

Curriculum Vitae

Philip K. McKinley

Department of Computer Science and Engineering
Michigan State University
3115 Engineering Building
East Lansing, Michigan 48824

Tel. 517-353-4396 Fax: 517-432-1061 Email: mckinley@cse.msu.edu

URL: <http://www.cse.msu.edu/~mckinley>

Biographical Sketch

Philip K. McKinley received the PhD degree from the University of Illinois, where his thesis advisor was Professor Jane Liu. His dissertation addressed protocols for supporting multimedia group communication. In 1990, he joined the faculty at Michigan State University as an Assistant Professor. He was promoted to Associate Professor in 1996 and to Professor in 2002. Prior to his academic career, he was a member of technical staff at AT&T Bell Laboratories.

In 1996, Dr. McKinley co-founded the Software Engineering and Network Systems Laboratory. The SENS Laboratory currently includes four faculty members and 15-20 graduate assistants. Dr. McKinley is also affiliated with MSU's Digital Evolution Laboratory, MSU's graduate program in Ecology, Evolutionary Biology, and Behavior, and BEACON, an NSF Science and Technology Center for the Study of Evolution in Action headquartered at MSU. Dr. McKinley has been a PI or co-PI on projects funded by the National Science Foundation, the Office of Naval Research, the Army Research Office, the Air Force Research Laboratory, the Department of Energy, and industrial partners; he has published over 190 technical papers in refereed journals and conferences. His current research interests include high-assurance software, self-adaptive software, evolutionary computation, artificial life, and computational biology. Dr. McKinley was the Principal Investigator on the ARO-funded *AWARE* project, which addressed the design of adaptive self-monitoring software for protecting critical infrastructure from software component failures and cyber attack. In two recent NSF projects, *Orchid* and *TEAMS*, and an ongoing AFRL project, *X-PLORE*, McKinley and his colleagues have investigated the application of evolutionary computation to the design of high-assurance adaptive software, robotic control systems, and robust cyber-physical systems, respectively. In addition, he has applied artificial life (evolving computer programs) to help understand and predict the evolution of complex behaviors (e.g., quorum sensing, biofilm formation, antibiotic resistance) in pathogenic bacteria.

Dr. McKinley teaches courses in distributed computing, computer networks, operating systems, and bio-inspired computing. In 1997, he was awarded the Withrow Award for Teaching Excellence. He actively serves the professional community through participation on review panels and program committees. He was program co-chair of the 2003 IEEE International Conference on Distributed Computing Systems (ICDCS) and has served as an Associate Editor for *IEEE Transactions on Parallel and Distributed Systems*.

Education

- 1989 Ph.D., Computer Science, University of Illinois at Urbana-Champaign, Urbana, Illinois.
Dissertation: *Group Communication in Bus-Based Computer Networks*
Doctoral Advisor: Prof. Jane W. S. Liu
- 1983 M.S., Computer Science, Purdue University, West Lafayette, Indiana.
- 1982 B.S., Mathematics and Computer Science, Iowa State University, Ames, Iowa.

Professional Experience

- **Professor** (2002 - present)
Department of Computer Science and Engineering, Michigan State University, E. Lansing, Michigan.
- **Associate Professor** (1996 - 2002)
Department of Computer Science and Engineering, Michigan State University, E. Lansing, Michigan.
- **Assistant Professor** (1990 - 1996)
Department of Computer Science and Engineering, Michigan State University, E. Lansing, Michigan.
- **Member of Technical Staff** (1982 - 1990)
AT&T Bell Laboratories, Naperville, Illinois. (on educational leave of absence 1985-1989)
- **Graduate Fellow** (1987 - 1989)
Department of Computer Science, University of Illinois, Urbana, Illinois.
- **Graduate Research Assistant** (1986 - 1987)
Department of Computer Science, University of Illinois, Urbana, Illinois.
- **Graduate Teaching Assistant**(1985 - 1986)
Department of Computer Science, University of Illinois, Urbana, Illinois.

Grants and Contracts

- Air Force Research Laboratory
Title: X-PLORE: Combining Model-Driven Engineering, Bio-Inspiration, and Formal Analysis to Mitigate Uncertainty in High-Assurance Software Systems
PI: B. Cheng, Co-PI: **P. McKinley**
Amount: \$699,922
Duration: 2016 - 2018.
- National Science Foundation, Office of Integrative Activities
Title: BEACON: An NSF Center for the Study of Evolution in Action (5-year renewal)
PI: E. Goodman; Co-PIs: C. Ofria, R. Lenski, K. Holecamp, R. Pennock
Amount: \$22,500,000
McKinley role: Senior Personnel; expenditure/overhead credit: 10% of total
Duration: 2015 - 2020.
- Michigan State University, Discretionary Funding Initiative
Title: Brain-Body Coupling in Soft Robotics
PI: **P. McKinley** Co-PI: X. Tan
Amount: \$22,242
Duration: 2013 - 2015.
- National Science Foundation, Research Experiences for Teachers Program
Title: RET in Engineering and Computer Science Site: Robotics Engineering for Better Life and Sustainable Future
PI: X. Tan; Co-PI: D. Kim
Amount: \$500,000
McKinley role: Senior Personnel
Duration: 2013 - 2016.

- National Science Foundation, Computing Research Infrastructure Program
 Title: Evolution Park: An Evolutionary Robotics Habitat for the Study of Crawling, Swimming and Flying Creatures
 PI: **P. McKinley**; Co-PIs: X. Tan, J. Boughman
 Amount: \$305,000
 Duration: 2011 - 2014.
- Northrop Grumman Corporation
 Title: Unrestricted Gift
 PI: C. Ofria; Co-PI: **P. McKinley**
 Amount: \$5,000
 Duration: 2011 - 2012.
- Northrop Grumman Corporation
 Title: Unrestricted Gift
 PI: C. Ofria; Co-PI: **P. McKinley**
 Amount: \$25,000
 Duration: 2010 - 2011.
- National Science Foundation, Office of Integrative Activities
 Title: BEACON: An NSF Center for the Study of Evolution in Action
 PI: E. Goodman; Co-PIs: C. Ofria, R. Lenski, K. Holecamp, R. Pennock
McKinley role: Senior Personnel; expenditure/overhead credit: 10% of total
 Duration: 2010 - 2015.
- National Science Foundation, Computing Systems Research Program
 Title: TEAMS: Transplanting Artificial Life Behaviors to Mobile Robots
 PI: **P. McKinley**
 Amount: \$494,364
 Duration: 2009 - 2013.
- Army Research Office
 Title: AWARE: Adaptive Software Monitoring and Dynamic Reconfiguration for Critical Infrastructure Protection
 PI: **P. McKinley**; Co-PI: B. Cheng
 Amount: \$315,000
 Duration: 2008 - 2012.
- National Science Foundation, Computing Research Infrastructure Program
 Title: A Testbed for Evolving Adaptive and Cooperative Behavior Among Autonomous Systems
 PI: **P. McKinley**; Co-PIs: B. Cheng, C. Ofria, R. Pennock and X. Tan
 Amount: \$188,110
 Duration: 2008 - 2011.
- National Science Foundation, Software for Real-World Systems Program
 Title: ORCHID: Harnessing Digital Evolution to Design High-Assurance Adaptive Systems
 PI: B. Cheng; Co-PIs: **P. McKinley**, C. Ofria, and X. Tan
 Amount: \$600,000
 Duration: 2008 - 2013.
- National Science Foundation, Small Grants for Exploratory Research Program
 Title: Applying Digital Evolution to Behavioral Models

PI: B. Cheng; Co-PIs: **P. McKinley**, C. Ofria, and R. Lenski
Amount: \$100,000
Duration: 9/2007 - 8/2008.

- National Science Foundation, IUCRC Program
Title: Planning grant: Center for Software-Intensive Ultra-Large-Scale Systems
PI: B. Cheng; Co-PIs: S. Biswas, C. Ofria, **P. McKinley**, and L. Dillon
Amount: \$10,000
Duration: 1/2007 - 12/2007.
- Michigan State University, Quality Funds Program
Title: High-Assurance Systems Initiative
PIs: **B. Cheng and P. McKinley** Co-PIs: S. Gage, B. Pentland, C. Radcliffe, X. Tan, S. Biswas,
S. Kulkarni, L. Dillon, R. Stirewalt
Amount: \$370,000 (plus \$427,815 in matching from departments and colleges)
Duration: 2006-2008.
- Office of Naval Research, Critical Infrastructure Protection Program
Title: RAPIDware: Component-Based Development of Adaptive and Dependable Middleware
PI: **P. McKinley** Co-PIs: R. Stirewalt, B. Cheng, L. Dillon, S. Kulkarni
Amount: \$3,135,609
Duration: 2001-2007.
- National Science Foundation, ITR Program
Title: ITR: Supporting Adaptable Pervasive Computing through a Kernel-Middleware eXchange
PI: **P. McKinley**
Amount: \$210,000
Duration: 2003-2006.
- National Science Foundation, CISE/EIA Experimental Partnerships Program
Title: Meridian: An Integrated Toolkit for Developing Interactive Distributed Applications
PI: B. Cheng Co-PIs: L. Dillon, **P. McKinley**, R. Stirewalt
Amount: \$1,934,076
Duration: 2000-2007.
- National Science Foundation, CISE/EIA
Title: A Proxy-Centric Testbed for Mobile Internet Research
PI: **P. McKinley** Co-PIs: S. Kulkarni, B. Cheng, R. Stirewalt, J. Lee, L. Dillon
Amount: \$96,360 plus \$50,000 MSU matching
Duration: 2001-2004.
- National Science Foundation, CISE/CCR
Title: Host-Level Protocol Support for Interoperable Distributed Computing
PI: **P. McKinley**
Amount: \$199,904
Duration: 2000-2004.
- National Science Foundation, CISE/NCR
Title: LSR-Based Group Communication in ATM Networks
PI: **P. McKinley**
Amount: \$214,945
Duration: 1997-2000.

