

## **Donald C. Wunsch II**

Missouri University of Science & Technology

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### **Education**

Kellogg Executive Scholar in Nonprofit Management, Northwestern University 2007

Washington University in St. Louis, Olin School of Business. Executive MBA, 2006

University of Washington. Ph.D. Electrical Engineering. 1991

University of Washington. M.S. Applied mathematics. 1987

University of New Mexico. B.S. Applied mathematics, Philosophy Minor. 1984

Seattle University. Jesuit Core Humanities Honors Program. 1981

### **Experience**

#### **Missouri University of Science & Technology**

##### **Interim Director, Intelligent Systems Center**

2020 – present. Executive leadership of the University's largest research center.

#### **Mary K. Finley Missouri Distinguished Professor.**

Department of Electrical and Computer Engineering. Courtesy appointments in Systems Engineering, Computer Science and Business Administration.

1999 - present. **Director, Applied Computational Intelligence Laboratory (ACIL).**

Graduate, undergraduate teaching, international service, and faculty mentoring. P&T

Chair 2017-present. Faculty governance and various board-level services.

#### **Texas Tech University, Associate Professor.**

Department of Electrical and Computer Engineering. Joint appointment in Computer Science.

1998 - 1999. Previously (1993-1998), Assistant Professor.

Director, Applied Computational Intelligence Laboratory.

#### **The Boeing Company, Senior Principal Scientist. 1984 - 1993.**

Hardware task leader, Boeing Computer Services neural network IR&D. Also: AI Specialist, Research Engineer, and Engineer. Research prominently featured in Boeing 75<sup>th</sup> Anniversary Poster and 1992 Annual Report.

#### **University of Washington, Electrical Engineering Department. Teaching Assistant.**

Fall 1988-Spring 1989. Taught Linear Systems Analysis.

#### **Rockwell International, Kirtland Air Force Base, Technician. 1982-1983.**

Optical Component Evaluation Lab, Air Force Weapons Lab (AFWL), Airborne Laser Laboratory project. Optical Testing, holographic interferometry.

#### **International Laser Systems, Kirtland Air Force Base, Coating Technician. 1981-1982.**

Developmental Optics Facility, AFWL, Airborne Laser Lab project. Thin film coating.

## **Publications, Presentations, Products (Over 500 with over 18,000 citations):**

### **Books**

1. Lei Meng, Ah-Hwee Tan, and Donald C. Wunsch II, *Adaptive Resonance Theory in Social Media Data Clustering*, Springer-Verlag, 2019.
2. Khalid Al-Jabery, Gayla Olbricht, Tayo Obafemi-Ajayi and Donald C. Wunsch II, *Computational Intelligence Approaches to Data Analytics in Biomedical Applications*, Elsevier, 2019.
3. Tetyana Baydyk, Ernst Kussul, and Donald C. Wunsch II, *Intelligent Automation in Renewable Energy*, Springer-Verlag, 2019.
4. J. Sieffertt and D.C. Wunsch, *Unified Computational Intelligence for Complex Systems: Studies in Neural, Economic and Social Dynamics*. Springer-Verlag, 2010.
5. E. Kussul, T. Baidyk, and D.C. Wunsch II, *Neural Networks in Micromechanics*, Springer-Verlag, 2010.
6. R. Xu and D.C. Wunsch II, *Clustering*. IEEE Press / Wiley, 2009.
7. D.-S. Huang, D.C. Wunsch, D.S. Levine, and K.-H. Jo, Eds., “Advanced intelligent computing theories and applications: With aspects of contemporary intelligent computing techniques,” in *Communications in Computer and Information Science*, vol. 15. Springer, 2008.
8. D.-S. Huang, D.C. Wunsch, D.S. Levine, and K.-H. Jo, Eds., “Advanced intelligent computing theories and applications: With aspects of artificial intelligence”. in *Lecture Notes in Artificial Intelligence*, vol. 5227, Springer, 2008.
9. D.-S. Huang, D.C. Wunsch, D.S. Levine, and K.-H. Jo, Eds., “Advanced intelligent computing theories and applications: With aspects of theoretical and methodological issues,” in *Lecture Notes in Computer Science*, vol. 5226, Springer, 2008.
10. A. Gorban, B. Kégl, D.C. Wunsch, and A. Zinovyev, Eds., *Principal Manifolds for Data Visualization and Dimension Reduction*. Springer, 2007.
11. J. Si, A.G. Barto, W.B. Powell, and D.C. Wunsch II, Eds., *Handbook of Learning and Approximate Dynamic Programming*. IEEE Press, 2004.
12. D.C. Wunsch II, M. Hasselmo, K. Venayagamoorthy, and D. Wang, Eds., *Advances in Neural Network Research: IJCNN 2003*. Elsevier, 2003.

## Book Chapters

1. James Foster and Donald C. Wunsch II, “The Ethical Status of an AI,” in *No-Boundary Thinking in Bioinformatics*, Jason Moore, Xiuzhen Huang and Yu Zhang, Eds., Cambridge University Press, to appear.
2. Joan Peckham, Bryan Dewsbury, Bindu Nanduri, Andy Perkins, Donald C. Wunsch II, and Yu Zhang, “No-Boundary Education Across the Disciplines Results from the First Trial NBT Classes,” in *No-Boundary Thinking in Bioinformatics*, Jason Moore, Xiuzhen Huang and Yu Zhang, Eds., Cambridge University Press, to appear.
3. Donald C. Wunsch II, “How Can a Machine Promote Peace?” in *Rauhankone (The Peace Machine: Artificial Intelligence Testament)*, Timo Honkela, Ed., Gaudeamus Press, 2017.
4. Ashraf M. Abdelbar, Islam El-Nabarawy, Donald C. Wunsch, and Khalid M. Salama, “Ant Colony Optimization Applied to the Training of a High Order Neural Networks with Adaptable Exponential Weights, in *Applied Artificial Higher Order Neural Networks for Control and Recognition*, IGI Global, May 2016.
5. Dao Lam and Donald C. Wunsch, “Clustering”, in Academic Press Library in Signal Processing, Signal Processing Theory and Machine Learning, Vol. 1, 2014.
6. J. Seiffertt and D.C. Wunsch II, “Approximate Dynamic Programming and Backpropagation on Timescales”, in *Reinforcement Learning and Approximate Dynamic Programming for Feedback Control*, F.L. Lewis and D. Liu (eds.), IEEE Press / Wiley, 2012, pp. 474-493.
7. M. Versace, R.T. Kozma, and D.C. Wunsch, “Adaptive Resonance Theory design in mixed memristive-fuzzy hardware,” in *Advances in Neuromorphic Memristor Science and Applications*, R. Kozma, R. Pino, and G. Pazienza (eds.), Springer, 2012.
8. R. Xu and D.C. Wunsch, “Exploring the nature of unknown data: Cluster analysis and application,” in *Handbook of Research on Machine Learning Applications and Trends: Algorithms, Methods and Techniques*, E. Soria et. al., Eds. IGI Global, 2009, pp. 1-27.
9. J. Seiffertt and D.C. Wunsch II, “Higher order neural network architectures for agent – based computational economics and finance,” in *Artificial Higher Order Neural Networks for Economics and Business*, M. Zhang, Ed.. New York: Information Science Reference, 2008, pp. 79–93.
10. R. Xu, G.C. Anagnostopoulos, and D.C. Wunsch II, “A hybrid of neural classifier and swarm intelligence in multi-class cancer diagnosis with gene expression signatures,” in *Computational Intelligence in Bioinformatics*, G. Fogel, D. Corne, and Y. Pan, Eds. IEEE Press / Wiley, 2008, pp. 3–20.

