolutionary Processes, Machine Learning, Walsh Analysis, the Emergence of Cooperation, Bioinformatics, Computational Biology, Languages and Compilers, Algorithms for Message Passing Architectures

Courses Taught:

The CS499 and CS404 courses were my creation to support the development and use of the Beowulf cluster.

Semester	Course No.	Course Name	Avg. Eval Inst/Course	Num. Resp.	End Semester Class Size
Fall 1999	CS310	Programming Languages (new)	3.2	17	28
Spring 2000	CS310	Programming Languages	2.8	26	28
Spring 2000	CS472/572	Evolutionary Computation (new)	3.6	9	10+5(video)
Fall 2000	CS310	Programming Languages	3.2	18	23
Fall 2000	CS499/599	Beowulf Cluster Design (new)	4.0	2	9
Spring 2001	CS310	Programming Languages	3.3	32	41
Spring 2001	CS404/504	High Performance Computing (new)	3.3	14	18
Fall 2001	CS310	Programming Languages (new)	3.4	21	30
Spring 2002	CS310	Programming Languages	3.5	15	27
Fall 2002	CS310	Programming Languages	3.5/3.2	17	31+6(video)
Spring 2003	CS445	Compilers (new)	2.9/2.9	20	35
Spring 2003	CS499	Beowulf Design (new)	3.9/3.9	8	12
Fall 2003	CS504(CS515)	Computational Biology (new)	3.0/3.1	9	23+3(video)
Spring 2004	CS445	Compilers	3.7/3.4	23	42+4(video)
Fall 2004	CS472/572	Evolutionary Computation	3.6/3.8	18	30+3(video)
Spring 2005	CS445	Compilers	3.5/3.3	15	31+3(video)
Fall 2005	CS415/515	Computational Biology	3.0/2.8	6	10
Spring 2006	CS445	Compilers	2.5/2.7	12	43+4(video)
Fall 2006	CS472/572	Evolutionary Computation	3.3/3.3	4	12+0(video)
Fall 2006	CS404/504	Artificial Life and Biosimulation (new)	(too few)	(too few)	8
Fall 2006	CS445	Compilers	4.0/4.0	2	5(video only)
Spring 2007	CS445	Compilers	3.7/3.6	10	19+2(video)
Spring 2007	CS210	Programming Languages	3.6/3.4	5	14+6(video)
Fall 2007	CS445	Compilers	4.0/4.0	4	6+2(video)
Fall 2007	CS210	Programming Languages	3.8/3.5	11	17
Spring 2008	CS415/515	Computational Biology	3.7/3.3	3	10+1(video)
Spring 2008	CS210	Programming Languages	3.7/3.6	7	11
Fall 2008	CS210	Programming Languages	3.3/3.1 ¹	10	21
Fall 2008	CS472/572	Evolutionary Computation	3.5/4.0	2	6
Fall 2008	CS401/501	CS Seminar (new) (shared with Dr. Soule)	3.3/3.5	4	12
Spring 2009	CS210	Programming Languages			
Spring 2009	CS504	Stochastic Optimization (new) (shared with Dr. Soule)			
Fall 2009	CS445	Compilers			
Fall 2009	CS105	Introduction to CS as a profession			

Students Advised:

I normally advise approximately 25 undergraduate and 5 graduate students a semester. I have advised two masters students and one Ph.D. to completion.

¹All 4s and 5s, one person hated it. Ignoring them should be 3.6/3.4.