- National Science Foundation, CISE/CDA
 Title: CISE Research Instrumentation for an SMP Cluster Testbed
 PI: **P. McKinley** Co-PIs: B. Cheng, A. Jain
 Amount: \$125,200 plus \$65,000 MSU matching
 Duration: 1997-1998.
- National Science Foundation, CISE/CDA
 Title: CISE Research Instrumentation for ATM Networking
 PI: H. Hughes Co-PIs: **P. McKinley**, M. Mutka
 Amount: \$169,068 plus \$94,000 MSU matching
 Duration: 1996-1997.
- National Science Foundation, CISE/CCR
 Title: Collective Communication in Wormhole-Routed Massively Parallel Computers
 PI: **P. McKinley**
 Amount: \$208,200
 Duration: 1995-1998.
- Manufacturing Research Consortium
 Title: Environmental Information and Decision Support System for Secure Access
 to Distributed Multimedia Data
 PI: B. Cheng Co-PI: **P. McKinley**
 Amount: \$42,360
 Duration: 1995-1996.
- National Science Foundation, EHR/DUE
 Title: Cooperative Multimedia Computing Laboratory
 PI: **P. McKinley** Co-PIs: B. Cheng, J. Weng
 Amount: \$94,610 plus \$100,000 MSU matching
 Duration: 1995-1997.
- AT&T Foundation
 Title: Enhancements to High-Speed Network and Performance Laboratory
 PI: H. Hughes Co-PIs: **P. McKinley**, M. Mutka, A. Wojcik
 Amount: \$50,000
 Duration: 1994-1995.
- U.S. Department of Energy
 Title: A Scalable Communications Library for Distributed-Memory Computing Environments
 PI: **P. McKinley** Co-PI: L. Ni
 Amount: \$294,918
 Duration: 1993-1996.
- AT&T Foundation
 Title: Enhancements to High-Speed Network and Performance Research Laboratory
 PI: H. Hughes Co-PIs: **P. McKinley**, M. Mutka, A. Wojcik
 Amount: \$25,000
 Duration: 1993-1994.
- National Science Foundation, CISE/CDA
 Title: Equipment Proposal for High Speed Local Area Networks
 PI: H. Hughes Co-PIs: **P. McKinley**, M. Mutka, A. Esfahanian

Amount: \$100,000 plus \$45,851 MSU matching
Duration: 1993-1994.

- National Science Foundation, CISE/MIPS
Title: Multicast Communication in Multicomputers
PI: L. M. Ni Co-PIs: **P. McKinley**, A. Esfahanian
Amount: \$331,914
Duration: 1992-1996.
First REU Supplement (**McKinley**, Ni, Esfahanian), 1993-1994, \$13,000.
Second REU Supplement (**McKinley**, Ni, Esfahanian), 1994-1995, \$13,000.
- National Science Foundation, CISE/CDA
Title: Equipment Proposal for Wormhole-Routed Multicomputer
PI: L. Ni Co-PIs: **P. McKinley**, M. Mutka, and R. Enbody
Amount: \$77,000 plus \$45,890 MSU matching
Duration: 1992-1993.
- AT&T Foundation
Title: Development of Computer Performance Evaluation and Computer Network Laboratory
PI: H. Hughes Co-PIs: **P. McKinley**, M. Mutka, A. Wojcik
Amount: \$25,000
Duration: 1992-1993.
- Ameritech Corporation
Title: Multicast Communication in High-Speed Optical Networks
PI: **P. McKinley**
Amount: \$30,000
Duration: 1991-1993.
- Michigan State University (AURIG Program)
Title: Architectures and Protocols for High-Speed Networks
PI: **P. McKinley**
Amount: \$7,607
Duration: 1991.

Other Awards and Honors

- Best Paper Award for “Just Keep Swimming: Accounting for Uncertainty in Self-Modeling Aquatic Robots,” by M. Rose, A. Clark, J. Moore and P. McKinley, *Proceedings of the 6th International Workshop on Evolutionary and Reinforcement Learning for Autonomous Robot Systems*, Taormina, Italy, Sept. 2013.
- Best Paper Award for “Evolutionary Design and Experimental Validation of a Flexible Caudal Fin for Robotic Fish,” by A. Clark, J Moore, J. Wang, X. Tan and P. McKinley, *Proceedings of the Thirteenth International Conference on the Synthesis and Simulation of Living Systems*, East Lansing, Michigan, July 2012.
- Best Paper Nomination for “Digital Enzymes: Agents of Reaction Inside Robotic Controllers for the Foraging Problem,” by C. M. Byers, B. H. C. Cheng and P. K. McKinley, *Proceedings of the ACM Genetic and Evolutionary Computation Conference*, Dublin, Ireland, July 2011.

- Best Paper Award for “Resource Abundance Promotes the Evolution of Public Goods Cooperation,” by B. D. Connelly, B. E. Beckmann and P. K. McKinley, *Proceedings of the ACM Genetic and Evolutionary Computation Conference*, Portland, Oregon, July 2010.
- Best Paper nomination for “Evolution of Robust Data Distribution Among Digital Organisms,” by D. B. Knoester, A. Ramirez, P. K. McKinley and Betty H.C. Cheng, *Proceedings of the ACM Genetic and Evolutionary Computation Conference (GECCO-2009)*, Montreal, Canada, July, 2009.
- Best Paper Award for “Applying Genetic Algorithms to Decision Making in Autonomic Computing Systems,” by A. Ramirez, D. B. Knoester, B. H. C. Cheng and P. K. McKinley, *Proceedings of the 6th IEEE International Conference on Autonomic Computing and Communications*, Barcelona, Spain, June 2009.
- Best Paper Award for “Digital Evolution of Behavioral Models for Autonomic Systems,” by H. J. Goldsby, B. H.C. Cheng, P. K. McKinley, D. B. Knoester, and C. A. Ofria, *Proceedings of the Fifth IEEE International Conference on Autonomic Computing*, Chicago, Illinois, June 2008.
- Best Paper recognition for “TA-LTL: Specifying Adaptation Timing Properties in Autonomic Systems,” by Z. Zhou, J. Zhang, P. K. McKinley and B. H. C. Cheng, *Proceedings of the Third IEEE Workshop on Engineering of Autonomic and Autonomous Systems (EASe 2006)*, Columbia, Maryland, April 2006. Selected as one of the best papers, invited for journal publication.
- Best Student Paper Award for “On Quality-of-Service and Energy Consumption Tradeoffs in FEC-Enabled Audio Streaming,” by Z. Zhou, P. K. McKinley and S. M. Sadjadi. *Proceedings of the Twelfth IEEE International Workshop on Quality of Service (IWQoS)*, Montreal, Canada, June 2004. This paper was selected as the best paper whose primary author is a student, from 30 papers accepted for the workshop and 154 total submissions.
- Best Paper nomination for “A Thread-Based Interface for Collective Communication on ATM Networks,” by C. C. Huang, Y. Huang and P. K. McKinley, *Proceedings of the 1995 IEEE International Conference on Distributed Computing Systems*, Vancouver, Canada, May 1995. (At most one paper nominated from each conference track.)
- Best Paper Award for “Multicast Tree Construction in Bus-Based Networks,” by P. K. McKinley and J. W. S. Liu, *Proceedings of the 1989 Phoenix Conference on Computers and Communications*, Phoenix, Arizona, 1989.
- Withrow Award for Teaching Excellence (selected by students), College of Engineering, Michigan State University, 1997.
- Ameritech Faculty Fellowship, 1991-1993.
- U.S. Army Graduate Fellowship, 1987-1989.
- Phi Beta Kappa.

Multidisciplinary Activities and Laboratory Development

- *Thrust Group Leader* and core faculty member, BEACON: An NSF Science and Technology Center for the Study of Evolution in Action. Research at BEACON focuses on biological evolution, digital evolution, and evolutionary applications in engineering, uniting biologists who study natural evolutionary processes with computer scientists and engineers who are harnessing these processes to solve complex problems.

