

CURRICULUM VITAE

Risto Miikkulainen

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Education

Doctor of Philosophy in Computer Science, University of California, Los Angeles, 1990.
Master of Science in Engineering (Applied Mathematics), “with distinction”, Helsinki University of Technology, Finland, 1986.

Academic Positions

Professor, Department of Computer Sciences, University of Texas at Austin, since 2002; Associate Professor, 1996 – 2002; Assistant Professor, 1990 – 1996.
Faculty Member, Institute for Neuroscience, The University of Texas at Austin, since 2000.

Research Summary

My research focuses on biologically-inspired computation such as neural networks and evolutionary computation. On one hand, the goal is to understand biological information processing, and on the other, to develop intelligent artificial systems that learn and adapt by observing and interacting with the environment. The three main focus areas are: (1) Neuroevolution, i.e. evolving complex deep learning architectures and recurrent neural networks for sequential decision tasks such as those in robotics, games, and artificial life; (2) Cognitive Science, i.e. models of natural language processing, memory, and learning that, in particular, shed light on disorders such as schizophrenia and aphasia; and (3) Computational Neuroscience, i.e. development, structure, and function of the visual cortex, episodic memory, and language processing.

Professional Positions

Board of Governors, International Neural Network Society, 2007–2016.
Computational Intelligence in Games Technical Committee, IEEE Computational Intelligence Society, Vice Chair 2007-2011, Member since 2007.
Scientific Advisory Board, Center of Excellence in Adaptive Informatics Research, Helsinki University of Technology, 2006–2011.
Fellow, Sentient Technologies, Inc., San Francisco, since 2015.
Consultant, Centaur Technology, Inc., Austin, since 2015.
Co-founder, Digital Certainty, Inc., Austin, 2011-2016 (acquired).
Consultant, 21st Century Technologies, Inc., Austin, 2008-2010.
Advisory Board, Lange Fund Management, LLC, Los Angeles, 2005-2006.
Consultant, Catalis Healthcare / Recare Inc., Austin, 2000-2006.

Editorships

IEEE Transactions on Computational Intelligence and AI in Games, associate editor, since 2008.

Cognitive Systems Research, associate editor, 2000-2015.

IEEE Transactions on Autonomous Mental Development, associate editor, 2008–2014.

Neural Networks, associate editor, 2008–2011.

Machine Learning, action editor, 2002–2011.

Scholarpedia, curator, since 2015.

aigamereserch.org, editorial board member, since 2013.

Machine Learning, editorial board member, since 2011.

Evolutionary Intelligence, editorial board member, since 2007.

Encyclopedia of Machine Learning, editorial board member, 2005–2011 (1st Edition); 2014 (2nd Edition).

Neural Computing Surveys, editorial board member, 1996–2001.

Applied Intelligence, editorial board member, 1995–2005.

Neural Processing Letters, editorial board member, 1994–2005.

IEEE Transactions on Computational Intelligence and AI in Games, Guest co-editor of a special issue on “Physics-Based Simulation Games,” 2015.

Neural Networks, Guest co-editor of a special issue on “Advances on Self-Organizing Maps,” 2005.

IEEE Transactions on Evolutionary Computation, Guest co-editor of a special issue on “Evolutionary Computation and Games,” 2005.

Research Grants

National Institutes of Health, “Predicting Rehabilitation Outcomes In Bilingual Aphasia Using Computational Modeling,” (subcontract of a Boston University grant 1U01DC014922, PI Swathi Kiran), July 1st 2016 - June 30th 2021, \$1,118,097.

National Science Foundation, “BEACON: An NSF Science and Technology Center for the Study of Evolution in Action,” (subcontract of a Michigan State University grant DBI-0939454, PI Erik Goodman), August 1, 2010 - July 31st, 2020, ~\$4,500,000.

National Institutes of Health, “The Role of Emotion and Communication in Cooperative Behavior,” 1R01GM105042, September 2nd 2013 - July 31st 2017, \$929,113.

Army Research Office, “Neurometric Modeling: Computational Modeling of Individual Brains,” (PI David Ress), 59476-LS, June 1st 2012 - August 31st 2015, \$503,717.

IARPA, “Knowledge Representation as Embodied Abstractions: Theory and Experimental Validation” (subcontract of a Teledyne, Inc. grant, PI Mario Aguilar), November 15th 2013 - January 15th 2015, FA8650-14-C-7357, \$192,601.

National Science Foundation, “Learning Strategic Behavior in Sequential Decision Tasks,” IIS-0915038, September 1st 2009 - August 31st 2014, \$455,000

National Science Foundation, “A Predictive Simulation Model of Competitive Dynamics in Innovation,” SBE-0914796, September 1st 2009 - August 31st 2013, \$190,099.

National Institutes of Health, “Interdisciplinary Investigation of Biological Signatures of Autism Subtypes” (subcontract of University of California at Davis grant 1R01MH089626, PI David G. Amaral), September 30, 2009 - August 31, 2011, \$66,185.

National Science Foundation, “Pilot: Leveraging Human Creativity with Machine Discovery,” IIS-0757479, June 1st 2008 - May 31st 2011, \$199,967.

U.S. Army Medical Research Institute, “Neurometric Modeling: Computational Modeling of Individual Brains,” W911NF-10-1-0145, June 1st 2010 - February 28th, 2011, \$47,039.

Texas Higher Education Coordinating Board, “Constructing Intelligent Agents in Simulated Worlds” (003658-0036-2007), June 1st 2008 – January 31st, 2011, \$150,000.

National Institutes of Health, “Computational and Behavioral Evidence for Bilingual Aphasia Rehabilitation” (R21-DC009446), December 1st, 2008 - November 30th, 2011, \$401,180.

The Fetzer Institute, “A Formal Theory of Meditation” (subcontract of University of California at Davis grant, PI Clifford Saron), September 1st 2008 - August 31st 2011, \$86,418.

Google, Inc., “The OpenNERO AI Research and Education Platform,” September 1st, 2009, \$40,000.

National Science Foundation, “RI: Mastodon: A Large-Memory, High-Throughput Simulation Infrastructure” (CISE Research Infrastructure Grant EIA-0303609), September 1st 2003 - August 31st 2008, \$1,927,031.

National Institutes of Health, “Neural Network Models of Schizophrenic Language” (subcontract of Yale grant 5R01-MH066228, PI Ralph Hoffman), July 1st 2003 - June 30th 2008, \$185,196.

Defense Advanced Research Projects Agency, “Polymorphous Cognitive Agent Architecture (PCAA)” (subcontract of Lockheed Martin Advanced Technology Laboratories grant FA8750-04-C-0266, PI Julius Ettl), March 26th 2004 – August 31st 2006, \$700,000.

National Institutes of Health, “Computational Modeling of Cortical Maps” (Human Brain Project Grant 1R01-MH66991), April 22nd 2002 - March 31st 2006, \$765,500.

Toyota Technical Center, “Collision Avoidance through Neuroevolution Reinforcement Learning”, November 1st 2003 - January 15th 2006, \$333,750.

Defense Advanced Research Projects Agency, “Integrating Neuroevolution Learning into TIELT” (subcontract of NRL grant N00173041G025, PI David Aha), November 1st 2004 - October 31st 2005, \$27,000.

National Science Foundation, “Cooperative Coevolution of Neural Networks in Sequential Decision Tasks” (IIS-0083776), September 5th 2000 - August 31st 2004, \$419,114.

Texas Higher Education Coordinating Board, “Coevolution of Neural Networks for Multi-Agent Tasks” (ARP-003658-0476-2001), January 1st 2002 – December 31st, 2003, \$146,936.

National Science Foundation, “Modeling Development and Perceptual Phenomena in the Visual Cortex” (IIS-9811478), December 15th 1998 - November 30th 2001, \$231,377.

National Science Foundation, “Symbiotic Evolution of Neural Networks in Sequential Decision Tasks” (IRI-9504317), September 15th 1995 – August 31st, 1999, \$249,523.

Texas Higher Education Coordinating Board, “Natural Language Processing with Modular Neural Networks” (ARP-003658-444-1995), January 1st 1996 – August 31st, 1998, \$91,170.

National Science Foundation, “RIA: A Self-Organizing Neural Network Model of the Primary Visual Cortex” (IRI-9309273), June 15th 1993 – May 31st 1996, \$89,916.

Awards and Honors

Gabor Award, International Neural Network Society, 2017.

IEEE Fellow, since 2016

Distinguished Lecturer, IEEE Computational Intelligence Society, 2015-2017.

Best Paper Award in the Digital Entertainment and Arts track, *Genetic and Evolutionary Computation Conference* (GECCO-2015, Madrid, Spain), for Schrum, J., and Miikkulainen, R., “Solving Interleaved and Blended Sequential Decision-Making Problems through Modular Neuroevolution”

Best Paper Award in the Digital Entertainment and Arts track, *Genetic and Evolutionary Computation Conference* (GECCO-2014, Vancouver, Canada), for Schrum, J., and Miikkulainen, R., “Evolving Multimodal Behavior With Modular Neural Networks in Ms. Pac-Man.”

Deployed Application Award, *Innovative Applications of Artificial Intelligence Conference* (IAAI-2013, to A. Waters and R. Miikkulainen for “GRADE: Machine Learning Support for Graduate Admissions.”

Winner, BotPrize Award (successfully passing a Turing test for game bots), at the *IEEE Conference on Computational Intelligence in Games* (CIG-12, Grenada, Spain), for the UT² program of Igor Karpov, Jacob Schrum, and Risto Miikkulainen.

Honorable mention, 2012 Ziskind-Somerfield Research Award, Society of Biological Psychiatry, for the article “Using Computational Patients to Evaluate Illness Mechanisms in Schizophrenia” by Ralph E. Hoffman, Uli Grasemann, Ralitza Gueorguieva, Donald Quinlan, Douglas Lane, and Risto Miikkulainen.

Winner, Humanlike Bot competition (Turing test for game bots), at the *World Congress for Computational Intelligence* (WCCI-12, Brisbane, Australia), for the UT² program of Igor Karpov, Jacob Schrum, and Risto Miikkulainen.

Best Paper Award, *2011 IEEE Conference on Computational Intelligence and Games* (CIG-2011, Seoul, Korea), to J. Schrum and R. Miikkulainen for “Evolving Multimodal Networks for Multitask Games.”

First place, Sixth Annual Competition of Pseudo-Boolean Solvers, at the *Fourteenth International Conference on Theory and Applications of Satisfiability Testing* (SAT-2011, Ann Arbor, MI), for the Borg program of B. Silverthorn and R. Miikkulainen.

First place, Fifth Annual Competition of Pseudo-Boolean Solvers, at the *Thirteenth International Conference on Theory and Applications of Satisfiability Testing* (SAT-2010, Edinburgh, UK), for the Borg program of B. Silverthorn and R. Miikkulainen.

Best Student Paper Award, *IEEE Symposium on Computational Intelligence and Games* (CIG-2009, Milan, Italy), for Schrum, J. and Miikkulainen, R. on “Evolving Multi-modal Behavior in NPCs.”

Best Paper Award in Artificial Life, Evolutionary Robotics, Adaptive Behavior, and Evolvable Hardware, *Genetic and Evolutionary Computation Conference* (GECCO-2008, Atlanta, GA), for Valsalam, V., and Miikkulainen, R., “Modular Neuroevolution for Multilegged Locomotion.”

Best Paper Award in Generative and Developmental Systems, *Genetic and Evolutionary Computation Conference* (GECCO-2007, London, UK), for Reisinger, J. and Miikkulainen, R., “Acquiring Evolvability through Adaptive Representations.”

Best Student Paper Award, *IEEE Symposium on Computational Intelligence and Games* (CIG-2006, Reno, NV), for Bryant, B. and Miikkulainen, R., “Exploiting Sensor Symmetries in Example-based Training for Intelligent Agents.”

Best Paper Award in Evolutionary Robotics, A-Life, Adaptive Behavior, *Genetic and Evolutionary Computation Conference* (GECCO-2005, Washington, DC), for Valsalam, V., Bednar, J. A., and Miikkulainen, R., “Constructing Good Learners using Evolved Pattern Generators.”

Best Paper Award in Real World Applications, *Genetic and Evolutionary Computation Conference* (GECCO-2005, Washington, DC), for Sit, Y. F. and Miikkulainen, R., “Learning Basic Navigation for Personal Satellite Assistant using Neuroevolution.”

Bronze Medal, Human Competitive Results Competition, *Genetic and Evolutionary Computation Conference* (GECCO-2005, Washington, DC), for Grasemann, U. and Miikkulainen, R., “Effective Image Compression using Evolved Wavelets.”

Best Paper Award, *IEEE Symposium on Computational Intelligence and Games* (CIG-2005, Essex, UK), for Stanley, K. O., Bryant, B., and Miikkulainen, R., “Evolving Neural Network Agents in the NERO Video Game.”

Best Paper Award in Real World Applications, *Genetic and Evolutionary Computation Conference* (GECCO-2003, Chicago, IL), for Gomez, F. and Miikkulainen, R., “Active Guidance for a Finless Rocket Using Neuroevolution.”

Best Paper Award in Genetic Algorithms, *Genetic and Evolutionary Computation Conference* (GECCO-2002, New York, NY), for Stanley, K. and Miikkulainen, R., “Efficient Reinforcement Learning Through Evolving Neural Network Topologies.”

Francisco J. Varela Research Award, Mind and Life Institute, “Developing computational model for meditation using cross cortical synchrony in EEG data,” 2006–2009, \$10,000 (student: Manish Sagar).

Fellow on David Bruton Jr. Centennial Professorship #3 2005–2006, \$2000.

Dean’s Fellowship, College of Natural Sciences, the University of Texas at Austin, Spring 2002.

Faculty Fellowship, Department of Computer Sciences, the University of Texas at Austin, \$5,000–\$7,000 per year, 1995 – 2002.

National Institutes of Health, “The Source of Cross-Language Variation in Syllable Systems,” NIDCD National Research Service Award 1F32-DC00459-01, March 2000 – February 2002, \$65,748 (Postdoc: Dr. Melissa A. Redford).

Research Internship Award, The University of Texas at Austin, “Research Practice in Neuroevolution,” September 2001 - May 2002, \$18,500.

National Science Foundation (REU Supplement to grant IRI-9504317), April 1997 – September 1998, \$10,000.

National Science Foundation, “Synchronization and Segmentation in a Unified Neural Network Model of the Primary Visual Cortex,” IRI-940004P, 105 Service Units on Cray-90 and 119,000 SU on T3D at Pittsburgh Supercomputing Center, October 3rd 1994 – July 15th 1997.

High Performance Computer Time Grant, The University of Texas at Austin, “Handwritten Digit Recognition with the Laterally Interconnected Self-Organizing Map,” \$15,000 on the Cray J90, September 1st 1995 – August 31st 1996.

Special Research Grant, University Research Institute, the University of Texas at Austin, “Handwritten Digit Recognition with Laterally Connected Self-Organizing Maps”, February 1996, \$500.

College of Natural Sciences, the University of Texas at Austin, matching funds for equipment for the National Science Foundation Grant IRI-9504317, June 1995, \$11,000.

National Science Foundation, “A Self-Organizing Neural Network Model of the Primary Visual Cortex,” IRI-930005P, 1008 Service Units on Cray-90 at the Pittsburgh Supercomputing Center, June 23rd 1993 – January 15th 1995.

Summer Research Award, University Research Institute, the University of Texas at Austin, “Learning Abstractions with Distributed Neural Networks,” June – July 1991, \$10,222.

Max-Planck-Institute für Psycholinguistik, Nijmegen, the Netherlands, “Neural Network Models of Natural Language Processing,” May 1991, \$1,800.

Applied AI Systems, Ontario, Canada, “Gift to Support Natural Language Processing Research,” March 1991, \$1,000.

The Academy of Finland, “Neural Network Models of Natural Language Processing,” January 1987 – August 1990, \$34,000.

Emil Aaltonen Foundation Fellowship (Finland), 1986, 1989, 1990.

Foundation for the Advancement of Technology Fellowship (Finland), 1989, 1990.

Alfred Kordelin Foundation Fellowship (Finland), 1989.
Finnish Science Academy Fellowship, 1988.
Finnish Cultural Foundation Fellowship, 1987, 1988.
Jenny and Antti Wihuri Foundation Fellowship (Finland), 1987.
Thanks to Scandinavia Foundation Fellowship, 1987.
Economic and Technological Sciences Foundation Fellowship (Finland), 1986.

Publications

Papers are available at nn.cs.utexas.edu, or directly by clicking on the title below.

Books

1. Príncipe, J. P. and Miikkulainen, R. (editors) (2009). *Proceedings of the Seventh Workshop on Self-Organizing Maps*. LNCS 5629. Berlin: Springer.
2. Miikkulainen, R., Bednar, J. A., Choe, Y., and Sirosh, J. (2005). *Computational Maps in the Visual Cortex*. New York: Springer.
3. Sirosh, J., Miikkulainen, R., and Choe, Y. (editors) (1996). *Lateral Interactions in the Cortex: Structure and Function*. The UTCS Neural Networks Research Group, Austin, TX. Electronic book, ISBN 0-9647060-0-8, nn.cs.utexas.edu/web-pubs/htmlbook96.
4. Miikkulainen, R. (1993). *Subsymbolic Natural Language Processing: An Integrated Model of Scripts, Lexicon, and Memory*. Cambridge, MA: MIT Press.

Journal Articles

5. Alden, M. and Miikkulainen, R. (2016). MARLEDA: Effective Distribution Estimation Through Markov Random Fields. *Theoretical Computer Science*, 633:4-18.
6. Lockett, A. and Miikkulainen, R. (in press). A Probabilistic Re-Formulation of No Free Lunch: Continuous Lunches Are Not Free. *Evolutionary Computation*.
7. Schrum, J. and Miikkulainen, R. (2016). Solving Multiple Isolated, Interleaved, and Blended Tasks through Modular Neuroevolution. *Evolutionary Computation* 24:459–490.
8. Floren, A., Naylor, B., Miikkulainen, R., and Ress, D. (in press). Accurately Decoding Visual Information from fMRI Data Obtained in a Realistic Virtual Environment. *Frontiers in Neuroscience*.
9. Schrum, J. and Miikkulainen, R. (2016). Discovering Multimodal Behavior in Ms. Pac-Man through Evolution of Modular Neural Networks. *IEEE Transactions on Computational Intelligence and AI in Games*, 8:67–81.
10. Sagar, M., Zanesco, A. P., King B. G., Bridwell, D. A., MacLean, K. A., Aichele, S. R., Jacobs, T. L., Wallace, B. A., Saron, C. D., Miikkulainen, R. (2015). Mean-field thalamocortical modeling of longitudinal EEG acquired during intensive meditation training. *Neuroimage* 120:274–284.
11. Lehman, J. and Miikkulainen, R. (2015). Extinction Events Can Accelerate Evolution. *PLOS ONE*, DOI 10.1371/journal.pone.0132886.
12. Hausknecht, M., Lehman, J., Miikkulainen, R., and Stone, P. (2014). A Neuroevolution Approach to General Atari Game Playing. *IEEE Transactions on Computational Intelligence and AI in Games* 6:355–366.
13. Waters, A. and Miikkulainen, R. (2014). GRADE: Machine Learning Support for Graduate Admissions. *AI Magazine*.
14. Lockett, A. and Miikkulainen, R. (2014). Evolutionary Annealing: Global Optimization in Borel Measure Spaces. *Journal of Global Optimization* 58:75–108.