11. X. Cai and D.C. Wunsch II, "Computer Go: A grand challenge to AI," in *Challenges for Computational Intelligence* (Studies in Computational Intelligence, vol. 63), W. Duch and J. Mandziuk, Eds. Springer-Verlag, 2007.
12. X. Cai, G.K. Venayagamoorthy, and D. C. Wunsch II, "Hybrid PSO-EA algorithm for training feedforward and recurrent neural networks for challenging problems," in *Advances in Computational Intelligence: Theory and Applications* (Series in Intelligent Control and Intelligent Automation, vol. 5), World Scientific, 2006, , pp. 171-214.
13. E. Kussul, T. Baidyk, F. Lara-Rosano, O. Makeyev, A. Martin, and D.C. Wunsch, "Micromechanics as a testbed for artificial intelligence methods evaluation," in *IFIP International Federation for Information Processing*, (Professional Practice in Artificial Intelligence, vol. 218), J. Debenham, Ed. Boston: Springer, 2006, pp. 275-284.
14. G.K. Venayagamoorthy, R.G. Harley, and D.C. Wunsch II, "Applications of approximate dynamic programming in power systems control," in *Handbook of Learning and Approximate Dynamic Programming*, J. Si, A. Barto, W. Powell, and D.C. Wunsch Eds. Wiley, July 2004, pp. 479-515.
15. D.C. Wunsch II, D.V. Prokhorov, "Adaptive critic designs," in *Computational Intelligence: A Dynamic Systems Approach*, R.J. Marks, Ed. New Jersey: IEEE Press, 1995.
16. K. Bergerson and D.C. Wunsch II, "A commodity trading model based on a neural network-expert system hybrid," in *Neural Networks in Finance and Investing*, R.R. Trippi and E. Turban, Eds. Chicago: Probus, 1993.

### Archival Journal Papers

1. Xiaoyang Liu, Zhigang Zeng, Donald C. Wunsch II, "Memristor-based LSTM network with in situ training and its applications," *Neural Networks*, to appear. <https://doi.org/10.1016/j.neunet.2020.07.035>
2. Daniel B Hier, Jonathan Kopel, Steven U Brint, Donald C Wunsch II, Gayla R Olbricht, Sima Azizi, Blaine Allen, "Evaluation of standard and semantically-augmented distance metrics for neurology patients," *BMC Medical Informatics and Decision Making*, to appear. Pre-review preprint available online: <https://www.researchsquare.com/article/rs-20018/latest.pdf>
3. Marcin Zalasinski, Krzysztof Cpałka, Łukasz Laskowski, Donald C. Wunsch, Krzysztof Przybyszewski, "An Algorithm for the Evolutionary-Fuzzy Generation of on-Line Signature Hybrid Descriptors," *Journal of Artificial Intelligence and Soft Computing Research* 10 (3), 173-187, 2020.

4. Leonardo Enzo Brito da Silva, Niklas Melton, and Donald C. Wunsch II, "Incremental Cluster Validity Indices for Online Learning of Hard Partitions: Extensions and Comparative Study," *IEEE Access*, 2020, Volume 8, available online. DOI: 10.1109/ACCESS.2020.2969849
5. Yongliang Yang, Kyriakos G. Vamvoudakis, Hamidreza Modares, Yixin Yin and Donald C. Wunsch, "Safe Intermittent Reinforcement Learning With Static and Dynamic Event Generators," *IEEE Trans. on Neural Networks and Learning Systems*, 2020 to appear, available online: DOI: 10.1109/TNNLS.2020.2967871
6. Jonathan Kopel, Carmine Gorga, Paul Thomas, Roger K. Strickland & Donald C. Wunsch II, "Neurotheology in interfaith dialogue," *Baylor University Medical Center Proceedings*, 33:2, 295-297, 2020. DOI: 10.1080/08998280.2019.1698881
7. Majid Bagheri, Khalid Al-jabery, Donald Wunsch, and Joel G. Burken, "Examining Plant Uptake and Translocation of Emerging Contaminants Using Artificial Intelligence and Machine Learning: Implications to Food Security," *Science of the Total Environment*, (Elsevier), 698, 133999, 2020. DOI: 10.1016/j.scitotenv.2019.133999
8. Yongliang Yang, Kyriakos G. Vamvoudakis, Hamidreza Modares, Yixin Yin and Donald C. Wunsch, "Hamiltonian-Driven Hybrid Adaptive Dynamic Programming," *IEEE Transactions on Systems, Man and Cybernetics: Systems*, 2020, available online. DOI: 10.1109/TSMC.2019.2962103
9. Wei He, Changyin Sun, Donald C. Wunsch II, and Richard Yi Da Xu, "Intelligent Control through Neural Learning and Optimization for Human Machine Hybrid Systems," *IEEE Trans. on Neural Networks and Learning Systems*, 2020, available online. DOI: 10.1109/TNNLS.2019.2952699
10. Leonardo Enzo Brito da Silva, Islam Elnabarawy and Donald C. Wunsch II, "Distributed dual vigilance fuzzy adaptive resonance theory learns online, retrieves arbitrarily-shaped clusters, and mitigates order dependence," *Neural Networks*, Vol. 121, 2020. DOI: 10.1016/j.neunet.2019.08.033
11. Yongliang Yang, Da-Wei Ding, Haoyi Xiong, Yixin Yin, and Donald C. Wunsch, "Online Barrier-Actor-Critic Learning for  $H_\infty$  Control with Full-State Constraints and Input Saturation," *Journal of the Franklin Institute*, (Elsevier), December 2019. DOI: 10.1016/j.jfranklin.2019.12.017
12. Donald C. Wunsch II, "Admiring the Great Mountain: A Celebration Special Issue in Honor of Stephen Grossberg's 80th Birthday," *Neural Networks* (Elsevier), Special Issue Dedicated to the 80<sup>th</sup> Birthday of Stephen Grossberg, Vol. 120, pp. 1-4. DOI: 10.1016/j.neunet.2019.09.015
13. Yongliang Yang, Hamidreza Modares, Kyriakos G. Vamvoudakis, Yixin Yin, and Donald C. Wunsch, "Dynamic Intermittent Feedback Design for  $H_\infty$  Containment