- *Faculty member*, MSU Ecology, Evolutionary Biology, and Behavior Program, a multidisciplinary graduate program emphasizing the interdisciplinary nature of these fields and other biological sciences such as genetics, developmental and molecular biology.
- *Co-founder* of MSU's High-Assurance Systems Initiative to develop new educational programs, foster interdisciplinary research, and enhance outreach linkages to local industry and state government.
- *Co-PI*, NSF I/UCRC Center on Ultra-Large-Scale Software Intensive Systems (U. Virginia, UC San Diego, MSU, Vanderbilt). The center will focus on research problems of industrial importance in the context of complex software-intensive systems across multiple application domains. Planning grant funded, full proposal in progress.
- *Co-founder* (with Betty Cheng), Software Engineering and Network Systems Laboratory. Established in 1996 for research in software engineering, computer networking, formal methods, parallel and distributed computing. Other faculty previously or currently associated with the SENS Laboratory are: Laura Dillon, Kurt Stirewalt, Sandeep Kulkarni, Jonathan Shapiro and Alex Liu. The Lab presently supports approximately 30 graduate research assistants.
- *Co-founder*, Multimedia Computing Laboratory. Established in 1995 for undergraduate instruction, with support from NSF ILI Grant and matching funds from Michigan State University.
- *Co-founder*, High-Speed Networking and Performance Laboratory, Established in 1993 for research in computer networking, with support from an NSF CISE Instrumentation Grant, AT&T, and matching funds from Michigan State University.

Publications

Monographs

- *Fault Covering Problems in Reconfigurable VLSI Systems*, (with R. Libeskind-Hadas, N. Hasan, J. Cong, and C. L. Liu), Kluwer Academic Publishers, Norwell, Massachusetts, 1992.

Chapters in Books

- S. M. Sadjadi, P. K. McKinley, and B.H.C. Cheng, "Transparent Shaping: A Methodology for Adding Adaptive Behavior to Existing Software Systems and Applications," in *An Adaptive Control Approach for Software Quality Improvement*, edited by W. Eric Wong and Bojan Cukic, World Scientific, pp. 77–114, 2011.
- S. M. Sadjadi and P. K. McKinley, "Transparent Autonomization in Composite Systems," in *Autonomic Computing: Concepts, Infrastructure, and Applications*, edited by M. Parashar and S. Hariri, CRC Press, 2006.
- J. Zhang, B.H.C. Cheng, Z. Yang, and P.K. McKinley, "Enabling Safe Dynamic Component-Based Software Adaptation," in *Architecting Dependable Systems*, Springer Lecture Notes for Computer Science, Springer-Verlag, 2005, pp. 194-211.

Refereed Journal and Magazine Articles

- B. D. Connelly, E. L. Bruger, P. K. McKinley and C. M. Waters, “Resource Abundance and the Critical Transition to Cooperation,” *Journal of Evolutionary Biology*, 2016, in press.
- J. M. Moore and P. K. McKinley, “Evolution of Joint-Level Control for Quadrupedal Locomotion,” *Artificial Life*, 2016, in press.
- A. J. Clark, X. Tan and P. K. McKinley, “Evolutionary Multiobjective Design of a Flexible Caudal Fin for Robotic Fish,” *Bioinspiration & Biomimetics*, special issue on Bioinspired Soft Robotics, vol. 10, no. 6, November 2015.
- J. Wang, P. K. McKinley and X. Tan, “Dynamic Modeling of Robotic Fish with a Base-actuated Flexible Tail,” *Journal of Dynamic Systems, Measurement and Control*, vol. 137, no. 1, August 2014.
- D. B. Knoester, H. J. Goldsby and P. K. McKinley, “Genetic Variation and the Evolution of Consensus in Digital Organisms,” *IEEE Transactions on Evolutionary Computation* vol. 17, no. 3, pp. 403–417, 2013.
- B. E. Beckmann, D. B. Knoester, B. D. Connelly, C. M. Waters and P. K. McKinley, “Evolution of Resistance to Quorum Quenching in Digital Organisms,” *Artificial Life*, vol. 18, no. 3, pp. 291–310, 2012.
- P. K. McKinley, B. H.C. Cheng, A. J. Ramirez, and A. C. Jensen, “Applying Evolutionary Computation To Mitigate Uncertainty in Dynamically Adaptive, High-Assurance Middleware,” *Journal of Internet Services and Applications, Special Issue on The Future of Middleware*, vol. 3, no. 1, pp. 51–58, 2012.
- A. J. Ramirez, D. B. Knoester, B. H. C. Cheng and P. K. McKinley, “Plato: A Genetic Algorithm Approach to Run-Time Reconfiguration in Autonomic Computing Systems,” *Cluster Computing*, vol. 14, no. 3, pp. 229–244, 2011.
- D. B. Knoester and P. K. McKinley, “Evolution of Synchronization and Desynchronization in Digital Organisms,” *Artificial Life*, Winter 2011, Vol. 17, No. 1: 1-20.
- E. P. Kasten, P. K. McKinley and S. H. Gage, “Ensemble extraction for classification and detection of bird species,” *Ecological Informatics*, vol. 5, pp. 153–166, 2010.
- S. M. Sadjadi and P. K. McKinley, “Transparent autonomization of CORBA,” *Computer Networks*, vol. 53, no. 10, pp. 1570-1586, 2009.
- P. K. McKinley, B. H.C. Cheng, C. Ofria, D. Knoester, B. Beckmann and H. Goldsby, “Harnessing Digital Evolution,” *IEEE Computer*, vol. 41, no. 1, pp. 54-63, January 2008.
- F. A. Samimi, P. K. McKinley, S. M. Sadjadi, C. Tang, J. K. Shapiro and Z. Zhou, “Service Clouds: Distributed Infrastructure for Adaptive Communication Services,” *IEEE Transactions on Network and Service Management*, vol. 4, no. 2, pp. 84-95, September 2007.
- C. Tang and P. K. McKinley, “Topology-aware overlay path probing,” *Computer Communications* vol. 30, issue 9, pp. 1994-2009, 2007.
- E. P. Kasten and P. K. McKinley, “MESO: Supporting Online Decision Making in Autonomic Computing Systems,” *IEEE Transactions on Knowledge and Data Engineering*, 19(4):485-499, April 2007.

- J. Zhang, Z. Zhou, B. H. C. Cheng and P. K. McKinley, “Specifying Real-Time Properties in Autonomous Systems,” vol. 3, no. 1, pp. 3-16, March 2007.
- S. Sadjadi, P. McKinley, E. Kasten and Z. Zhou, “MetaSockets: Design and operation of run-time reconfigurable communication services,” *Software Practice and Experience*, vol. 36, no. 11–12, pp. 1157–1178, 2006.
- C. Tang and P. K. McKinley, “Energy Optimization under Informed Mobility,” *IEEE Transactions on Parallel and Distributed Systems*, special issue on Localized Communication and Topology Protocols for Ad Hoc Networks, vol. 17, no. 9, pp. 947–962, September 2006.
- P. McKinley, B.H.C. Cheng, and J. Weng, “Integrating Multimedia Technology into the Undergraduate Curriculum,” *International Journal of Engineering Education*, vol. 22, no. 4, 2006.
- P. K. McKinley, S. M. Sadjadi, E. P. Kasten and B. H. C. Cheng, “Composing Adaptive Software,” *IEEE Computer*, vol. 37, no. 7, pp. 56–64, July 2004.
- P. K. McKinley, U. I. Padmanabhan, N. Ancha and S. M. Sadjadi, “Composable Proxy Services to Support Collaboration on the Mobile Internet,” *IEEE Transactions on Computers (Special Issue on Wireless Internet)* vol. 52, no. 6, pp. 713–726, June 2003.
- Y. Huang and P. K. McKinley, “Tree-Based Link-State Routing in the Presence of Routing Information Corruption,” *Computer Communications*, vol. 26 no. 7, pp. 691–699, 2003.
- P. K. McKinley, C. Tang and A. Mani, “A Study of Adaptive Forward Error Correction for Wireless Collaborative Computing,” *IEEE Transactions on Parallel and Distributed Systems*, vol. 13, no. 9, pp. 936–947, September 2002.
- Y. Huang and P. K. McKinley, “Group Leader Election under Link-State Routing,” *Computer Communications*, vol. 23, pp. 653–666, 2000.
- E. Fleury, Y. Huang and P. K. McKinley, “On the Performance and Feasibility of Multicast Core Selection Heuristics,” *Networks*, vol. 35, no. 2, pp. 145–156, John Wiley, 2000.
- D. Judd, P. K. McKinley, A. K. Jain, “Large-Scale Parallel Data Clustering,” *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 20, no. 8, pp. 871–876, August 1998.
- D. F. Robinson, P. K. McKinley and B. H. C. Cheng, “Path-Based Multicast Communication in Wormhole-Routed Torus Networks,” *Journal of Parallel and Distributed Computing*, vol. 45, pp. 104–121, 1997.
- Y. Huang and P. K. McKinley, “An Adaptive Global Reduction Algorithm for Wormhole-Routed 2D Mesh Networks,” *Parallel Computing*, vol. 23, no. 13, pp. 1909–1936, December 1997.
- Y.-J. Tsai and P. K. McKinley, “An Extended Dominating Node Approach to Broadcast and Global Combine in Multi-Port Wormhole-Routed Mesh Networks,” *IEEE Transactions on Parallel and Distributed Systems*, vol. 8, no. 1, pp. 41–58, January 1997.
- Y.-J. Tsai and P. K. McKinley, “Extended Dominating Node Broadcast in All-Port Wormhole-Routed Torus Networks,” *IEEE Transactions on Parallel and Distributed Systems*, vol. 7, no. 8, August 1996.
- P. K. McKinley, Y.-J. Tsai and D. Robinson, “Collective Communication in Wormhole-Routed Massively Parallel Computers,” *IEEE Computer*, pp. 39–50, December 1995.