15. Lehman, J. and Miikkulainen, R. (2013). Neuroevolution. *Scholarpedia* 8(6):30977.
16. Valsalam, V. and Miikkulainen, R. (2013). Using Symmetry and Learning to Minimize Sorting Networks. *Journal of Machine Learning Research* 14:303–331.
17. Kiran, S., Grasemann, U., Sandberg, C., and Miikkulainen, R. (2013). A Computational Account of Bilingual Aphasia Rehabilitation. *Bilingualism: Language and Cognition* 16:325–342.
18. Valsalam, V., Hiller, J., MacCurdy, R., Lipson, H., and Miikkulainen, R. (2012). Constructing Controllers for Physical Multilegged Robots using the ENSO Neuroevolution Approach. *Evolutionary Intelligence* 5:45–56.
19. Sagar, M., King, B. G., Zanesco, A. P., Maclean, K. A., Aichele, S. R., Jacobs, T. L., Bridwell, D. A., Shaver, P. R., Rosenberg, E. L., Sahdra, B. K., Ferrer, E., Tang, A. C., Mangun, G. R., Wallace, B. A., Miikkulainen, R., and Saron, C. D. (2012). Intensive Training Induces Longitudinal Changes in Meditation State-related EEG Oscillatory Activity. *Frontiers In Human Neuroscience* 6:256, doi:10.3389/fnhum.2012.00256.
20. Schrum, J. and Miikkulainen, R. (2012). Evolving Multimodal Networks for Multitask Games. *IEEE Transactions on Computational Intelligence and AI in Games*, 4:94–111.
21. Kohl, N. and Miikkulainen, R. (2012). An Integrated Neuroevolutionary Approach to Reactive Control and High-level Strategy. *IEEE Transactions on Evolutionary Computation* 16:472–488.
22. Valsalam, V. and Miikkulainen, R. (2011). Evolving Symmetry for Modular System Design.. *IEEE Transactions on Evolutionary Computation*, 15:368–386.
23. Hoffman, R.E., Grasemann, U., Gueorguieva, R., Quinlan, D., Lane, D., and Miikkulainen, R. (2011). Using Computational Patients to Evaluate Illness Mechanisms in Schizophrenia. *Biological Psychiatry* 69:997–1005.
24. Sagar, M., Miikkulainen, R., and Schnyer, D. (2010). Behavioral, neuroimaging, and computational evidence for perceptual caching in repetition priming. *Brain Research* 1315:75–91.
25. Yong, C. H. and Miikkulainen, R. (2010). Coevolution of Role-Based Cooperation in Multi-Agent Systems. *IEEE Transactions on Autonomous Mental Development* 1:170–186.
26. Sit, Y. F., Chen, Y., Geisler, W. S., Miikkulainen, R., and Seidemann, E. (2009). Complex dynamics of V1 population responses explained by a simple gain-control model. *Neuron* 64:943–956.
27. Kohl, N. and Miikkulainen, R. (2009). Evolving Neural Networks for Strategic Decision-Making Problems. *Neural Networks* 22:326–337.
28. D’Silva, T. and Miikkulainen, R. (2009). Learning Dynamic Obstacle Avoidance for a Robot Arm Using Neuroevolution. *Neural Processing Letters* 30:59–69.
29. Sit, Y. F. and Miikkulainen, R. (2009). Computational Predictions on the Receptive Fields and Organization of V2 for Shape Processing. *Neural Computation* 21:762–785.
30. Gomez, F., Schmidhuber, J., and Miikkulainen, R. (2008) Accelerated Neural Evolution through Cooperatively Coevolved Synapses. *Journal of Machine Learning Research* 9:937–965.
31. Redford, M. and Miikkulainen, R. (2007). Effects of Acquisition Rate on Emergent Structure in Phonological Development. *Language* 83:737–769.
32. Silberman, Y., Bentin, S., and Miikkulainen, R. (2007). Semantic Boost on Episodic Associations: An Empirically Based Computational Model. *Cognitive Science* 31:645–671.
33. Sit, Y. F., and Miikkulainen, R. (2007). A Computational Model of the Signals in Optical Imaging with Voltage-Sensitive Dyes. *Neurocomputing* 70:1853–1857.
34. Valsalam, V., Bednar, J. A., and Miikkulainen, R. (2007). Developing Complex Systems using Evolved Pattern Generators. *IEEE Transactions on Evolutionary Computation* 11:181–198.
35. Miikkulainen, R. (2006). Creating Intelligent Agents in Games. *The Bridge*, 36(4):5–13.

36. Provost, J., Kuipers, B. J. and Miikkulainen, R. (2006). Developing navigation behavior through self-organizing distinctive state abstraction. *Connection Science* 18:159–172.
37. Sit, Y. F., and Miikkulainen, R. (2006). Self-Organization of Hierarchical Visual Maps with Feedback Connections. *Neurocomputing* 69:1309–1312.
38. Bednar, J. A., and Miikkulainen, R. (2006). Joint maps for orientation, eye, and direction preference in a self-organizing model of V1. *Neurocomputing* 69:1272–1276.
39. Jegelka, S., Bednar, J. A., and Miikkulainen, R. (2006). Prenatal Development of Ocular Dominance and Orientation Maps in a Self-Organizing Model of V1. *Neurocomputing* 69:1291–1296
40. Stanley, K., Bryant, B., and Miikkulainen, R. (2005). The NERO Real-time Video Game. *IEEE Transactions on Evolutionary Computation*, 9:653–668.
41. Silberman, Y., Miikkulainen, R., and Bentin, S. (2005). Associating Unseen Events: Semantically Mediated Formation of Episodic Associations. *Psychological Science* 16:161–166.
42. Whiteson, S., Kohl, N., Miikkulainen, R., and Stone, P. (2005). Evolving Keepaway Soccer Players through Task Decomposition. *Machine Learning* 59:5–30.
43. Bednar, J. A., De Paula, J., and Miikkulainen, R. (2005). Self-Organization of color opponent receptive fields and laterally connected orientation maps. *Neurocomputing* 65–66:69–76.
44. Mayberry, M. R. III and Miikkulainen, R. (2005). Broad-Coverage Parsing with Neural Networks. *Neural Processing Letters* 21:121–132.
45. Redford, M. A., Davis, B. L., and Miikkulainen, R. (2004). Phonetic Variability and Prosodic Structure in Motherese: Does One Mask the Other? *Infant Behavior and Development* 27:477–532.
46. Bednar, J. A., Kelkar, A., and Miikkulainen, R. (2004). Scaling Self-Organizing Maps to Model Large Cortical Networks. *Neuroinformatics* 2:275–302.
47. Bednar, J. A. and Miikkulainen, R. (2004). Prenatal and Postnatal Development of Laterally Connected Orientation Maps. *Neurocomputing* 58–60:985–992.
48. Bednar, J. A., Choe, Y., De Paula, J. B., Miikkulainen, R., Provost, J., Tversky, T. (2004). Modeling Cortical Maps with *Topographica*. *Neurocomputing* 58–60:1129–1135.
49. Stanley, K. and Miikkulainen, R. (2004). Competitive Coevolution through Evolutionary Complexification. *Journal of Artificial Intelligence Research* 21:63–100.
50. Choe, Y. and Miikkulainen, R. (2004). Contour Integration and Segmentation with Self-Organized Lateral Connections. *Biological Cybernetics*, 90:75–88.
51. Stanley, K. and Miikkulainen R. (2003). A Taxonomy for Artificial Embryogeny. *Artificial Life*, 9:93–130.
52. Bednar, J. A. and Miikkulainen, R. (2003). Self-Organization of Spatiotemporal Receptive Fields and Laterally Connected Direction and Orientation Maps. *Neurocomputing*, 52–54:473–480.
53. Choe, Y. and Miikkulainen, R. (2003). The Role of Postsynaptic Potential Decay Rate in Neural Synchrony. *Neurocomputing*, 52–54:707–712.
54. Bednar, J. A., and Miikkulainen, R. (2003). Learning Innate Face Preferences. *Neural Computation*, 15:1525–1557.
55. Stanley, K. and Miikkulainen, R. (2002). Evolution of Neural Networks through Augmenting Topologies. *Evolutionary Computation*, 10:99–127.
56. Bednar, J. A., Kelkar, A., and Miikkulainen, R. (2002). Modeling Large Cortical Networks with Growing Self-Organizing Maps. *Neurocomputing* 44–46:315–321.
57. Tversky, T. and Miikkulainen, R. (2002). Modeling Directional Selectivity Using Self-Organizing Delay-Adaptation Maps. *Neurocomputing* 44–46:679–684.
58. Redford, M., Chen, C.-C., and Miikkulainen, R. (2001). Constrained Emergence of Universals and Variation in Syllable Systems. *Language and Speech*, 44:27–56.

59. Bednar, J. A., and Miikkulainen, R. (2000). Tilt Aftereffects in a Self-Organizing Model of the Primary Visual Cortex *Neural Computation*, 12:1721–1740.
60. Howe, M., and Miikkulainen, R. (2000). Hebbian Learning and Temporary Storage in the Convergence-Zone Model of Episodic Memory. *Neurocomputing*, 32–33:817–821.
61. Choe, Y., Cormack, L., and Miikkulainen, R. (2000). Effects of Presynaptic and Postsynaptic Resource Redistribution in Hebbian Weight Adaptation. *Neurocomputing*, 32–33:77–82.
62. Agogino, A., Stanley, K., and Miikkulainen, R. (2000). Online Interactive Neuro-evolution. *Neural Processing Letters*, 11:29–38.
63. Choe, Y. and Miikkulainen, R. (1998) Self-Organization and Segmentation in a Laterally Connected Orientation Map of Spiking Neurons. *Neurocomputing*, 21:51–60.
64. Richards, N., Moriarty, D. E., and Miikkulainen, R. (1998). Evolving Neural Networks to Play Go. *Applied Intelligence*, 8:85–96.
65. Moriarty, D. E., and Miikkulainen, R. (1997). Forming Neural Networks through Efficient and Adaptive Coevolution. *Evolutionary Computation*, 5:373–399.
66. Gomez, F. and Miikkulainen, R. (1997). Incremental Evolution of Complex General Behavior. *Adaptive Behavior*, 5:317–342.
67. Moll, M., and Miikkulainen, R. (1997). Convergence-Zone Episodic Memory: Analysis and Simulations. *Neural Networks*, 10:1017–1036.
68. Leow, W. K. and Miikkulainen, R. (1997). Visual Schemas in Neural Networks for Object Recognition and Scene Analysis. *Connection Science*, 9:161–200.
69. Miikkulainen, R. (1997). Dyslexic and Category-Specific Impairments in a Self-Organizing Feature Map Model of the Lexicon. *Brain and Language*, 59:334–366.
70. Sirosh, J., and Miikkulainen, R. (1997). Topographic Receptive Fields and Patterned Lateral Interaction in a Self-Organizing Model of the Primary Visual Cortex. *Neural Computation*, 9:577–594.
71. Miikkulainen, R. (1996). Subsymbolic Case-Role Analysis of Sentences with Embedded Clauses. *Cognitive Science*, 20:47–73.
72. Moriarty, D., and Miikkulainen, R. (1996). Efficient Reinforcement Learning through Symbiotic Evolution. *Machine Learning*, 22:11–32.
73. Sirosh, J., and Miikkulainen, R. (1996). Self-Organization and Functional Role of Lateral Connections and Multisize Receptive Fields in the Primary Visual Cortex. *Neural Processing Letters*, 3:39–48.
74. Moriarty, D., and Miikkulainen, R. (1995). Discovering Complex Othello Strategies through Evolutionary Neural Networks. *Connection Science*, 7:195–209.
75. Miikkulainen, R. (1995). Script-Based Inference and Memory Retrieval in Subsymbolic Story Processing. *Applied Intelligence*, 5:137–163.
76. Leow, W. K., and Miikkulainen, R. (1994). VISOR: Schema-based Scene Analysis with Structured Neural Networks. *Neural Processing Letters*, 1(2) 18–23.
77. Sirosh, J., and Miikkulainen, R. (1994). Cooperative Self-Organization of Afferent and Lateral Connections in Cortical Maps. *Biological Cybernetics*, 71:66–78.
78. Miikkulainen, R. (1992). Trace Feature Map: A Model of Episodic Associative Memory. *Biological Cybernetics*, 66:273–282.
79. Miikkulainen, R., and Dyer, M. G. (1991). Natural Language Processing with Modular PDP Networks and Distributed Lexicon. *Cognitive Science*, 15:343–399.
80. Miikkulainen, R. (1990). Script Recognition with Hierarchical Feature Maps. *Connection Science*, 2:83–101.

Refereed Conference Papers

81. Braylan, A. and Miikkulainen, R. (2016) Object-Model Transfer in the General Video Game Domain. *Proceedings of the Fourth Artificial Intelligence and Interactive Digital Entertainment Conference (AIIDE-16, Burlingame, CA)*.
82. Li, X. and Miikkulainen, R. (2016). Evolving Artificial Language Through Evolutionary Reinforcement Learning. In *Proceedings of Fifteenth International Conference on the Synthesis and Simulation of Living Systems (Alife'16, Cancun, Mexico)*.
83. Babak Hodjat, Hormoz Shahrzad and Risto Miikkulainen (2016). Distributed Age-Layered Novelty Search. In *Proceedings of the Fifteenth International Conference on the Synthesis and Simulation of Living Systems (Alife'16, Cancun, Mexico)*.
84. Rawal, A. and Miikkulainen, R. (2016). Evolving Deep LSTMs Networks Using Information Maximization Objective. <http://nn.cs.utexas.edu/?rawal:gecco16>. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2016, Denver, CO)*.
85. Shahrzad, H., Hodjat, B., and Miikkulainen, R. (2016). Estimating the Advantage of Age-Layering in Evolutionary Algorithms. <http://nn.cs.utexas.edu/?shahrzad:gecco16>. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2016, Denver, CO)*.
86. Meyerson E., Lehman, J., and Miikkulainen, R. (2016). Learning Behavior Characterization for Novelty Search. <http://nn.cs.utexas.edu/?meyerson:gecco16>. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2016, Denver, CO)*.
87. Tutum, C. C., Sayed, S., and Miikkulainen, R. (2016). Surrogate-based Evolutionary Optimization for Friction Stir Welding. In *Proceedings of the IEEE World Congress on Computational Intelligence (WCCI-2016, Vancouver, Canada)*.
88. Braylan, A., Hollenbeck, M., Meyerson, E, and Miikkulainen, R. (2016). Reuse of Neural Modules for General Video Game Playing. In *Proceedings of the 30th AAAI Conference on Artificial Intelligence (AAAI-2016, Phoenix, AZ)*.
89. Huang, P.-C., Mok, A. K., Sentis, L., Fok C.-L., Lehman, J., and Miikkulainen, R. (2015). Tradeoffs in Real-Time Robotic Task Design with Neuroevolution Learning for Imprecise Computation. In *Proceedings of the IEEE Real-Time Systems Symposium*.
90. Karpov, I., Johnson, L., and Miikkulainen, R. (2015). Evaluating Team Behaviors Constructed with Human-Guided Machine Learning.. In *Proceedings of the IEEE Conference on Computational Intelligence and Games (CIG-2015, Tainan, Taiwan)*.
91. Bahceci, E., Katila, R., and Miikkulainen, R. (2015). Evolving Strategies for Social Innovation Games.. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2015, Madrid, Spain)*.
92. Schrum, J. and Miikkulainen, R. (2015). Solving Interleaved and Blended Sequential Decision-Making Problems through Modular Neuroevolution. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2015, Madrid, Spain)*. Best Paper Award in Digital Entertainment and Arts.
93. Liang, J. Z. and Miikkulainen, R. (2015). Evolutionary Bilevel Optimization for Complex Control Tasks. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2015, Madrid, Spain)*.
94. Lehman, J. and Miikkulainen, R. (2015). Enhancing Divergent Search through Extinction Events.. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2015, Madrid, Spain)*.
95. Huang, P.-C., Lehman, J., Mok, A. K., Miikkulainen, R., and Sentis, L. (2014). Grasping Novel Objects with a Dexterous Robotic Hand through Neuroevolution. In *IEEE Symposium Series on Computational Intelligence (SSCI 2014)*.

96. Li, X. and Miikkulainen, R. (2014). Evolving Multimodal Behavior Through Subtask and Switch Neural Networks. In *Proceedings of the Fourteenth International Conference on the Synthesis and Simulation of Living Systems (Alife'14, New York, NY)*.
97. Rawal, A., Boughman, J. and Miikkulainen, R. (2014). Evolution of Communication in Mate Selection. In *Proceedings of the Fourteenth International Conference on the Synthesis and Simulation of Living Systems (Alife'14, New York, NY)*.
98. Rajagopalan, P., Holekamp, K. E., and Miikkulainen, R. (2014). The Evolution of General Intelligence. In *Proceedings of the Fourteenth International Conference on the Synthesis and Simulation of Living Systems (Alife'14, New York, NY)*.
99. Lessin, D., Fussell, D., and Miikkulainen, R. (2014). Adapting Morphology to Multiple Tasks in Evolved Virtual Creatures. In *Proceedings of the Fourteenth International Conference on the Synthesis and Simulation of Living Systems (Alife'14, New York, NY)*.
100. Rajagopalan, P., Rawal, A., Holekamp, K. and Miikkulainen, R. (2014). General Intelligence through Prolonged Evolution of Densely Connected Neural Networks . In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2014, Vancouver, Canada)*.
101. Schrum, J. and Miikkulainen, R. (2014). Evolving Multimodal Behavior With Modular Neural Networks in Ms. Pac-Man. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2014, Vancouver, Canada)*. Best Paper Award in Digital Entertainment and Arts.
102. Lehman, J. and Miikkulainen, R. (2014). Overcoming Deception in Evolution of Cognitive Behaviors. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2014, Vancouver, Canada)*.
103. Lessin, D., Fussell, D., and Miikkulainen, R. (2014). Trading Control Intelligence for Physical Intelligence: Muscle Drives in Evolved Virtual Creatures. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2014, Vancouver, Canada)*.
104. Han, S., Mok, A. K., Meng, J., Wei, Y.-H., Huang, P.-C., Leng, Q., Zhu, X., Sentis, L., Kim, K. S., Miikkulainen, R. (2013). Architecture of a Cyberphysical Avatar. In *Proceedings of the ACM/IEEE Fourth International Conference on Cyber-Physical Systems (ICCPS-2013)*.
105. Bishop, J. and Miikkulainen, R. (2013). Evolutionary Feature Evaluation for Online Reinforcement Learning. In *Proceedings of the IEEE Conference on Computational Intelligence and Games (CIG-2013, Niagara Falls, Canada)*.
106. Waters, A. and Miikkulainen, R. (2013). GRADE: Machine Learning Support for Graduate Admissions. In *Proceedings of the Twenty-Fifth Conference on Innovative Applications of Artificial Intelligence (IAAI-2013, Bellevue, WA)*.
107. Lessin, D., Fussell, D., and Miikkulainen, R. (2013). Open-Ended Behavioral Complexity for Evolved Virtual Creatures. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2013, Amsterdam, the Netherlands)*.
108. Lockett, A. and Miikkulainen, R. (2013). Neuroannealing: Martingale-driven Learning for Neural Network. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2013, Amsterdam, the Netherlands)*.
109. Lehman, J. and Miikkulainen, R. (2013). Effective Diversity Maintenance in Deceptive Domains. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2013, Amsterdam, the Netherlands)*.
110. Zhou, Z., Kejrival, M., and Risto Miikkulainen (2013). Extended Scaled Neural Predictor for Improved Branch Prediction. In *Proceedings of the International Joint Conference on Neural Networks (IJCNN-2013, Dallas, TX)*.
111. Lockett, A. and Miikkulainen, R. (2013). A Measure-Theoretic Analysis of Stochastic Optimization. In *Foundations of Genetic Algorithms (FOGA-2013, Adelaide, Australia)*.