- Control on a Directed Graph,” *IEEE Trans. on Cybernetics*, 2019, available online. DOI: 10.1109/TCYB.2019.2933736
14. Jonathan Kopel, Donald Mackenzie, Carmine Gorga, and Donald C. Wunsch II, “Interfaith Dialog in Medicine,” *Proc. Baylor University Medical Center*, Taylor & Francis, Vol. 3, No. 1, 2020. DOI: 10.1080/08998280.2019.1670029
  15. Leonardo Enzo Brito da Silva, Islam Elnabarawy and Donald C. Wunsch II, “A Survey of Adaptive Resonance Theory Neural Network Models for Engineering Applications,” *Neural Networks Special Issue In Honor of the 80<sup>th</sup> Birthday of Stephen Grossberg*, Vol.120, December 2019, pp. 167-210. DOI: 10.1016/j.neunet.2019.09.012
  16. Yongliang Yang, Liming Wang, Hamidreza Modares, Dawei Ding, Yixin Yin, and Donald Wunsch, “Data-Driven Integral Reinforcement Learning for Continuous-Time Non-Zero-Sum Games,” *IEEE Access*, Vol. 7, June 2019. DOI: 10.1109/ACCESS.2019.2923845
  17. Seaar Al-Dabooni and Donald C. Wunsch II, “Convergence of Recurrent Neuro-Fuzzy Value-Gradient Learning With and Without Actor,” *IEEE Trans. on Fuzzy Systems*, 2019. DOI: 10.1109/TFUZZ.2019.2912349
  18. Seaar Al-Dabooni and Donald C. Wunsch II, “Online Model-Free N-Step HDP With Stability Analysis,” *IEEE Trans. on Neural Networks and Learning Systems*, 2019, available online. DOI: 10.1109/TNNLS.2019.2919614
  19. Ernst Kussul, Tetyana Baydyk, Alberto Escalante Estrada, Maria Teresa Rodriguez Gonzalez, Donald C. Wunsch II, “Solar Concentrators Manufacture and Automation,” *Open Physics*, v. 17, no. 1, pp. 93-103, Apr. 2019.
  20. Lei Xue, Changyin Sun and Donald C. Wunsch II, “A Game-theoretical Approach for a Finite-time Consensus of Second-order Multi-agent System,” *International Journal of Control, Automation and Systems*, 17, pp. 1071-1083, 2019. DOI: 10.1007/s12555-017-0716-8
  21. Shuhui Li, Hoyun Won, Xingang Fu, Michael Fairbank, Donald C. Wunsch, Eduardo Alonso, "Neural-Network Vector Controller for Permanent-Magnet Synchronous Motor Drives: Simulated and Hardware-Validated Results," *IEEE Trans. on Cybernetics*, 2019, available online. DOI: 10.1109/TCYB.2019.2897653
  22. Lee Emerson Voth-Gaeddert, Khalid Al-Jabery, Gayla Olbricht, Donald Wunsch II, Daniel Barton Oerther, “Complex Associations Between Environmental Factors and Child Growth: A Novel Mixed Methods Approach,” *ASCE Journal of Environmental Engineering*, Vol. 145, No. 6, 2019.
  23. Seaar Al-Dabooni and Donald C. Wunsch II, "The Boundedness Conditions for Model-Free HDP( $\lambda$ )," *IEEE Transactions on Neural Networks and Learning Systems*, Vol. 30, No. 7, 2019. DOI: 10.1109/TNNLS.2018.2875870

24. Leonardo Enzo Brito da Silva, Islam Elnabarawy, and Donald C. Wunsch II, "Dual Vigilance Fuzzy Adaptive Resonance Theory," *Neural Networks*, Vol. 109, pp. 1-5, 2019.
25. Yongliang Yang, Zhishan Guo, Haoyi Xiong, Dawei Ding, Yixin Yin, and Donald C. Wunsch, "Data-driven Robust Control of Discrete-Time Uncertain Linear Systems via Off-policy Reinforcement Learning," *IEEE Transactions on Neural Networks and Learning Systems*, Vol. 30, No. 12, 2019, pp. 3735-3747. DOI: 10.1109/TNNLS.2019.2897814
26. Majid Bagheri, Khalid Al-Jabery, Donald C. Wunsch II, and Joel Burken, "A deeper look at plant uptake of environmental contaminants using intelligent approaches," *Science of the Total Environment*, (Elsevier), Vol. 651, No. 1, Feb. 2019. DOI: 10.1016/j.scitotenv.2018.09.048
27. Seaar Al-Dabooni and Donald C. Wunsch II, "An Improved N-Step Value Gradient Learning Adaptive Dynamic Programming Algorithm for Online Learning," *IEEE Trans. on Neural Networks and Learning Systems*, Vol. 20, No. 6, 2019. DOI: 10.1109/TNNLS.2019.2919338
28. S. Sadati, L. E. B. Da Silva, D.C. Wunsch, K. H. Khayat, "Artificial Intelligence to Investigate Modulus of Elasticity of Recycled Aggregate Concrete", *American Concrete Institute Materials Journal*, Vol. 116, No. 1, pp. 51-62, 2019.
29. Yongliang Yang, Hamidreza Modares, Yixin Yin and Donald C. Wunsch, "Optimal Containment Control of Unknown Heterogeneous Systems with Active Leaders," *IEEE Trans. on Control Systems Technology*, Vol. 27, No. 3, 2019.
30. Pavlo Tymoshchuk and Donald C. Wunsch II, "Design of a K-Winners-Take-All Model with a Binary Spike Train," *IEEE Trans. on Cybernetics*, Vol. 49, No. 8, August 2019.
31. S. Al-Dabooni, and D. Wunsch, "Model Order Reduction Based on Agglomerative Hierarchical Clustering," *IEEE Trans. on Neural Networks and Learning Systems*, Vol. 30, No. 6, June 2019, pp. 1881-1895. DOI: 10.1109/TNNLS.2018.2873196
32. Jacob Mueller, Jonathan Kimball and Donald C. Wunsch II, "Forecast-Informed Energy Storage Utilization in Local Area Power Systems," *IEEE Trans. on Sustainable Energy*, Vol. 9, No. 13, 2018.
33. John Matta, Tayo Obafemi-Ajayi, Jeffrey Borwey, Koushik Sinha, Donald Wunsch, Gunes Ercal, "Node-Based Resilience Measure Clustering with Applications to Noisy and Overlapping Communities in Complex Networks," *Applied Sciences*, Vol. 8, No. 8, pp. 1-28, 2018. DOI: 10.3390/app8081307
34. Dustin Tanksley and Donald C. Wunsch II, "Outsmart Moore's Law With Machine Learning," *IEEE Eta Kappa Nu The Bridge Magazine*, Vol. 115, No. 2, pp. 6-9, 2018.