- D. F. Robinson, D. Judd, P. K. McKinley and B. H. C. Cheng, “Efficient Multicast Communication in All-Port Wormhole-Routed Hypercubes,” *Journal of Parallel and Distributed Computing*, vol. 31, no. 2, pp. 126–140, December 1995.
- D. F. Robinson, P. K. McKinley and B. H. C. Cheng, “Optimal Multicast Communication in Torus Networks,” *IEEE Transactions on Parallel and Distributed Systems*, vol. 6, no. 10, pp. 1029–1042, October 1995.
- C. Trefftz, P. K. McKinley, C. C. Huang, T.-Y. Li and Z. Zeng, “A Scalable Eigenvalue Solver for Symmetric Tridiagonal Matrices,” *Parallel Computing*, vol. 21, pp. 1213–1240, August 1995.
- X. Lin, P. K. McKinley and L. M. Ni, “The Message Flow Model for Routing in Wormhole-Routed Networks,” *IEEE Transactions on Parallel and Distributed Systems*, vol. 6, no. 7, pp. 755–760, July 1995.
- X. Lin, P. K. McKinley and A.-H. Esfahanian, “Adaptive Multicast Wormhole Routing in 2D Mesh Networks,” *Journal of Parallel and Distributed Computing*, vol. 28, no. 1, pp. 19–31, July 1995.
- C. C. Huang and P. K. McKinley, “Communication Issues in Parallel Computing across ATM Networks,” *IEEE Parallel and Distributed Technology*, vol. 2, no. 4, pp. 73–86, Winter 1994.
- P. K. McKinley, H. Xu, A.-H. Esfahanian and L. M. Ni, “Unicast-Based Multicast Communication in Wormhole-Routed Direct Networks,” *IEEE Transactions on Parallel and Distributed Systems*, vol. 5, no. 12, pp. 1254–1265, December 1994.
- P. K. McKinley, “Group Communication in Staircase Multichannel Lightwave Networks,” *Journal of Parallel and Distributed Computing*, vol. 23, no. 1, pp. 60–71, October 1994.
- H. Xu, E. T. Kalns, P. K. McKinley and L. M. Ni, “ComPaSS: A Communication Package for Scalable Software Design,” *Journal of Parallel and Distributed Computing*, vol. 22, no. 3, pp. 449–461, September 1994.
- X. Lin, P. K. McKinley and L. M. Ni, “Deadlock-free Multicast Wormhole Routing in 2D-Mesh Multicomputers,” *IEEE Transactions on Parallel and Distributed Systems*, vol. 5, no. 8, August 1994.
- M. W. Mutka and P. K. McKinley, “Supporting a Simulation Environment with OpenSim,” *Simulation*, vol. 61, no. 4, pp. 223–235, October 1993.
- L. M. Ni and P. K. McKinley, “A Survey of Wormhole Routing Techniques in Direct Networks,” *IEEE Computer*, vol. 26, no. 2, pp. 62–76, February 1993.
- H. Xu, P. K. McKinley and L. M. Ni, “Efficient Implementation of Barrier Synchronization in Wormhole-Routed Hypercube Multicomputers,” *Journal of Parallel and Distributed Computing*, vol. 16, pp. 172–184, October 1992.
- P. K. McKinley, N. Hasan, R. Libeskind-Hadas and C. L. Liu, “Disjoint Coverings in Replicated Heterogeneous Arrays,” *SIAM Journal of Discrete Mathematics*, vol. 4, pp. 281–291, May 1991.
- P. K. McKinley and J. W. S. Liu, “Multicast Tree Construction in Bus-Based Networks,” *Communications of the ACM*, vol. 33, no. 1, pp. 29–42, January 1990.

Refereed Conference and Workshop Proceedings

- A. J. Clark, B. DeVries, J. M. Moore, B. H.C. Cheng and P. K. McKinley, “An Evolutionary Approach to Discovering Execution Mode Boundaries for Adaptive Controllers,” *Proceedings of the IEEE International Conference on Evolvable Systems*, held in conjunction with the 2016 IEEE Symposium on Computational Intelligence (SSCI), Athens, Greece, December 2016.
- J. M. Moore and P. K. McKinley, “A Comparison of Multiobjective Algorithms in Evolving Quadrupedal Gaits,” *Proceedings of the 14th International Conference on the Simulation of Adaptive Behavior (SAB)*, pp. 157–169, Aberystwyth, United Kingdom, August 2016.
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- C. C. Huang, Y. Huang and P. K. McKinley, "A Thread-Based Interface for Collective Communication on ATM Networks," *Proceedings of the 15th IEEE International Conference on Distributed Computing Systems*, Vancouver, British Columbia, pp. 254–261, May 1995. **(Nominated for Best Paper Award)**
- C. Trefftz and P. K. McKinley and T.-Y. Li and Z. Zeng, "A Parallel Algorithm for the Singular Value Problem in Bidiagonal Matrices," *Proceedings of the Seventh SIAM Conference on Parallel Processing for Scientific Computing*, San Francisco, California, pp. 62–67, February 1995.

- Y.-J. Tsai and P. K. McKinley, "Extended Dominating Node Broadcast in All-Port Wormhole-Routed Torus Networks," *Proceedings of the Fifth Symposium on the Frontiers of Massively Parallel Computation*, McLean, Virginia, pp. 529–536, February 1995.
- Y.-J. Tsai and P. K. McKinley, "Broadcast in All-Port Wormhole-Routed 3D Mesh Networks Using Extended Dominating Sets," *Proceedings of the 1994 International Conference on Parallel and Distributed Systems*, pp. 120–127, December 1994.
- C. C. Huang and E. P. Kasten and P. K. McKinley, "Design and Implementation of Multicast Operations for ATM-Based High Performance Computing," *Proceedings of IEEE Supercomputing'94*, Washington, D.C., pp. 164–173, November 1994.
- D. Judd, N. K. Ratha, P. K. McKinley, J. Weng and A. K. Jain, "Parallel Implementation of Vision Algorithms on Workstation Clusters," *Proceedings of the 12th International Conference on Pattern Recognition*, Jerusalem, Israel, pp. 317-321, October 1994.
- D. F. Robinson, P. K. McKinley and B. H. C. Cheng, "Optimal Multicast Communication in Torus Networks," *Proceedings of the 1994 International Conference on Parallel Processing*, vol. I, St. Charles, Illinois, pp. 134–141, August 1994.
- C. C. Huang and P. K. McKinley, "Parallel Reduction Operations on ATM Networks," *Proc. of the 1994 IEEE Symposium on High-Performance Distributed Computing*, San Francisco, California, pp. 43–50, August 1994.
- Y.-J. Tsai and P. K. McKinley, "A Dominating Set Model for Broadcast in Wormhole-Routed 2D Mesh Networks," *Proceedings of the Eighth ACM International Conference on Supercomputing*, Manchester, England, pp. 126–135, July 1994.
- C. Trefftz, P. K. McKinley, C. C. Huang, T.-Y. Li and Z. Zeng, "Design and Performance Evaluation of a Distributed Eigenvalue Solver on a Workstation Cluster," *Proceedings of the 14th International Conference on Distributed Computing Systems*, Poznan, Poland, pp. 608–615, June 1994.
- Y.-J. Tsai and P. K. McKinley, "An Extended Dominating Node Approach to Collective Communication in Wormhole-Routed 2D Meshes," *Proceedings of the IEEE Scalable High Performance Computing Conference*, pp. 199–206, May 1994.
- X. Lin, A.-H. Esfahanian, P. K. McKinley and A. Burago, "Adaptive Multicast Wormhole Routing in Hypercube Multicomputers," in the *Proceedings of the Fifth IEEE Symposium on Parallel and Distributed Processing*, Dallas, Texas, pp. 72–79, December 1993.
- D. F. Robinson, D. Judd, P. K. McKinley and B. H. C. Cheng, "Efficient Collective Data Distribution in All-Port Wormhole-Routed Hypercubes," *Proceedings of Supercomputing'93*, Portland, Oregon, pp. 792–801, November 1993.
- P. K. McKinley and C. Trefftz, "Efficient Broadcast in All-Port Wormhole Routed Hypercubes," *Proceedings of the 1993 International Conference on Parallel Processing*, vol. II, St. Charles, Illinois, pp. 288–291, August 1993.
- X. Lin, P. K. McKinley and L. M. Ni, "The Message Flow Model for Routing in Wormhole-Routed Networks," *Proceedings of the 1993 International Conference on Parallel Processing*, vol. I, St. Charles, Illinois, pp. 294–297, August 1993.
- X. Lin, P. K. McKinley and A.-H. Esfahanian, "Adaptive Multicast Wormhole Routing in 2D Mesh Multicomputers," *Proceedings of 1993 Parallel Architectures and Languages Europe Conference (PARLE'93)*, Munich, Germany, pp. 228–241, June 1993.