112. Han, S., Mok, A. K., Meng, J., Wei, Y.-H., Huang, P.-C., Zhu, X., Sentis, L., Kim, K. S., Miikkulainen, R., Menashe, J. (2012). Architecture of a Cyberphysical Avatar. In *Proceedings of the International Workshop on Real-Time and Distributed Computing in Emerging Applications (REACTION)*.
113. Jain, A., Subramoney, A., and Miikkulainen, R. (2012). Task decomposition with neuroevolution in extended predator-prey domain.. In *Proceedings of the Thirteenth International Conference on the Synthesis and Simulation of Living Systems (Alife'13, East Lansing, MI)*.
114. Rawal, A., Rajagopalan, P., Holekamp, K., and Miikkulainen, R. (2012). Evolution of a Communication Code in Cooperative Tasks.. In *Proceedings of the Thirteenth International Conference on the Synthesis and Simulation of Living Systems (Alife'13, East Lansing, MI)*.
115. Hausknecht, M., Khandelwal, P., Miikkulainen, R., and Stone, P. (2012). HyperNEAT-GGP: A HyperNEAT-based Atari General Game Player. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2012, Philadelphia, PA)*.
116. Tansey, W., Feasley, E. and Miikkulainen, R. (2012). Accelerating Evolution via Egalitarian Social Learning. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2012, Philadelphia, PA)*.
117. Schrum, J., Karpov, I., and Miikkulainen, R. (2011). UT²: Human-like Behavior via Neuroevolution of Combat Behavior and Replay of Human Traces. In *Proceedings of the 2011 IEEE Conference on Computational Intelligence and Games*.
118. Schrum, J. and Miikkulainen, R. (2011). Evolving Multimodal Networks for Multitask Games. In *Proceedings of the 2011 IEEE Conference on Computational Intelligence and Games*. Best Paper award.
119. Rawal, A., Rajagopalan, P., Holekamp, K., Kerr, B., and Miikkulainen, R. (2011). The Role of Reward Structure, Coordination Mechanism, and Net Return in the Evolution of Cooperation. In *Proceedings of the 2011 IEEE Conference on Computational Intelligence and Games*.
120. Stober, J., Miikkulainen, R., and Kuipers, B. (2011). Learning Geometry from Sensorimotor Experience. In *Proceedings of International Conference on Development and Learning / Epigenetic Robotics*.
121. Grasemann, U., Hoffman, R., and Miikkulainen, R. (2011). Modeling Acute and Compensated Language Disturbance in Schizophrenia. In *Proceedings of the 33rd Annual Meeting of the Cognitive Science Society*.
122. Lockett, A. and Miikkulainen, R. (2011). Real-Space Evolutionary Annealing. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2011, Dublin, Ireland)*.
123. Karpov, I., Valsalam, V., and Miikkulainen, R. (2011). Human-Assisted Neuroevolution through Shaping, Advice, and Examples. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2011, Dublin, Ireland)*.
124. Silverthorn, B. and Miikkulainen, R. (2011). Learning Polarity from Structure in SAT. In *Proceedings of the SAT Conference*.
125. Lockett, A. and Miikkulainen, R. (2011). Measure-Theoretic Evolutionary Annealing. In *Proceedings of the IEEE Congress on Evolutionary Computation*.
126. Dziuk, A. and Miikkulainen, R. (2011). Creating Intelligent Agents through Shaping of Coevolution. In *Proceedings of the IEEE Congress on Evolutionary Computation*.
127. Grasemann, U., Sandberg, C., Kiran, S., and Miikkulainen, R. (2011). Impairment and Rehabilitation in Bilingual Aphasia: A SOM-Based Model. In *Proceedings of the Eighth Workshop on Self-Organizing Maps (WSOM'2011, Espoo, Finland)*.
128. Rajagopalan, P., Rawal, A., and Miikkulainen, R. (2010). Constructing Competitive and Cooperative Agent Behavior using Coevolution. In *Proceedings of the IEEE Conference on Computational Intelligence and Games (CIG-10, Copenhagen, Denmark)*. Piscataway, NJ: IEEE.

129. Silverthorn, B. and Miikkulainen, R. (2010). In Latent Class Models for Algorithm Portfolio Methods. In *Proceedings of the Twenty-Fifth AAAI Conference on Artificial Intelligence (AAAI-10, Atlanta, GA)*.
130. Schrum, J. and Miikkulainen, R. (2010). Evolving Agent Behavior In Multiobjective Domains Using Fitness-Based Shaping. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2010, Portland, OR)*.
131. Schrum, J. and Miikkulainen, R. (2009). Evolving Multi-modal Behavior in NPCs. In *Proceedings of the IEEE Symposium on Computational Intelligence and Games (CIG-09)*. Piscataway, NJ: IEEE. Best Student Paper Award.
132. Grasemann, U., Miikkulainen, R., and Hoffman, R. (2009). Hyperlearning: A connectionist Model of Psychosis in Schizophrenia. In *Proceedings of the 31st Annual Conference of the Cognitive Science Society*.
133. Valsalam, V. and Miikkulainen, R. (2009). Evolving Symmetric and Modular Neural Networks for Distributed Control. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2009, Montreal, Canada)*, 731–738.
134. Miikkulainen, R. and Kiran, S. (2009). Modeling the Bilingual Lexicon of an Individual Subject. In *Proceedings of the Workshop on Self-Organizing Maps (WSOM'09, St. Augustine, FL)*. Lecture Notes in Computer Science 5629. Berlin: Springer.
135. Mayberry, M. R. III and Miikkulainen, R. (2009). Representing Semantic Graphs in a Self-Organizing Map. In *Proceedings of the Workshop on Self-Organizing Maps (WSOM'09, St. Augustine, FL)*. Lecture Notes in Computer Science 5629. Berlin: Springer.
136. Bahceci, E. and Miikkulainen, R. (2008). Transfer of Evolved Pattern-Based Heuristics in Games. In *Proceedings of the IEEE Symposium on Computational Intelligence and Games (CIG-08)*. Piscataway, NJ: IEEE.
137. Lockett, A. and Miikkulainen, R. (2008). Evolving Opponent Models for Poker. In *Proceedings of the IEEE Symposium on Computational Intelligence and Games (CIG-08)*. Piscataway, NJ: IEEE.
138. Schrum, J. and Miikkulainen, R. (2008). Constructing Complex NPC Behavior via Multi-Objective Neuroevolution. In *Proceedings of the Fourth Artificial Intelligence and Interactive Digital Entertainment Conference (AIIDE-2008, Stanford, CA)*.
139. Reisinger, J. and Miikkulainen, R. (2008). Online Kernel Selection for Bayesian Reinforcement Learning. In *Proceedings of the 25th International Conference on Machine Learning (ICML-2008, Helsinki, Finland)*.
140. Saggat, M., Miikkulainen, R., and Schnyer, D. M. (2008). Memory Processes in Perceptual Decision Making. In *Proceedings of the 30th Annual Conference of the Cognitive Science Society (COGSCI-08, Washington, DC)*. Hillsdale, NJ: Erlbaum.
141. Valsalam, V. and Miikkulainen, R. (2008). Modular Neuroevolution for Multilegged Locomotion. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2008, Atlanta, GA)*. Best Paper Award in Artificial Life, Evolutionary Robotics, Adaptive Behavior, Evolvable Hardware.
142. Kohl, N. and Miikkulainen, R. (2008). Evolving Neural Networks for Fractured Domains. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2008, Atlanta, GA)*.
143. Provost, J., Kuipers, B. J., and Miikkulainen, R. (2007). Self-Organizing Distinctive State Abstraction Using Options. In *Proceedings of the 7th International Conference on Epigenetic Robotics*.
144. Reisinger, J. and Miikkulainen, R. (2007). Acquiring Evolvability through Adaptive Representations. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2007, London, UK)*. Best Paper Award in Generative and Developmental Systems.
145. Lockett, A. J., Chen, C. L., and Miikkulainen, R. (2007). Evolving Explicit Opponent Models in Game Playing. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2007, London, UK)*.

146. Bryant, B. D. and Miikkulainen, R. (2007). Acquiring Visibly Intelligent Behavior with Example-Guided Neuroevolution. In *Proceedings of the Twenty-Second AAAI Conference on Artificial Intelligence* (AAAI-07, Vancouver, Canada).
147. Grasemann, U., Miikkulainen, R., and Hoffman R. (2007). A Subsymbolic Model of Language Pathology in Schizophrenia. In *Proceedings of the 29th Annual Conference of the Cognitive Science Society* (COGSCI-07, Nashville, TN), 311–316. Hillsdale, NJ: Erlbaum.
148. Sagar, M., Markman, A. B., Maddox, W. T., and Miikkulainen, R. (2007). A Computational Model of the Motivation-Learning Interface. In *Proceedings of the 29th Annual Conference of the Cognitive Science Society* (COGSCI-07, Nashville, TN). Hillsdale, NJ: Erlbaum.
149. Sagar, M., Mericli, T., Andoni, S., and Miikkulainen, R. (2007). System Identification for the Hodgkin-Huxley Model using Artificial Neural Networks. In *Proceedings of the International Joint Conference on Neural Networks* (IJCNN-07, Orlando, FL).
150. Reisinger, J., Bahceci, E., Karpov, I., and Miikkulainen, R. (2007). Coevolving Strategies for General Game Playing. In *Proceedings of the IEEE Symposium on Computational Intelligence and Games* (CIG-07). Piscataway, NJ: IEEE.
151. Gomez, F. Schmidhuber, J., and Miikkulainen, R. (2006). Efficient Non-Linear Control through Neuroevolution. In *Proceedings of the 17th European Conference on Machine Learning* (ECML-06, Berlin), 654–662. Berlin: Springer.
152. Stanley, K. O., Bryant, B. D., Karpov, I., and Miikkulainen R. (2006). Real-Time Evolution of Neural Networks in the NERO Video Game. In *Proceedings of the Twenty-First National Conference on Artificial Intelligence* (AAAI-06, Boston, MA), 1671-1674.
153. Valsalam, V., Bednar, J. A., and Miikkulainen, R. (2006). Establishing an Appropriate Learning Bias Through Development. In *Proceedings of the Fifth International Conference on Development and Learning* (ICDL5, Bloomington, IN).
154. Reisinger, J. and Miikkulainen, R. (2006). Selecting for Evolvable Representations. In *Proceedings of the Genetic and Evolutionary Computation Conference* (GECCO-2006, Seattle, WA).
155. Kohl, N., Stanley, K. O., Miikkulainen, R., Samples, M., and Sherony, R. (2006). Evolving a Real-World Vehicle Warning System. In *Proceedings of the Genetic and Evolutionary Computation Conference* (GECCO-2006, Seattle, WA).
156. Monroy, G. A., Stanley, K. O., and Miikkulainen, R. (2006). Coevolution of Neural Networks Using a Layered Pareto Archive. In *Proceedings of the Genetic and Evolutionary Computation Conference* (GECCO-2006, Seattle, WA).
157. Fidelman, M., Coffman, T., Miikkulainen, R. (2006). Detecting Motion in the Environment with a Moving Quadruped Robot. In *Proceedings of the RoboCup Symposium 2006*.
158. Williams, P. and Miikkulainen, R. (2006). Grounding Language in Descriptions of Scenes. In *Proceedings of the 28th Annual Conference of the Cognitive Science Society* (COGSCI-06, Vancouver, Canada). Hillsdale, NJ: Erlbaum.
159. Kaczmarczyk, L. C., Last, M. Z., and Miikkulainen, R. (2006). The Effect of Delivery Method on Conceptual and Strategy Development. In *Proceedings of the 28th Annual Conference of the Cognitive Science Society* (COGSCI-06, Vancouver, Canada). Hillsdale, NJ: Erlbaum.
160. Bryant, B. D. and Miikkulainen R. (2006). Evolving Stochastic Bobby D. Bryant and Risto Miikkulainen (2006). Evolving Stochastic Controller Networks for Intelligent Game Agents. In *Proceedings of the 2006 IEEE World Congress on Computational Intelligence* (Vancouver, Canada: WCCI-2006), 3752–3759. Piscataway, NJ: IEEE.
161. Yong, C. H., Stanley, K. O., Miikkulainen, R., and Karpov, I. (2006). Incorporating Advice into Evolution of Neural Networks. In *Proceedings of the Second Artificial Intelligence and Interactive Digital Entertainment Conference* (AIIDE-2006, Marina del Rey, CA), 96–104. Menlo Park, CA: AAAI Press.

162. Bryant, B. D. and Miikkulainen, R. (2006). Exploiting Sensor Symmetries in Example-based Training for Intelligent Agents. In *Proceedings of the IEEE Symposium on Computational Intelligence and Games (CIG-06)*. Piscataway, NJ: IEEE. Best Student Paper Award.
163. Karpov, I., D’Silva, T., Varrichio, C., Stanley, K. O., and Miikkulainen, R. (2006). Integration and Evaluation of Exploration-Based Learning in Games. In *Proceedings of the IEEE Symposium on Computational Intelligence and Games (CIG-06)*. Piscataway, NJ: IEEE.
164. Fidelman, M., Hoffman, R., and Miikkulainen, R. (2005). A Subsymbolic Model of Complex Story Processing. In *Proceedings of the 27th Annual Conference of the Cognitive Science Society (COGSCI-05, Stresa, Italy)*. Hillsdale, NJ: Erlbaum.
165. Valsalam, V., Bednar, J. A., and Miikkulainen, R. (2005). Constructing Good Learners using Evolved Pattern Generators. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2005, Washington, DC)*. Best Paper Award in Evolutionary Robotics, A-Life, Adaptive Behavior.
166. Pardoe, D., Ryoo, M., and Miikkulainen, R. (2005). Evolving Neural Network Ensembles for Control Problems. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2005, Washington, DC)*.
167. Agogino, A., Tumer, K., and Miikkulainen, R. (2005). Efficient Credit Assignment through Evaluation Function Decomposition. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2005, Washington, DC)*.
168. Grasemann, U. and Miikkulainen, R. (2005). Effective Image Compression using Evolved Wavelets. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2005, Washington, DC)*.
169. Stanley, K., Kohl, N., Sherony, R., and Miikkulainen, R. (2005). Neuroevolution of an Automobile Crash Warning System. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2005, Washington, DC)*.
170. Whiteson, S., Stone, P., Stanley, K., Miikkulainen, R., Kohl, N. (2005). Automatic Feature Selection in Neuroevolution. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2005, Washington, DC)*.
171. Sit, Y. F. and Miikkulainen, R. (2005). Learning Basic Navigation for Personal Satellite Assistant using Neuroevolution. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2005, Washington, DC)*. Best Paper Award in Real World Applications.
172. D’Silva, T., Chrien, M., Janik, R., Stanley, K., and Miikkulainen, R. (2005). Retaining Learned Behavior During Real-Time Neuroevolution. In *Proceedings of the First Artificial Intelligence and Interactive Digital Entertainment Conference (AIIDE-2005, Marina del Rey, CA)*.
173. Stanley, K., Bryant, B., and Miikkulainen, R. (2005). Evolving Neural Network Agents in the NERO Video Game. In *Proceedings of the IEEE Symposium on Computational Intelligence and Games (CIG-05)*. Piscataway, NJ: IEEE. Best Paper Award.
174. Kaczmarczyk, L. C. and Miikkulainen, R. (2004). The Acquisition of Intellectual Expertise: A Computational Model. In *Proceedings of the 26th Annual Conference of the Cognitive Science Society (COGSCI-04, Chicago, IL)*. Hillsdale, NJ: Erlbaum.
175. Gomez, F. and Miikkulainen, R. (2004). Transfer of Neuroevolved Controllers in Unstable Domains. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2004, Seattle, WA)*, 957–968. San Francisco, CA: Morgan Kaufmann.
176. Reisinger, J., Stanley, K., and Miikkulainen, R. (2004). Evolving Reusable Neural Modules. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2004, Seattle, WA)*, 69–81. San Francisco, CA: Morgan Kaufmann.
177. Grasemann, U., and Miikkulainen, R. (2004). Evolving Wavelets using a Coevolutionary Genetic Algorithm and Lifting. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2004, Seattle, WA)*, 969–980. San Francisco, CA: Morgan Kaufmann.

178. Stanley, K. and Miikkulainen, R. (2004). Evolving a Roving Eye for Go. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2004, Seattle, WA)*, 1225–1238. San Francisco, CA: Morgan Kaufmann.
179. Bryant, B. D. and Miikkulainen, R. (2003). Neuroevolution of Adaptive Teams: Learning Heterogeneous Behavior in Homogeneous Multi-Agent Systems. In *Proceedings of the 2003 Congress on Evolutionary Computation (CEC'03, Canberra, Australia)*. Piscataway, NJ: IEEE.
180. Stanley, K., Bryant, B., and Miikkulainen, R. (2003). Evolving Adaptive Neural Networks with and without Adaptive Synapses. In *Proceedings of the 2003 Congress on Evolutionary Computation (CEC'03, Canberra, Australia)*. Piscataway, NJ: IEEE.
181. Chaput, H. H., Kuipers, B. and Miikkulainen, R. (2003). Constructivist Learning: A SOM-based reimplement of the Schema Mechanism. In *Proceedings of the Workshop on Self-Organizing Maps (WSOM'03, Kitakyushu, Japan)*.
182. Fan, J., Lau, R., and Miikkulainen, R. (2003). Utilizing Domain Knowledge in Neuroevolution. In *Proceedings of the Twentieth International Conference on Machine Learning (ICML-2003, Washington, DC)*, 170–177. Menlo Park, CA: AAAI Press.
183. Mayberry, M. R. III and Miikkulainen, R. (2003). Incremental Nonmonotonic Parsing through Semantic Self-Organization. In *Proceedings of the 25th Annual Conference of the Cognitive Science Society (COGSCI-03, Boston, MA)*. Hillsdale, NJ: Erlbaum.
184. Gomez, F. and Miikkulainen, R. (2003). Active Guidance for a Finless Rocket Using Neuroevolution. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2003, Chicago, IL)*, 2084–2095. San Francisco, CA: Morgan Kaufmann. Best Paper Award in Real World Applications.
185. Whiteson, S., Kohl, N., Miikkulainen, R., and Stone, P. (2003). Evolving RoboCup Keepaway Players through Task Decomposition. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2003, Chicago, IL)*, 356–368. San Francisco, CA: Morgan Kaufmann.
186. Bednar, J. A. and Miikkulainen, R. (2002). Neonatal Learning of Faces: Environmental and Genetic Influences. In *Proceedings of the 24th Annual Conference of the Cognitive Science Society (COGSCI-02, Fairfax, VA)*, 107–112. Hillsdale, NJ: Erlbaum.
187. Conradie, A. v. E., Miikkulainen, R., and Aldrich, C. (2002). Adaptive Control Utilizing Neural Swarming. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2002, New York, NY)*, 60–67. San Francisco, CA: Morgan Kaufmann.
188. Stanley, K. and Miikkulainen, R. (2002). Efficient Reinforcement Learning Through Evolving Neural Network Topologies. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2002, New York, NY)*, 569–577. San Francisco, CA: Morgan Kaufmann. Best Paper Award in Genetic Algorithms.
189. Stanley, K. and Miikkulainen R. (2002). Continual Coevolution through Complexification. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2002, New York, NY)*, 113–120. San Francisco, CA: Morgan Kaufmann.
190. Alden, M., van Kesteren, A.-J., and Miikkulainen R. (2002). Eugenic Evolution Utilizing a Domain Model. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2002, New York, NY)*, 279–286. San Francisco, CA: Morgan Kaufmann.
191. Conradie, A. v. E., Miikkulainen, R., and Aldrich, C. (2002). Intelligent Process Control Utilizing Symbiotic Memetic Neuro-Evolution. In *Proceedings of the 2002 Congress on Evolutionary Computation (CEC'02, Honolulu, HI)*, 623–628. Piscataway, NJ: IEEE.
192. Greer, B., Hakonen, H., Lahdelma, R., and Miikkulainen, R. (2002). Numerical Optimization with Neuroevolution. In *Proceedings of the 2002 Congress on Evolutionary Computation (CEC'02, Honolulu, HI)*, 361–401. Piscataway, NJ: IEEE.

