CURRICULUM VITAE

University of Idaho

NAME: Heckendorn, Robert B.

DATE: Jan 20, 2019

RANK OR TITLE: Associate Professor

DEPARTMENT: Computer Science

OFFICE LOCATION AND CAMPUS ZIP: JEB 226, 1010

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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:

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:

Fully Paid Sabbatical Leave for one year to the *BEACON Center for the Study of Evolution in Action*, an NSF funded center for research at Michigan State University (2011-2012)

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):

BEACON center for the Study of Evolution in Action (Michigan State) (BEACON)
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, Theory of Epistasis in Evolutionary Systems, Machine Learning, Walsh Analysis, the Emergence of Cooperation, Bioinformatics, Computational Biology, Languages and Compilers

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

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
Spring/Fall 2015/Spring 2016	CS480/481	Adding XBee local ad hoc networking to cell phone robots

Materials Developed for Education:

State Board of Education Standards for CS: I worked on the state-wide committees for Idaho Computer Science Teacher standards (2015) and the Idaho Computer Science K-12 Content Standards (2016).

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). These beowulfs lead to the computational biology core clusters.

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. This software is used in most of my classes.

Courses Developed:

CS 0 for retention: With the help of Dr. Terence Soule I developed the CS112, "Computational Thinking", course. We replaced the CS105 professional course with this CS 0 course for students who haven't had any programming experience to introduce them to the programming, computer science concepts, computers in society, and give them confidence to step into CS120 (CS 1). It

uses a unique combination of three freely available and well documented languages. I then went through the accreditation process to have the course accepted as a state wide GEM course suitable as a math credit. Then I helped move the course to become a Dual Credit course and act as the professor of record for the CS112 at Sandpoint High School.

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.

Courses Taught: Evaluated on a scale of 0 to 4. Numbers are (instructor quality)/(course quality).

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)	-	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 w/Dr. Soule)	3.3/3.5	4	12
Spring 2009	CS210	Programming Languages	3.7/3.4	12	24
Spring 2009	CS504	Stochastic Optimization (new, w/Dr. Soule)	(too few)	-	4
Fall 2009	CS445	Compilers	3.8/3.8	6	13
Fall 2009	CS105	Introduction to CS as a profession	3.1/2.8	23	47
Spring 2010	CS120	Intro to programming (all: group lec + 3 labs)	3.2/3.2	18	57
Spring 2010	CS210	Programming Languages	3.6/3.4	7	17
Spring 2010	CS499/502	COTS Robots (w/Dr. Soule)	(too few)	-	8
Fall 2010	CS445	Compilers	3.6/3.6	5	16+4(video)
Fall 2010	CS472/572	Evolutionary Computation	3.7/3.7	7	15+4(video)
Spring 2011	CS210	Programming Languages	3.6/3.3	13	28
Spring 2011	CS415/515	Computational Biology	2.9/2.7	8	19
Spring 2011	CS499	Robots (w/Dr. Soule)	(too few)	-	7
Fall 2011		On Sabbatical at Michigan State			
Spring 2012		On Sabbatical at Michigan State			
Fall 2012	CS472/572	Evolutionary Computation	1.0/1.0 [2]	1	7 (video)
Fall 2012	CS270	Systems Software (NEW)	3.5/3.4	11	26
Spring 2013	CS395/M395	Analysis of Algorithms (NEW)	3.1/3.2	13	23
Spring 2013	CS415/515	Computational Biology	3.0/3.0	2	7+3(video)
Fall 2013	CS105	Introduction to CS as a profession (rework course)	3.7/3.4	28	61
Fall 2013	CS445	Compilers	3.8/4.0	4	18+3(video)