- C. Trefftz, P. K. McKinley, T.-Y. Li and Z. Zeng, “A Scalable Eigenvalue Solver for Symmetric Tridiagonal Matrices,” *Proceedings of the Sixth SIAM Conference on Parallel Processing for Scientific Computing*, Norfolk, Virginia, pp. 602–609, March 1993.
- P. K. McKinley and C. Trefftz, “MultiSim: A Tool for the Study of Large-Scale Multiprocessors,” *Proceedings of the 1993 International Workshop on Modeling, Analysis and Simulation of Computer and Telecommunication Networks (MASCOTS)*, San Diego, California, pp. 57–62, January 1993.
- C. Trefftz and P. K. McKinley, “Performance Evaluation of Wormhole Routing in Octagonal Mesh Multicomputers,” *Proceedings of the 1992 Conference on Parallel and Distributed Systems*, Hsinchu, Taiwan, pp. 25–33, December 1992.
- P. K. McKinley, H. Xu, E. Kalns and L. M. Ni, “ComPaSS: Efficient Communication Services for Scalable Architectures,” *Proceedings of IEEE Supercomputing '92*, Minneapolis, Minnesota, pp. 478–487, November 1992.
- H. Xu, P. K. McKinley and L. M. Ni, “A Scalable Multicast Service for Mesh Networks,” *Proceedings of Frontiers '92: The 5th Symposium on the Frontiers of Massively Parallel Computation*, McLean, Virginia, pp. 156–163, October 1992.
- P. K. McKinley, H. Xu, A.-H. Esfahanian and L. M. Ni, “Unicast-Based Multicast Communication in Wormhole-Routed Networks,” *Proceedings of the 1992 International Conference on Parallel Processing*, vol. II, St. Charles, Illinois, pp. 10–19, August 1992.
- H. Xu, P. K. McKinley and L. M. Ni, “Efficient Implementation of Distributed Barrier Synchronization in Hypercube Multicomputers,” *Proceedings of the 12th International Conference on Distributed Computing Systems*, Yokohama, Japan, pp. 118–125, June 1992.
- M. W. Mutka and P. K. McKinley, “The OpenSim Approach – Tools for Management and Analysis of Simulation Jobs,” *Proceedings of the USENIX Winter 1992 Technical Conference*, San Francisco, California, pp. 291–304, January 1992.
- X. Lin, P. K. McKinley and L. M. Ni, “Performance Evaluation of Multicast Wormhole Routing in 2D-Mesh Multicomputers,” *Proceedings of the 1991 International Conference on Parallel Processing*, vol. I, pp. 435–442, August 1991.
- P. K. McKinley, “Lightwave Multichannel Networks with Grid-Based Topologies,” *Proceedings of the International Phoenix Conference on Computers and Communications*, Scottsdale, Arizona, pp. 506–512, March 1991.
- B. Rajagopalan and P. K. McKinley, “A Token-Based Protocol for Reliable, Ordered Multicast,” *Proceedings of the Eighth Symposium on Reliable Distributed Systems*, Seattle, Washington, October 1989.
- P. K. McKinley and J. W. S. Liu, “Group Communication in Multichannel Networks with Staircase Interconnection Topologies,” *Proceedings of SIGCOMM*, Austin, Texas, pp. 170–181, September 1989.
- P. K. McKinley and J. W. S. Liu, “Multicast Tree Construction in Bus-Based Networks,” *Proc. International Phoenix Conference on Computers and Communications*, Scottsdale, Arizona, pp. 171–177, March 1989. **(Best Paper Award)**
- P. K. McKinley, “Multicast Routing in Spanning Bus Hypercubes,” *Proc. International Conference on Parallel Processing*, St. Charles, Illinois, pp. 204–211, August 1988.

- P. K. McKinley and J. W. S. Liu, “Multicast Routing in Bus-Based Computer Networks,” *Proceedings of the Computer Networking Symposium*, Washington, D.C., pp. 277–287, April 1988.
- D. A. Reed, P. K. McKinley and M. Barr, “Performance Analysis of Switching Strategies,” *Proc. Symposium on the Simulation of Computer Networks*, Colorado Springs, Colorado, pp. 130–141, August 1987.
- P. K. McKinley and Y. Ofek, “Resource Sharing in a Synchronous Optical Hypergraph,” *Proc. Symposium on the Simulation of Computer Networks*, Colorado Springs, Colorado, pp. 159–169, August 1987.

Invited Publications

- P. K. McKinley, R. Stirewalt, B. Cheng, L. Dillon, S. Kulkarni, “Interactive Distributed Applications and the Computer Science Curriculum,” *IEEE Distributed Systems Online*, October 2002.
- P. K. McKinley, “Design of Collective Communication Operations on ATM Networks,” *Newsletter of the Technical Committee on Distributed Processing*, IEEE Computer Society, Summer 1997.
- P. K. McKinley, “Support for Collective Communication in MPCs and Clusters,” *Technical Committee on Computer Architecture Newsletter*, IEEE Computer Society, pp. 28-30, Summer-Fall Issue, 1994.

Thesis/Project Supervision

Ph.D. Students

- Anthony Clark, “Automatically Addressing Uncertainty in Autonomous Robots with Computational Evolution,” Ph.D., May 2016. Currently an Assistant Professor at Missouri State University.
- Jared Moore, “Exploring Joint-Level Control in Evolutionary Robotics,” Ph.D., May 2015. Currently an Assistant Professor at Grand Valley State University.
- Brian Connelly, “Ecological Effects on the Evolution of Cooperative Behaviors,” Ph.D., May 2012. Currently an NSF Postdoctoral Fellow at the University of Washington.
- David Knoester, “Evolution of Distributed Behavior,” Ph.D., May 2011. Position upon graduation: NSF Postdoctoral Fellow. Currently with Amazon.
- Benjamin Beckmann, “Evolving Cooperative, Energy-Conserving Agent-Based Systems,” Ph.D., May 2010. Currently with General Electric Research.
- Farshad Samimi, “Service Clouds: Overlay-Based Infrastructure for Autonomic Communication Services,” Ph.D., December 2007. Currently with a Incapture Technologies.
- Eric Kasten, “An Integrated Approach to Autonomous Computation in Data Streaming Applications,” Ph.D., May 2007. Currently research faculty at Michigan State University.
- Zhinan Zhou, “Design and Evaluation of Adaptive Software for Mobile Computing Systems,” Ph.D., August 2006. Currently with Samsung Corporation.
- Chiping Tang, “Underlay-Aware Overlay Networks,” Ph.D., August 2005. Currently with Microsoft Corporation.

- Peng Ge, “Interactive Video Multicast in Wireless LANs,” Ph.D., December 2004. Currently with Intel Corporation.
- Masoud Sadjadi, “Transparent Shaping Support for Adaptability in Pervasive and Autonomic Computing,” Ph.D., August 2004. Current position: Associate Professor, School of Computer Science, Florida International University.
- Yih Huang, “Group Communication under Link-State Routing,” Ph.D., May 1998. Position upon graduation: Assistant Professor, Department of Computer Science, George Mason University.
- Yih-jia Tsai, “Modeling Collective Communication: Design and Performance Evaluation,” Ph.D., May 1997. Position upon graduation: Assistant Professor, Department of Computer Science and Information Engineering, Tamkang University, Taiwan.
- David F. Robinson, “Scalable Multicast Communication in Massively Parallel Computers,” Ph.D., 1994 (co-advised with B. Cheng). Current position: Professor, Department of Computer Science, Quincy University.
- Christian Trefftz, “Effects of Collective Communications in Parallel Numerical Algorithms,” Ph.D., 1994. Current position: Associate Professor, Department of Computer Science, Grand Valley State University.