Graduates Supervised:CURRENT STUDENTS**none**GRADUATED STUDENTS**Armand Bankhead** (Ph.D. BCB) - (Jan 2003 - Dec 2006) Title: "Computational Modeling of Cancer Etiology and Progression Using Neural Networks and Genetic Cellular Automata"**Smitha Kara (nee Surakanti)** (MS BCB thesis option) - (Jan 2003 - Aug 2005) Title: "Using Classic Optimization to Speed up burn in and Mixing in Markov Chain Monte Carlo Methods for Phylogenetic Inference"**Jian Shen** (MS CS thesis option) - (Jan 2003 - May 2004) Work was on evolutionary optimization of maximum likelihood trees and the "longest branch hypothesis". Title: "A New Representation Scheme for Genetic Algorithms for Solving the Phylogenetic Inference Problem"INACTIVE STUDENTS**Brian Kramer** (Ph.D. BCB) - (Sep 2004 - 2007) Exploring effective divide and conquer algorithms for phylogenetic inference on massively parallel machines**Tim Meekhof** (MS CS thesis option) - (Sep 2004 - 2007) Protein classification using Markov models and evolutionary optimization of sequence translation**John Russo** (Ph.D. CS) - (Sep 2003 - present) Remote student**Kurt Derr** (Ph.D. CS) - (Fall 2002 - present) Remote student from INEL. (switching advisor)**Jon Meyer** (Ph.D. CS) - (Jan 2003 - Sep 2005) Learning subtasks by evolutionary means (switching advisor)**Kavitha Madduri** (MS CS) - (Dec 2000 - Jul 2002) Elogo (a research platform for the study of the evolution of cooperative/competitive behavior)**Sreekanth Malladi** (MS CS) - (May 2001 - Nov 2001) Evolutionary Approach to Cracking Security Protocols (served as temporary major advisor while advisor on leave)**Karl Riley** (MS CS) - (Jul 2000 - Sep 2000) Elogo development (went to industry)**Graduate Committee Work:**CURRENT STUDENTS**Audra Johnson** (MS BCB) Disordered protein prediction 2007-**Xiaojun Hu** (Ph.D. BCB) Computer Modeling of Potato Virus Crossover and Resistance 2006-**Jason Stevens** (MS CS) Controlling code bloat with increased crossover probabilities 2006-2007**Matt Settles** (Ph.D. CS) Swarm Based Optimization and microarray analysis 2006-**Jennifer Ripplinger** (Ph.D. BCB) Bioinformatic databases 2004-switchedAdvisors**Jorge Williams** (Ph.D. CS) High performance graphics algorithms 2002-GRADUATED STUDENTS**Ryan Bradetich** (MS CS) Security 2007-2007**Russell Thomason** (MS CS) Using evolved teams on the disordered protein problem 2006-2007**Alan Piszcz** (Ph.D. CS) Methodical analysis of population size on affectiveness of evolutionary techniques on problems of varying difficulty 2002-2006**Jose Miguel Ponciano** (Ph.D. Math/Stat) Statistical Models for Population Genetics 2004-2006**Matt Settles** (MS CS) Swarm Based Optimization 2005-2006**Hua Feng** (MS BCB) 2000-2006**Zaid Abdo** (Ph.D. Math) Statistical Analysis of Popular Bioinformatic Applications and Algorithms 2003-2005**Brian Auer** (MS ME thesis option) Optimizing Space Frames with Evolutionary Computation 2004-2005**Gerard Goh** (MS CS thesis option) A Database Based Analysis of Error Rates in the PONDR Series of Disordered Protein Predictors 2001-2005

Xian Liu (MS CS thesis option) Models of Code Growth in Genetic Programming 2004-2005
Johnathan Graham (Ph.D. CS) Dynamic Reallocation of Data in Object Oriented Data Bases 2001-2005
Matt Settles (MS CS thesis option) Swarm Based Optimization 2003-2005
Christopher Willis-Ford (MS CS) 2002-2004
Joseph Richards (MS CS) 2000-2003
Sreekanth Malladi (MS CS thesis option) Preventing Replay Attacks on Security Protocols 2002-2003
Huaqiang Wu (Ph.D.) Using Game Theory to Optimize Defensive Response to Network Attacks 2002-2003 (I resigned from committee due to lack of progress)
Rob Shepherd (MS CS) Fault Tolerance in Evolved Sorting Networks ???-2002
Mark Meysenburg (Ph.D. CS) Random Number Generator Quality and Genetic Algorithm Performance 2000-2002
John Determan (MS CS) 1998-2000