193. Stanley, K., and Miikkulainen, R. (2002). Efficient Evolution of Neural Network Topologies. In *Proceedings of the 2002 Congress on Evolutionary Computation (CEC'02, Honolulu, HI)*, 1757–1762. Piscataway, NJ: IEEE.
194. Silberman, Y., Miikkulainen, R., and Bentin, S. (2001). Semantic Effect on Episodic Associations. In *Proceedings of the 23rd Annual Conference of the Cognitive Science Society (COGSCI-01, Edinburgh, UK)*, 934–939. Hillsdale, NJ: Erlbaum.
195. Bruce, J. and Miikkulainen, R. (2001). Evolving Populations of Expert Neural Networks. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2001, San Francisco, CA)*, 251–257. San Francisco, CA: Morgan Kaufmann.
196. Chen, C.-C. and Miikkulainen, R. (2001). Creating Melodies with Evolving Recurrent Neural Networks. In *Proceedings of the INNS-IEEE International Joint Conference on Neural Networks (IJCNN-2001, Washington, DC)*, 2241–2246. Piscataway, NJ: IEEE.
197. Gomez, F., Burger, D., and Miikkulainen, R. (2001). A Neuroevolution Method for Dynamic Resource Allocation on a Chip Multiprocessor. In *Proceedings of the INNS-IEEE International Joint Conference on Neural Networks (IJCNN-2001, Washington, DC)*, 2355–2361. Piscataway, NJ: IEEE.
198. Polani, D. and Miikkulainen, R. (2000). Eugenic Neuro-Evolution for Reinforcement Learning. To appear in *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2000, Las Vegas, NV)*, 1041–1046. San Francisco, CA: Morgan Kaufmann.
199. Choe, Y., and Miikkulainen, R. (2000). A Self-Organizing Neural Network for Contour Integration through Synchronized Firing. In *Proceedings of the Seventeenth National Conference on Artificial Intelligence (AAAI-2000, Austin TX)*, 123–128. Menlo Park, CA: AAAI Press.
200. Bednar, J. A., and Miikkulainen, R. (2000). Self-Organization of Innate Face Preferences: Could Genetics Be Expressed Through Learning?. In *Proceedings of the 17th National Conference on Artificial Intelligence (AAAI-2000, Austin TX)*, 117–122. Menlo Park, CA: AAAI Press.
201. Mayberry, M. R. III, and Miikkulainen, R. (1999). Using a Sequential SOM to Parse Long-term Dependencies. In *Proceedings of the 21st Annual Conference of the Cognitive Science Society (COGSCI-99, Vancouver, BC)*, 367–372. Hillsdale, NJ: Erlbaum.
202. Gomez, F. and Miikkulainen, R. (1999). Solving Non-Markovian Control Tasks with Neuro-Evolution. In *Proceedings of the Sixteenth International Joint Conference on Artificial Intelligence (IJCAI-99, Stockholm, Sweden)*, 1356–1361. San Francisco, CA: Morgan Kaufmann.
203. Kumar, S. and Miikkulainen, R. (1999). Confidence-based Dual Reinforcement Q-Routing: An Adaptive Online Network Routing Algorithm. In *Proceedings of the Sixteenth International Joint Conference on Artificial Intelligence (IJCAI-99, Stockholm, Sweden)*, 758–763. San Francisco, CA: Morgan Kaufmann.
204. Mayberry, M. R. III, and Miikkulainen, R. (1999). SARDSRN: A Neural Network Shift-Reduce Parser. In *Proceedings of the Sixteenth International Joint Conference on Artificial Intelligence (IJCAI-99, Stockholm, Sweden)*, 820–825. San Francisco, CA: Morgan Kaufmann.
205. Farkas, I. and Miikkulainen, R. (1999). Modeling the self-organization of directional selectivity in the primary visual cortex. In *Proceedings of the International Conference on Artificial Neural Networks (ICANN-99, Edinburgh, UK)*, 251–256. Berlin, New York: Springer.
206. Redford, M., Chen, C.-C., and Miikkulainen, R. (1998). Modeling the Emergence of Syllable Systems. In *Proceedings of the 20th Annual Meeting of the Cognitive Science Society (COGSCI-98, Madison, WI)*, 882–886. Hillsdale, NJ: Erlbaum.
207. Ryan, J., Lin, M.-J., and Miikkulainen, R. (1998). Intrusion Detection with Neural Networks. In Jordan, M. I., Kearns, M. J., and Solla, S. A. (editors) *Advances in Neural Information Processing Systems 10 (NIPS'97, Denver, CO)*, 943–949. Cambridge, MA: MIT Press.

208. Miikkulainen, R., Bednar, J. A., Choe, Y., and Sirosh, J. (1998). A Self-Organizing Neural Network Model of the Primary Visual Cortex. In S. Usui, T. Omori (editors), *Proceedings of the Fifth International Conference on Neural Information Processing (ICONIP'98, Kitakyushu, Japan)*, Volume 2, pages 815–818. Tokyo, JP; Burke, VA; Amsterdam, the Netherlands: IOS Press.
209. Kumar, S. and Miikkulainen, R. (1998). Confidence-based Q-routing. In C. H. Dagli, M. Akay, O. Ersoy, B. R. Fernandez and A. Smith (editors), *Smart Engineering Systems: Neural Networks, Fuzzy Logic, Data Mining, and Evolutionary Programming: Volume 8 in Intelligent Engineering Systems Through Artificial Neural Networks*, (ANNIE-98, St. Louis, MO). New York: ASME Press.
210. Gomez, F. and Miikkulainen, R. (1998). 2-D Pole-balancing with Recurrent Evolutionary Networks. In *Proceedings of the International Conference on Artificial Neural Networks (ICANN-98, Skovde, Sweden)*, 425–430. Berlin, New York: Springer.
211. Bednar, J. A. and Miikkulainen, R. (1998). Pattern-Generator-Driven Development in Self-Organizing Models. In J. M. Bower (editor), *Computational Neuroscience: Trends in Research, 1998 (CNS*97, Big Sky, MT)*, 317–323. New York: Plenum Press.
212. Moriarty, D., and Miikkulainen, R. (1998). Hierarchical Evolution of Neural Networks. In *Proceedings of the 1998 IEEE Conference on Evolutionary Computation (ICEC'98, Anchorage, Alaska)*, 428–433. Piscataway, NJ: IEEE.
213. Bednar, J. A. and Miikkulainen, R. (1997). A Neural Network Model of Visual Tilt Aftereffects. In *Proceedings of the 19th Annual Conference of the Cognitive Science Society (COGSCI-97, Stanford, CA)*, 37–42. Hillsdale, NJ: Erlbaum.
214. Choe, Y. and Miikkulainen, R. (1997) Self-Organization and Segmentation with Laterally Connected Spiking Neurons. In *Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI-97, Nagoya, Japan)*, 1120–1125. San Francisco: Morgan Kaufmann.
215. McQuesten, P., and Miikkulainen, R. (1997). Culling and Teaching in Neuro-Evolution. In *Proceedings of the Seventh International Conference in Genetic Algorithms (ICGA-97, East Lansing, MI)*, 760–767. San Francisco: Morgan Kaufmann.
216. Richards, N., Moriarty, D. E., McQuesten, P., and Miikkulainen, R. (1997). Evolving Neural Networks to Play Go. In *Proceedings of the Seventh International Conference in Genetic Algorithms (ICGA-97, East Lansing, MI)*, 768–775. San Francisco: Morgan Kaufmann.
217. Kumar, S. and Miikkulainen, R. (1997). Dual Reinforcement Q-Routing: An On-line Adaptive Routing Algorithm. In C. H. Dagli, M. Akay, O. Ersoy, B. R. Fernandez and A. Smith (editors), *Smart Engineering Systems: Neural Networks, Fuzzy Logic, Data Mining, and Evolutionary Programming: Volume 7 in Intelligent Engineering Systems Through Artificial Neural Networks*, 231–238, (ANNIE-97, St. Louis, MO). New York: ASME Press.
218. Choe, Y. and Miikkulainen, R. (1997) Self-Organization and Segmentation with Laterally Connected Maps of Spiking Neurons. In *WSOM'97: Workshop on Self-Organizing Maps (WSOM'97, Espoo, Finland)*, 26–31. Espoo: Finland: Helsinki University of Technology.
219. Moriarty, D. E., and Miikkulainen, R. (1996). Evolving Obstacle Avoidance Behavior in a Robot Arm. In P. Maes, M. Mataric, J.-A. Meyer, and J. Pollack (editors), *From Animals to Animats 4: Proceedings of the Fourth International Conference on Simulation of Adaptive Behavior (SAB96, Cape Cod, MA)*, 468–475. Cambridge, MA: MIT Press.
220. Sirosh, J., and Miikkulainen, R. (1996). Multisize Receptive Fields and Lateral Connections Self-Organize Like Ocular Dominance and Orientation Columns in a Hebbian Model of the Visual Cortex. In *Proceedings of the Eighteenth Annual Conference of the Cognitive Science Society (COGSCI-96, San Diego, CA)*, 430–435. Hillsdale, NJ: Erlbaum.
221. Goetz, P., Kumar, S., and Miikkulainen, R. (1996). On-Line Adaptation of a Signal Predistorter through Dual Reinforcement Learning. In Lorenza Saitta (editor), *Machine Learning: Proceedings*

- of the *Thirteenth International Conference (ICML'96, Bari, Italy)*, 175–181. San Francisco: Morgan Kaufmann.
222. Choe, Y., Sirosh, J., and Miikkulainen, R. (1996). Laterally Interconnected Self-Organizing Maps in Hand-Written Digit Recognition. In D. S. Touretzky, M. C. Mozer, and M. E. Hasselmo (editors), *Advances in Neural Information Processing Systems 8 (NIPS'95, Denver, CO)*, 736–742. Cambridge, MA: MIT Press.
 223. Haessly, A., Sirosh, J., and Miikkulainen, R. (1995). A Model of Visually Guided Plasticity of the Auditory Spatial Map in the Barn Owl. In *Proceedings of the Seventeenth Annual Conference of the Cognitive Science Society (COGSCI-95, Pittsburgh, PA)*, 154–158. Hillsdale, NJ: Erlbaum.
 224. Blackmore, J., and Miikkulainen, R. (1995). Visualizing High-Dimensional Structure with the Incremental Grid Growing Neural Network. In A. Prieditis and S. Russell (editors), *Machine Learning: Proceedings of the Twelfth International Conference (ICML'95, Tahoe City, CA)*, 55–63. San Francisco: Morgan Kaufmann.
 225. Moriarty, D., and Miikkulainen, R. (1995). Efficient Learning from Delayed Rewards through Symbiotic Evolution. In A. Prieditis and S. Russell (editors), *Machine Learning: Proceedings of the Twelfth International Conference (ICML'95, Tahoe City, CA)*, 396–404. San Francisco: Morgan Kaufmann.
 226. Sirosh, J., and Miikkulainen, R. (1995). Ocular Dominance and Activation Dynamics in a Unified Self-Organizing Model of the Visual Cortex. In G. Tesauro, D. S. Touretzky, and T. K. Leen (editors), *Advances in Neural Information Processing Systems 7 (NIPS'94, Denver, CO)*, 109–116. Cambridge, MA: MIT Press.
 227. James, D. L., and Miikkulainen, R. (1995). SARDNET: A Self-Organizing Feature Map for Sequences. In G. Tesauro, D. S. Touretzky, and T. K. Leen (editors), *Advances in Neural Information Processing Systems 7 (NIPS'94, Denver, CO)*, 577–584. Cambridge, MA: MIT Press.
 228. Sirosh, J. and Miikkulainen, R. (1995). Modeling Cortical Plasticity Based on Adapting Lateral Interaction. In J. M. Bower (editor) *The Neurobiology of Computation: The Proceedings of the Third Annual Computation and Neural Systems Conference (CNS'94, Monterey, CA)*, 305–310. Boston; Dordrecht; London: Kluwer.
 229. Sirosh, J., and Miikkulainen, R. (1995). A Unified Neural Network Model for the Self-Organization of Topographic Receptive Fields and Lateral Interaction. In D. W. Pearson, N. C. Steele and R. F. Albrecht (editors), *Artificial Neural Nets and Genetic Algorithms: Proceedings of the International Conference in Ales, France, 1995 (ICANNGA95, Ales, France)*, 420–423. Wien; New York: Springer.
 230. Leow, W. K., and Miikkulainen, R. (1994). Priming, Perceptual Reversal, and Circular Reaction in a Neural Network Model of Schema-Based Vision. In *Proceedings of the Sixteenth Annual Meeting of the Cognitive Science Society (COGSCI-94, Atlanta, GA)*, 560–565. Hillsdale, NJ: Erlbaum.
 231. Mayberry, M. R. III, and Miikkulainen, R. (1994). Lexical Disambiguation Based on Distributed Representations of Context Frequency. In *Proceedings of the Sixteenth Annual Conference of the Cognitive Science Society (COGSCI-94, Atlanta, GA)*, 601–606. Hillsdale, NJ: Erlbaum.
 232. Westermann, G., and Miikkulainen, R. (1994). Verb Inflections in German Child Language: A Connectionist Account. In *Proceedings of the Sixteenth Annual Conference of the Cognitive Science Society (COGSCI-94, Atlanta, GA)*, 928–933. Hillsdale, NJ: Erlbaum.
 233. Moriarty, D., and Miikkulainen, R. (1994). Evolving Neural Networks to Focus Minimax Search. In *Proceedings of the Twelfth National Conference on Artificial Intelligence (AAAI-94, Seattle, WA)*, 1371–1377. Cambridge, MA: MIT Press.
 234. Miikkulainen, R., and Bijwaard, D. (1994). Parsing Embedded Clauses with Distributed Neural Networks. In *Proceedings of the Twelfth National Conference on Artificial Intelligence (AAAI-94, Seattle, WA)*, 858–864. Cambridge, MA: MIT Press.

235. Moll, M., Miikkulainen, R., and Abbey, J. (1994). The Capacity of Convergence Zone Episodic Memory. In *Proceedings of the Twelfth National Conference on Artificial Intelligence (AAAI-94, Seattle, WA)*, 68–73. Cambridge, MA: MIT Press.
236. Sirosh, J., and Miikkulainen, R. (1994). Self-Organizing Feature Maps with Lateral Connections: Modeling Ocular Dominance. In *Proceedings of the Connectionist Models Summer School (CMSS-93, Boulder, CO)*, 31–38. Hillsdale, NJ: Erlbaum.
237. Moriarty, D., and Miikkulainen, R. (1994). Improving Game-Tree Search with Evolutionary Neural Networks. In *Proceedings of the First IEEE Conference on Evolutionary Computation (ICEC-94, Orlando, FL)*, 496–501. Piscataway, NJ: IEEE.
238. Blackmore, J., and Miikkulainen, R. (1993). Incremental Grid Growing: Encoding High-Dimensional Structure into a Two-Dimensional Feature Map. In *Proceedings of the International Conference on Neural Networks (ICNN-93, San Francisco, CA)*, 450–455. Piscataway, NJ: IEEE.
239. Leow, W. K., and Miikkulainen, R. (1993). Representing Visual Schemas in Neural Networks for Scene Analysis. In *Proceedings of the International Conference on Neural Networks (ICNN-93, San Francisco, CA)*, 1612–1617. Piscataway, NJ: IEEE.
240. Sirosh, J., and Miikkulainen, R. (1993). How Lateral Interaction Develops in a Self-Organizing Feature Map. In *Proceedings of the International Conference on Neural Networks (ICNN-93, San Francisco, CA)*, 1360–1365. Piscataway, NJ: IEEE.
241. Karjala, T. W., Himmelblau, D. M., and Miikkulainen, R. (1992). Data Rectification using Recurrent (Elman) Neural Networks. In *Proceedings of the International Joint Conference on Neural Networks (IJCNN-92, Baltimore, MD)*, II:901–906. Piscataway, NJ: IEEE.
242. Fullmer, B., and Miikkulainen, R. (1992). Using Marker-Based Genetic Encoding of Neural Networks to Evolve Finite-State Behaviour. In F. J. Varela and P. Bourguine (editors) *Toward a Practice of Autonomous Systems: Proceedings of the First European Conference on Artificial Life (ECAL-91, Paris, France)*, 255–262. Cambridge, MA: MIT Press.
243. Leow, W. K., and Miikkulainen, R. (1991). A Neural Network for Attentional Spotlight. In *Proceedings of the International Joint Conference on Neural Networks (IJCNN-91, Singapore)*, 436–441. Piscataway, NJ: IEEE.
244. Miikkulainen, R. (1991). Self-Organizing Process Based on Lateral Inhibition and Synaptic Resource Redistribution. In T. Kohonen, K. Mäkisara, Olli Simula and Jari Kangas (editors), *Proceedings of the International Conference on Artificial Neural Networks (ICANN-91, Espoo, Finland)*, 415–420. New York: Elsevier.
245. Miikkulainen, R. (1990). A PDP Architecture for Processing Sentences with Relative Clauses. In *Proceedings of the 13th International Conference on Computational Linguistics (COLING-90, Helsinki, Finland)*, 201–206. Helsinki, Finland: Yliopistopaino.
246. Miikkulainen, R. (1990). A Distributed Feature Map Model of the Lexicon. In *Proceedings of the 12th Annual Conference of the Cognitive Science Society (COGSCI-90, Cambridge, MA)*, 447–454. Hillsdale, NJ: Erlbaum.
247. Miikkulainen, R., and Dyer, M. G. (1989). Encoding Input/Output Representations in Connectionist Cognitive Systems. In Touretzky, D. S., Hinton, G. E., and Sejnowski, T. J. (editors), *Proceedings of the 1988 Connectionist Models Summer School (CMSS-88, Pittsburgh, PA)*, 347–356. San Francisco, CA: Morgan Kaufmann.
248. Miikkulainen, R., and Dyer, M. G. (1989). A Modular Neural Network Architecture for Sequential Paraphrasing of Script-Based Stories. In *Proceedings of the International Joint Conference on Neural Networks (IJCNN-89, Washington, DC)*, II:49–56. Piscataway, NJ: IEEE.
249. Miikkulainen, R., and Dyer, M. G. (1988). Forming Global Representations with Extended Backpropagation. In *Proceedings of the IEEE Second Annual International Conference on Neural Networks (ICNN-88, San Diego, CA)*, I:285–292. Piscataway, NJ: IEEE.

Book Chapters

250. Schrum, J. and Miikkulainen, R. (2016). Constructing Game Agents Through Simulated Evolution. In *Encyclopedia of Computer Graphics and Games*. Springer. DOI:10.1007/978-3-319-08234-9-15-1.
251. Braylan, A., Hollenbeck, M., Meyerson, E., and Miikkulainen, R. (2015). On the Cross-Domain Reusability of Neural Modules for General Video Game Playing. Vol. in *Communications in Computer and Information Science*. Berlin, New York: Springer.
252. Levine, J., Congdon, C. B., Ebner, M., Kendall, G., Lucas, S. M., Miikkulainen, R., Schaul, T., and Thompson T. (2013). General Video Game Playing. In L. M. Lucas, M. Mateas, M. Preuss, P. Spronk, and J. Togelius, *Artificial and Computational Intelligence in Games*. Dagstuhl, Germany: Schloss Dagstuhl — Leibniz-Zentrum für Informatik.
253. Miikkulainen, R., Feasley, E., Johnson, L., Karpov, I., Rajagopalan, P., Rawal, A., and Tansey, W. (2012). Multiagent Learning through Neuroevolution. In J. Liu et al. (Editors), *Advances in Computational Intelligence* Vol. LNCS 7311, pp. 24–46. Berlin, Heidelberg: Springer.
254. Karpov, I., Schrum, J., and Miikkulainen, R. (2012). Believable Bot Navigation via Playback of Human Traces. In P. Hingston (editor), *Believable Bots*. New York: Springer.
255. Schrum, J., Karpov, I., and Miikkulainen, R. (2012). Humanlike Combat Behavior via Multiobjective Neuroevolution. In P. Hingston (editor), *Believable Bots*. New York: Springer.
256. Miikkulainen, R. (2011). Definitional entries for Neuron, Weight, Topology, Simple Recurrent Network, Reservoir Computing, and Hopfield Network. In Sammut, C. and Webb, G. I. (editors), *Encyclopedia of Machine Learning*. Berlin: Springer.
257. Miikkulainen, R. (2011). Neuroevolution. In Sammut, C. and Webb, G. I. (editors), *Encyclopedia of Machine Learning*. Berlin: Springer.
258. Bednar, J. A., and Miikkulainen, R. (2007). Constructing Visual Function Through Prenatal and Postnatal Learning. In D. Mareschal, M. Johnson, S. Sirois, M. Spratling, M. S. C. Thomas and G. Westermann (editors) *Neuroconstructivism: How the Brain Constructs Cognition*. Oxford University Press.
259. Miikkulainen, R., Bryant, B. D., Cornelius, R., Karpov, I. V., Stanley, K. O., and Yong, C. H. (2006). Computational Intelligence in Games. In Yen, G. Y. and Fogel, D. B. (editors), *Computational Intelligence: Principles and Practice*, 155-191. IEEE Computational Intelligence Society.
260. Cornelius, R., Stanley, K., and Miikkulainen, R. (2006). Constructing Adaptive AI using Knowledge-Based Neuroevolution. In Rabin, S. (editor), *AI Game Programming Wisdom 3*, 693–708. Revere, MA: Charles River Media.
261. Moriarty, D., and Miikkulainen, R. (2001). Learning Sequential Decision Tasks through Symbiotic Evolution of Neural Networks. In M. Patel, V. Honavar, and K. Balakrishnan (editors), *Advances in the Evolutionary Synthesis of Intelligent Agents*, 367–382 Cambridge, MA: MIT Press.
262. Mayberry, M. R. III, and Miikkulainen, R. (2000). Combining Maps and Distributed Representations for Shift-Reduce Parsing. In Stefan Wermter and Ron Sun (editors) *Hybrid Neural Systems*, 144–157. Heidelberg: Springer.
263. Miikkulainen, R. (2000). Text and Discourse Understanding: The DISCERN System. In R. Dale, H. Moisl, and H. Somers (editors), *A Handbook of Natural Language Processing: Techniques and Applications for the Processing of Language as Text*, 905–919. New York: Marcel Dekker.
264. Miikkulainen, R., Bednar J. A., Choe, Y., and Sirosh J. (1999) Modeling Self-Organization in the Visual Cortex. In Oja, E., and Kaski, S. (editors) *Kohonen Maps*, 243–252. New York: Elsevier.
265. Miikkulainen, R. and Mayberry, M. R. III (1999). Disambiguation and Grammar as Emergent Soft Constraints. In B. J. MacWhinney (editor), *The Emergence of Language*, 153–176. Hillsdale, NJ: Erlbaum.