M.S. Students

- Glen Simon, assurance in autonomous systems, current student.
- Timothy Taviano, cyber-physical systems, current student.
- Matthew Rose, “Self-Modeling Robots,” research assistant 2012-2013, graduated May 2013.
- Nerva Espinosa, “Applying Artificial Life to the Study of Collective Behavior,” research assistant 2011-2012, M.S. course option, graduated May 2012.
- David Knoester, “Using Developmental Learning for Network Intrusion Detection,” M.S. thesis, May 2004.
- Rahul Kalaskar, “Collaborative Multimedia Computing with Adaptive Middleware,” M.S. project, May 2003.
- Chiping Tang, “Simulation of reliable multicast communication in wireless local area networks,” M.S. thesis, May 2002.
- Udiyan Padmanabhan, “Design of a Composable Proxy Framework,” M.S. project, May 2001.
- Suraj Gaurav, “Experimental Evaluation of Forward Error Correction on Multicast Audio Streams in Wireless LANs,” M.S. project, May 2001.
- Arun Mani, “Performance studies of forward error correction in wireless local area networks,” M.S. project, August 2000.
- Ji Li, “Pocket Pavilion: Extending collaborative applications to wireless handheld computers,” MS project, May 2000.
- Jesus Arango, “VGuide: Design and Performance Evaluation of a synchronous collaborative virtual reality application,” MS project, May 2000.

- Aaron Malenfant, “Pavilion: A Middleware Framework for Collaborative Web-Based Applications,” M.S. project, May 2000.
- Ravi Rao, H-RMC: A Hybrid Reliable Multicast Protocol for the Linux Kernel, M.S. project, July 1999.
- Robin Wright, “Design of Flow Control Mechanisms for Reliable Multicast,” M.S. thesis, December 1998.
- Robel Barrios, “WEBCLASS: A Multimedia Web-Based Instructional Tool,” M.S. project, August 1998.
- Gerald Fordyce, “Implementing Collective Operations in the Windows NT Operating System,” M.S. project, December 1997.
- Eric Kasten, “O2Threads: An Object-Oriented Threads Package for Internet Applications,” M.S. project, May 1997.
- Eric Kass, “IMcast: An Object-Oriented Image Multicasting System,” M.S. project, December 1996.
- Manish Rathi, “A Monitoring and Testing Tool for ATM LANs,” M.S. project, 1996.
- Tharuna Nirajan “A Video Conferencing Package for Computer Network Instruction,” M.S. project, 1996.

Undergraduates

- Malcolm Doering, undergraduate research assistant, “Evolution of Communication in Robots,” 2010-2013.
- Joseph Meleca, undergraduate research assistant, “Evolution of Resistance in Digital Organisms,” summer 2009.
- Anthony Curley, Professorial Assistant, Experimental research in evolutionary robotics, 2008-present.
- Alex Kuhn, “Simulation of Wireless Sensor Network Systems and Protocols,” 2006-2007.
- Paul Labadie, “Design of an Object-Oriented Multicast Video Server,” 1995-1996.
- Scott Hetrick, “Java-based Applications on World-Wide Web,” 1995-1996.
- Joseph D. Budzyn, “Design and Performance of a Video Server,” Summer 1995.
- Wendy S. Weiss, “MultiSim⁺⁺: An Object-Oriented Simulator of Parallel Computer Architectures,” 1993–1994.
- C. Jeremy Uniacke, “Parallel Numerical Algorithms on Workstation Clusters,” Summer 1993.
- William J. Ryan, “Load Balancing in a Scalable Eigenvalue Solver,” Summer 1992,

Visiting Scholars

- René Draschwandtner, Visiting Scholar from University of Applied Sciences Upper Austria, conducted research on evolutionary robotics for his M.S. thesis, 2015. His thesis, “Evolving Aquatic Robots for Payload Transportation,” won first prize in the 2016 Austrian Computer Society M.S. Thesis Competition.
- Eric Fleury, Visiting Scientist from Ecole Normale Supérieure de Lyon, France, conducted research on multicast tree construction in computer networks, 1997-1998.

Teaching Experience

University Courses Developed and Taught

- Advanced Topics in Cloud Computing and Internet of Things (graduate, seminar/project)
- Advanced Topics in Artificial Life Communities (graduate, seminar/project)
- Selected Topics in Autonomic Computing Systems (graduate, seminar/project)
- Selected Topics in Sensor Networks (graduate, seminar/project)
- Selected Topics in Mobile Computing and Communications (graduate, seminar/project)
- Selected Topics in Computer Networks and Distributed Systems (graduate, seminar/project)
- Advanced Topics in Computer Networks (graduate, lecture/project)
- Advanced Operating Systems (graduate, lecture/project)
- Advanced Computer Architecture (graduate, lecture/project)
- Operating Systems (undergraduate, lecture/laboratory)
- Computer Networks (undergraduate, lecture/laboratory)
- Computer Communications (undergraduate, lecture/laboratory)

Short Courses Offered

- “Programming Support for Distributed-Memory Computing Environments,” (with L.M. Ni). The course was offered at two conferences: the Seventh International Parallel Processing Symposium (IPPS), Newport Beach, California, April 1993, and the 13th IEEE International Conference on Distributed Computing Systems (ICDCS) Pittsburgh, Pennsylvania, May 1993.

Development of Instructional Resources

- Continuous development of new laboratory exercises/projects for undergraduate and graduate systems, enabling students to gain experience in developing interesting applications. Examples include: sensor network simulation, data classification methods, audio/video streaming, collaborative web browsing, data compression and encryption, error control techniques for wireless networks.
- Development of course packs for computer networks and operating systems courses. These have been used by several other faculty at MSU and by faculty at other institutions (e.g., Clemson, Arizona State, George Mason, Saginaw Valley State, Grand Valley State)
- Integration of major new topics into courses over the years (e.g., Linux kernel internals, middleware technologies, mobile computing and wireless networking, video streaming, sensor networks, workstation cluster software design).

Service Activities

Professional Service

- **Editorial Board Member**

- *IEEE Transactions on Parallel and Distributed Systems*, 2001-2005.

- **Program Co-Chair**

- 2003 IEEE International Conference on Distributed Computing Systems, Providence, Rhode Island, May 2003.

- **Program Committee Vice Chair**

- 2005 IEEE International Conference on Pervasive Computing and Communications (PerCom), Kauai, Hawaii, March 2005.
- 2001 IEEE International Conference on Distributed Computing Systems (ICDCS), Phoenix, Arizona, April 2001 (VC for Internet Technologies)
- 2000 IEEE International Conference on Distributed Computing Systems (ICDCS), Taipei, Taiwan, April 2000 (VC for Distributed Operating Systems)

- **Program Committee Member**

- Fourteenth European Conference on Artificial Life (ECAL 2017), Lyon, France, September 2017.
- 2016 IEEE International Conference on Evolvable Systems (ICES), Athens, Greece, December 2016.
- Fifth International Conference on the Theory and Practice of Natural Computing (TPNC), Sendai, Japan December 2016.
- Tenth IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO), Augsburg, Germany, September 2016.
- Fifteenth International Conference on the Synthesis and Simulation of Living Systems, Cancun, Mexico, July 2016.

- Ninth IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO), Cambridge, Massachusetts, September 2015
- 2014 IEEE International Conference on Evolvable Systems (ICES), Orlando, Florida, December 2014.
- Fourteenth International Conference on the Synthesis and Simulation of Living Systems (ALIFE 14), New York, NY, USA, July 2014.
- Seventh IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO) Philadelphia, Pennsylvania, September 2013.
- Sixth IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO) Lyon, France, October 2012.
- Thirteenth International Conference on the Synthesis and Simulation of Living Systems (ALIFE 13), East Lansing, Michigan, July 2012.
- Fifth IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO) Ann Arbor, Michigan, October 2011.
- Fourth IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO) Budapest, Hungary, September 2010.
- Third IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO) San Francisco, California, September 2009.
- Sixth IEEE International Conference on Autonomic Computing (ICAC), Barcelona, Spain, June 2009.
- Second IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO) Venice, Italy, October 2008.
- First International Conference on Autonomic Computing and Communication Systems (Autonomics'07) Rome, Italy, October 2007.
- First Workshop on Software Engineering for Pervasive Computing Applications and Systems (SEPCAS) Minneapolis, Minnesota, May 2007.
- ACM/IFIP/USENIX 7th International Middleware Conference, Melbourne, Australia, November 2006.
- 2006 IEEE International Conference on Distributed Computing Systems, Lisbon, Portugal, July 2006.
- Fourth Workshop on Adaptive and Reflective Middleware (ARM 2005), Grenoble, France, November 2005.
- 2005 International Symposium on Distributed Objects and Applications (DOA), Agia Napa, Cyprus, October 2005.
- Fifth International Workshop on Software Engineering and Middleware (SEM 2005), co-located with ESEC/FSE'05, Lisbon, Portugal, September 2005.
- Fourth IEEE International Symposium on Network Computing and Applications (IEEE NCA05) Cambridge, Massachusetts, July 2005.
- 2005 IEEE International Conference on Autonomic Computing, Seattle, Washington, June 2005.
- 2005 IEEE International Conference on Distributed Computing Systems, Columbus, Ohio, June 2005.
- 2005 International Conference on Parallel Processing, Oslo, Norway, June 2005
- Tenth IEEE International Workshop on Future Trends in Distributed Computing Systems, Suzhou, China, May 2004.