Undergraduate Student Projects:

Semester	Class	Project Description
Spring 2001	CS481	Function database tool for use with my EC research.
Fall 2001	CS480	Student advising tool much like a corporate FAQ/support web page.
Fall 2001	CS480	Thermal monitoring and shutdown tool for Beowulf cluster.
Fall 2002	CS480	Extension of advising tool
Fall 2002	CS480	General purpose on-line signup sheet
Spring 2003	CS480	A domain specific Wiki for genealogy

Materials Developed for Education:

Beowulf Supercomputer: Using a Project Based Learning (PBL) approach I involved the students in my CS499 (Fall 2002) in the specification, design, purchase, construction, and software installation for a Beowulf Supercomputer cluster of 64 computers for use as a departmental and interdepartmental research tool. The Beowulf was then used to teach parallel computer programming (Spring 2001) using MPI. The design course was repeated for construction of the second Beowulf in (Spring 2003).

Web Based Class Program Feedback System: Constructed a automated web based assignment submission, pregrading feedback, and final grading system for use in computer science classes where complex executable assignments need to be managed. The system gives students feedback during development and final grading. It also provides a mechanism for delivering, via the web, the assignments to grade by hand to a human grader. This improves communication with the student on complex requirements, allows for monitoring of student progress and greatly simplifies the process of providing help by making it trivial to reconstruct and debug each student's assignment.

Courses Developed:

I developed all courses entirely from scratch. Although I looked at the work of previous instructors, I generally had my own ideas about content and direction in every case.

Honors and Awards in Teaching:

Outstanding Faculty Award, voted by ACM Student Chapter, 2005-2006, 2006-2007
 Naval Reserve Officer Training Corps (NROTC) Faculty Excellence Award, 2005

SCHOLARSHIP ACCOMPLISHMENTS:

Refereed Journal Publications († = student author):

- Armand Bankhead III[†], Robert B. Heckendorn, **Using Evolvable Genetic Cellular Automaton to Model Breast Cancer** *Genetic Programming and Evolvable Machines (special issue on medical applications)*, 8(4), pp 381-393, Elsevier Ltd, 2007
- Armand Bankhead III[†], Nancy S. Magnuson, Robert B. Heckendorn, **Cellular Automaton Simulation Examining Progenitor Hierarchy Structure Effects on Mammary Ductal Carcinoma in Situ**, *Journal of Theoretical Biology*, 246(3), pp 491-498, Elsevier Ltd, 2007
- Armand Bankhead III[†], Nancy S. Magnuson, and Robert B. Heckendorn, **Gene Knockout Experiments to Quantify a G2/M Genetic Network Simulation for Mammary Cancer Susceptibility**, *In Silico Biology* <http://www.bioinfo.de/isb/2006/06/0017/>, 6(0017), 2006
- R. B. Heckendorn, A. H. Wright, **Efficient Linkage Discovery by Limited Probing**, *Journal of Evolutionary Computation*, 12(4), pp. 517-545, MIT Press, Cambridge, MA., 2004 (presented material beyond 2003 work of the same name)
- K. Imamura[†], T. Soule, R. B. Heckendorn, J. A. Foster, **Behavioral Diversity and a Probabilistically Optimal GP Ensemble**, *Genetic Programming and Evolvable Machines*, 4(4), pp. 235-253, Kluwer Academic Publishers. 2003
- Darrell Whitley, Robert B. Heckendorn, Soraya Stevens, **Hyperplane Ranking, Nonlinearity and the Simple Genetic Algorithms** *Information Sciences (special issue on evolutionary computation)* 156(3-4), pp. 123-145, Elsevier, B.V., Amsterdam, Netherlands, 2003
- R. B. Heckendorn, **Embedded Landscapes**, *Journal of Evolutionary Computation*. 10(4), pp. 345-370, MIT Press, Cambridge, MA., Winter, 2002
- R. B. Heckendorn, **Building a Beowulf: Leveraging Research and Department Needs for Student Enrichment via Project Based Learning**. *Journal of Computer Science Education*, 12(4), pp. 255-273, Swets & Zeitlinger Publishers, The Netherlands, 2002
- Terence Soule and Robert B. Heckendorn, **An Analysis of the Causes of Code Growth in Genetic Programming**. *Journal of Genetic Programming and Evolvable Hardware*. Kluwer Academic Publishers. 3(3), pp283-309, 2002
- Darrell Whitley, Soraya Rana, and Robert B. Heckendorn, **Exploiting Separability in Search: The Island Model Genetic Algorithm**. *Journal of Computing and Information Technology (Special Issue on Evolutionary Computing)*. 7(1), pp. 33-47. 1999.
- R. B. Heckendorn and Darrell Whitley, **Predicting Epistasis from Mathematical Models**. *Evolutionary Computation*. MIT Press. Cambridge, MA. 7(1). pp. 69-101. 1999.

