

RUI XU

Research Associate
Applied Computational Intelligence Laboratory
Department of Electrical and Computer Engineering
Missouri University of Science and Technology
131 Emerson Electric Co. Hall, 1870 Miner Circle
Rolla, Missouri 65409-0040
Work Phone: (573) 341 – 6811
Home: (573) 201 – 8421
Fax: (573) 341 – 4532
E-mail: rxu@mst.edu, rxu@ieee.org

EDUCATION

- University of Missouri – Rolla (UMR), Rolla, MO, U.S.A. May 2006
Ph.D. in Electrical Engineering
Advisor: Donald C. Wunsch II
Dissertation: Microarray Gene Expression Data Analysis Using Machine Learning and Neural Networks
- Sichuan University, Chengdu, Sichuan, P.R. China July 2000
Master of Engineering in Electrical Engineering
- Huazhong University of Science and Technology, Wuhan, Hubei, P.R. China July 1997
Bachelor of Engineering in Electrical Engineering

EXPERIENCE

- Applied Computational Intelligence Laboratory, Missouri University of Science & Technology
(formerly UMR), Rolla, MO
Post Doctoral Fellow January 2006 – Present
Research Assistant August 2000 – December 2005
Emphasis: Computational intelligence, machine learning, neural networks, pattern recognition
(classification, clustering), evolutionary computation, statistical analysis, bioinformatics,
biostatistics, nonlinear dynamic systems, time series analysis
- Sichuan University, Chengdu, Sichuan August 1999 – May 2000
Research Assistant
Emphasis: Control theory and engineering, artificial intelligence, neural networks

TUTORIAL

- **Rui Xu** and Donald C. Wunsch II, “Cluster analysis and swarm intelligence in clustering,”
IEEE Swarm Intelligence Symposium 2008, St. Louis, MO, September 21, 2008.

PUBLICATIONS

BOOK

- **Rui Xu** and Donald C. Wunsch II, “Clustering,” IEEE Press / Wiley, October, 2008.

JOURNAL PAPERS

- **Rui Xu**, Steven Damelin, Boaz Nadler, and Donald C. Wunsch II, "Clustering of high-dimensional gene expression data with feature filtering methods and diffusion maps," *Artificial Intelligence in Medicine*, to appear, 2009.
- **Rui Xu** and Donald C. Wunsch II, "Recent advances in cluster analysis," *International Journal of Intelligent Computing and Cybernetics*, vol. 1, no. 4, pp. 484-508, 2008.
- **Rui Xu**, Donald C. Wunsch II, and Ronald L. Frank "Inference of genetic regulatory networks with recurrent neural network models using particle swarm optimization," *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, vol. 4, no. 4, pp. 681-692, 2007.
- **Rui Xu**, Ganesh K. Venayagamoorthy, and Donald C. Wunsch II "Modeling of gene regulatory networks with hybrid differential evolution and particle swarm optimization," *Neural Networks*, vol. 20, pp. 917-927, 2007.
- **Rui Xu**, Georgios C. Anagnostopoulos, and Donald C. Wunsch II, "Multi-class cancer classification using semi-supervised ellipsoid ARTMAP and particle swarm optimization with gene expression data," *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, vol. 4, no. 1, pp. 65-77, 2007.
- **Rui Xu** and Donald C. Wunsch II, "Survey of clustering algorithms," *IEEE Transactions on Neural Networks*, vol. 16, no. 3, pp. 645-678, 2005.

BOOK CHAPTERS

- **Rui Xu** and Donald C. Wunsch II, "Exploring the unknown nature of data: Cluster analysis and applications," In E. Soria, J. D. Martín, R. Magdalena, M. Martínez, A. J. Serrano, Eds., *Handbook of Research on Machine Learning Applications and Trends: Algorithms, Methods and Techniques*, to appear, 2009.
- **Rui Xu**, Georgios C. Anagnostopoulos, and Donald C. Wunsch II, "A hybrid of neural classifier and swarm intelligence in multi-class cancer diagnosis with gene expression signatures," In G. Fogel, D. Corne, and Y. Pan, Eds., *Computational Intelligence in Bioinformatics*, pp. 3-20, IEEE Press / Wiley, 2007.

CONFERENCE PAPERS

- **Rui Xu**, Robert Woodley, and Donald C. Wunsch II, "A comparison of major machine learning methods in classification of anthrax time series from inhalation anthrax models," *14th U.S. Army Conference on Applied Statistics*, Lexington, VA, October, 2008.
- **Rui Xu**, Robert Woodley, and Donald C. Wunsch II, "Default ARTMAP neural networks for classification of anthrax time series from inhalation anthrax models," In *Proceedings of the 2008 International Conference on Data Mining*, Vol. 1, pp. 211-216, Las Vegas, July, 2008.
- **Rui Xu**, Steven Damelin, Boaz Nadler, and Donald C. Wunsch II, "Clustering of high-dimensional gene expression data with feature filtering methods and diffusion maps," In *Proceedings of the International Conference on Biomedical Engineering and Informatics*, Vol. 1, pp. 245-249, Sanya, China, May, 2008.