- 2004 IEEE International Conference on Pervasive Computing and Communications, Orlando, Florida, March 2004.
- 2004 International Workshop on Distributed Auto-adaptive and Reconfigurable Systems, Tokyo, Japan, March 2004.
- 2002 IEEE International Conference on Distributed Computing Systems, Vienna, Austria, July 2002.
- 2002 International Conference on Parallel Processing, Vancouver, Canada, August 2002
- 2002 Workshop on Aspect Oriented Programming for Distributed Computing Systems, Vienna, Austria, July 2002.
- 2000 International Conference on Parallel Processing, Toronto, Canada, August 2000.
- 1999 IEEE International Conference on Computer Communications and Networks, Boston, Massachusetts, October 1999.
- 1999 International Workshop on Group Communication, Aizu, Japan, September 1999.
- 1998 IEEE International Conference on Parallel and Distributed Systems, Tainan, Taiwan, December 1998
- 1998 IEEE International Conference on Computer Communications and Networks, October 1998.
- 1997 IEEE International Conference on Parallel and Distributed Systems, Seoul, Korea, December 1997.
- Sixth IEEE Symposium on High-Performance Distributed Computing, August 1997.
- Third IEEE Symposium on High-Performance Computer Architecture, January 1997.
- 1996 International Conference on Parallel Processing, August 1996.
- 1995 IEEE International Conference on Distributed Computing Systems, Vancouver, British Columbia, May 1995.
- 1994 IEEE International Conference on Parallel and Distributed Systems, Hsinchu, Taiwan, December 1994.
- 1993 IEEE International Conference on Parallel and Distributed Systems, Taipei, Taiwan, December 1993.
- 13th IEEE International Conference on Distributed Computing Systems, Pittsburgh, Pennsylvania, June 1993.
- 1993 Phoenix Conference on Computers and Communications, Phoenix, Arizona, March 1993.
- 1992 Phoenix Conference on Computers and Communications, Phoenix, Arizona, March 1992.

- **Workshops Chair**

- Thirteenth International Conference on the Synthesis and Simulation of Living Systems (ALIFE 13), East Lansing, Michigan, July 2012.
- 2005 IEEE International Conference on Distributed Computing Systems, Columbus, Ohio, June 2005.

- **Publicity Chair**

- 1998 IEEE International Conference on Distributed Computing Systems, Amsterdam, The Netherlands, May 1998.

- 1995 IEEE International Symposium on High-Performance Computer Architecture, Raleigh, North Carolina, January 1995.
- **Session Chair**
 - 2011 BEACON Congress, Session on Evolution of Communication and Cooperation, East Lansing, Michigan, August 2011.
 - 2007 IEEE International Conference on Distributed Computing Systems, Toronto, Ontario, July 2007.
 - 2006 IEEE International Conference on Distributed Computing Systems, Lisbon, Portugal, July 2006.
 - Second IEEE International Workshop on Self-Managed Networks, Systems and Services (Self-Man), Dublin, Ireland, June 2006.
 - 2005 IEEE International Conference on Autonomic Computing, Seattle, Washington, June 2005.
 - 2005 IEEE International Conference on Distributed Computing Systems, Columbus, Ohio, June 2005.
 - 2005 IEEE International Conference on Pervasive Computing and Communications (PerCom), Kauai, Hawaii, March 2005.
 - 2004 International Workshop Quality of Service, Montreal, Canada, June 2004.
 - 2004 IEEE International Conference on Autonomic Computing, New York, May 2004.
 - 2004 International Workshop Distributed Auto-adaptive and Reconfigurable Systems, Hachioji, Japan, March 2004.
 - 2004 IEEE International Conference on Distributed Computing Systems, Hachioji, Japan, March 2004.
 - 2003 IEEE International Workshop on Modeling Analysis and Simulation of Wireless and Mobile Systems, San Diego, California, September 2003.
 - Ninth IEEE International Workshop on Future Trends in Distributed Computing Systems, San Juan, Puerto Rico, June 2003.
 - 2002 IEEE International Conference on Distributed Computing Systems, Vienna, Austria, July 2002.
 - 2001 IEEE International Conference on Distributed Computing Systems, Phoenix, Arizona, April 2001.
 - Third International Workshop on Multimedia Network Systems, Phoenix, Arizona, April 2001.
 - 1999 International Conference on Parallel and Distributed Computing Systems, Fort Lauderdale, Florida, August 1999.
 - 1997 International Conference on Parallel and Distributed Computing Systems, New Orleans, Louisiana, October 1997.
 - 13th IEEE International Conference on Distributed Computing Systems, Pittsburgh, Pennsylvania, June 1993.
 - 1992 International Conference on Parallel Processing, St. Charles, Illinois, August 1992.
 - 1991 Computer Software and Applications Conference, Tokyo, Japan, September 1991.
- **Vice-Chair**, Chapter V - Computers, IEEE Southeast Michigan Chapter (IEEE/SEM), 1996 - 1998.
- **Review Panel Member**

- NSF/CISE ad hoc reviewer, 2013.
- NSF/CISE review panels, 2007, 2006, 2005, 2000, 1999(2), 1997, 1995.
- NSF/DUE review panel, 1996.
- DOE HPCC review panel, 1995.
- **Referee** for the following journals: IEEE Transactions on Robotics, IEEE Transactions on Evolutionary Computation, Artificial Life, IEEE Transactions on Network and Service Management, IEEE Transactions on Computers, IEEE Transactions on Software Engineering, IEEE Transactions on Parallel and Distributed Systems, Communications of the ACM, ACM Computing Surveys, Software Practice and Experience, Journal of Parallel and Distributed Computing, Computer Systems in Engineering, Information Processing Letters, Parallel Processing Letters, Journal of Computer Simulation, Parallel Computing, Computer Communications. Also a referee for many conferences in addition to program committee memberships.
- **Individual Reviewer** of research proposals to NSF, ARO, DOE, and the Swedish Research Council for Engineering Sciences.
- **Book Reviewer** for IEEE Computer Society Press and several other publishers.
- **Member**, IEEE Computer Society, ACM.

University Committee Service

- Engineering College Rating Committee (Promotion and Tenure) 2012-2016.
- Engineering College Advisory Council (elected), 2006-2007 (Secretary), 2005-2006 (Secretary).
- CSE Graduate Studies and Research Committee, 2015-present, 2008-2014, 2006-2008 (Chair), 2005-2006, 2000-2003, 1991-1992 (secretary).
- CSE Tenure and Promotion Committee (2002-present), 2012-2014 (Chair).
- CSE Chair Search Committee (elected), 2006-2007, 1994-1995.
- CSE Faculty Search Committee (elected), 2005-2006 (Chair), 2002-2003 (Chair), 2000-2001, 1999-2000, 1996-1997.
- CSE Curriculum Committee, 2014-2015
- CSE Department Advisory Committee (elected), 2001-2003, 1996-1997.
- CSE Computing Environment Committee, 2003-2004, 1999-2000, 1996-1998 (chairperson), 1995-1996 (secretary), 1992-1994, 1990-1991 (secretary).
- Graduate Recruitment Committee, 2000-2001.
- CSE Qualifying Exam Committee 2000-2001, 1999-2000 (chairperson), 1997-1998, and various qualifier subcommittees (1992-1997).
- CSE Space Committee, 1996-1997.
- CSE Colloquium Committee, 2010-2011, 1995-1996, 1993-1994.
- CSE Awards Committee, 1994-1995.
- Engineering College Computer Engineering Task Force, 1994 - 2001.
- Engineering College Computer Engineering Faculty Committee, 1990 - 1992
- Engineering College Wireless Infrastructure Committee, 2000 - 2002.
- University Academic Council / Faculty Council (elected), 1994-1996
- University Hearing Board (elected), 1993-1995.