Refereed Conference Publications:

- Russell Thomason[†], Robert B. Heckendorn, and Terence Soule **Training Time and Team Composition Robustness in Evolved Multi-Agent Systems**, *Genetic Programming, Proceedings of the 11th European Conference, EuroGP 2008*, pp 1-12, 2008
- Shude Zhou[†], Zengqi Sun, and Robert B. Heckendorn, **Extended probe method for linkage discovery over high-cardinality alphabets**, *GECCO 2007: Proceedings of the Genetic and Evolutionary Computation Conference*, ACM Press, New York, NY, pp 1484-1491, ACM, 2007
- Shude Zhou[†], Robert B. Heckendorn, and Zengqi Sun, **Generalized Embedded Landscape and Its Decomposed Representation**, *Lecture Notes in Computer Science 4247/2006*, pp 9-17, Springer Berlin, Berlin, 2006
- Terence Soule, Robert B. Heckendorn, **Improving Performance And Cooperation In Multi-Agent Systems**, *Genetic Programming Theory and Practice 2007*, Center for Complex Systems, University of Michigan Springer, Chapter 13, 2007
- Timothy Meekhof[†], Gary W. Daughdrill, Robert B. Heckendorn, **String transformation-based Bayesian classification or proteins**, *GECCO 2006: Proceedings of the Genetic and Evolutionary Computation Conference*, ACM Press, New York, NY, pp301-302, 2006
- Jason Stevens[†], Robert B. Heckendorn, Terry Soule, **Exploiting Disruption Aversion to Control Code Bloat**, *GECCO 2005: Proceedings of the Genetic and Evolutionary Computation Conference*, ACM Press, New York, NY, pp1605-1612, 2005