Semester	Course No.	Course Name	Avg. Eval Inst/Course	Num. Resp.	End Semester Class Size
Spring 2014	CS210	Programming Languages	3.4/3.2	5	23
Spring 2014	CS270	Systems Software	3.4/3.4	8	27
Spring 2014	CS401/501	CS Seminar	(too few)	-	17
Fall 2014	CS112	Computational Thinking	2.9/2.9	43	99
Fall 2014	CS470	Artificial Intelligence (NEW)	4.0/3.7	6	15
Spring 2015	CS472/572	Evolutionary Computation	3.8/3.8	4	10+1(video)
Spring 2015	CS401/501	CS Seminar	3.8/3.8 [3]	5	5
Spring 2015	CS415/515	Computational Biology	2.5/2.5	4	12
Fall 2015	CS112	Computational Thinking	3.0/3.2	23	75
Fall 2015	CS445	Compilers	3.3/2.9	9	25+1(video)
Spring 2016	CS112	Computational Thinking	3.5/3.4	12	45
Spring 2016	CS445	Compilers (video replay only)	4.0/3.5	2	6(video)
Spring 2016	CS404/504	Machine Learning and Data Mining (NEW)	3.4/3.3	10	18+1(video)
Fall 2016	CS445	Compilers	2.5/3.3	4	25+2(video)
Fall 2016	CS472/572	Evolutionary Computation	4.0/4.0	4	10+2(video)
Spring 2017 [4]	CS112	Computational Thinking	3.1/2.9	10	74
Spring 2017	CS401/501	CS Seminar	3.2/2.6	4	15
Spring 2017	CS445	Compilers (video replay only)	2.7/3.0	3	7
Spring 2017	CS404/504	Machine Learning and Data Mining	3.0/3.0	3	16
Fall 2017	CS112	Computational Thinking	3.0/3.0	25	73
Fall 2017	CS270	Systems Software	1.8/1.9	8	32
Fall 2017	CS401/501	CS Seminar	2.6/2.6	8	29
Fall 2017	CS505	Prof. Dev.: Teaching Computational Thinking	(too few)	-	10 (live video across the state)
Spring 2018	CS112	Computational Thinking	2.1/2.3	15	44
Spring 2018	CS475/575	Machine Learning	3.3/3.2	6	25 + 6(video)
Fall 2018		On Sabbatical at Brown University			
Spring 2019	CS475/575	Machine Learning	3.2/3.2	12	33
Fall 2019	CS112	Computational Thinking	3.0/3.0	24	56
Fall 2019	CS472/572	Evolutionary Computation	3.5/3.7	6	15

Students Advised:

I normally advise approximately 30 undergraduate and 5 graduate students a semester.

Graduates Supervised:

Current Students

Abdulah Alajlan (Ph.D.) - (Aug 2019 - present) Topic: Using machine learning to learn crowd behavior.

Tami Alghamdi (Ph.D.) - (Aug 2019 - present) Topic: Understanding the information transfer requirements for effectively using transfer learning in evolutionary algorithms.

Zac Benning (Ph.D.) - (Aug 2019 - present) Topic: evolving optimization strategy parameters.

Alaa Edris (Ph.D.) - (Aug 2019 - present) Topic: Using machine learning to learn crowd behavior.

Hossny Ghanem (Ph.D.) - (Aug 2019 - present) Topic: incorporating machine learning to create an enhanced online education system.

Tzu-Hua Yang (MS) - (Aug 2019 - present) Topic: using bioinformatic techniques to analyze the structure of music.

Graduated Students

Armand Bankhead (Ph.D. BCB) - (Jan 2003 - Dec 2006) Works at Oregon Health and Science University in Portland. 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"

[1] All 4s and 5s, one person hated it. Ignoring them should be 3.6/3.4.
[2] Only one person turned in eval and they got a D. Rest of class got As and one B.
[3] Only 501 data available. 401 was accidentally listed under Hasan Jamil.
[4] Took over last 1/3 of course from Greg who had to take medical leave.

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"

Joshua Rubini (MS CS non-thesis) - (Aug 2011 - Dec 2015) Topic: Cooperative robotics. Now works for military at China Lake. Project Title: "An Island Model Technique for Problems of Relative Fitness"

Damian Ball (MS CS non-thesis) - (Aug 2010 - Jul 2015) Topic: Evacuation Planning using a variant of Ant Colony optimization. Works in Bay Area. Project Title: "TrafficNet Stochastic Optimization Applied to Traffic"

Max McKinnon (MS CS non-thesis) - (Aug 2012 - May 2016) Topic: Enumeration of fitness landscapes on a hypercube. Works in San Francisco and completing degree in Spring of 2016.

Keith Drew (MS CS thesis) - (May 2016 - May 2017) Now works for Mitre in Boston. Thesis Title: "Evolving Traffic Assignments for Urban Evacuations"

Homaja Marisetty (MS CS non-thesis) - (Jan 2017 - Aug 2018) Topic: Personality Prediction from the limited vocabulary

Madhav Pandey (MS CS) - (Jan 2017 - Dec 2019) Topic: Real Time City Evacuation Planning using Transfer Learning

Inactive Students

Matt Halliday (PhD) - (Aug 2010) Topic: Using Ant Colony Optimization to do realtime evacuation planning for cities. (working in conjunction with Ahmed Abdel-Rahim from Civil Engineering, for medical reasons withdrew from school.)