35. Yongliang Yang, Hamidreza Modares, Donald C. Wunsch and Yixin Yin, " Leader-Follower Output Synchronization of Linear Heterogeneous Systems with Active Leader Using Reinforcement Learning," *IEEE Trans. on Neural Networks and Learning Systems*, Vol. 29, No. 6, pp. 2139-2153, 2018.
36. Hüseyin Göksu, Donald C. Wunsch, II, Xiaopeng Dong, Ali Kökçe, and Daryl G. Beetner, "Detection and Identification of Vehicles Based on Their Spark-Free Unintended Electromagnetic Emissions," *IEEE Trans. On Electromagnetic Compatibility*, Vol. 60, No. 5, pp. 1594-1597, 2018.
37. Guang-Bin Huang, Jonathan Wu, and Donald C. Wunsch II, "Hierarchical Extreme Learning Machines," *Neurocomputing*, Vol. 277, pp. 1-3, February 2018.
38. Emily G. Hernandez and Donald C. Wunsch II, "Graphical Trust Models for Agent-Based Systems," *IEEE Potentials*, Vol. 37, No. 5, pp. 25-33, September/October 2018.
39. L. Xue, C. Sun, D. Wunsch, "An Adaptive Strategy via Reinforcement Learning for the Prisoner's Dilemma Game," *IEEE/CAA Journal of Automatica Sinica*, Vol. 5, No. 1, pp. 301-310, 2018.
40. Yongliang Yang, Shusen Cheng, Yixin Yin and Donald C. Wunsch, "Containment Control of Heterogeneous Systems with Non-Autonomous Leaders: A Distributed Optimal Model Reference Approach," *IEEE Access*, Vol. 6, pp. 60689-60703, 2018.
41. Leonardo Enzo Brito da Silva; and Donald C. Wunsch, "An Information-Theoretic-Cluster Visualization for Self-Organizing Maps," *IEEE Transactions on Neural Networks and Learning Systems*, Vol. 29, No. 6, pp. 2595 – 2613, 2018.
42. Fuchun Sun, Guang-Bin Huang, Q.M. Jonathan Wu, Shiji Song, and Donald C. Wunsch II, "Efficient and Rapid Machine Learning Algorithms for Big Data and Dynamic Varying Systems," *IEEE Trans. on Systems, Man and Cybernetics: Systems*, Vol. 47, No. 10, pp. 2625- 2626, October 2017.
43. Yongliang Yang, Yixin Yin, Donald Wunsch, Sen Zhang, Xianzhong Chen, Xiaoli Li, Shusen Cheng, Min Wu, and Kang-Zhi Liu, "Development of Blast Furnace Burden Distribution Process Modeling and Control," *Iron and Steel Institute of Japan International*, Vol 57, No. 8, pp. 1350 - 1363, 2017.
44. Yongliang Yang, Donald C. Wunsch, Yixin Ying, "Hamiltonian-Driven Adaptive Dynamic Programming for Continuous Nonlinear Dynamical Systems," *IEEE Trans. Neural Networks and Learning Systems*, Vol. 28, No. 8, pp. 1929 – 1940, 2017.
45. D. Lam; D. Wunsch, "Unsupervised Feature Learning Classification With Radial Basis Function Extreme Learning Machine Using Graphic Processors," in *IEEE Transactions on Cybernetics*, vol. 47, no. 1, pp. 224 - 231, 2017.

46. K. Al-Jabery; Z. Xu; W. Yu; D. Wunsch; J. Xiong; Y. Shi, "Demand-Side Management of Domestic Electric Water Heaters Using Approximate Dynamic Programming," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems* , vol.36, no.5, pp.775-788, 2017.
47. D. Wunsch, "How to Revise and Resubmit a Journal Paper," *IEEE Potentials*, vol. 35, no. 3, pp. 12-14, May-June 2016.
48. W. Kayani, S.P. Acharya, I.G. Guardiola, D.C. Wunsch, B. Schumacher, Isaac Wagner-Muns, Shape Analysis of Traffic Flow Curves Using a Hybrid Computational Analysis, *Procedia Computer Science*, Volume 95, Pages 457-466, ISSN 1877-0509, 2016.
49. Lei Meng, Ah-Hwee Tan, and Donald Wunsch, "Adaptive Scaling of Cluster Boundaries for Large-scale Social Media Data Clustering," *IEEE Trans. on Neural Networks and Learning Systems*, Vol. 27, No. 12, pp. 2656-2669, 2016.
50. Dao Lam, Mingzhen Wei, Donald Wunsch, "Clustering Data of Mixed Categorical and Numerical Type with Unsupervised Feature Learning," *IEEE Access*, Vol. 3, pp. 1605-1613, Sept. 2015.
51. Xiuzhen Huang, Steven F. Jennings, Barry Bruce, Alison Buchan, Liming Cai, Pengyin Chen, Carole Cramer, Weihua Guan, Uwe KK Hilgert, Hongmei Jiang, Zenglu Li, Gail McClure, Donald F. McMullen, Bindu Nanduri, Andy Perkins, Bhanu Rekepalli, Saeed Salem, Jennifer Specker, Karl Walker, Donald Wunsch, Donghai Xiong, Shuzhong Zhang, Yu Zhang, Zhongming Zhao and Jason H Moore, "Big data – a 21<sup>st</sup> century science Maginot Line? No-boundary thinking: shifting from the big data paradigm," *Journal of BMC BioData Mining*, Vol. 8, No. 7, February 2015.
52. Steven Damelin, Y. Gu, Donald Wunsch, and Rui Xu, "Fuzzy Adaptive Resonance Theory, Diffusion Maps, and their applications to Clustering and Biclustering," *Mathematical Modelling of Natural Phenomena: Special Issue on Model Reduction Across Disciplines in Honor of Alexander N. Gorban*, Vol. 10, No. 3, 2015, pp. 206-211.
53. Gennady Fridman, Jeremy Levesley, Ivan Tyukin, and Donald Wunsch (Eds.), "Preface," *Mathematical Modelling of Natural Phenomena: Special Issue on Model Reduction Across Disciplines in Honor of Alexander N. Gorban*, Vol. 10, No. 3, 2015, pp. 1-5.
54. Xingang Fu, Shuhui Li, Michael Fairbank, Donald Wunsch, and Eduardo Alonso, "Training Recurrent Neural Networks with the Levenberg-Marquardt Algorithm for Optimal Control of a Grid-Connected Converter," *IEEE Transactions on Neural Networks and Learning Systems*, Vol 26, No. 9, September 2015.
55. Dao Lam, Shuhui Li, and Donald Wunsch, "Hidden Markov Model with Information Criteria Clustering and Extreme Learning Machine Regression for Wind Forecasting," *J. Computer Science and Cybernetics: Special Issue 30<sup>th</sup> Anniversary*, Vol. 30, No. 4, 2014, pp. 361-376.