266. Miikkulainen, R. (1997). Natural Language Processing with Subsymbolic Neural Networks. In A. Browne (editor), *Neural Network Perspectives on Cognition and Adaptive Robotics*, 120–139. Bristol, UK; Philadelphia, PA: Institute of Physics Publishing.
267. Miikkulainen, R., Bednar, J. A., Choe, Y., and Sirosh, J. (1997). Self-Organization, Plasticity, and Low-level Visual Phenomena in a Laterally Connected Map Model of the Primary Visual Cortex. In R. L. Goldstone, P. G. Schyns, and D. L. Medin (editors), *Psychology of Learning and Motivation, vol. 36: Perceptual Learning*, 257–308. San Diego, CA: Academic Press.
268. Moriarty, D., and Miikkulainen, R. (1996). Efficient Reinforcement Learning through Symbiotic Evolution. In L. P. Kaelbling (editor), *Recent Advances in Reinforcement Learning*. Boston; Dordrecht; London: Kluwer.
269. Sirosh, J., Miikkulainen, R., and Bednar, J. A. (1996). Self-Organization of Orientation Maps, Lateral Connections, and Dynamic Receptive Fields in the Primary Visual Cortex. In Sirosh, J., Miikkulainen, R., and Choe, Y. (editors), *Lateral Interactions in the Cortex: Structure and Function*. The UTCS Neural Networks Research Group, Austin, TX. Electronic book, ISBN 0-9647060-0-8, nn.cs.utexas.edu/web-pubs/htmlbook96.
270. Miikkulainen, R., and Leow, W. K. (1995). Visual Schemas in Object Recognition and Scene Analysis. In M. A. Arbib (editor), *The Handbook of Brain Theory and Neural Networks*, 1029–1031. Cambridge, MA: MIT Press.
271. Miikkulainen, R. (1995). Subsymbolic Parsing of Embedded Structures. In R. Sun and L. Bookman (editors), *Computational Architectures Integrating Neural and Symbolic Processes*, 153–185. Boston; Dordrecht; London: Kluwer.
272. Miikkulainen R. (1994). Integrated Connectionist Models: Building AI Systems on Subsymbolic Foundations. In V. Honavar and L. Uhr (editors), *Artificial Intelligence and Neural Networks: Steps toward Principled Integration*, 483–508. New York: Academic Press.
273. Miikkulainen, R. (1990). Script Recognition with Hierarchical Feature Maps. In N. E. Sharkey (editor), *Connectionist Natural Language Processing*, 196–214. Oxford, UK: Intellect.

Other Conference Papers and Abstracts

274. Li, X. and Miikkulainen, R. (2016). Evolving Adaptive Poker Players for Effective Opponent Exploitation. In *AAAI Workshop on Computational Poker*.
275. Hodjat, B., Shahrzad, H., Miikkulainen, R., Murray, L., and Holmes, C. (in press). PRETSL: Distributed Probabilistic Rule Evolution for Time-Series Classification. In *Genetic Programming Theory and Practice Workshop*.
276. Braylan, A., Hollenbeck, M., Meyerson, E., and Miikkulainen, R. (2015). On the Cross-Domain Reusability of Neural Modules for General Video Game Playing. In Proceedings of the *IJCAI Workshop on General Intelligence in Game-Playing Agents (GIGA'15)*.
277. Braylan, A. and Miikkulainen, R. (2015). A Neural Network Approach to Model Learning for Stochastic Discrete Environments. In Proceedings of the *IJCAI Workshop on General Intelligence in Game-Playing Agents (GIGA'15)*.
278. Floren, A., Naylor, B., Miikkulainen, R., and Ress, D. (2015). Decoding Cognitive States with a Hidden Markov Model. In *Society of Neuroscience Abstracts*.
279. Liang, J. and Miikkulainen, R. (2015). Evolutionary Bilevel Optimization for Complex Control Tasks. In Proceedings of the *AAAI Workshop on Algorithm Configuration*.
280. Braylan, A., Hollenbeck, M., Meyerson, E., and Miikkulainen, R. (2015). Frame Skip is a Powerful Parameter for Learning to Play Atari. In Proceedings of the *AAAI Workshop on Learning for General Competency in Video Games*, WS-15-10.

281. Lehman, J. and Miikkulainen, R. (2015). General Video Game Playing as a Benchmark for Human-Competitive AI. In *AAAI Workshop on Beyond Turing 2015*.
282. dAvila Garcez, A., Besold, T. R., de Raedt, L., Földiák, P., Hitzler, P., Icard, T., Kühnberger, K.-U., Lamb, L. C., Miikkulainen, R., and Silver, D. L. (2015). Neural-Symbolic Learning and Reasoning: Contributions and Challenges. In *AAAI Spring Symposium on Knowledge Representation and Reasoning: Integrating Symbolic and Neural Approaches*.
283. Aguirre-Celis, N., Morales, I., Binder, J., Aguilar, M., Connolly, P., and Miikkulainen, R. (2015). From Words to Sentences and Back: Unlocking the fMRI Patterns using Neural Networks. Abstract presented at the 19th Annual Neuroscience Symposium, the University of Texas at Austin.
284. Floren, A., Naylor, B., Miikkulainen, R., and Ress, D. (2014). Decoding external and internal cognitive variables during natural tasks in realistic virtual environments. In *Society of Neuroscience Abstracts*.
285. Floren, A., Naylor, B., Miikkulainen, R., and Ress, D. (2014). Identifying Brain Regions Associated with Task Performance in a Complex Virtual Environment. Abstract presented at the 20th Annual Meeting of the Organization for Human Brain Mapping.
286. Lehman, J. and Miikkulainen, R. (2013). Boosting Interactive Evolution using Human Computation Markets. In *Proceedings of the 2nd International Conference on the Theory and Practice of Natural Computing* (TPNC 2013, Caceres, Spain). LNCS 8273. Berlin, Heidelberg: Springer.
287. Lehman, J. and Miikkulainen, R. (2013). Leveraging Human Computation Markets for Interactive Evolution. In *Proceedings of ICML Workshop on Machine Learning Meets Crowdsourcing*.
288. Levine, J., Congdon, C. B., Bida, M., Ebner, M., Kendall, G., Lucas, S., Miikkulainen, R., Schaul, T., and Thompson, T. (2012). Generalized Video Game Playing. In S. M. Lucas, M. Mateas, M. Preuss, P. Spronck, and J. Togelius (editors), *Artificial and Computational Intelligence in Games (Dagstuhl Seminar 12191)* 2(5):52–53. Dagstuhl, Germany: Schloss Dagstuhl — Leibniz-Zentrum für Informatik.
289. Stanley, K. O., Bida, M., Burelli, P., Miikkulainen, R., and Yannakakis, G. N. (2012). Evaluating AI in Games Research. In S. M. Lucas, M. Mateas, M. Preuss, P. Spronck, and J. Togelius (editors), *Artificial and Computational Intelligence in Games (Dagstuhl Seminar 12191)* 2(5):61. Dagstuhl, Germany: Schloss Dagstuhl — Leibniz-Zentrum Informatik.
290. Stanley, K. O., Champandard, A., Congdon, C. B., Hingston, P. F., Kendall, G., Lanzi, P. L., Loiacono, D., and Miikkulainen, R. (2012). The AIGameResearch.org AI Game Clearinghouse. In S. M. Lucas, M. Mateas, M. Preuss, P. Spronck, and J. Togelius (editors) *Artificial and Computational Intelligence in Games (Dagstuhl Seminar 12191)* 2(5):62. Dagstuhl, Germany: Schloss Dagstuhl — Leibniz-Zentrum für Informatik.
291. Karpov, I., Johnson, L., Valsalam, V., and Miikkulainen, R. (2012). Evaluation Methods for Human-Guided Neuroevolution in Games. *2012 AAAI Fall Symposium on Robots that Learn Interactively from Human Teachers* (Crystal City, VA). Menlo Park, CA: AAAI.
292. Thatchenkery, S., Katila, R., Chen E., and Miikkulainen, R. (2012). Sequences of competitive moves and effects on firm performance. Abstract presented at *European Group for Organizational Studies* conference (Helsinki, Finland).
293. Schrum, J. and Miikkulainen, R. (2011). UT²: Human-like Behavior via Neuroevolution of Combat Behavior and Replay of Human Traces. Abstract presented at the *Human-like Bot Workshop at the IEEE Congress on Evolutionary Computation*.
294. Sagar, M., Maclean, K. A., Sahdra, B. K., Aichele, S. R., Jacobs, T. L., Zanesco, A. P., Bridwell, D. A., King, B. G., Rosenberg, E. L., Mangun, G. R., Shaver, P. R., Ferrer, E., Wallace, B. A., Saron, C. D., and Miikkulainen, R. (2011). A computational model to understand longitudinal changes in EEG associated with intensive meditation training. In *Society of Neuroscience Abstracts*.

295. Albert, M. V., Miikkulainen, R., and Field, D. J. (2011). Using the statistics of binocular images to model spontaneous activity in the developing visual system. In *Society of Neuroscience Abstracts*.
296. Grasemann, U., Hoffman, R., and Miikkulainen, R. (2010). Hyperlearning: A Hypothesis of Dopamine and Storytelling in Schizophrenia. Abstract presented at the International Joint Conference on Neural Networks (IJCNN-2011, San Jose, CA).
297. Karpov, I., Valsalam, V., and Miikkulainen, R. (2011). Assisting Machine Learning via Shaping, Advice and Examples. In *Proceedings of the 2011 IJCAI Workshop on Agents Learning Interactively from Human Teachers*.
298. Kiran, S., Grasemann, U., Sandberg, C., and Miikkulainen, R. (2011). Simulating Bilingual Aphasia Rehabilitation: Evidence from a computational model was accepted as a platform presentation. Abstract presented at the *Clinical Aphasiology Conference*, Ft. Lauderdale, FL.
299. Sagar, M., MacLean, K.A., Aichele, S.R., Jacobs, T.L., Zanesco, A.P., Bridwell, D.A., King, B.G., Sahdra, B.K., Rosenberg, E.L., Shaver, P.R., Ferrer, E., Wallace, B.A., Mangun, G.R., Miikkulainen, R., and Saron, C.D. (2011). Cortical activation changes associated with intensive meditation training are related to vigilance performance. Abstract presented at the Cognitive Neuroscience Society meeting.
300. Kiran, S., Grasemann, U., Sandberg, C., and Miikkulainen, R. (2010). Simulating Bilingual Aphasia: A Novel Computational Model. Abstract presented at the *Academy of Aphasia Meeting*, Athens Greece.
301. Kiran, S., Grasemann, U., Sandberg, C. and Miikkulainen, R. (2010). Simulating bilingual aphasia Rehabilitation: A novel computational model. Abstract presented at the *Donostia Workshop on Neurobilingualism*, San Sebastian, Spain.
302. Sagar, M., Aichele, S. R., Jacobs, T. L., Zanesco, A. P., Bridwell, D. A., Maclean, K. A., King, B. G., Sahdra, B. K., Rosenberg, E. L., Shaver, P. R., Ferrer, E., Wallace, B. A., Mangun, G. R., Miikkulainen, R., and Saron, C. D. (2010). A computational approach to understanding the longitudinal changes in cortical activity associated with intensive meditation training. Abstract presented at the *Computation and Neural Systems Conference (CNS*10)*, San Antonio, TX (oral presentation).
303. Grasemann, U., Hoffman, R., and Miikkulainen, R. (2010). Evaluating computational models of language disturbance in schizophrenia. Abstract presented at the *Computation and Neural Systems Conference (CNS*10)*, San Antonio, TX.
304. Grasemann, U., Sandberg, C., Kiran, S., and Miikkulainen, R. (2010). Rehabilitation and cross-language transfer in bilingual aphasia: Towards a computational model. Abstract presented at the *Computation and Neural Systems Conference (CNS*10)*, San Antonio, TX.
305. Grasemann, U., Sandberg, C., Kiran, S., and Miikkulainen, R. (2010). Rehabilitation and cross-language transfer in bilingual aphasia: Towards a computational model. Abstract presented at the *Fourteenth International Conference on Cognitive and Neural Systems (CNS-10)*, Boston, MA.
306. Valsalam, V. and Miikkulainen, R. (2009). Evolving Symmetric and Modular Neural Network Controllers for Multilegged Robots. In *Workshop on Exploring New Horizons in Evolutionary Design of Robots at the 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS-2009)*, St. Louis, MO).
307. Sagar, M., Aichele, S. R., Jacobs, T. L., Zanesco, A. P., Bridwell, D. A., Maclean, K. A., King, B. G., Sahdra, B. K., Rosenberg, E. L., Shaver, P. R., Ferrer, E., Tang, A. C., Wallace, B. A., Mangun, G. R., Miikkulainen, R., and Saron, C. D. (2009). Longitudinal changes in brain activity associated with intensive meditation training. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience.
308. Hoffman, R. E., Grasemann, U., Quinlan, D., Lane, D., and Miikkulainen, R. (2009). Derailed and Delusional Narratives in a Hyperlearning Neural Network Model of Schizophrenia. Abstract presented at *The 13th International Conference on Cognitive and Neural Systems*.

309. Katila, R. and Miikkulainen, R. (2009). Balancing Exploration and Exploitation in Competitive Environments: How does Appropriability Factor in? Abstract presented at the *Academy of Management Annual Meetings* (Chicago, IL). Washington, DC: Academy of Management.
310. Sit, Y. F., Chen, Y., Geisler, W. S., Seidemann, E., and Miikkulainen, R. (2008). A Population Gain Control Model for Responses in the Primary Visual Cortex. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience.
311. Karpov, I., Sheblak, J., and Miikkulainen, R. (2008). OpenNERO: A Game Platform for AI Research and Education. A demo abstract in the *Proceedings of the Fourth Artificial Intelligence and Interactive Digital Entertainment Conference* (AIIDE-2008, Stanford, CA).
312. Miikkulainen, R. (2008). The Computational Role of Lateral and Feedback Connections in the Primary Visual Cortex. Abstract at the *Seventh International Conference on Development and Learning* (ICDL7, Monterey, CA).
313. Andoni, S., Saggarr, M., Mericli, T., and Miikkulainen, R. (2007). Extracting the Dynamics of the Hodgkin-Huxley Model using Recurrent Neural Networks. Abstract presented at the *Computation and Neural Systems Conference* (CNS*07, Toronto, Canada).
314. De Paula, J., Bednar, J. A., and Miikkulainen, R. (2007). Modeling self-organizing tri-chromatic color selective regions in primary visual cortex. Abstract presented at the *Computation and Neural Systems Conference* (CNS*07, Toronto, Canada; oral presentation).
315. Katila, R. and Miikkulainen, R. (2007). In Search of Innovation: Beyond Local Neighborhoods and Rigid Ties. Abstract presented at the *Academy of Management Annual Meetings* (Philadelphia, PA). Washington, DC: Academy of Management.
316. Kaczmarczyk, L. C., Last, M. Z., and Miikkulainen, R. (2006). A Computational Model of Pedagogical Delivery Strategies. In *Proceedings of the Midwest Celebration of Women in Computing*, 13–17.
317. Reisinger, J. and Miikkulainen, R. (2006). Evolvability in Developmental Systems. Abstract in *Working Notes of the 2006 AAAI Fall Symposium on Developmental Systems* (Crystal City, VA). Menlo Park, CA: AAAI.
318. Reisinger, J. and Miikkulainen, R. (2006). Coevolution and Selection for Evolvability. Abstract in *Proceedings of the Genetic and Evolutionary Computation Conference Workshop Program* (GECCO-2006, Seattle, WA).
319. Saggarr, M. and Miikkulainen, R. (2006). A Computational Approach to Meditation. Abstract in *Proceedings of the 28th Annual Conference of the Cognitive Science Society* (COGSCI-2006, Vancouver, CA).
320. Stanley, K. O., Karpov, I., Miikkulainen, R., and Gold, A. (2006). Real-time Interactive Learning in the NERO Video Game. Demo abstract in *Proceedings of the National Conference on Artificial Intelligence* (AAAI-2006), Boston, MA.
321. Stanley, K. O., Karpov, I., Miikkulainen, R., and Gold, A. (2006) The NERO Video Game. Demo abstract in *Proceedings of the Second Artificial Intelligence and Interactive Digital Entertainment Conference* (AIIDE-2006, Marina del Rey, CA).
322. Monroy, G. A., Stanley, K. O., and Miikkulainen, R. (2005). Coevolution of Neural Networks Using a Layered Pareto Archive. In *Working Notes of the 2005 AAAI Fall Symposium on Coevolutionary and Coadaptive Systems* (Arlington, VA). Menlo Park, CA: AAAI.
323. Yong, C. H., Stanley, K. O. and Miikkulainen, R. (2005). Incorporating Advice into Evolution of Neural Networks. In *2005 Genetic and Evolutionary Computation Conference Late-Breaking Papers* (GECCO-2005, Washington, DC).
324. Reisinger, J., Stanley, K. O., and Miikkulainen, R. (2005). Towards an Empirical Measure of Evolvability. In *Proceedings of the Genetic and Evolutionary Computation Conference Workshop Program* (GECCO-2005, Washington, DC).