Brian Kramer (Ph.D. BCB) - (Sep 2004 - 2007) Exploring effective divide and conquer algorithms for phylogenetic inference on massively parallel machines

Timothy 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 - ?) Remote student

Kurt Derr (Ph.D. CS) - (Fall 2002 - ?) Remote student from INEL. (switched Adviser)

Jon Meyer (Ph.D. CS) - (Jan 2003 - Sep 2005) Learning subtasks by evolutionary means (switched Adviser)

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 adviser while adviser on leave)

Karl Riley (MS CS) - (Jul 2000 - Sep 2000) Elogo development (went to industry)

Graduate Committee Work:

Current Students

None

Graduated Students

Ying Qian Zhan (Ph.D. BCB) 2013-2016

John Goettsche (MS CS) SNOBOL patterns in Unicon. 2012-2015.

Ilya Urievich Zhbannikov (Ph.D. BCB) Bioinformatic Tools for Small Sequence Analysis 2010-2015.

Heyan Huang (MS CS) 2012-2015.

Jayandra Pokharel (MS CS) Robot Vision 2012-2014.

Juan Marulanda (MS CS) Anticipatory Communications and Swarm Behavior 2012-2013.

Jafar Al-Gharaibeh (Ph.D. CS) Parallel Computation Features in the Unicon Language 2007-2012

Matt Settles (Ph.D. CS) Microarray Analysis 2006-2011

Ziad A. Al-Sharif (CS Ph.D.) Extensible Debugging Architectures 2007-2009

Audra Johnson (MS BCB) Disordered protein prediction 2007-2009

Xiaojun Hu (Ph.D. BCB) Computer Modeling of Potato Virus Crossover and Resistance 2006-2009

Jason Stevens (MS CS) Controling code bloat with increased crossover probabilities 2006-2007

Jennifer Ripplinger (Ph.D. BCB) Bioinformatic databases 2004-(switched Advisers)

Jorge Williams (Ph.D. CS) High performance graphics algorithms 2002-2008

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 effectiveness 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) Preventing Replay Attacks on Security Protocols 2002-2003

Huaqiang Wu (Ph.D. CS) 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

SCHOLARSHIP ACCOMPLISHMENTS:

Refereed Journal Publications († = student author):

Daniel M. Weinreich, Yinghong Lan, Jacob Jaffe, Robert B. Heckendorn, **The Influence of Higher-Order Epistasis on Biological Fitness Landscape Topography**, *Journal of Statistical Physics*, v172, p208–225, Springer, 2018

Daniel M Weinreich, Yinghong Lan, C Scott Wylie, Robert B Heckendorn, **Should Evolutionary Geneticists Worry About Higher-Order Epistasis?**, *Current Opinion in Genetics & Development*, v23, p700–707, Elsevier, 2013

Terence Soule, Robert B. Heckendorn, **A Practical Platform for On-Line Genetic Programming for Robotics**, *Genetic Programming Theory and Practice X*, p15–29, Springer, 2013

Terence Soule, Robert B. Heckendorn, **COTSBots: Computationally Powerful, Low-Cost Robots for Computer Science Curriculums**, *Journal of Computing Sciences in Colleges*, 27(1), p180–187, ACM, 2011

Shude Zhou, Robert B. Heckendorn and Zengqi Sun, **Detecting the Epistatic Structure of Generalized Embedded Landscape**, *Genetic Programming and Evolvable Machines*, 9(2), pp125–155, Springer, 2008

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:

Hasan M Jamil, Xin Mou, Robert B Heckendorn, Clinton L Jeffery, Frederick T Sheldon, Cassidy S Hall, Nina M Peterson, **Authoring Adaptive Digital Computational Thinking Lessons Using vTutor for Web-Based Learning**, *International Conference on Web-Based Learning*, pp125–131, Springer, 2018

Juan F Marulanda, Dean B Edwards, Robert B. Heckendorn, Terence Soule, **Learned Anticipation Strategy on Complex Behaviors and as an Approach to Generalization Behavior for the Coordination of an AUV Fleet**. *OCEANS 2018 MTS/IEEE Charleston*, pp1–9, IEEE, 2018

Drew, Keith J. and Heckendorn, Robert B and Abdel-Rahim, Ahmed and Marisetty, Homaja Pydi Kumar and Stalick, Anton, **Evolving a Real-time Evacuation for Urban Disaster Management**. *GECCO 2017: Proceedings of the Genetic and Evolutionary Computation Conference*, pp1089-1096, ACM, 2017