Recent Outreach and Recruiting Activities

- Presentations on Evolutionary Robotics Research to 8th graders as part of Chippewa Career Day, Okemos, Michigan, February 5, 2016; February 6, 2015; February 7, 2014.
- Presentation on evolutionary robotics to high school students participating in the Introduction to Robotics Engineering Program, July 2015.
- Presentation, tour and demo of Evolve-A-Robot software to group of 25 high school students participating in COE Introduction to Robotics Engineering Residential Program, July 28, 2014.
- Presentations to K-12 teachers as part of NSF Research Experiences program, April 2013 and July 2013.
- Faculty mentor, NSF Research Experiences for Teachers Program, Summer 2014. With graduate assistants Tony Clark and Jared Moore, worked with Charles Payson, a science teacher and robotics coach at the Battle Creek Area Mathematics and Science Center. Mr. Payson developed a web-accessible, 3D-graphics system enabling students to observe and interact with the evolution of wheeled robots.
- Evolutionary robotics presentations to high school students participating in the Robotics Engineering residential program, July 2013.
- Faculty mentor, NSF Research Experiences for Teachers Program, Summer 2013. With graduate assistants Tony Clark and Jared Moore, worked with Charles Payson, a science teacher and robotics coach at the Battle Creek Area Mathematics and Science Center. Mr. Payson's research project explored evolutionary robotics as applied to terrestrial robots. Prof. McKinley also gave presentations to the entire group of K-12 Teachers on various aspects of the program.
- Engineering Robotics faculty presenter, Summer 2013, 2014. With graduate assistants Tony Clark and Jared Moore, presented a seminar and demonstrations on Evolutionary Robotics to high school students participating in Engineering Robotics at MSU, a summer residential program introducing students to research and development in biomimetic robots, nanorobotics, mechatronics and manufacturing automation.
- Faculty mentor, NSF Research Experiences for Teachers Program. With graduate assistant Brian Connelly, worked with Wendy Johnson, a biology teacher at Lansing Catholic High School in Lansing, Michigan, on a project involving the evolution of group behavior in digital organisms; summer 2012.
- Organizer, Frontiers in Science Workshop. Conducted a 5-hour workshop as part of this Weekend Workshop Series, assisted by graduate student Brian Connelly. These workshops provide opportunities for K-12 teachers learn about new research developments while earning university credits for continuing certification; April 2012.
- Faculty mentor, NSF Research Experiences for Teachers Program. With graduate assistants Tony Clark and Daniel Couvertier, worked with Adam Ford, a middle school teacher in Lansing, Michigan, on a project involving evolution of software for stationary sensors; summer 2011.
- Provided tour of evolutionary robotics facility to Kei Koizumi, White House Office of Science and Technology Policy; April 2010.
- Participated in High School Engineering Institute Residential Program: Gave lectures on research in evolutionary robotics, as well as overviews of other computer science subdisciplines, to participants; provided a tour and demonstrations of Digital Evolution Testbed; July 2010.

- Provided tours and demonstrations of Evolution Park facilities to CSE Open House participants (February 2011, October 2010, February 2010), visiting Dewitt high school class (May 2011), REU group from DePauw University (July 2011), and numerous visiting individuals and small groups.

Invited Talks, Exhibits, and Other Presentations

- Exploring Science and Engineering with Evolutionary Computation, presented to the local ACM Chapter, November 2014, East Lansing.
- Presenter (with A. Clark and J. Moore), 3D Printing Showcase, Michigan State Library Open House, East Lansing, Michigan, September 2014.
- Evolutionary Computation and Applications (with Brian Connelly), five-hour workshop as part of MSU's Frontiers in Science Weekend Workshop program, East Lansing, Michigan, April 2012.
- Evolving Robotic Fish, research presentation at the 2nd Annual BEACON Congress, East Lansing, Michigan, August 2011.
- Evolving Robust Systems for Distributed Computing and Robotics, research presentation to Continental Automotive group, East Lansing, Michigan, August 2011.
- Harnessing Evolution for Robust Distributed Systems, Northrop Grumman Corporation, Fort Wayne, Indiana, June 2011.
- Evolution of Cooperation in Digital Organisms, Microbiology and Molecular Genetics Seminar, East Lansing, Michigan, February 2011.
- Evolution in Action, presented to the MSU Gifted and Talented Advisory Committee Annual Luncheon, East Lansing, Michigan, October 2010
- Digital Evolution and Evolutionary Robotics, MSU High School Engineering Institute, East Lansing, Michigan, July 2010.
- Digital Evolution of Robust, Self-Adaptive Distributed Systems, NSF IUCRC Kickoff Meeting, Crystal City, Virginia, October 2007.
- Digital Evolution of Robust and Resilient Software for Distributed Systems, CSE Graduate Seminar, East Lansing, Michigan, September 2007.
- Directed Evolution of Communication and Cooperation in Digital Organisms, poster presentation, European Conference on Artificial Life (ECAL), Lisbon, Portugal, September 2007.
- Self-Adaptive Software Technologies for High-Assurance Systems, College of Engineering Seminar, East Lansing, Michigan, October 2006
- Evolution of Adaptive Sleep Response in Digital Organisms, poster presentation, European Conference on Artificial Life (ECAL), Lisbon, Portugal, September 2007.
- High-Assurance Autonomic Systems: RAPIDware and Follow-on Projects, Motorola Labs, Schaumburg, Illinois, August 2006
- The Role of Transparency in Autonomic Cyberinfrastructure, IBM Watson Research Center, Hawthorne, New York, March 2006

- Dynamic Adaptation for Autonomic Distributed Computing, invited presentation, Motorola Labs, Schaumburg, Illinois, July 2005.
- RAPIDware Project Overview and Status, ONR site visit, East Lansing, Michigan, October 2005.
- University Cyberinfrastructure: Pervasive, Sustainable, Autonomic, Evolvable, presented at MSU Cyberinfrastructure Workshop, East Lansing, Michigan, February 2005.
- RAPIDware: Component-Based Development of Adaptive and Dependable Middleware, DoD Workshop on Critical Infrastructure Protection, Annapolis, Maryland, August 2004.
- Generation of Self-Optimizing Wireless Network Applications, poster presentation, International Conference on Autonomic Computing (ICAC), New York, May 2004.
- Supporting Unanticipated Adaptation in Mobile Computing Systems, invited seminar, Department of Computer Science and Engineering, University of Minnesota, Minneapolis, Minnesota, December 2003.
- Support for Run-Time Adaptation in RAPIDware, invited seminar, Department of Computer Science and Engineering, University of Notre Dame, South Bend, Indiana, September 2003.
- RAPIDware: Adaptive Middleware for Critical Infrastructure Protection, MSU Cybersecurity Workshop, East Lansing, Michigan, November 2002.
- RAPIDware: Design of Adaptive Software for “Always-On” Systems, invited seminar, U.S.-European Union Workshop on Critical Infrastructure Protection, Lansdowne, Virginia, September 2002.
- MetaSockets: Run-Time Support for Adaptive Communication Services, poster presentation, International Symposium on Distributed Objects and Applications, Irvine, California, October 2002.
- Issues in the Design of Middleware for Mobile Computing Systems, invited seminar, Strategic Workshop on Middleware for Mobile Systems, jointly sponsored by the European Research Council on Informatics and Mathematics and the U.S. National Science Foundation, Vienna, Austria, July 2002.
- Design and Use of Adaptive Components in RAPIDware, invited seminar, Department of Computer Science, University of Illinois, Urbana, Illinois, April 2002.
- Design and Use of Adaptive Components in RAPIDware, invited seminar, Department of Computer Science, Purdue University, West Lafayette, Indiana, April 2002.
- RAPIDware: Adaptive Middleware for Mobile Computing, invited seminar, Department of Computer Science Indiana University - Purdue University at Indianapolis, Indianapolis, Indiana, April 2002.
- RAPIDware: Adaptive Middleware for Multi-Party Applications, invited seminar, National Superconducting Cyclotron Laboratory, East Lansing, Michigan, October 2001.
- RAPIDware: Component-Based Development of Adaptive and Dependable Middleware, ONR PI Meeting, Arlington, Virginia, July 2001.
- Design of Proxy Services for Heterogeneous Distributed Computing, invited seminar, Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, Michigan, February 2001.
- Adaptive Middleware for Heterogeneous Distributed Computing, invited seminar, Lucent Technologies, Holmdel, New Jersey, January 2001.

- Experimental Evaluation of Forward Error Correction on Multicast Audio Streams in Wireless LANs, poster presentation, ACM Multimedia Conference, Los Angeles, California, October 2000.
- Pocket Pavilion: Synchronous collaborative browsing for wireless handheld computers, poster presentation, IEEE International Conference on Multimedia and Expo, New York, July 2000.
- VGuide: Design and Performance Evaluation of a Synchronous Collaborative Virtual Reality Application, poster presentation, IEEE International Conference on Multimedia and Expo, New York, July 2000.
- Research Directions in Multi-Party Systems and Applications, invited seminar, Department of Electrical and Computer Engineering, Iowa State University, Ames, Iowa, April 1999.
- Research Directions in Multi-Party Systems and Applications, invited seminar, Lucent Technologies, Murray Hill, New Jersey, December 1998.
- Joint Research Exhibit of MSU Computer Science and Electrical Engineering Departments, IEEE Supercomputing'95, San Diego, California, December 1995.
- Collective Communication in Multicomputers and ATM Networks, invited seminar, Department of Electrical Engineering and Computer Engineering, Iowa State University, March 1995.
- Design of the ComPaSS Communications Library, Department of Energy Headquarters, Germantown, Maryland, March 1995.
- Cluster²: Parallel Data Clustering on a Workstation Cluster, poster presentation, IEEE Supercomputing'94, Washington, D.C., November 1994.

Personal Information

U.S. citizen. Born in 1960 and raised in St. Ansgar, Iowa.

References

Available upon request.