325. Miikkulainen, R. (2005). Scaling Up Towards Real-World Tasks. Abstract presented at the *NIPS Workshop on Reinforcement Learning Benchmarks and Bake-offs II*.
326. Bednar, J. A., Choe, Y., De Paula, J., Miikkulainen, R., and Provost, J. (2005). Modeling the visual cortex using the Topographica cortical map simulator. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience.
327. Bednar, J. A., Choe, Y., De Paula, J., Miikkulainen, R., and Provost, J. (2005). The Topographica Cortical Map Simulator. Abstract presented at the *European Conference on Visual Perception (ECVP'05, Coruna, Spain)*.
328. Stanley, K. O., Cornelius, R., Miikkulainen, R., D'Silva, T., and Gold, A. (2005). Real-time Learning in the NERO video game. Demo abstract in *Proceedings of the First Artificial Intelligence and Interactive Digital Entertainment Conference (AIIDE-2005, Marina del Rey, CA)*.
329. Provost, J., Kuipers, J. B., and Miikkulainen R. (2004). Self-Organizing Perceptual and Temporal Abstraction for Robot Reinforcement Learning. In *Proceedings of the AAAI-04 Workshop on Learning and Planning in Markov Processes - Advances and Challenges*.
330. Agogino, A. and Miikkulainen, R. (2004). Multi-agent Utilities for Efficient Allele Evaluation. In *Proceedings of the Genetic and Evolutionary Computation Conference Workshop Program (GECCO-2004, Seattle, WA)*. New York, NY: Springer.
331. Whiteson, S., Stanley, K., and Miikkulainen, R. (2004) Automatic Feature Selection in Neuroevolution. In *Proceedings of the Genetic and Evolutionary Computation Conference Workshop Program (GECCO-2004, Seattle, WA)*. New York, NY: Springer.
332. Stanley, K. O., Reisinger, J., and Miikkulainen, R. (2004). Exploiting Morphological Conventions for Genetic Reuse. Abstract in *Proceedings of the Genetic and Evolutionary Computation Conference Workshop Program (GECCO-2004, Seattle, WA)*. New York, NY: Springer.
333. De Paula, J., Bednar, J. A., and Miikkulainen, R. (2004). Modeling self-organization of color-opponent receptive fields and laterally connected orientation maps and color blobs in V1. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience.
334. Miikkulainen, R., Bednar, J. A., and Choe, Y. (2004). Sparse, Redundancy-Reduced Visual Coding Through Self-Organized Lateral Connections. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience (oral presentation).
335. Stanley, K. and Miikkulainen, R. (2003). Evolving Adaptive Neural Networks with and without Adaptive Synapses. In *2003 Genetic and Evolutionary Computation Conference Late-Breaking Papers (GECCO-2003, Chicago, IL)*. San Francisco, CA: Morgan Kaufmann.
336. Stanley, K. and Miikkulainen R. (2003). Achieving High-Level Functionality through Complexification. In *Proceedings of the AAAI Spring Symposium on Computational Synthesis*.
337. Bednar, J. A. and Miikkulainen, R. (2003). Joint Maps for Orientation, Ocular Dominance, and Direction Preference in a Self-Organizing Laterally Connected Model of Primary Visual Cortex. In *Society for Neuroscience Abstracts*, Program No. 701.2. Washington, DC: Society for Neuroscience.
338. Stanley, K. and Miikkulainen R. (2002). The Dominance Tournament Method of Monitoring Progress in Coevolution. In *2002 Genetic and Evolutionary Computation Conference Workshop Program (GECCO-2002, New York, NY)*. San Francisco, CA: Morgan Kaufmann.
339. Bednar, J. A. and Miikkulainen, R. (2002). Self-Organization of Spatiotemporal Receptive Fields and Laterally Connected Direction and Orientation Maps. Abstract presented at the workshop *Dynamical Neuroscience X: From Experiments and Models to Brain Theory* (Annual Meeting of the Society for Neuroscience, Orlando, FL).
340. Lubberts, A. and Miikkulainen, R. (2001). Co-Evolving a Go-Playing Neural Network. In *2001 Genetic and Evolutionary Computation Conference Workshop Program (GECCO-2001, San Francisco, CA)*, 14–19. San Francisco, CA: Morgan Kaufmann.

341. Katila, R. and Miikkulainen, R. (2001). New product search over time: Past ideas in their prime? Abstract presented at the *Academy of Management Annual Meetings* (Washington, DC). Washington, DC: Academy of Management.
342. Bruce, J. and Miikkulainen, R. (2000). Evolving Populations of Expert Neural Networks. In *Learning to Behave: Proceedings of Twente Workshop on Language Technology 18 and CELE Workshop on Evolutionary Language Engineering 2, Workshop II: Internalising Knowledge*, 1–9. Enschede, The Netherlands: Universiteit Twente.
343. Desai, N. S. and Miikkulainen, R. (2000). Neuro-evolution and Natural Deduction. In *Proceedings of The First IEEE Symposium on Combinations of Evolutionary Computation and Neural Networks*, 64–69. Piscataway, NJ: IEEE.
344. Mayberry, M. R. III, and Miikkulainen, R. (1998). SARDSRN: A Neural Network Shift-Reduce Parser. Abstract presented at the *NIPS Workshop on Hybrid Neural Symbolic Integration*.
345. Miikkulainen, R. and Mayberry, M. R. III (1997). Disambiguation and Grammar as Emergent Soft Constraints. *Workshop on Thought and Language*, 20–31. Iizuka, Japan: Department of Artificial Intelligence, Kyushu Institute of Technology.
346. Ryan, J., Lin, M.-J., and Miikkulainen, R. (1997). Intrusion Detection with Neural Networks. In Technical Report WS-97-07, *AI Approaches to Fraud Detection: Papers from the 1997 AAAI Workshop* (Providence, Rhode Island; Tom Fawcett, Program Chair), 72–79. Menlo Park, CA: AAAI.
347. Bednar, J. A. and Miikkulainen, R. (1997). A Neural Network Model of Visual Tilt Aftereffects. Abstract presented at the *European Conference on Visual Perception (ECVP'97, Helsinki, Finland)*. *Perception* vol. 26 supplement, page 20.
348. Gomez, F., and Miikkulainen, R. (1996). Evolving General Complex Behavior in Stochastic Dynamic Environments. In *Working Notes of the 1996 AAAI Fall Symposium on Learning Complex Behaviors in Adaptive Intelligent Systems* (Cambridge, MA), 140–147. Menlo Park, CA: AAAI.
349. Sirosh, J. and Miikkulainen, R. (1996). A Neural Network Model of Topographic Reorganization Following Cortical Lesions. In M. Witten (editor), *Computational Medicine, Public Health and Biotechnology: Building a Man in the Machine. Proceedings of the First World Congress* (Austin, TX). Singapore; Teaneck, NJ: World Scientific.
350. Sirosh, J., and Miikkulainen, R. (1995). Cooperative Self-Organization of Orientation Maps and Lateral Connections in the Visual Cortex. In *Society for Neuroscience Abstracts*, vol. 21, Part 3, page 1751 (San Diego, CA). Washington, DC: Society for Neuroscience (oral presentation).
351. Sirosh, J., and Miikkulainen, R. (1995). A Self-Organizing Neural Network Model of the Primary Visual Cortex. Abstract presented at the *Second Annual Meeting of the Cognitive Neuroscience Society* (San Francisco, CA), page 128. Davis, CA: Cognitive Neuroscience Society.
352. Leow, W. K., and Miikkulainen, R. (1994). Representing and Learning Visual Schemas in Neural Networks for Scene Analysis. In *Proceedings of the IV Iberoamerican Congress on AI (IBERAMIA'94, Caracas, Venezuela)*, 516–525. Caracas, Venezuela: McGraw-Hill.
353. Leow, W. K., and Miikkulainen, R. (1994). Analyzing Scenes in a Neural Network Model of Schema-Based Vision. In *Proceedings of the 1994 International Symposium on Artificial Neural Networks (ISANN-94, Tainan, Republic of China)*.
354. Bijwaard, D. and Miikkulainen, R. (1994). Parsing Relative Clauses with Neural Networks. In *Proceedings of the 1994 Turkish Symposium on AI and Neural Networks (TAINN-94, Ankara, Turkey)*.
355. Leow, W. K., and Miikkulainen, R. (1993). Representing and Learning Visual Schemas in Neural Networks for Scene Analysis. In *Proceedings of Workshop on Neural Architectures and Distributed AI: From Schema Assemblages to Neural Networks* (Los Angeles, CA), 35–40. Los Angeles, CA: Center for Neural Engineering, University of Southern California.

356. Miikkulainen, R. (1992). DISCERN: A Distributed Neural Network Model of Script Processing and Memory. In *Proceedings of the Third Twente Workshop on Language Technology (TWLT3, Enschede, the Netherlands)*, 115–124. Enschede, the Netherlands: Computer Science Department, University of Twente.
357. Miikkulainen, R. (1991). A Neural Network Model of Script Processing and Memory. In *Proceedings of the International Workshop on Fundamental Research for the Next Generation of Natural Language Processing (FGNLP-91, Kyoto, Japan)*, 68–86. Kyoto, Japan: ATR International.
358. Miikkulainen, R. (1991). Parsing Embedded Clauses with Simple Recurrent Networks. In *Working Notes of the AAAI Spring Symposium on Connectionist Language Processing (Stanford, CA)*, 211–215. Menlo Park, CA: AAAI.
359. Lee, G., and Miikkulainen, R. (1990). Distributed Connectionist Knowledge Representation in Script/Goal-Based Story Understanding. In *Proceedings of Seoul International Conference on Natural Language Processing (SICONLP-90, Seoul, Korea)*, 339–350. Seoul, Korea: Seoul National University Language Research Institute.

Editorials, Position Statements, Commentary, and Reviews

360. Holecamp, K. and Miikkulainen, R. (in press). The evolution of general intelligence in all animals and machines. Commentary to Burkart et al. “The evolution of general intelligence” (2016) in *Behavioral and Brain Sciences*.
361. Miikkulainen, R. (2016) Machines are becoming more creative than humans. *VentureBeat*, April 3 2016, <http://venturebeat.com/2016/04/03/>.
362. Renz, J. Miikkulainen, R., Sturtevant, N., and Winands, M. (in press). Guest Editorial: Physics-Based Simulation Games. *IEEE Transactions on Computational Intelligence and AI in Games*.
363. Fogel, D., Blair, A., and Miikkulainen, R. (2005). Guest Editorial, Special Issue: Evolutionary Computation and Games. *IEEE Transactions on Evolutionary Computation*.
364. Ishikawa, M., Miikkulainen, R., and Ritter, H. (2004). Editorial: New Developments in Self-Organizing Systems. *Neural Networks* 17:1037.
365. Miikkulainen, R. (2000). Evolution of Intelligent Machines. *Hetkyn Tietosanomat* 3/2000, 37–39.
366. Miikkulainen, R., and Sirosh, J. (1996). Introduction: The Emerging Understanding of Lateral Interactions in the Cortex. In Sirosh, J., Miikkulainen, R., and Choe, Y. (editors), *Lateral Interactions in the Cortex: Structure and Function*. The UTCS Neural Networks Research Group, Austin, TX. Electronic book, ISBN 0-9647060-0-8, nn.cs.utexas.edu/web-pubs/htmlbook96.
367. Miikkulainen, R. (1995). Symbolic and Subsymbolic Cognitive Science: Reply to Dror and Young on Language-Network. *Psychology*, 95.6.04.
368. Miikkulainen, R. (1995). Computational Constraints and the Role of Scripts in Story Understanding: Reply to Reilly on Language-Network. *Psychology*, 95.6.03.
369. Miikkulainen, R. (1995). Subsymbolic Processing of Embedded Structures: Reply to Deane on Language-Network. *Psychology*, 95.6.02.
370. Miikkulainen, R. (1994). Representation of Structure on Linguistic Maps: Reply to Edelman on Language-Network. *Psychology*, 94.5.86.
371. Miikkulainen, R. (1994). Storage and Reorganization in Episodic Memory: Reply to Goertzel on Language-Network. *Psychology*, 94.5.85.
372. Miikkulainen, R. (1994). Precis of the book “Subsymbolic Natural Language Processing: An Integrated Model of Scripts, Lexicon, and Memory.” *Psychology*, 94.5.46.

373. Miikkulainen, R. (1994). Integrated Connectionist Models: Building AI Systems on Subsymbolic Foundations. Position statement in *Proceedings of the Sixth International Conference on Tools with Artificial Intelligence (ICTAI-94, New Orleans, LA)*, 231–232. Los Alamitos, CA: IEEE Computer Society Press.
374. Miikkulainen, R. (1992). Review of Barnden, J., and Pollack, J. (editors), *Advances in Connectionist and Neural Computation Theory, Volume 1: High-Level Connectionist Models*. *Connection Science*, 4:57–60.
375. Miikkulainen, R. and Dyer, M. G. (1989). Author’s Response to “Language Processing with Distributed Representation: A review of ‘A modular neural network architecture for sequential paraphrasing of script-based stories’ by Risto Miikkulainen and Michael G. Dyer” by Timothy L. Humphrey. *Neural Network Review* 3:73.

Software Systems

All software packages are available under the GNU General Public Software License at nn.cs.utexas.edu, or directly by clicking on the links below.

- MM-NEAT: software for Multiobjective evolution of modular neural networks, V1.0 May 2014, V1.1 October 2015 (with Jacob Schrum).
- OpenNERO simulation environment for research in multiagent systems, October 2008 (with Igor Karpov and John Sheblak), V2.0 February 2010 (with Igor Karpov, Daniel Lessin, Vinod Valsalam, Adam Dziuk, and Minh Pham), V2.1 August 2011 (with Igor Karpov and Adam Dziuk), V2011.12.14 December 2011 (with Igor Karpov), V2015.05.28 May 2015 (with Reza Mahjourian).
- BBMS: software for simulating troop movements and optimizing scout locations, May 2015 (with Brian Boyles).
- BREVE Monsters: software for exploring the evolution of multimodal behavior using neural networks, February 2014 (with Jacob Schrum).
- MARLEDA: distribution estimation using a Markov Random Field model, October 2013 (with Matthew E. Alden).
- mMARLEDA: multiobjective optimization using MARLEDA, October 2013 (with Matthew E. Alden).
- UT²: software for the BotPrize 2012 winning entry, September 2012 (with Igor Karpov and Jacob Schrum).
- PyEC software for Evolutionary Annealing and a number of other evolutionary and stochastic optimization algorithms. V0.1 May 2011 (with Alan Lockett), V0.2 in July 2012 (with Alan Lockett).
- ESL software for Egalitarian Social Learning in the robot foraging domain, June 2012 (with Eliana Feasley and Wesley Tansey).
- NEAT software for evolving neural network topologies. Versions: C++, v1.0 August 2001; v1.1 July 2002 (with Kenneth Stanley); v1.2 July 2010 (with Igor Karpov and Kenneth Stanley); v1.2.1 August 2011 (with Erkin Bahceci); Java, June 2002 (Ugo Vierucci); C++/ms, September 2002 (Mat Buckland); C#, April 2003 (Colin Green); Matlab, August 2003 (Christian Mayr); Delphi, December 2003 (Mattias Fagerlund); Java, June 2004 (Derek James and Philip Tucker).
- BORG algorithm portfolio software, July 2011 (with Bryan Silverthorn).
- CoSyNE: software for evolving neural networks through cooperative coevolution of synapses, Aug 2007; v1.2 May 2011 (with Faustino Gomez).
- NKVIS a visualization tool for NK fitness landscapes, May 2011 (with Erkin Bahceci).
- ENSO software for evolution of symmetric modular neural networks, November 2010 (with Vinod Valsalam).

Sorting networks software for minimizing the number of comparators in sorting networks, November 2010 (with Vinod Valsalam).

NERO video game, based on real-time interactive neuroevolution, June 2005 (with Kenneth O. Stanley, Bobby Bryant, Aliza Gold, and the NERO development team); v1.1 November 2005; v2.0 August 2007.

ESP software for evolving neural networks for sequential decision tasks: C++ version February 2000 (with Faustino Gomez); Java version v1.0 February 2002 (with Alan Oursland); v1.1 August 2007 (with Jacob Schrum).

rtNEAT package for evolutionary training of software agents in real time, February 2006 (with Kenneth O. Stanley).

Topographica software for simulating cortical maps (to accompany the *Computational Maps in the Visual Cortex NLP* book [1]), November 2005 (with James A. Bednar, Yoonsuck Choe, Judah De Paula, Jefferson Provost, and Yiu Fai Sit).

DEPTHSCOPE package for calculating depth and scope of innovation search from patent data, November 2005 (with Riitta Katila).

SOFM self-organizing map software, September 1994; v3.0 December 2002 (with Marty Mayberry).

SignalSim event-driven simulator of an interconnected network of spiking neurons, September 1990 (by Risto Miikkulainen); v2.0 December 2002 (with Marty Mayberry).

TEAM software for probabilistic model based evolution, July 2002 (with Matt Alden).

PGLISSOM software for modeling perceptual grouping in the visual cortex, March 2002 (with Yoonsuck Choe)

LISSOM software for self-organizing maps with lateral connections, July 1994 (with Joseph Sirosh); v2.0 October 1998; v3.0 November 2001 (with James A. Bednar).

SANE software for Symbiotic, Adaptive Neuro-Evolution for sequential decision tasks; C version v1.0 May 1996 (with David Moriarty); v2.0 May 1997 (with David Moriarty); v2.1 August 2000 (with Bram Stolk); Java version October 1998 (with Cynthia Matuszek).

MIR software for rapid prototyping of sentence processing architectures, October 1998 (with Marshall Mayberry).

Pole-balancing simulations for neuron-level SANE, February 1995 (with David Moriarty).

PROC connectionist story processing system, September 1994.

DISLEX lexicon model, September 1994.

HFM hierarchical feature maps, September 1994.

FGREPNET software for learning distributed word representations, September 1994.

SPEC subsymbolic sentence processing software, August 1994.

DISCERN story processing package (to accompany the *Subsymbolic NLP* book [3]), May 1993.

Patents

Sherony, R., Miikkulainen, R., Stanley, K. O., and Kohl, N. (2009). Crash Prediction Network with Visual Input for Vehicle. United States Patent 7,613,569.

Sherony, R., Miikkulainen, R., Stanley, K. O., and Kohl, N. (2009). Crash Prediction Network With Graded Warning for Vehicle. United States Patent 7,565,231.

Stanley, K. O. and Miikkulainen R. (2009). Method and Apparatus for Providing Real-Time Machine Learning to Computer-Controlled Agents Used in Video Games. United States Patent 7,559,843.

Miikkulainen, R., Dahlin, M. D., and Lipscher, R. P. (2006). Systems and methods for adaptive medical decision support. United States Patent 6,988,088.

Teaching

Graduate Courses

Cognitive Science
Neural Networks
Artificial Intelligence
Research Practice and Experience

Undergraduate Courses

Neural Networks
Artificial Intelligence
Computational Intelligence in Game Design I
Computational Intelligence in Game Design II

Postdoctorals Supervised

Cem Tutum, Research Educator, The University of Texas at Austin, since Spring 2015.
Joel Lehman, Research Educator, The University of Texas at Austin, Fall 2012 - Fall 2014. Assistant Professor, IT University of Copenhagen.
Uli Grasemann, Research Educator, The University of Texas at Austin, Spring 2011 - Summer 2012.
Kenneth O. Stanley, Fall 2004 – Fall 2005. Associate Professor, University of Central Florida.
Faustino Gomez, Fall 2003 – Spring 2004. Senior Researcher, IDSIA, Switzerland.
James A. Bednar, Summer 2002 - Summer 2004. Senior Lecturer, University of Edinburgh.
Melissa Redford, Spring 2000 - Spring 2002. Associate Professor, University of Oregon.
Igor Farkas, Fall 1998. Associate Professor, Comenius University, Slovakia.
Daniel Polani, Fall 1997. Reader, Department of Computer Science, University of Hertfordshire, UK.

Dissertations Supervised

Padmini Rajagopalan, “The Evolution of Coordinated Cooperative Behaviors,” Fall 2016.
Jeremy Stober, “Sensorimotor Embedding: A Developmental Approach to Learning Geometry,” Spring 2015. Apple, Inc.
Erkin Bahceci, “Competitive Multi-Agent Search,” Fall 2014. Google, Inc.
Daniel Lessin, “Open-Ended Behavioral Complexity for Evolved Virtual Creatures,” Fall 2014. Co-advisor Don Fussell. Postdoc, IT University of Copenhagen.
Jacob Schrum, “Evolving Multimodal Behavior Through Modular Multiobjective Neuroevolution,” Spring 2014. Assistant Professor, Southwestern University.
Austin Waters, “Analyzing Collections of Digital Media Documents with Hierarchical Bayesian Models,” Spring 2014. Google, Inc.
Bryan Silverthorn, “A Probabilistic Architecture for Algorithm Portfolios,” Spring 2012. CTO, Angaza Design, Inc., Palo Alto, CA.
Alan Lockett, “General-Purpose Optimization Through Information Maximization,” Spring 2012. Research Scientist, IDSIA, Switzerland.
Manish Saggarr, “Computational Analysis Of Meditation,” Summer 2011. Co-advisor Cliff Saron, UC Davis. Postdoc, Stanford University.

Uli Grasemann, “A Subsymbolic Model Of Language Pathology In Schizophrenia”, Fall 2010. Co-advisor Ralph Hoffman, Yale.

Vinod Valsalam, “Utilizing Symmetry in Evolutionary Design,” Summer 2010. Analyst, TwoSigma Inc., New York, NY.

Yiu Fai Sit, “A Population Gain Control Model of Spatiotemporal Responses in the Visual Cortex,” Summer 2009. Co-advisor Eyal Seidemann.

Nate Kohl, “Learning in Fractured Problems with Constructive Neural Network Algorithms”, Summer 2009. Software Engineer, Google Inc., New York, NY.

Tal Tversky, “Motion Perception and the Scene Statistics of Motion”, Spring 2008. Director of Risk Analytics, Apple Inc., Austin TX; co-advisor Wilson S. Geisler.

Matthew E. Alden, “MARLEDA: Effective Distribution Estimation Through Markov Random Fields”, Fall 2007. Lecturer, University of Washington, Tacoma.