56. Ahmed Ezzat, Ashraf Abdelbar and Donald Wunsch, "A Bare-Bones Ant Colony Optimization Algorithm That Performs Competitively on the Sequential Ordering Problem", *Memetic Computing*, Vol. 6, No. 1, pp. 19-29, 2014.
57. Michael Fairbank, Shuhui Li, Xingang Fu, Eduardo Alonso and Donald Wunsch, "An adaptive recurrent neural network controller using a stabilization matrix and predictive inputs to solve a tracking problem under disturbances," *Neural Networks* 49, pp. 74-86, 2014.
58. Shuhui Li, Michael Fairbank, Cameron Johnson, Donald C. Wunsch, Eduardo Alonso, and Julio Proano, Artificial Neural Networks for Control of a Grid-Connected Rectifier/Inverter under Disturbance, Dynamic and Power Converter Switching Conditions. *IEEE Transactions on Neural Networks and Learning Systems*, Vol. 25, No. 4, April 2014, pp. 738-750.
59. Xiuzhen Huang, Barry Bruce, Alison Buchan, Clare Bates Congdon, Carole Cramer, Steven F. Jennings, Hongmei Jiang, Guojun Li, Zenglu Li, David Liberles, Gail McClure, Rick McMullen, Jason Moore, Bindu Nanduri, Joan Peckham, Andy Perkins, Shawn W. Polson, Bhanu Rekepalli, Saeed Salem, Jennifer Specker, Donald Wunsch, Donghai Xiong, Shuzhong Zhang, and Zhongming Zhao, "No-Boundary Thinking in Bioinformatics Research," *Journal of BMC BioData Mining*, Vol. 6, No. 19, November 2013.
60. A.M. Abdelbar and D.C. Wunsch, "Search Context Awareness in Several Ant Colony Optimization Models," *International Journal of Computers and Their Applications*, Vol. 20, No. 2, 2013.
61. F.H. Montgomery, S. Chellappan, R. Katikalapudi, D.C. Wunsch and K.F. Lutzen, "Monitoring student internet patterns: Big brother or promoting mental health?," *Journal of Technology in Human Services*, V. 31, No. 1, 2013, pp. 61-70.
62. R. Katikalapudi, S. Chellappan, F. Montgomery, D. Wunsch and K. Lutzen, "Associating internet usage with depressive behavior among college students," *IEEE Technology and Society Magazine*, vol. 31, no. 4, pp. 73-80, 2012.
63. R. Xu, J. Xu, and D.C. Wunsch, "A Comparison Study of Validity Indices on Swarm Intelligence-Based Clustering," *IEEE Trans. on Systems, Man and Cybernetics, part B*, Vol. 42, No. 4, pp. 1243 – 1256, 2012.
64. R. Xu and D.C. Wunsch, "BARTMAP: A viable structure for biclustering," *Neural Networks*, vol. 24, no. 7, pp. 709-716, 2011.

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66. L. du Plessis, R. Xu, S. Damelin, M. Sears, and D.C. Wunsch II, "Reducing dimensionality of hyperspectral data with diffusion maps and clustering with K-means and fuzzy ART," *International Journal of Systems, Control and Communications*, Vol. 3, No. 3, pp. 232-251, 2011.
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68. J. Seiffertt and D.C. Wunsch, "Backpropagation and ordered derivatives in the time scales calculus," *IEEE Transactions on Neural Networks*, vol. 21, no. 8, pp. 1262-1269, 2010.
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## Tutorials

1. Lei Meng, Ah-Hwee Tan, Donald C. Wunsch, and Leonardo Enzo Brito da Silva, "Adaptive Resonance Theory in Social Media Clustering with Applications," *IEEE / INNS International Joint Conference on Neural Networks*, Rio de Janeiro, Brazil, July 2018.
2. Donald C. Wunsch, Tayo Obafemi-Ajayi, Gayla Olbricht, and Khalid Al-Jabery, "Computational Learning Approaches to Data Analytics in Biomedical Applications," *IEEE Engineering in Medicine and Biology Conference*, August 16, 2016.
3. R. Xu and D.C. Wunsch, "Clustering: Basics, algorithms, applications, and trends," presented at the *IEEE/INNS International Joint Conference on Neural Networks*, part of the *World Congress on Computational Intelligence '10*, Barcelona, Spain, July 18, 2010.
4. R. Xu and D.C. Wunsch, "Cluster analysis and swarm intelligence in clustering," presented at the *IEEE Swarm Intelligence Symposium*, Sept. 21, 2008.
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### Conference Papers, Presentations, Seminars, Reports, Other Papers