Terence Soule, Barrie D Robinson, Robert B Heckendorn, **Co-evolution of Sensor Morphology and Behavior**, *Proceedings of the 2016 on Genetic and Evolutionary Computation Conference Companion* pp135-136, ACM, 2016

Kodi CA Cumbo, Samantha Heck, Ian Tanimoto, Travis DeVault, Robert B Heckendorn, Terence Soule, **Bee-inspired landmark recognition in robotic navigation**, *Proceedings of the 2016 on Genetic and Evolutionary Computation Conference Companion*, pp1139-1042, ACM, 2016

Solomon, Michael and Heckendorn, Robert B and Soule, Terence, **A Comparison of a Communication Strategies in Cooperative Learning**. *GECCO 2012: Proceedings of the Genetic and Evolutionary Computation Conference*, pp153-160, ACM, 2012

Soule, T. and Heckendorn, Robert B, **Developmental Scalable Hierarchies for Multi-agent Swarms**. *GECCO 2011: Proceedings of the Genetic and Evolutionary Computation Conference*, pp207-208, ACM, 2011.

Terence Soule and Robert B. Heckendorn, Brian Dyre, and Roger Lew, **Ensemble Classifiers: AdaBoost and Orthogonal Evolution of Teams**. Genetic Programming Theory and Practice VIII, pp 55-69, 2011.

Soule, T. and Heckendorn, R.B, **A Developmental Algorithm for Multi-agent Swarms with Scalable Hierarchies**. *GECCO 2010: Proceedings of the Genetic and Evolutionary Computation Conference*, pp647-648. ACM, 2010.

Terence Soule, and Robert B. Heckendorn, **Environmental Robustness in Multi-Agent Teams**, *GECCO 2009: Proceedings of the Genetic and Evolutionary Computation Conference*, ACM Press, New York, NY, pp 177-184, ACM, 2009

Joshua Rubini†, Robert B. Heckendorn, and Terence Soule, **Evolution of Team Composition in Multi-Agent Systems**, *GECCO 2009: Proceedings of the Genetic and Evolutionary Computation Conference*, ACM Press, New York, NY, pp 1075-1082, ACM, 2009

Timothy Meekhof†, Terence Soule, and Robert B. Heckendorn, **Improving Markov Chain Classification using String Transformations and Evolutionary Search**, *GECCO 2009: Proceedings of the Genetic and Evolutionary Computation Conference*, ACM Press, New York, NY, pp 1259-1266, ACM, 2009

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):

Annie S. Wu, Ray Dacey, Lisa Carlson, Robert B Heckendorn, **Evolution of Preference Orderings for the Deterrence Game**, Tech Report CS-TR-17-04, Central Florida University, 2017

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):

Soule, T. and Heckendorn, R.B. **A Developmental Approach to Evolving Scalable Hierarchies for Multi-agent Swarms**, *GECCO 2010: Proceedings of the Genetic and Evolutionary Computation Conference*, Workshop on Evolutionary Computation and Multi-Agent Systems and Simulation (ECoMASS), pp1769-1776, ACM, 2010

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:

The Hitchhiker's Guide to Epistasis: The Galactic View Reworked and presented as a keynote address at the "7th Annual Epistasis Discovery in Genetics and Epidemiology" EDGE 2019 conference, Feb 2019

The Hitchhiker's Guide to Epistasis: The Galactic View presented to Brown's Center for Computational Molecular Biology weekly talk, Oct 2018

COTSbots: Powerful - Affordable - Accessible Robots presented to Palouse Knowledge Corridor in Pullman, Nov 2012 (in coordination with a talk given by Trence Soule on this topic).

Nonclassical Mathematical Tools for Conceptualizing Epistasis Talk customized for audience and presented in bioinformatics seminar at Brown University, Apr 2012. Invited by Dr. Weinreich.