- Tim Meekhof[†], Robert B. Heckendorn, **Using Evolutionary Optimization to Improve Classification with Limited Training Data**, *GECCO 2005: Proceedings of the Genetic and Evolutionary Computation Conference*, ACM Press, New York, NY, pp2211-2212, 2005
- Armand Bankhead III[†], Nancy Magnuson, Robert B. Heckendorn, **Modeling Multicellular and Tumorous Existence with Genetic Cellular Automata**, *Artificial Life IX, Proceedings of the Ninth International Conference on the Simulation and Synthesis of Living Systems*, Bradford Books, pp220-225, 2004
- Jian Shen[†] and Robert B. Heckendorn, **Discrete Branch Length Representations for Genetic Algorithms in Phylogenetic Search** *Applications of Evolutionary Computing*, LNCS3004, Springer-Verlag, Berlin, pp94-103, 2004 (I presented at EUROGP)
- Robert B. Heckendorn and Alden Wright, **Efficient Linkage Discovery by Limited Probing** *GECCO 2003: Proceedings of the Genetic and Evolutionary Computation Conference*, LNCS2724, Springer-Verlag, Berlin, pp1003-1011, 2003 (I presented)
- Robert B. Heckendorn **Partitioning, Epistasis, and Uncertainty**, *Foundations of Genetic Algorithms - 7*, Morgan Kaufmann Publishers, Inc., Palo Alto, CA., pp27-44, 2002 (I presented)
- S. Malladi[†], J. Alves-Foss and R. Heckendorn. **On Preventing Replay Attacks on Security Protocols**. *Proceedings of the International Conference on Security and Management (SAM02)*, CSREA Press, Las Vegas, NV, USA, pp. 77-83, 2002 (Sreekanth presented)
- Kosuke Imamura[†], Robert B. Heckendorn, Terence Soule, James A. Foster **N-version Genetic Programming via Fault Masking**, *Genetic Programming, Proceedings of the 5th European Conference, EuroGP 2002*, Springer-Verlag, Berlin, pp. 172-181, 2002. (Kosuke presented)
- Kosuke Imamura[†], Robert B. Heckendorn, Terence Soule, James A. Foster **Abstention Reduces Errors - Decision Abstaining N-version Genetic Programming**, *GECCO 2002: Proceedings of the Genetic and Evolutionary Computation Conference*, Morgan Kaufmann Publishers, Inc., Palo Alto, CA., pp. 796-803, 2002. (Kosuke presented)
- Terence Soule and Robert B. Heckendorn. **Function Sets in Genetic Programming** (accepted as 1 page short version) *Proceedings of the Genetic and Evolutionary Computation Conference 2001*. Morgan Kaufmann Publishers, Inc., Palo Alto, CA., pp. 190, 2001.
- Robert B. Heckendorn, **Of Heisenberg and Epistasis** *Proceedings of the Genetic and Evolutionary Computation Conference 2001*. Morgan Kaufmann Publishers, Inc.. Palo Alto, CA., pp. 765, 2001.
- Heckendorn, R. B. and Soraya Rana and Darrell Whitley. **Polynomial Time Summary Statistics for a Generalization of MAXSAT**. Wolfgang Banzhaf and Jason Daida and Agoston E Eiben and Max H. Garzon and Vasant Honavar and Mark Jakiela and Robert E. Smith. *Proceedings of the Genetic and Evolutionary Computation Conference*. Morgan Kaufmann Publishers, Inc.. Palo Alto, CA. pp281-288 1999. (I presented)
- Heckendorn, R. B. and Soraya Rana and Darrell Whitley. **Test Function Generators as Embedded Landscapes**. *Foundations of Genetic Algorithms - 5*. Thomas Bäck and Wolfgang Banzhaf eds. Morgan Kaufmann Publishers, Inc.. Palo Alto, CA. 1999 (I presented)
- Heckendorn, R. B. **Walsh Functions and Predicting Problem Complexity**. *Artificial Neural Networks and Genetic Algorithms*. George D. Smith, Nigel C. Steele, and Rudolf F. Albrecht eds Springer-Verlag. Vienna, Austria. pp179-182, 1998 (I presented)
- Rana, Soraya and R. B. Heckendorn and Darrell Whitley. **A Tractable Walsh Analysis of SAT and its Implications for Genetic Algorithms**, *Proceedings of the Fifteenth National Conference on Artificial Intelligence*. AAAI Press. Menlo Park, CA. pp392-397. 1998 (Soraya presented)
- Heckendorn, Robert B., L. Darrell Whitley, and Soraya Rana. **Nonlinearity, Hyperplane Ranking and the Simple Genetic Algorithm**. *Foundations of Genetic Algorithms - 4*. Richard K. Belew and Michael Vose eds Morgan Kaufmann Publishers, Inc.. Palo Alto, CA. 1997 (I presented)

Heckendorn, R. B. and D. Whitley. **A Walsh Analysis of NK-Landscapes.** *Proceedings of the 7th International Conference on GAs.* Morgan Kaufmann Publishers, Inc., Palo Alto, CA. Thomas Bäck ed. 1997 (I presented)