1. Louis Steinmeister, Dacosta Yeboah, Gayla Olbricht, Tayo Oberfami-Ajayi, Bassam Hadi, Daniel Hier, Donald C. Wunsch II, "Handling missing data for unsupervised learning with an application on a FITBIR Traumatic Brain Injury (TBI) Dataset," *Military Health System Research Symposium*, August 2020.
2. Islam Elnabarawy, Kristijana Arroyo, Donald C. Wunsch II, "StarCraft II Build Order Optimization using Deep Reinforcement Learning and Monte-Carlo Tree Search," *arXiv:2006.10525*, June 12, 2020.
3. Zachary Roy, Sujit Subhash, Lien Bui, Bassam Hadi, Daniel Hier, Donald Wunsch, Gayla Olbricht, Tayo Obafemi-Ajayi, "Exploratory Analysis of Concussion Recovery Trajectories using Multi-modal Assessments and Serum Biomarkers," *IEEE Engineering in Medicine and Biology Society Annual Conference (EMBC 2020)*, July 2020.
4. Raghu Yelugam, Leonardo Enzo Brito da Silva and Donald C. Wunsch II, "TopoBARTMAP: Biclustering ARTMAP With or Without Topological Methods in a Blood Cancer Case Study," *IEEE / INNS International Joint Conference on Neural Networks (IJCNN 20)*, July 2020.
5. S Saadatmand, S Azizi, M Kavousi, D Wunsch, "Autonomous Control of a Line Follower Robot Using a Q-Learning Controller," *IEEE Computing and Communication Workshop and Conference*, January 2020.
6. Islam Elnabarawy, Wei Jiang, Donald C. Wunsch II, "Survey of Privacy-Preserving Collaborative Filtering," *IEEE / INNS IJCNN 2020 Secure Learning Workshop*, July 21, 2020, also available on: *arXiv:2003.08343*.
7. Islam Elnabarawy, Leonardo Enzo Brito da Silva and Donald C. Wunsch II, "Dual Vigilance Hypersphere Adaptive Resonance Theory," *IEEE Symposium Series on Computational Intelligence*, Xiamen, China, Dec. 6-9, 2019, pp. 2525-2532.
8. Donald C. Wunsch II, "The Future of Reinforcement Learning After Alpha Go," *IEEE Symposium Series on Computational Intelligence Adaptive Dynamic Programming Panel*, Invited Presentation, Xiamen, China, December 7, 2019.
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10. Donald C. Wunsch II, "AI: Progress, Paradox and Prognosis," invited seminar for the American Association of Matrimonial Attorneys Dirty Thirty, annual retreat, Rough Creek Lodge, TX, October 5, 2019.
11. Saadatmand, S., M. Nia, P. Shamsi, M. Ferdowsi, and D. C. Wunsch. "Heuristic Dynamic Programming for Adaptive Virtual Synchronous Generators." In *2019 North American Power Symposium (NAPS)*, 2019
12. Marketa Illetskova, Islam Elnabarawy, Leonardo Enzo Brito da Silva, Daniel R. Tauritz, and Donald C. Wunsch II, "Nested Monte Carlo Search Expression Discovery for the Automated Design of Fuzzy ART Category Choice Functions," *Proc. Genetic and Evolutionary Computation Conference Companion (GECCO '19 Companion)*, July 13–17, 2019, Prague, Czech Republic.
13. Liming Wang, Lu Li, Yongliang Yang, Dawei Ding, Yixin Yin, Zhishan Guo and Donald Wunsch, "Model-Free Temporal Difference Learning for Non-Zero-Sum Games," *IEEE / INNS International Joint Conference on Neural Networks*, Budapest, 2019.
14. Yongliang Yang, Kyriakos G. Vamvoudakis, Hamidreza Modares, Wei He, Yi-Xin Yin, Donald C. Wunsch II, "Safety-Aware Reinforcement Learning Framework with an Actor-Critic-Barrier Structure," *IEEE American Control Conference*, July 10-12, 2019, Philadelphia.
15. Donald C. Wunsch II, "Crosscutting NBT Issues: Order Dependence, Order Reduction," *University of Pennsylvania No-Boundary Thinking in Bioinformatics Workshop*, Invited Presentation, Philadelphia, Pennsylvania, December 6, 2018.
16. Donald C. Wunsch II, "Clustering Contributions to Lifelong Learning Machines," *Gulf Coast Deep Learning Workshop*, Lafayette, Louisiana, October 26, 2018.
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19. Ethar H.K. Alkamil, Ralph Flori, Leonardo Enzo Brito da Silva and Donald C. Wunsch II, "Extended Learning from Experience: Stuck Pipe Prediction System Using Unsupervised Learning," *11<sup>th</sup> International Petroleum Technology Conference*, Beijing, 2019.
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23. Donald C. Wunsch II, "Computational Intelligence in Biomedical Research," Poster Presentation, Ozark Biomedical Initiative, Rolla, MO, August 2018.
24. Donald C. Wunsch II, "Automated Negotiations, Games, and Tools," Keynote, *International Conference on Intelligent Computing*, Wuhan, China, August 16, 2018.
25. Donald C. Wunsch II, "Mixed Modality Learning," Research Seminar, Huazhong University of Science and Technology, Wuhan, China, August 15, 2018.
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29. Yongliang Yang, Kyriakos G. Vamvoudakis, Hamidreza Modares, Dawei Ding, Yixin Yin, Donald C. Wunsch, "Dynamic Intermittent Suboptimal Control: Performance Quantification and Comparisons," *37th Chinese Control Conference*, Wuhan, China, July 2018.
30. Leonardo Enzo Brito da Silva and Donald C. Wunsch II, "A study on exploiting VAT to mitigate ordering effects in Fuzzy ART," *Proc. IEEE / INNS International Joint Conference on Neural Networks*, Rio de Janeiro, Brazil, July 2018.
31. Ashraf Abdelbar, Islam Elnabarawy, Khalid Salama and Donald Wunsch, "Matrix Factorization Based Collaborative Filtering with Resilient Stochastic Gradient Descent," *Proc. IEEE / INNS International Joint Conference on Neural Networks*, Rio de Janeiro, Brazil, July 2018.

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40. Tayo Obafemi-Ajayi, Luke Settles, Yuqing Su, Gayla Olbricht, Cynthia Germeroth, T. Nicole Takahashi, Judith Miles, and Donald Wunsch, "Genetic Variant Analysis of Boys with Autism: a Pilot Study on Linking Facial Phenotype to Genotype," *BIBM 2017: IEEE International Conference on Bioinformatics and Biomedicine*, November 2017.
41. Ayah Helal, Enas Jawdat, Islam Elnabarawy, Ashraf Abdelbar and Donald Wunsch, "Integrated Particle Swarm and Evolutionary Algorithm Approaches to the Quadratic Assignment Problem," *IEEE Symposium Series on Computational Intelligence*, Honolulu, November 2017.
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45. George Shannon, James Levett, Steve Corns and Donald C. Wunsch II, "Cognitive Relevance," *IEEE Symposium Series on Computational Intelligence*, Honolulu, November 2017.
46. Islam Elnabarawy, Dustin Tanksley, Kristjana Arroyo and Donald C. Wunsch II, "Tools, Libraries and Algorithms for PYSC2," *DeepMind / Blizzard StarCraft II AI Workshop*, invited presentation, Anaheim, CA, November 4, 2017.
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297. D.C. Wunsch, "Adaptive critics for machine learning," presented at Texas Systems Day, Lubbock, Nov. 1998.
298. R. Uz-Zaman and D.C. Wunsch, "A hybrid learning architecture for computer Go," presented at Texas Systems Day, Lubbock, Nov. 1998.

299. J. Duniyak and D.C. Wunsch, "Safety analysis of redundant systems using fuzzy probability theory," in *Proc. High Consequences Operations Safety Symposium II*, Albuquerque, NM: Sandia National Laboratories, July 1997.
300. D.C. Wunsch, "The need for improved reinforcement learning techniques in intelligent agents," in *Proc. IEEE International Conference on Neural Networks*, Houston, TX: IEEE, 1997, pp. 2279-2282.
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302. S. Li, D.C. Wunsch, E. O'Hair, and M.G. Giesselmann, "Neural network for wind power generation with compressing function," in *Proc. IEEE International Conference on Neural Networks*, Houston, TX: IEEE, 1997, pp. 115-120.
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307. D.V. Prokhorov and D.C. Wunsch, "A general training procedure for stable control with adaptive critic designs," in *Proc. Vision, Recognition, Action: Neural Models of Mind and Machine*, Boston, MA, May 1997.
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317. D. Prokhorov and D.C. Wunsch II, "Advanced adaptive critic designs," in *Proc. World Congress on Neural Networks*, International Neural Networks Society Annual Meeting, Sept. 1996.
318. D.C. Wunsch II, "Applied Computational Intelligence Laboratory at Texas Tech University," presented at the *IEEE International Conference on Neural Networks*, Washington, DC, June 1996.
319. E. Saad, D. Prokhorov, and D.C. Wunsch II, "Advanced neural network training methods for low false alarm stock trend prediction," in *Proc. International Conference on Neural Networks*, vol. 4, June 1996, pp. 2021-2026.
320. I. Saad, J. Duniyakh, and D.C. Wunsch II, "Fuzzy Markov processes for nuclear transportation surety analysis," presented at the Third Annual Student Research Conference of the Texas Engineering Experimental Station, Nov. 1996.
321. D.C. Wunsch II, "Introduction to adaptive critic designs for neurocontrol," presented at the V.M. Glushov Institute for Cybernetics Two Day Short Course, Kiev, Ukraine, June 1996.
322. D.C. Wunsch II, "Neurocontrol for the aerospace industry," presented at *WESTCON '95*, San Francisco, CA, Oct. 1995.