Nonclassical Mathematical Tools for Conceptualizing Epistasis Talk presented to BEACON cross institutional Friday lecture series. broadcast from Michigan State to 5 universities total, Dec 2011

BEACON's Multi-institutional Partnership presented to the visiting NSF site review panel, Michigan State University, Dec 2011

Evolution in Action at the University of Idaho presented at BEACON Day at North Carolina A&T, Nov 2011

Using Evolution An introduction to evolutionary computation presented to interdisciplinary bioinformatics class, Michigan State University, Dec 2011

Getting an Intuition for Fitness Landscapes A presentation to Kalyan Deb's Evolutionary Computation Class on the structure of fitness landscapes, Michigan State University, Oct 2011

Shared Views of Epistasis An presentation of my research directions to the Evolution of Intelligence seminar, Michigan State University, Sep 2011

Measuring the Bounds of Naturally Occurring Epistasis Talk at 9^{th} *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/Mine[5]	PI[6]	Comments
2019	**Pacific Northwest Transportation Consortium (PacTrans)**	$50,000	Robert Heckendorn (PI), Ahmed Abdel-Rahim	A Connected-Vehicle Traffic Signal System Modeling Platform
2017	**State of Idaho STEM Action Center**	$108,993	Robert Heckendorn (PI), Hasan Jamil, Rick Sheldon, Nina Peterson, Cassidy Hall	Expansion of IDoCode throughout the State of Idaho
2016	**BEACON Center (competitive grants)**	$89,199	R.B. Heckendorn, Ahmed Abdel-Rahim, Kalyanmoy Deb	Using Evolution to Manage Real-time Evacuation Planning
2015	**BEACON Center (competitive grants)**	$113,379	Fred Dyer, R.B. Heckendorn, et al.	Landmark Guidance: An integrated study in bees, Avida, and physical robots
2014	**BEACON Center (competitive grants)**	$72,109	T. Soule, R.B. Heckendorn et al.	Genetic and Evolutionary Feature Extraction for Evolutionary Robotics
2013	**BEACON Center (competitive grants)**	$168,000	T. Soule, R.B. Heckendorn et al.	Distributed, Onboard Evolution in a Robotic Cloud
2013	**BEACON Center (competitive grants)**	$5,000	R.B. Heckendorn, Judi Brown Clarke	BEACON Summit to Catalyze Diversity
2012	**BEACON Center (competitive grants)**	$104,000/$41,000	R.B. Heckendorn	Cross-fertilization of Techniques for Epistasis from Evolutionary Computation and Biology
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 a 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

[4](Total amount of grant)/(amount under my control). If no denominator given then all of the funds are under my control.
[5]I am an investigator in grants where I am not PI.

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:

Keynote speaker at "Epistasis Discovery in Genetic Epidemiology (EDGE 2019)", Feb 2019

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)

Conferences and Workshops Attended:

Artificial Intelligence in Education 2019), Chicago, Jun 2019

Epistasis Discovery in Genetic Epidemiology (EDGE 2019), Key West, Florida, Feb 2019

IEEE World Congress on Computational Intelligence (WCCI), Vancouver, Canada, Jul 2016

Genetic and Evolutionary Computation Conference '14 (GECCO-2014), Vancouver, Canada, Jul 2014

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

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

9^{th} **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:

Artificial Intelligence 2011

Computational Intelligence 2011

Computational Statistics and Data Analysis 2004, 2005

Evolution 2019

IEEE Transactions on Evolutionary Computation 1999, 2000, 2005, 2007(twice)

Information Science 2010

Journal of Evolutionary Computation 1997, 1998, 2001, 2002, 2004, 2005
Journal of Genetic Programming and Evolvable Hardware 2001, 2002, 2009
Journal of Theoretical Computer Science 2007, 2008, 2013, 2014
Nature Reviews Genetics 2001
PLOS ONE 2015

Reviewing for Conferences:

European Conference on Genetic Programming (EuroGP) 2001, 2003
Foundations of Genetic Algorithms (FOGA) 2007, 2011
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), 2012
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:

Faculty Search Committee (Math Department) 2010-2011
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-present
Curriculum Committee (departmental) 2010-2011,2014-
Hardware Software Planning Committee (departmental) 2008-2009 *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 Adviser (departmental) for a student in the "Research Experiences for Undergraduates (REU)" summer program funded by NSF, 2003, 2004

Professional Service:

Served as external tenure review member for faculty member at an institution in the Portland area. 2009
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 BEACON Center for the Study of Evolution in Action at NSF site review visit giving a talk to and answering questions of NSF panel about BEACON cross institutional programs, Michigan State University, 2011
Represented BEACON Center for the Study of Evolution in Action at a recruitment event at North Carolina A&T, Greensboro, North Carolina, 2011
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

Service to the Community:

Serve on the Moscow City Paradise Path Commission, 2016-
Serve on the Moscow City Transportation Committee, 2009-2011
Serve on the Moscow City Paradise Path Committee, 2010-2011
Serve on the Moscow City Mobility Task Force, 2010-2011