Judah B. De Paula, “Modeling the Self-Organization of Color Selectivity in the Visual Cortex”, Fall 2007. Technical Manager, DuPont Pioneer Inc., Des Moines, IA; co-advisor James A. Bednar.

Jefferson Provost, “Reinforcement Learning in High-Diameter Environments”, Summer 2007. Data Scientist, Apple Inc., Austin TX; co-advisor Benjamin J. Kuipers.

Bobby D. Bryant, “Evolving Visibly Intelligent Behavior for Embedded Game Agents”, Fall 2006. Assistant Professor, Computer Science Department, University of Nevada, Reno.

Elizabeth C. Kaczmarczyk (Interdisciplinary), “The Acquisition Of Intellectual Expertise: A Computational And Empirical Theory,” Summer 2005.

Yaron Silberman (Hebrew University, Israel), “Characteristics of Forming Episodic Associations Between Words,” Spring 2005. VP, Medigus Inc.; co-advisor Shlomo Bentin.

Kenneth O. Stanley, “Efficient Evolution of Neural Networks through Complexification,” Summer 2004. Associate Professor, Computer Science, University of Central Florida.

Harold H. Chaput, “The Constructivist Learning Architecture: A Model of Cognitive Development for Robust Autonomous Robots,” Summer 2004. Technical Director, BioWare, Inc., Montreal, Canada; co-advisor Benjamin J. Kuipers.

Marshall R. Mayberry, III, “Broad-Coverage Parsing with Neural Networks,” Summer 2003.

Faustino Gomez, “Robust Nonlinear Control with Neuroevolution,” Summer 2003. Senior Researcher, IDSIA, Lugano, Switzerland.

Paul H. McQuesten, “Cultural Enhancement of Neuroevolution,” Summer 2002. Senior modeler, Elite Analytics, Inc.

James A. Bednar, “Self-Organization of Visual Function: Expressing Genetics through Learning,” Spring 2002. Bert Kay Best Dissertation Award, Department of Computer Sciences, The University of Texas at Austin. Senior Lecturer, School of Informatics, University of Edinburgh, UK.

Yoonsuck Choe, “Perceptual Grouping in a Self-Organizing Map of Spiking Neurons,” Summer 2001. Associate Professor, Department of Computer Science, Texas A&M University.

David Moriarty, “Symbiotic Evolution of Neural Networks in Sequential Decision Tasks,” Spring 1997. Director, Analytic Insight, Apple Inc., Austin TX.

Joseph Sirosh, “A Self-Organizing Neural Network Model of the Primary Visual Cortex,” Fall 1995. Corporate Vice President, Microsoft, Inc., Bellevue, WA.

Wee Kheng Leow, “VISOR: Learning Visual Schemas in Neural Networks for Object Recognition and Scene Analysis,” Spring 1994. Associate Professor, Department of Computer Science, National University of Singapore.

Masters Theses Supervised

- Jason Zhi Liang, “Evolutionary Bilevel Optimization for Neuroevolution,” Spring 2015.
- Brian Boyles, “Optimizing Formation Observations Through Neuroevolution” Spring 2015.
- Anand Subramoney, “Evaluating Modular Neuroevolution in Robotic Keepaway Soccer,” Fall 2012.
- Vito Ruiz, “Adaptation in a Deep Network”, Spring 2011; co-advisor Jonathan Pillow.
- Aravind Gowrisankar, “Evolving Controllers for Simulated Car Racing Using Neuroevolution”, Fall 2008.
- Thomas W. D’Silva, “Evolving Robot Arm Controllers Using the NEAT Neuroevolution Method”, Spring 2006; co-advisor Benjamin Kuipers.
- German A. Monroy, “Coevolution of Neural Networks Using a Layered Pareto Archive”, Fall 2005.
- John Prior, “Eugenic Evolution for Combinatorial Optimization,” Spring 1998.
- Shailesh Kumar, “Confidence-Based Dual Reinforcement Q Routing: An On-line Adaptive Network Routing Algorithm,” Spring 1998.
- James A. Bednar, “Tilt Aftereffects in a Self-Organizing Model of the Visual Cortex,” Spring 1997.
- Rick Tanney (Philosophy), “Reflections in Silicon: Artificial and Natural Neural Networks,” Spring 1997; co-advisor Robert Causey.
- Justine Blackmore, “Visualizing High-Dimensional Structure with the Incremental Grid Growing Neural Network”, Fall 1995.
- Yoonsuck Choe, “Laterally Interconnected Self-Organizing Feature Map in Handwritten Digit Recognition.” Fall 1995.

Undergraduate Honors Theses Supervised

- Patrick B. Haley, “The Evolution of Language Groups among Cooperating Predators,” Spring 2016.
- Matthew de Wet, “Avoiding Premature Convergence in Neuroevolution by Broadening the Evolutionary Search,” Fall 2010.
- Adam Dziuk, “Creating Intelligent Agents through Shaping of Coevolution,” Fall 2010.
- Chris Bush, “An Analysis of Automated Decision Making Methodologies in Role Playing Video Games: Centralized Approach,” Spring 2010.
- Matthew Johnston, “An Analysis of Distributed Decision Making Methodologies in Role Playing Video Games,” Spring 2010.
- Timothy Nodine, “Speciation in NEAT,” Spring 2010.
- David Robson, “Hierarchical Neural Networks for Behavior-Based Decision Making,” Spring 2010.
- Nathaniel Tucker, “Evolving Adaptive Intelligence: Using NeuroEvolution with Temporal Difference Methods in the Game Domain,” Spring 2009.
- Yonatan Bisk, “The Necessity of Separating Control and Logic when Grounding Language Using Neuroevolution,” Spring 2009.
- Christopher J. Clark, “A Computational Model of Distributed Neural Integration in the Brittlestar Sensorimotor System,” Fall 2007; co-advised with Jennifer Morgan.
- James Craver, “Example-based Training in Neuroevolution,” Fall 2007.
- Paul Williams, “Learning Visual Scene Descriptions: An Approach to Symbol Grounding,” Fall 2005.
- Ryan Cornelius, “Improving Prescribed Agent Behavior with Neuroevolution,” Spring 2005.
- Joseph Reisinger, “A Symbiotic Method for Modular Reuse and Problem Decomposition with NeuroEvolution,” Fall 2003.

Timothy Andersen, “Neuroevolution through Augmenting Topologies Applied to Evolving Neural Networks to Play Othello,” Spring 2002.

Brian Greer, “Numerical Optimization with Neuroevolution,” Fall 2001. AMD, Austin.

Andres Santiago Perez-Bergquist, “Applying ESP and Region Specialists to Neuro-Evolution for Go,” Spring 2001.

Chern Han Yong, “Cooperative Coevolution of Multi-Agent Systems,” Fall 2000.

Chun-Chi Chen, “Automatic Music Composition using Genetic Algorithm and Neural Networks: A Constrained Evolution Approach,” Fall 2000.

Todd Greer, “Evolving Hierarchical Neural Networks to Play Go,” Spring 1998.

Norman Richards, “Evolving Neural Networks to Play Go,” Fall 1996.

Rupert Tang, “A Connectionist Corpus-Based Approach to the Building of Word Representations,” Fall 1994.

James A. Bednar, “Multi-Level Neural Network Language Translator,” Spring 1993.

Brad Fullmer, “Evolving Finite State Behavior using Marker-Based Genetic Encoding of Neural Networks,” Spring 1991.

Current Student Supervision

Advisor or co-advisor for six PhD students in candidacy: Nora Aguirre (ITESM, Mexico), Julian Bishop, Igor Karpov, Reza Mahjourian, Aditya Rawal.

Advisor for three pre-candidacy PhD students: Kim Houck, Xun Li, Jason Liang, Elliot Meyerson.

Dissertation and Thesis Evaluation

External Evaluator of the Masters Thesis of Sunrise Wang, Department of Computer Science, University of Cape Town, “Evolving Controllable Emergent Crowd Behaviours with Neuro-Evolution,” James Gain and Geoff Nitschke, supervisors, Summer 2015.

External Evaluator of the dissertation of Royce R. Smart, School of Aerospace, Mechanical, and Manufacturing Engineering, RMIT University, Australia, “Evolutionary Control of Autonomous Underwater Vehicles,” John Wharington and Pavel Trivailo, supervisors, Fall 2008.

External Evaluator of the dissertation of Alon Keinan, School of Computer Science, Tel-Aviv University, Israel, “Localization of Function via Multi-Perturbation Analysis: Theory and Applications for the Analysis of Neural Networks,” Eytan Ruppim and Isaac Meilijson, supervisors, Fall 2005.

Dissertation Opponent for Krista Lagus, Department of Computer Science, Helsinki University of Technology, “Text Mining with the WEBSOM,” Erkki Oja, supervisor, Fall 2000.

External Evaluator of the dissertation of Samuel W. K. Chan, Department of Computer Science, University of New South Wales, Sydney, Australia, “Discourse Comprehension: A NeuroSymbolic Approach,” James Franklin, supervisor, Spring 1997.

External Evaluator of the dissertation of Heikki Hyötyniemi, Control Engineering Laboratory, Helsinki University of Technology, Finland “Self-Organizing Artificial Neural Networks in Dynamic Systems Modeling and Control,” Antti Niemi and Jouko Virkkunen, supervisors, Fall 1994.

Member of 62 completed and two current doctoral committees.

Member of four completed Masters committees and eight completed undergraduate honors thesis committees.

Service

Conference and Workshop Chair Positions

- Track Co-Chair for Complex Systems, *Genetic and Evolutionary Computation Conference* (GECCO-2017, Berlin, Germany) 2016–2017.
- Track Co-Chair for Complex Systems, *Genetic and Evolutionary Computation Conference* (GECCO-2016, Denver, CO), 2015–2016.
- Co-chair, Workshop on Cognitive Computation: Integrating Neural and Symbolic Approaches, NIPS 2015.
- Co-chair, 10th International Workshop on Neural-Symbolic Learning and Reasoning (NeSy15), IJCAI 2015.
- Technical Program Co-Chair, *Congress on Evolutionary Computation* (CEC-2011, New Orleans, LA), 2011.
- Program Co-Chair, *The 2010 IEEE Conference on Computational Intelligence and Games* (CIG-10, Copenhagen, Denmark), 2010.
- Program Chair, “Workshop on Self-Organizing Maps” (WSOM-2009, St. Augustine, FL), 2009.
- Program Chair, *The Fourth IEEE Symposium on Computational Intelligence and Games* (CIG-08, Perth, Australia), 2008.
- Co-chair (with James A. Bednar), “Modeling Cortical Map Development,” Workshop at the *Tenth Annual Computational Neuroscience Meeting* (CNS*2001), July 2001.
- Co-chair (with Joseph Sirosch), “Computational Role of Lateral Connections in the Cortex,” Workshop at the *Neural Information Processing Systems* (NIPS’94) conference, December 1994.

Program Committees

- Workshop on Self-Organizing Maps* (WSOM’16, Houston, TX), 2016.
- The 4th International Conference on the Theory and Practice of Natural Computing* (TPNC 2015, Mieres, Spain)
- Genetic and Evolutionary Computation Conference* (GECCO-15, Madrid, Spain), 2015.
- International Joint Conference on Neural Networks* (IJCNN’15, Killarney, Ireland).
Senior Program Committee Member
- The 3rd International Conference on the Theory and Practice of Natural Computing* (TPNC 2014, Granada, Spain)
- Genetic and Evolutionary Computation Conference* (GECCO-14, Vancouver, Canada), 2014.
- International Joint Conference on Neural Networks* (IJCNN’14, Beijing, China), 2014.
Senior Program Committee Member.
- Workshop on Self-Organizing Maps* (WSOM’14, Mittweida, Germany), 2014.
- International Joint Conference on Neural Networks* (IJCNN’13, Dallas, TX).
Senior Program Committee Member
- Foundations of Digital Games Conference* (FDG, Crete), 2013.
- Congress on Evolutionary Computation* (CEC-13, Cancun, Mexico), 2013.
- Genetic and Evolutionary Computation Conference* (GECCO-13, Amsterdam, the Netherlands), 2013.
- Artificial Intelligence in Interactive Digital Entertainment Conference* (AIIDE-12, Stanford, CA), 2012.
- Genetic and Evolutionary Computation Conference* (GECCO-12, Philadelphia, PA), 2012.
- Congress on Evolutionary Computation* (CEC-12, Brisbane, Australia), 2012.
- Evolutionary Computation in Games* (EvoGAMES-12, Malaga, Spain), 2012.

The 2011 IEEE Conference on Computational Intelligence and Games (CIG-11, Seoul, Korea), 2011.
Artificial Intelligence in Interactive Digital Entertainment Conference (AIIDE-11, Stanford, CA), 2011.
International Joint Conference on Neural Networks (IJCNN'11, San Jose, CA). Plenary Chair
Workshop on Self-Organizing Maps (WSOM'11, Helsinki, Finland), 2011.
Artificial Intelligence in Interactive Digital Entertainment Conference (AIIDE-10, Stanford, CA), 2010.
The 2010 IEEE Conference on Computational Intelligence and Games (CIG-10, Copenhagen, Denmark), 2010.
Genetic and Evolutionary Computation Conference (GECCO-10, Portland, OR), 2010.
The 4th International Conference on Language and Automata Theory and Applications (LATA 2010, Trier, Germany)
The Second European Conference on Bio-inspired Algorithms in Games (EvoGames 2010, Istanbul, Turkey), 2010.
The Fifth IEEE Symposium on Computational Intelligence and Games (CIG-09, Milan, Italy), 2009.
Artificial Intelligence in Interactive Digital Entertainment Conference (AIIDE-09, Stanford, CA), 2009.
International Conference on Development and Learning (ICDL'09, Shanghai, China). Area Chair
International Joint Conference on Neural Networks (IJCNN'09, Atlanta, GA). Vice Chair
Genetic and Evolutionary Computation Conference (GECCO-09, Montreal, Canada), 2009.
Evolutionary Computation and Games Session, Congress on Evolutionary Computation (CEC-09, Trondheim, Norway), 2009.
International Conference on Development and Learning (ICDL'08, Asilomar, CA).
 Senior Program Committee Member
Artificial Intelligence in Interactive Digital Entertainment Conference (AIIDE-08, Stanford, CA), 2008.
Genetic and Evolutionary Computation Conference (GECCO-08, Atlanta, GA), 2008.
World Congress on Computational Intelligence (WCCI-2008, Hong Kong), 2008.
 Senior Program Committee member.
Thirtieth Annual Conference of the Cognitive Science Society (COGSCI-2008, Washington, DC), 2008.
 Senior Program Committee member.
Twentysecond National Conference on Artificial Intelligence (AAAI-07, Vancouver, Canada), 2007.
 Senior Program Committee member.
Twenty-ninth Annual Conference of the Cognitive Science Society (COGSCI-2007, Nashville, TN), 2007.
 Senior Program Committee member.
Genetic and Evolutionary Computation Conference (GECCO-07, London, UK), 2007.
Innovative Applications of Artificial Intelligence (IAAI-07, Vancouver, Canada), 2007.
Workshop on Self-Organizing Maps (WSOM'07, Bielefeld, Germany), 2007.
The Third IEEE Symposium on Computational Intelligence and Games (CIG-07, Honolulu, HI), 2007.
Language and Automata Theory and Applications (LATA-07, Tarragona, Spain), 2007.
Innovative Applications of Artificial Intelligence (IAAI-06, Boston, MA), 2006.
Genetic and Evolutionary Computation Conference (GECCO-06, Seattle, WA), 2006.
Twentyeighth Annual Conference of the Cognitive Science Society (COGSCI-2006, Vancouver, Canada), 2006. Senior Program Committee Member.
Twentyfirst National Conference on Artificial Intelligence (AAAI-06, Boston, MA), 2006.
The Second IEEE Symposium on Computational Intelligence and Games (CIG-06, Reno, NV), 2006.
Evolutionary Computation and Games Session, Congress on Evolutionary Computation (CEC-05, Edinburgh, UK), 2005.

Innovative Applications of Artificial Intelligence (IAAI-05, Pittsburgh, PA), 2005.

International Joint Conference on Neural Networks (IJCNN-05, Montreal, Canada), 2005.
Area chair for evolutionary methods.

Genetic and Evolutionary Computation Conference (GECCO-05, Washington, DC), 2005.

Workshop on Self-Organizing Maps (WSOM'05, Paris, France), 2005.

The First IEEE Symposium on Computational Intelligence and Games (CIG-05, Essex, UK), 2005.

International Conference on Development and Learning (ICDL'04, San Diego, CA).

The 21st International Conference on Machine Learning (ICML-2004, Banff, Canada), 2004.
Area chair for Evolutionary Computation and Neural Networks.

Evolutionary Computation and Games Session, Congress on Evolutionary Computation (CEC-04, Portland, OR), 2004.

Evolutionary Computation and Games Session, Congress on Evolutionary Computation (CEC-03, Canberra, Australia), 2003.

Genetic and Evolutionary Computation Conference (GECCO-03, Chicago, IL), 2003.

Workshop on Self-Organizing Maps (WSOM'03, Kitakyushu, Japan), 2003.

Understanding Coevolution: Theory and Analysis of Coevolutionary Algorithms. Workshop at the Genetic and Evolutionary Computation Conference (GECCO-02, New York, NY), 2002.

Genetic and Evolutionary Computation Conference (GECCO-02, New York, NY), 2002.

Second International Conference on Development and Learning (ICDL'02, Boston, MA).

The Second Workshop on Natural Language Processing and Neural Networks (NLPNN2001, Tokyo, Japan), 2001.

Workshop on Coevolution, Genetic and Evolutionary Computation Conference (GECCO-2001, San Francisco, CA), 2001.

Workshop on Self-Organizing Maps (WSOM'01, Lincoln, UK), 2001.

CELE-Twente Workshops on Natural Language Technology 2000: Learning to Behave (Ieper, Belgium).

ACAI-99 Workshop on Biologically Inspired Machine Learning (Crete, Greece), 1999.

Sixteenth National Conference on Artificial Intelligence (AAAI-99, Orlando, FL), 1999.

Genetic and Evolutionary Computation Conference (GECCO-99, Orlando, FL), 1999.

Fourth Argentine Congress on Computer Science (Buenos Aires, Argentina), 1998.

Workshop on Self-Organizing Maps (WSOM97, Helsinki, Finland), 1997.

Second Argentinian Congress on Computer Science (Buenos Aires, Argentina), 1996.

Eighteenth Annual Conference of the Cognitive Science Society (COGSCI-96, San Diego, CA), 1996.
Area chair for Computer Science.

Thirteenth National Conference on Artificial Intelligence (AAAI-96, Portland, OR), 1996.

Reviewing

Journals: *Applied Intelligence*; *Artificial Intelligence*; *Behavior Research Methods, Instruments, and Computers*; *Behavior and Brain Sciences*; *Biological Cybernetics*; *Brain and Language*; *Cognitive Science*; *Connection Science*; *Decision Support Systems*; *Evolutionary Intelligence*; *IEEE Intelligent Systems*; *IEEE Transactions on Data Mining*; *IEEE Transactions on Evolutionary Computation*; *IEEE Transactions on Neural Networks*; *IEEE Transactions on Systems, Man, and Cybernetics*; *Infancy*; *Information and Computation*; *Information Processing Letters*; *International Journal of Computational Intelligence and Applications*; *International Journal of Intelligent Mechatronics*; *International*

Journal of Man-Machine Studies; International Journal of Neural Systems; Journal of Artificial Intelligence Research; Journal of Biological Chemistry; Journal of Machine Learning Research; Machine Learning; Network: Computation in Neural Systems; Neural Computation; Neural Computing Surveys; Neural Networks; Neural Processing Letters; Neurocomputing; Parallel Processing Letters; Philosophical Transactions of the Royal Society PLOS ONE; Proceedings of the National Academy of Sciences Psychology; Psychology of Learning and Motivation; Soft Computing; U.S. Navy Journal of Underwater Acoustics.