Whitley, Darrell, Soraya Rana, R. B. Heckendorn. **Island Model GAs and Linearly Separable Problems.** AISB Workshop on Evolutionary Computation. 1997 (Darrell presented)

Book Chapters (invited/peer reviewed):

Whitley, D., S. Rana, and R. Heckendorn. **Representation Issues in Neighborhood Search and Evolutionary Algorithms.** *Genetic Algorithms and Evolution Strategies in Engineering and Computer Science.* D. Quagliarella and J. Periaux and C. Poloni and G. Winter. pp39-57, John Wiley. Chichester, England. 1998

Technical Reports (not refereed):

Heckendorn, R. B. and Charles Anderson. **A Multigrid Form of Value Iteration Applied to a Markov Decision Problem.** Colorado State University. CS-98-113. 1998

Miscellaneous Publications (invited/not refereed):

Lisa J. Carlson, Raymond Dacey, Robert B. Heckendorn and Annie S. Wu, **Computational Modeling of the Traditional Deterrence Game.** At the conference: International Studies Association 2008, San Francisco, 2008 (I presented)

Soule, Terence and Robert B. Heckendorn. **Evolutionary optimization of cooperative heterogeneous teams.** At the conference: Evolutionary and Bio-inspired Computation: Theory and Applications Volume 6563 – SPIE (The International Society of Optical Engineering), Published on-line, Misty Blowers, Alex F. Sisti, Editors, SPIE, 2007 (I presented)

Heckendorn, R. B. and Soraya Rana Stevens (uncredited editors) **Proceedings of the GECCO '01 Workshop** Morgan Kaufmann, 2001

Invited Talks:

Measuring the Bounds of Naturally Occurring Epistasis Talk at 9th *Annual Plant Sciences Institute Symposium on Epistasis: Predicting Phenotypes and Evolutionary Trajectories*, Iowa State University, Jun 2007

Introduction to Genetic Algorithms Tutorial at GECCO-2003, Chicago, Illinois, Jul 2003

Searching for Epistasis IBEST Seminar Series on "Doing Evolution", University of Idaho, Feb 2003

Introduction to Genetic Algorithms Tutorial at GECCO-2002, New York City, New York, Jul 2002

What Problems Can Evolution Solve? Epistasis and the Problem Space IBEST Seminar Series on "Explaining Evolution", University of Idaho, Apr 2002

Polynomial Time Walsh Analysis Tutorial at GECCO-2000, Orlando, Florida, Jul 2000

Walsh Analysis of Optimization Problems for Genetic Algorithms, Colorado State University Department of Mathematics Seminar, Fort Collins, Colorado, Dec 1998

What Makes Problems Hard for Genetic Algorithms, University of Wyoming Computer Science Colloquium, Larimie, Wyoming, Oct 1998

Grants:

Dates	Granting Agency	Total/Mine²	PI³	Comments
2004	Intel Corporation	\$24,000	R.B. Heckendorn	Processors for Beowulf
2003	Intel Corporation	\$24,000	R.B. Heckendorn	Processors for Beowulf
2003	Micron Technologies	\$490	R.B. Heckendorn	Beowulf memory modules
2003	Idaho EPSCoR	\$5,000	R.B. Heckendorn	Staff funding for access grid
2002-2007	NIH, COBRE (IP20 RR16448-01)	\$10,013,547/\$100,000	L. Forney	Construction of next Beowulf
2002-2004	NIH, BRIN (IP20 RR16454-01)	\$5,909,232/\$300,000	M. Laskowski	Upgrading Beowulf for Idaho researchers
2001	Idaho EPSCoR	\$50,000	R.B. Heckendorn	Purchase access grid node
2001	Micron Technologies	\$14,000	R.B. Heckendorn	Memory modules
2000-2003	NSF, EPSCoR (EPS 0080935)	\$499,994/\$45,000	J.A. Foster	Creating prototype Beowulf cluster
2000	University of Idaho, competitive seed grant	\$9,000	R.B. Heckendorn	Elogo platform

Materials Developed for Research:

Beowulf Supercomputers: I conceived of and constructed our first Beowulf supercomputer. This cluster of 64 PCs has become an important research tool in the department. The speed of the machine allows an experiment that would take a 24 hours on the fastest machine in our department to run to run in 25 minutes. The machine has generated numerous press articles including a mention in the Christian Science Monitor and a picture in the University of Idaho Foundation Annual Report. The machine has proven an invaluable in speeding research and was used as a key infrastructure component of follow-on NIH BRIN and COBRE grants. I designed and ordered the first installment of our second Beowulf cluster 100+ dual CPU servers. We now own three Beowulf clusters as a result and a 1200 square foot supercomputing facility for use by researchers throughout Idaho.

Access Grid Node: I have championed the first installation in Idaho of an Access Grid Node at the University of Idaho. This will be the first of a series of classroom size interactive internet 2 based teleconferencing classrooms. This technology provides an economical way to leverage faculty and improve inter/intrastate research collaboration. First meeting with someone other than support personnel occurred on Feb 7, 2003. This has since been used for regional BRIN and NIH meetings. It was the prototype for in the Idaho wide teleconferencing portion of \$10M NIH infrastructure grant calling for construction of other larger access grid nodes such as in LSS 277.

Professional and Scholarly Organizations:

American Association for Computing Machinery (ACM)
 American Association for Artificial Intelligence (AAAI)
 International Society for Genetic and Evolutionary Computation (ISGEC)
 now Association for Computing Machinery Special Interest Group in
 Evolutionary Computation (SIGEVO)
 International Society for Computational Biology (ISCB)

Honors and Awards in Research:

Chosen to participate in the two week long **Workshop on Molecular Evolution** at the Marine Biological Laboratory Woods Hole, Massachusetts, Jul-Aug 2003 (internationally competitive application)

¹(Total amount of grant)/(amount under my control). If no denominator given then all of the funds are under my control.

²I am an investigator in grants where I am not PI.

Conferences and Workshops Attended:

Genetic and Evolutionary Computation Conference '09 (GECCO-2009), Montreal, Canada, Jul 2009

Genetic and Evolutionary Computation Conference '08 (GECCO-2008), Atlanta, Jul 2008

9th Annual Plant Sciences Institute Symposium on Epistasis: Predicting Phenotypes and Evolutionary Trajectories, Iowa State University, Jun 2007

Evolutionary and Bio-inspired Computation: Theory and Applications SPIE (The International Society of Optical Engineering), Orlando, Florida, April 2007

Genetic and Evolutionary Computation Conference '06 (GECCO-2006), Seattle, Jul 2006

Genetic and Evolutionary Computation Conference '05 (GECCO-2005), Washington D.C., Jun 2005

Genetic and Evolutionary Computation Conference '04 (GECCO-2004), Seattle, Washington, Jul 2004

European Conference on Genetic Programming '04 (EuroGP-2004), Coimbra, Portugal, Apr 2004

Dagstuhl Workshop on Evolutionary Computation, (by invitation only), Dagstuhl, Germany, Jan 2004

Workshop on Molecular Evolution at the Marine Biological Laboratory, (competitive application), Woods Hole, Massachusetts, Jul-Aug 2003

Pacific Symposium of Biocomputing, Hawaii, Jan 2003

Genetic and Evolutionary Computation Conference '03 (GECCO-2003), Chicago, Illinois, Jul 2003

Genetic and Evolutionary Computation Conference '02 (GECCO-2002), New York City, New York, Jul 2002

Foundations of Genetic Algorithms 7, Malaga, Spain, Apr 2002

Dagstuhl Workshop on Evolutionary Computation, (by invitation only), Dagstuhl, Germany, Jan 2002

First Annual Institutional Development Award (IDeA) Program Meeting, Oklahoma City, Oklahoma, Oct 2001

Alaska Meeting of Western EPSCoR States to build research collaborations, Fairbanks, Alaska, Aug 2001