323. B. Turner and D.C. Wunsch II, "Identification of choke points in a complex logistics optimization system," presented at the *World Congress on Neural Networks*, International Neural Networks Society, Washington, DC, July 1995.
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328. D.C. Wunsch II, "A hierarchy of control problems and implementation of adaptive critic solutions," in *Proc. World Congress on Neural Networks*, Washington, DC: International Neural Networks Society, July 1995.
329. D. Prokhorov and D.C. Wunsch II, "Adaptive critic control of Autolander," presented at the *NASA Ames Workshop on Neural Networks in Aerospace*, Aug. 1994.
330. R. Uz-Zaman and D.C. Wunsch, "An adaptive VLSI neural network chip," in *Proc. IEEE International Conference on Neural Networks, 1994. IEEE World Congress on Computational Intelligence*, vol. 4, 1994, pp. 2018 -2021.
331. D.C. Wunsch II, "Philosophical and societal implications of computational intelligence," presented at the *Proc. IEEE International Conference on Neural Networks, IEEE World Congress on Computational Intelligence*, Orlando, FL, July 1994.
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334. D.C. Wunsch II, "Neural networks in the former Soviet Union," in *Proc. World Congress on Neural Networks*, vol. IV. INNS, June 94, pp. 260-268.
335. D.C. Wunsch II, "Fuzzy logic and neural network techniques in surety assessment," presented at the *Sandia National Laboratories Surety Seminar Series*, Oct. 1994.

336. B. Turner and D.C. Wunsch II, "Neural network enhancement of the Los Alamos force deployment estimator," in *Proc. High Consequence Surety Symposium*, Sandia National Laboratory, July 1994.
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339. M. Fritz, D.C. Wunsch, and S. Mitra, "Adaptive control of an active automobile suspension system," presented at the *SPIE Conf. on Image Processing & AI*, Boston, MA, Sept. 1993.
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356. D.C. Wunsch II, A. Gaillard, and M. Singer, "Neural network architectures for machine vision," *Boeing Advanced Technology Center Report*, Seattle, WA, 1990.
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358. A. Gaillard, D.C. Wunsch II, and R. Escobedo, "Neural hypercolumn architectures for the preprocessing of radiographic weld images," in *Proc. SPIE*, vol. 1294, *Applications of Neural Networks*, Apr. 1990.
359. T. Caudell, S. Smith, C. Johnson, D.C. Wunsch and R. Escobedo, "A data compressed ART1 neural network algorithm," in *Proc. SPIE Conference on Aerospace Sensing*, Apr. 1990.

360. D. Wunsch, "Optical neural networks," presented at the Puget Sound Section of the Optical Society of America, Aug. 1989.
361. R. Escobedo, A. Gaillard, M. Singer, and D.C. Wunsch II, "A neural network investigation of radiographic weld images," *Boeing Advanced Technology Center Report*, Seattle, WA, 1989.
362. D.C. Wunsch II, "Adaptive resonance theory, masking fields, and other advanced neural network architectures," presented at the Boeing Neural Networks Interest Group Seminar, Seattle, WA, Sept. 1987.
363. D.C. Wunsch II, "Introduction to neural networks," presented to the Seattle Section of American Association of Artificial Intelligence, Seattle, WA, March 1987.
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## **Videoconferences**

1. D.C. Wunsch II, Neural Network Interest Group, May 1991.
2. D.C. Wunsch II, A. Gaillard, and R. Escobedo, Neural Network Interest Group, 1989.
3. D.C. Wunsch II, Boeing Neural Network Videoconference 5-Part Series, Summer 1988.

## **Patents**

1. R. Dua, S.E. Watkins, D.C. Wunsch, "Neural network demodulator for optical sensor," U.S. Patent 7,603,004, Filed June 12, 2007, Issued October 13, 2009.
2. R. Meuth, J.L. Vian, E.W. Saad, D.C. Wunsch, "Adaptive multi-vehicle coverage optimization system and method, U.S. Patent 8,260,510, Filed July 12, 2012, Issued December 31, 2013.

3. R. Meuth, J.L. Vian, E.W. Saad, D.C. Wunsch, "Adaptive multi-vehicle coverage optimization system and method, U.S. Patent 8,260,485, Filed September 18, 2007, Issued September 4, 2012.
4. E.W. Saad, J.L. Vian, R.J. Meuth, and D.C. Wunsch, "Hierarchical mission management," U.S. Patent Application 20110082717, October 5, 2009.
5. E.W. Saad, J.L. Vian, M.A. Vavrina, J.A. Nisbett, D.C. Wunsch, "Vehicle base station," US Patent 8,899,903, Application November 6, 2014, Issued 2017.
6. E.W. Saad, J.L. Vian, M.A. Vavrina, J.A. Nisbett, D.C. Wunsch, "Vehicle base station," US Patent 9,840,380, Application November 6, 2014, Issued 2017.
7. S Li, M Fairbank, X Fu, D Wunsch, E Alonso, "Systems, methods and devices for vector control of permanent magnet synchronous machines using artificial neural networks," Applied for June 9, 2014, US Patent No. 9,379,546, issued June 28, 2016.
8. E.W. Saad, S.R. Bieniawski, P.E.R. Pigg, J.L. Vian, P.M. Robinette, D.C. Wunsch, "Real time mission planning," U.S. Patent 9,064,222, Applied for May 14, 2010, issued June 23, 2015.
9. R. Xu, D.C. Wunsch, S. Kim, "Methods and systems for biclustering algorithm," U.S. Patent 9,043,326 Filed January 28, 2012, claiming priority to Provisional U.S. Patent Application, January 28, 2011, issued May 26, 2015.