Ad hoc reviewer for conferences: *International Conference on Artificial Neural Networks (ICANN, Vienna, Austria), 2001; Neural Information Processing Systems: Natural and Synthetic (NIPS, Denver, CO), 1992, 1993, 1994, 1997, 1999; The 1999 Conference of the Texas Linguistic Society: Perspectives on Argument Structure (Austin, TX), 1998; International Joint Conference in Artificial Intelligence (IJCAI-97, Nagoya, Japan), in 1997; IEEE International Conference on Tools with Artificial Intelligence (New Orleans, LA) 1995; IEEE Conference on Decision and Control, 1992. IEEE Conference on Decision and Control (Tucson, AZ), 1992.*

Member of the National Science Foundation review panels: Collaborative Research in Computational Neuroscience; Knowledge Models and Cognitive Systems; Perception, Action, and Cognition; Computational Cognition; Information and Intelligent Systems;

Ad hoc reviewer for NSF; NIH European Research Council Consolidator Grant Panel; Netherlands Organization for Scientific Research; Israel Science Foundation; European Science Foundation; NSERC (Canada); EPSRC (UK; Qatar National Research Fund; Marsden Foundation (New Zealand); Swiss National Science Foundation; UT Research Grants.

Judge for the Siemens Westinghouse Competition Southwest Regional Finals, University of Texas at Austin, 2002.

Memberships in Professional Societies

IEEE Computational Intelligence Society, since 2006.

IEEE, since 2006; senior member, since 2014; Fellow, since 2016.

ACM SIGEVO, since 2005.

ACM, since 2009.

Cognitive Science Society, since 1989.

International Neural Network Society, since 1987; Senior Member, since 2008.

Association for the Advancement of Artificial Intelligence, since 1987.

Society for Neuroscience 2002–2010

Invited Talks and Lectures

On Evolution of Neural Networks

Invited talk at the Symposium on Recurrent Neural Networks and Other Machines that Learn Algorithms at the *Neural Information Processing Systems Conference (NIPS 2016)*, Barcelona, Spain, December 2016.

Invited talk at the *IEEE MetroCon 2016* conference, Arlington, TX, October 2016.

IEEE CIS Distinguished Lecture, Las Vegas Chapter, March 2016.

IEEE CIS Distinguished Lecture, Bogota Chapter, November 2015.

Invited talk at the Deep Learning Workshop at the *INNS Conference on Big Data*, San Francisco, CA, August 2015.

On Constructing Intelligent Agents Through Neuroevolution

- Keynote talk at the annual meeting of the *Korean Computer Scientists and Engineers Association in America*, San Jose, CA, December 2013.
- Keynote talk at the *AAAI Fall Symposium on How Should Intelligence be Abstracted in AI Research*, Arlington, VA, November 2013.
- Plenary talk at the *World Congress on Computational Intelligence* conference, Brisbane, Australia, June 2012.
- Invited talk at the *IEEE MetroCon 2010* conference, Arlington, TX, September 2010.
- Plenary talk at the *Seventh International Conference on Intelligent Systems Design and Applications*, Rio de Janeiro, October 2007.
- Sentient Technologies, Inc., August 2015
- Department of Mathematics and Computer Science, North Carolina A&T University, October 2013.
- Advanced Analytics Institute, University of Technology Sydney, Australia, June 2012.
- UT Austin ACM Student Chapter, October 2008.
- MITRE Emerging Technologies Speaker Series, May 2008.
- Computer Science Department, Michigan State University, November 2006.
- Computer Science Department, University of Nevada, Reno, October 2006.

On Constructing Intelligent Agents in Games

- IEEE CIS Distinguished Lecture, Fort Worth Chapter, July 2015.
- Invited talk at the *Neuromorphic Computing Workshop*, MITRE, McLean, VA, April 2008.
- Invited talk at the *INNS Texas/MIND/UTA Conference on Goal-Directed Neural Systems*, Arlington, TX, November 2006.
- Invited talk at the *National Academy of Engineering Frontiers of Engineering Conference*, Ann Arbor, MI, September 2006.
- Keynote address at the *Game-On North America Conference*, Monterey, CA, September 2006.
- Plenary talk at the *World Congress on Computational Intelligence*, Vancouver, BC, July 2006.
- Keynote talk at the *IEEE Symposium on Computational Intelligence and Games*, April 2005.
- Invited talk at the *Conference on AI in Games*, the University of Texas at Austin, August 2003.
- Computer Science Department, University of Nevada, Reno, April 2007

On Solving Sequential Decision Tasks with Neuroevolution

- Invited talk at the *Road to Software Evolvability Workshop*, Santa Fe Institute, June 2005.
- Invited talk at the *AAAI Fall Symposium on Real-World Reinforcement Learning*, October 2004.
- Invited talk at the *CELE Workshop on Evolutionary Language Engineering 2*, Ieper, Belgium, November 2000.
- Invited talk at the *Neural Computing in Science and Technology Workshop*, Maale Hachamisha, Israel, October 1999.
- Keynote address at the *IASTED Conference on Artificial Intelligence and Soft Computing*, Banff, Canada, July 1997.
- Invited talk at the *Conference on Neural Networks for Novel High-Order Rule Formation*, Texas A&M University, May 1995.

Computer Science Department, University of Michigan, April 2006.
Computer Science Department, University College London, October 2005.
International Computer Science Institute (ICSI), University of California, Berkeley, June 2005.
Institute of Systems Engineering, Swiss Federal Institute of Technology (EPFL), May 2005.
Toyota Technical Center, Ann Arbor, August 2004.
School of Computing, National University of Singapore, July 2004.
Department of Computer Science, Texas A & M University, November 2001.
Department of Computer Science, University of Richmond, January 2001.
ACM talk series, the University of Texas at Austin, October 2000.
Center for Artificial Intelligence, ITESM, Monterrey, Mexico, May 2000.
Department of Engineering, Cambridge University, UK, July 1998.
Department of Computer Science, Tel Aviv University, Israel, June 1998.
Faculty of Industrial Engineering, Technion, Israel, June 1998.
Sigma Xi Society, The University of Texas at Austin, March 1998.
Society of Computational Biology, The University of Texas at Austin, February 1998.
Matematico e Informatico, Universidade Eduardo Mondlane, Maputo, Mozambique, Dec. 1996.
Department of Computer Science, University of California, Irvine, July 1995.
Department of Computer Science, University of Helsinki, Finland, June 1995.
Computer Science Department, University of California, Los Angeles, April 1995.
International Computer Science Institute (ICSI), University of California, Berkeley, March 1995.
Department of Computer Science, Stanford University, March 1995.
Department of Computer Science, Carnegie Mellon University, February 1995.

On Computational Modeling of Schizophrenic Language Processing

Invited talk at the *Workshop on Self-Organizing Maps*, Houston, TX, January 2016.
Invited talk at the DARPA Workshop on *Narrative Networks (N2): The Neurobiology of Narratives*, San Francisco, CA, April 2011.
Invited talk at the Workshop on *Grand Challenges in Neural Computation II: Neuromimetic Processing and Synthetic Cognition*, Santa Fe, NM, February 2011.
Department of Computer Science, Southwestern University, April 2015.
Institute for Neuroscience, The University of Texas at Austin, January 2011.

On Dyslexic and Aphasic Impairments in a Self-Organizing Model of the Lexicon

Invited talk at the *Second International Workshop on Neural Modeling of Brain and Cognitive Disorders*, University of Maryland, June 1998.
Invited talk at the *First Annual Woolfolk Lectures in Communication Sciences and Disorders*, San Antonio, February 1997.
Invited talk at the *Biennial Meeting of the World Federation of Neurology: Research Group on Aphasia and Cognitive Disorders*, Budapest, Hungary, June 1994.
Max-Planck-Institute für Psycholinguistik, Nijmegen, the Netherlands, May 1992.
Department of Cognitive Science, Johns Hopkins University, August 1991.

On Modeling the Development and Function in the Primary Visual Cortex

Invited talk at the *Information Processing in the Visual System Workshop*, Mathematical BioSciences Institute, Ohio State University, April 2007

Invited talk at the *Sixth University of Texas Neuroscience Symposium*, February 2001.

Invited talk at the *Self-Organizing Systems Workshop*, UMIST, Manchester, UK, October 1999.

Invited talk at the *Workshop on Self-Organizing Maps (WSOM'99)*, Helsinki University of Technology, Finland, July 1999.

Invited talk at the *Fifth International Conference on Neural Information Processing (ICONIP-98)*, Kitakyushu, Japan, October 1998.

Neurobiology Club, the University of Texas at Austin, September 2009.

Department of Electrical Engineering and Computer Science, Rice University, April 2008.

Institute for Neuroscience, the University of Texas at Austin, November 2007.

Center for Theoretical Neuroscience, Columbia University, April 2006.

Redwood Center for Theoretical Neuroscience, University of California, Berkeley, April 2006.

Computer Science Department, Helsinki University of Technology, August 2005.

Computer Science Department, University of Maryland, April 2005.

Department of Computer Sciences, University of California, Los Angeles, March 2005.

Center for Perceptual Systems, the University of Texas at Austin, April 2003.

Computer Science Department, Helsinki University of Technology, December 2000.

Department of Mathematics, King's College London, UK, July 1998.

Faculty of Industrial Engineering, Technion, Israel, June 1998.

Society of Computational Biology, The University of Texas at Austin, November 1997.

Department of Brain and Cognitive Sciences, MIT, April 1997.

Center for Vision and Image Science, University of Texas at Austin, November 1996.

Research Imaging Center, University of Texas Health Sciences Center at San Antonio, October 1996.

Department of Informatics, University of Buenos Aires, Argentina, May 1996.

Freshman honors seminar, The University of Texas at Austin, February 1996.

Neuroinformatics Laboratory, University of Bielefeld, Germany, May 1995.

Department of Psychology, Technical University of Braunschweig, Germany, May 1995.

Department of Computer Science, University of Southern California, March 1995.

Pittsburgh Supercomputing Center, February 1995.

Laboratory of Information Technology, Helsinki University of Technology, Finland, June 1994.

Centre for Neuro-Mimetic Systems, EPFL, Lausanne, Switzerland, March 1994.

School of Engineering and Research in Computer Science and Electronics (EERIE), Nimes, France, March 1994.

On Convergence-Zone Episodic Memory

Department of Informatics, University of Buenos Aires, Argentina, May 1996.

Laboratory of Information Technology, Helsinki University of Technology, Finland, June 1995.

Department of Cognitive Science, University of California, San Diego, April 1995.

Center for Neural Basis of Cognition, Carnegie Mellon University, February 1995.

On Parsing Sentences with Subsymbolic Neural Networks

Plenary talk at the *Annual Conference of the Italian Society of Philosophy of Language*, Noto, Italy, October 2002.

Invited talk at *Emergentist Approaches to Language: the 28th Carnegie Mellon Symposium on Cognition*, CMU, May 1997.

Invited talk at the *Workshop on Thought and Language*, Kyushu Institute of Technology, Japan, September 1997.

Department of Linguistics, The University of Texas at Austin, March 1999.

Center for Artificial Intelligence, ITESM, Monterrey, Mexico, November 1996.

Department of Linguistics, The University of Texas at Austin, January 1996.

On Processing Narratives with Subsymbolic Neural Networks

Invited talk at the *Third Twente Workshop on Language Technology*, University of Twente, the Netherlands, May 1992.

Invited talk at the *International Workshop on Fundamental Research for the Next Generation of Natural Language Processing*, ATR International, Kyoto, Japan, July 1991.

Department of Artificial Intelligence, Kyushu Institute of Technology, Japan, July 1991.

Human Interface Laboratories, Nippon Telegraph and Telephone, Yokosuka, Japan, July 1991.

On Subsymbolic Cognitive Science

Invited talk at the *21st Annual Conference of the Cognitive Science Society (COGSCI-99)*, Vancouver, Canada, August 1999.

Cognitive Science Club, the University of Texas at Austin, November 1993.

Computer Science Department, University of Twente, the Netherlands, May 1992.

Computer Science Industrial Forum, the University of Texas at Austin, February 1992.

Cognitive Science Club, the University of Texas at Austin, January 1992.

Computer Sciences Department Visiting Committee, University of Texas at Austin, October 1990.

On Other Topics

“How Does Word Meaning Depend on Context?” Invited talk at the workshop on Cognitive Computation: Integrating Neural and Symbolic Approaches, *Neural Information Processing Systems conference (NIPS 2016)*, Barcelona, Spain, December 2016.

“Grounding Meaning in Perceptual Representations,” Invited talk at *Dagstuhl Seminar on Neural-Symbolic Learning and Reasoning*, September 2014

“Open-Ended Behavioral Complexity for Evolved Virtual Creatures.” Invited talk at the *BEACON Congress*, Michigan State University, August 2013.

“Technological Innovation as Competitive Search.” IBM Silicon Valley, April 2012 (jointly with Riitta Katila).

“Coevolution of Cooperative Behaviors in Simulated Predator & Prey Teams.” Invited talk at the *Biocomplexity XI: The Evolution of Cooperation Workshop*, Indiana University, December 2010.

“Evolving Neural Network Controllers for Multilegged Robots,” Department of Mechanical Engineering, Oregon State University, August 2010.

- “Machines Gone Wild,” Science Study Break presentation, the University of Texas at Austin, March 2010.
- “Modeling Cortical Maps with *Topographica*.” Glaser Lab, University of California, Berkeley, May 2006.
- “Multiagent Learning Through Neuroevolution.” Invited talk at the *Information Science and Technology workshop on Distributed Cognitive Systems Focused on Team and Multiagent Learning*, Cambridge, MA, June 2004.
- “Topographica: Computational Modeling of Cortical Maps.” Invited talk at the *Human Brain Project Annual Conference*, May 2003.
- “Semantic Effect on Episodic Associations.” Invited talk at the *Computational Neuropsychology Workshop*, Neural Information Processing Systems conference (NIPS’01), Whistler, Canada, December 2001.
- “Semantic Effect on Episodic Associations.” Department of Psychology, The University of Texas at Austin, September 2001.

Panel Presentations, Review Talks, and Demonstrations

- “OpenNERO: a Game Platform for AI Research and Education” by Igor Karpov, John Sheblak, and Risto Miikkulainen (2008). Contributed demonstration at the *Artificial Intelligence and Interactive Digital Entertainment Conference* (AIIDE-2008, Stanford, CA), October 2008.
- “NERO: Neuro-Evolving Robotic Operatives” by Igor Karpov, Thomas Nelson, Kenneth O. Stanley, and Risto Miikkulainen (2007). In *Video Program of the Twenty-Second AAI Conference on Artificial Intelligence*.
- “Topographica: Computational Modeling of Neural Maps” by James A. Bednar, Christopher Ball, Yoonsuck Choe, Julien Ciroux, Judah De Paula, Yiu Fai Sit, Jefferson Provost, and Risto Miikkulainen. Demonstration at the *Annual Meeting of the Society for Neuroscience*, October 2006.
- “The NERO Machine Learning Game” by Kenneth O. Stanley, Igor Karpov, and Risto Miikkulainen. Contributed demonstration at the *Google Zeitgeist Conference*, Mountain View, CA, October 2006.
- “Real-time Interactive Learning in the NERO Video Game,” by Kenneth O. Stanley, Igor Karpov, Risto Miikkulainen, and Aliza Gold. Intelligent Systems Demonstrations Program, *National Conference on Artificial Intelligence* (AAAI-2006), Boston, MA, July 2006.
- “The NERO Video Game,” by Kenneth O. Stanley, Igor Karpov, Risto Miikkulainen, and Aliza Gold. Contributed demonstration at the *Second Artificial Intelligence and Interactive Digital Entertainment Conference* (AIIDE-2006), Marina del Rey, CA, June 2006.
- “Topographica: Computational Modeling of Cortical Maps,” by James A. Bednar, Yoonsuck Choe, Judah De Paula, Risto Miikkulainen, Jefferson Provost, and Yiu Fai Sit. Invited demonstration at the NIMH Human Brain Project exhibit at the *Annual Meeting of the Society for Neuroscience*, November 2005.
- “Real-time Learning in the NERO Video Game,” by Kenneth O. Stanley, Ryan Cornelius, Risto Miikkulainen, Thomas D’Silva, and Aliza Gold. Contributed demonstration at the *First Artificial Intelligence and Interactive Digital Entertainment Conference* (AIIDE-2005, Marina del Rey, CA), June 2005.
- “Topographica: Computational Modeling of Cortical Maps,” by Risto Miikkulainen, James A. Bednar, Yoonsuck Choe, Judah De Paula, Jefferson Provost, and Tal Tversky. Invited demonstration at the *Human Brain Project Annual Conference*, April 2004.
- “Topographica: Computational Modeling of Cortical Maps,” by Risto Miikkulainen, James A. Bednar, Yoonsuck Choe, Judah De Paula, Jefferson Provost, and Tal Tversky. Invited demonstration at the *Human Brain Project Annual Conference*, May 2003.
- “Topographica: Computational Modeling of Cortical Maps,” by James A. Bednar, Yoonsuck Choe, and Risto Miikkulainen. Invited demonstration at the NIMH Human Brain Project exhibit at the *Annual Meeting of the Society for Neuroscience*, November 2002.

- “Symbolic-Subsymbolic Hybrids?” Invited panel presentation at the *NIPS Workshop on Hybrid Neural Symbolic Integration*, December 1998.
- “SOM Research in the US.” Invited talk at *Workshop on Self-Organizing Maps*, (WSOM’97), Helsinki University of Technology, Finland, June 1997.
- “Integrated Connectionist Models: Building AI Systems on Subsymbolic Foundations.” Invited panel presentation at the *Sixth International Conference on Tools with Artificial Intelligence (ICTAI-94)*, New Orleans, November 1994.

Research Visits

- Department of Mathematics, Helsinki University of Technology, Finland, June – August, 1999, and May – July, 1998.
- Department of Computer Sciences, San Luis National University, San Luis, Argentina, May – June, 1996.
- Max-Planck-Institute für Psycholinguistik, Nijmegen, the Netherlands, May 1992 and May 1991.
- Computer Science Department, University of Twente, the Netherlands, May 1992.

Tutorials and Short Courses

- “Evolving Neural Networks.” Tutorial at the *Genetic and Evolutionary Computation Conference: GECCO-2016* (Denver, CO); *GECCO-2015* (Madrid, Spain); *GECCO-2014* (Vancouver, Canada); *GECCO-2013* (Amsterdam, the Netherlands); *GECCO-2011* (Dublin, Ireland); *GECCO-2010* (Portland, OR); *GECCO-2009* (Montreal, Canada); *GECCO-2008* (Atlanta, GA); *GECCO-2007* (London, UK); *GECCO-2006* (Seattle, WA); *GECCO-2005* (Washington, DC).
- “Evolving Neural Networks.” Tutorial at the *2015 IEEE Conference on Computational Intelligence and Games*, Tainan, Taiwan, August 2015.
- “Neuroevolution Reinforcement Learning.” Tutorial at the *Twenty-Ninth AAI Conference on Artificial Intelligence (AAAI-15)*, Austin, TX, January 2015.
- “Evolving Neural Networks.” Tutorial at the *Machine-Learning Summer School*, Austin, TX, January 2015.
- “Evolving Neural Networks.” Tutorial at the *Artificial Life Conference*, New York, NY, August 2014; East Lansing, MI, July 2012.
- “Evolving Neural Networks.” Invited tutorial at the *Theory and Practice of Natural Computation Conference*, Caceres, Spain, December 2013
- “Evolving Neural Networks.” Tutorial at the *International Joint Conference on Artificial Neural Networks*, Dallas, TX, August 2013; San Jose, CA, July 2011
- “Evolving Neural Networks.” Tutorial at the *World Congress on Computational Intelligence*, Brisbane, Australia, June 2012.
- “Evolving Neural Networks.” Tutorial at the *BEACON Congress*, Michigan State University, August 2010.
- “Natural Language Processing with Symbolic Neural Networks.” A 10-hour course at the International PhD School in Formal Languages and Applications, Rovira i Virgili University, Tarragona, Spain, September 2004, 2005, 2006.
- “Artificial Intelligence.” A 40-hour lecture course at the Department of Informatics, San Luis National University, San Luis, Argentina, June 3rd – 14th, 1996.
- “Evolving Neural Networks with Genetic Algorithms.” A 40-hour lecture course at the Department of Informatics, San Luis National University, San Luis, Argentina, May 20th – 31st, 1996.

“Progress in Self-Organizing Feature Maps.” A short course presented at the Phoenix Corporate Research Laboratories, Motorola Inc, Phoenix AZ, July 7th, 1995.