Genetic and Evolutionary Computation Conference '01 (GECCO), San Francisco, California, Jul 2001

Genetic and Evolutionary Computation Conference '00 (GECCO), Las Vegas, Nevada, Jul 2000

Supercomputer 2000 Dallas, Texas, Jun 2000

Genetic and Evolutionary Computation Conference '99, Orlando, Florida, Jul 1999

Foundations of Genetic Algorithms 5 (FOGA), Leiden, Netherlands, Sep 1998

AAAI-98, Madison, Wisconsin, Jul 1998

CRA Academic Careers Workshop, Madison, Wisconsin, Jul 1998

The Seventh International Conference on Genetic Algorithms (ICGA), East Lansing, Michigan, Jul 1997

International Conference on Artificial Neural Networks and Genetic Algorithms '97, Norwich, England, Apr 1997

Foundations of Genetic Algorithms 4 (FOGA), San Diego, California, Aug 1996

The Sixth International Conference on Genetic Algorithms (ICGA), Pittsburgh, Pennsylvania, Aug 1995

Foundations of Genetic Algorithms 3 (FOGA), Estes Park, Colorado, Aug 1994
The Fourth International Conference on Genetic Algorithms, San Diego, California, Aug 1991
The International Joint Conference on Artificial Intelligence '87 (IJCAI), Milan, Italy, Aug 1987
The International Joint Conference on Artificial Intelligence '85 (IJCAI), Los Angeles, California, 1985
Object Oriented Programming, Systems, Languages, and Applications (OOPSLA), Portland, Oregon, 1983

SERVICE:**Reviewing for Journals:**

Computational Statistics and Data Analysis 2004, 2005
IEEE Transactions on Evolutionary Computation 1999, 2000, 2005, 2007(twice)
Journal of Evolutionary Computation 1997, 1998, 2001, 2002, 2004, 2005
Journal of Genetic Programming and Evolvable Hardware 2001, 2002
Nature Reviews Genetics 2001

Reviewing for Conferences:

European Conference on Genetic Programming (EuroGP) 2001, 2003
Foundations of Genetic Algorithms (FOGA) 2007
Genetic and Evolutionary Computation Conference (GECCO) Workshop on Gene Expression 2001
Genetic and Evolutionary Computation Conference (GECCO) 1999, 2002, 2006(2 sessions), 2007(2 sessions)
Hawaii International Conference On System Sciences 2002
Society for the Study of Artificial Intelligence and the Simulation of Behaviour (AISB) Workshop on Evolutionary Computation 1997

Committees:

Borah Committee (university wide) A faculty/student committee of the Borah Foundation (affiliated with the Martin Institute for Peace Studies and Conflict Resolution) at the University of Idaho, 2005-

Hardware Software Planning Committee (departmental) 2008- *Duties include strategizing the future direction of computing in the department, recommending hardware and software purchases and procedures and policies.*

Graduate Student Application Committee (departmental) 2006

Distinguished Faculty in Bioinformatics Search Committee (departmental) 2002-2003

Hardware Software Planning Committee (departmental) 1999-2002

Library Liaison (departmental) 1999-present *Coordinating the needs of the department with the library.*

Chair Search Committee (departmental) 2000 and 2001 *(two searches were performed)*

Faculty Search Committee (departmental) 2000, 2006

Faculty Advisor (departmental) for a student in the "Research Experiences for Undergraduates (REU)" summer program funded by NSF, 2003, 2004

Professional Service:

National Science Foundation Advisory Panel in Biological Databases and Informatics, 2005, 2007
Chaired sessions at GECCO 2003, 2004, 2005

Invited to give tutorials at three separate GECCO meetings

University Service Meetings:

Represented our BRIN grant at **First Annual Institutional Development Award (IDeA) Program Meeting** Oklahoma City, Oklahoma, Oct 2001

Represented the State of Idaho at **Alaska Meeting of Western EPSCoR States to build research collaborations**, Fairbanks, Alaska, Aug 2001