- **Rui Xu**, Steven Damelin, and Donald C. Wunsch II, "Clustering of cancer tissues using diffusion maps and fuzzy ART with gene expression data," In *Proceedings of World Congress on Computational Intelligence 2008*, pp. 183-188, Hong Kong, China, June, 2008.
- **Rui Xu**, Robert Woodley, and Donald C. Wunsch II, "Identification of anthrax time series from inhalation anthrax models using default ARTMAP," *12th International Conference on Cognitive and Neural Systems*, Boston, May, 2008.
- **Rui Xu**, Steven Damelin, and Donald C. Wunsch II, "Applications of diffusion maps in gene expression data-based cancer diagnosis analysis," In *Proceedings of the 29th Annual International Conference of IEEE Engineering in Medicine and Biology Society*, Lyon, France, pp. 4613-4616, August, 2007.
- **Rui Xu** and Donald C. Wunsch II, "Computational intelligence in clustering algorithms, with applications," In A. Iske and J. Levesley, Eds., *Algorithms for Approximation, Proceedings of 5th International Conference*, Chester, England, UK, Springer, Heidelberg, pp. 31-50, 2007.
- **Rui Xu**, Ganesh K. Venayagamoorthy, and Donald C. Wunsch II, "A study of particle swarm optimization in gene regulatory networks inference," In J. Wang, Z. Yi, J. Zurada, B. Lu, and H. Yin, Eds., *Advances in Neural Networks - ISNN 2006: Third International Symposium on Neural Networks, ISNN 2006*, Chengdu, China, pp. 648-653, Springer Berlin / Heidelberg, 2006.
- **Rui Xu**, Xindi Cai, and Donald C. Wunsch II, "Gene expression data for DLBCL cancer survival prediction with a combination of machine learning technologies," In *Proceeding of the 27th Annual International Conference of IEEE Engineering in Medicine and Biology Society*, pp. 894-897, Shanghai, China, September, 2005.
- **Rui Xu** and Donald C. Wunsch II, "Gene regulatory networks inference with recurrent neural network models," In *Proceedings of International Joint Conference on Neural Networks 2005*, vol. 1, pp. 286-291, Montreal, Quebec, Canada, August, 2005.
- **Rui Xu**, Xiao Hu, and Donald C. Wunsch II, "Inference of genetic regulatory networks with recurrent neural network models," In *Proceedings of the 26th Annual International Conference of IEEE Engineering in Medicine and Biology Society*, vol. 2, pp. 2905-2908, September, 2004.
- **Rui Xu**, Georgios C. Anagnostopoulos, and Donald C. Wunsch II, "Multi-class cancer classification by semi-supervised ellipsoid ARTMAP with gene expression data," In *Proceedings of the 26th Annual International Conference of IEEE Engineering in Medicine and Biology Society*, vol. 1, pp. 188-191, September, 2004.
- **Rui Xu**, Xiao Hu, and Donald C. Wunsch II, "Inference of genetic regulatory networks from time series gene expression data," In *Proceedings of International Joint Conference on Neural Networks 2004*, vol. 2, pp. 1215-1220, Budapest, Hungary, July, 2004.
- **Rui Xu**, Donald C. Wunsch II, "Application of ellipsoid ART/ARTMAP in analyzing gene expression data," *8th International Conference on Cognitive and Neural Systems*, Boston, May, 2004.
- **Rui Xu** and Donald C. Wunsch II, "Probabilistic neural networks for multi-class tissue classification with gene expression data," In *Proceedings of International Joint Conference on Neural Networks 2003*, vol. 3, pp. 1696-1701, Portland, Oregon, July, 2003.

- **Rui Xu**, Georgios C. Anagnostopoulos and Donald C. Wunsch II, "Tissue classification through analysis of gene expression data using a new family of ART architectures," In *Proceedings of International Joint Conference on Neural Networks 2002*, vol. 1, pp. 300-304, Honolulu, Hawaii, May, 2002.
- **Rui Xu** and Donald C. Wunsch II, "Analysis of gene expression data by ellipsoid ART and ARTMAP," *3rd Georgia Tech-Emory International Conference on Bioinformatics*, Atlanta, 2001.
- Xindi Cai, **Rui Xu**, V. A. Samaranayake, and Donald C. Wunsch II, "A statistical solution to a text decoding challenge problem," In *Proceedings of International Joint Conference on Neural Networks 2001*, vol. 2, pp. 1043 - 1046, Washington DC, July, 2001.

PROFESSIONAL MEMBERSHIP

- Institute of Electrical and Electronics Engineers (IEEE), *Member*
- IEEE Computational Intelligence Society
- Sigma Xi, *Full Member*
- International Society for Computational Biology (ISCB), *Member*

ACTIVITIES AND HONORS

- Session Chair of IEEE Swarm Intelligence Symposium, 2008
- Reviewer for Bioinformatics, Bioinformatics and Biology Insights, the Birkhäuser Boston, IEEE Transactions on Evolutionary Computation, IEEE Transactions on Neural Networks, International Journal of Pattern Recognition and Artificial Intelligence, Latin American Applied Research, and Pattern Recognition.
- Reviewer committee for International Joint Conference on Neural Networks (2002–2008), IEEE Congress on Evolutionary Computation (2009), IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology (2007 – 2008), the 32nd Annual International Computer Software and Applications Conference (2008), the International Symposium on Neural Networks (2008–2009), IEEE Swarm Intelligence Symposium (2008), the 2nd International Symposium on Bio- and Medical Informatics and Cybernetics (2008), the 2nd IAPR Workshop on Pattern Recognition in Bioinformatics (2007).
- US Department of Energy travel grant for the 3rd Georgia Tech-Emory International Conference on Bioinformatics
- IEEE Neural Network Society travel grant for the 2002 International Joint Conference on Neural Networks
- Scholar travel fellowship for the 8th International Conference on Cognitive and Neural Systems
- IEEE Computational Intelligence Society travel grant for the 2005 International Joint Conference on Neural Networks
- Scholar travel fellowship for the 12th International Conference on Cognitive and Neural Systems
- Decoded Text Messages – International Joint Conference on Neural Networks 2001 Challenge Problem, won second prize worldwide