## **National / International Service Activities and Memberships**

IEEE / INNS IJCNN Secure Learning Workshop Program Committee 2020  
 IEEE Computational Intelligence Society (CIS) Secure Learning Task Force 2019 - present  
 Special Issue Guest Editor, *Neural Networks*, Elsevier, 2019.  
 Associate Editor, *Cybernetics and Computer Engineering*, 2018 – present.  
 IEEE Systems, Man and Cybernetics (SMC) Fellow Nominee Evaluation Committee 2018, 2019  
 IEEE CIS Fellow Nominee Evaluation Committee 2011, 2012, 2013, 2015, 2016, 2017, 2019  
 General Chair, IEEE Computational Intelligence in Bioinformatics and Computational Biology conference 2018  
 International Neural Networks Society Ad Hoc Advisory Committees:  
     2018 (Foundation formation, journal relations, other matters)  
     2017 (Management contract evaluation, call for proposals, bid evaluations)  
 International Neural Networks Society History Committee, 2018-present.  
 Chair, IEEE CIS History Committee, 2014-2015  
 Member, IEEE CIS History Committee, 2012 – present.  
 IEEE CIS Neural Networks Technical Committee, 2007 – present  
 IEEE CIS Computational Finance and Economics Technical Committee, 2007 – present  
 IEEE CIS Games Technical Committee, 2007 - present

International Neural Networks Society Senior Fellow 2007-2013  
 Advisory Committee, International Symposium on Neural Networks, 2010  
 Federation of International Robosoccer Association Executive Committee 2009- 2011.  
 Federation of International Robosoccer (FIRA) Congress 09, Steering Committee.  
 NRC Assessment Rating Survey Invited Reviewer 2007.  
 International Neural Networks Society Past President, 2006.  
 International Neural Network Society President, 2005.  
 International Neural Networks Society President-Elect, 2004.  
 Elected International Neural Network Society Board of Governors Member 02-03.  
 General Chair, IEEE / INNS IJCNN 03.  
 International Conference on Intelligent Computing 08, Shanghai, General Chair.  
 IEEE Computational Intelligence Society Technical Committee, 2002-2004. (Vice-Chair, 2003).  
 Technical Co-Chair and Special Sessions Chair, IJCNN 02.  
 Action Editor, 03- 13, *Neural Networks* (Journal of the International Neural Networks Society)  
 Editorial Board, *Cybernetics and Computer Engineering*  
 Editorial Board, *Memetic Computing*  
 Idaho EPSCOR Project Advisory Board, member 2002 - 2004, Chair, 2003.  
 General Chair, NSF / ACIL USA NIS Neurocomputing Opportunities Workshop, Washington, D.C., July 1999.  
 Associate Editor, 1998, *IEEE Transactions on Neural Networks*  
 Technical Program Committee Member: FEPCON 98, South Africa; Second IEEE / RNNS Symposium on Neuroinformatics and Neurocomputing, Rostov-on-Don, Russia, 1995; IEEE Conference on Computer Based Medical Systems, 1998 and 1995; Artificial Neural Networks in Engineering 98 - present; SPIE Applications and Science of Computational Intelligence 1999, 2000, 2001; IEEE / INNS IJCNN (many times), ISIC 2006, 2008, numerous other meetings.  
 Special Session Chair and Organizer, IEEE Systems, Man and Cybernetics Society Annual Meeting, 1997.  
 Program Chair, IEEE Neural Network Council Distinguished Lecturer Series, 1991 - 95.  
 Session Chair, INNS World Congress on Neural Networks, 1995.  
 Session Chair, IEEE International Conference on Neural Networks, 1995.  
 Publications Chair, First IEEE / International Association of Financial Engineers Conference on Computational Intelligence for Financial Engineering, 1995.  
 Voting member IEEE Neural Network Council 1992 - 1994.  
 Special Session Chair and Organizer on Philosophical and Societal Implications of Computational Intelligence, IEEE World Congress on Computational Intelligence, 94.  
 Session Chair, IEEE World Congress on Computational Intelligence, 1994.  
 Session Chair, IEEE/INNS International Joint Conference on Neural Networks, 1992.  
 Session Chair, IEEE/INNS International Joint Conference on Neural Networks, 1991.  
 Local Arrangements Chair, IEEE/INNS International Joint Conference on Neural Networks, 1991.  
 Book reviewer for *Neural Networks*.  
 Member: Eta Kappa Nu, SPIE, Mathematical Association of America, Phi Kappa Phi, Sigma Xi, Association for Computing Machinery, American Association for Artificial Intelligence (Member for Life), International Neural Network Society, IEEE with several society memberships.

Reviewer for:

*Proceedings of the IEEE*, IEEE Press, Prentice-Hall, McGraw-Hill, *IEEE Transactions on Neural Networks*, *Neurocomputing*, *Neural Networks*, *AIAA Journal*, *Journal of Intelligent Control*, *Neurocomputing and Fuzzy Logic*, *Applied Optics*, *Optical Engineering*, *JOSA A*, *IEEE Circuits and Devices*, *IEEE Transactions on Systems, Man and Cybernetics*, *International Journal of Approximate Reasoning*, *Journal of Risk Analysis*, *Optics Letters*, IEEE Engineering Research Initiation Grant, Three Diplom (M.S. equivalent) projects at Krasnoyarsk State Technical University, Russia, numerous conferences, various international funding agency reviews, NASA contracts, and NSF proposals and panels (regular programs, Phase I & II SBIR's, Center grants, site visits, special programs, and CAREER Awards).

## **Local Service Activities**

While At UMR / Missouri S&T:

### **University of Missouri (Statewide) System Level**

UM Bioinformatics Consortium Executive Committee (representing UMR) 00-06

President's Award for Research & Creativity Selection Committee 99-02

University of Missouri Research Board Proposal Reviewer, 02, 06, 07

### **UMR / Missouri S&T and Outside of School of Engineering Level**

Interim Director, Intelligent Systems Center, 2020-present

Faculty Senator Alternate 2019

Chair, Information Technology and Computing Committee, 06-13

Chair, CIO Search Committee, 07, 12 - 13

Vice-Chair, Student Design and Experiential Learning Center (SDELC) Director Search, 12-13

Vice-Chair, SDELC Board, 12-13

Chair, SDELC Board, 13-14

Member, SDELC Board, 07 - present

Curators' Teaching Professor Selection Committee, 13, 15, 16

University Corporate Relations Team, Faculty Senate Rep. 08 - 12

Ad-hoc Faculty Committee for Inquiry of Research Misconduct Allegations  
(multiple dates omitted)

Member, Information Technology and Computing Committee, 03-13

Elected member, Faculty Senate, 06 – 10

Chair, ITCC Computer Security Task Force 03- 12

Chair, ITCC Computer Security Subcommittee, 12-16

Faculty Advisor, Robotics Team 07 – 16

Faculty Advisor, Newman Center, 16 - present

Faculty Advisor, Underwater Robotics Team 16 - present

Faculty Advisor, Youn Wha Ryu Club 07 – 16

Faculty Advisor, Tae-Kwon-Do Club 12 – present

Faculty Advisor, Aikido Club 15 - present

Faculty Advisor, Go Miners Club (Go, Baduk, Weichi), 08 - 12

Chair, UMR Computer Security Cluster of Excellence 04-06  
Senior Investigator, Intelligent Systems Center 04 - present  
UMR Intellectual Property Committee, 07 – 10  
School of Materials, Energy & Earth Resources Promotion & Tenure Committee, 05  
Provost's Task Force on Conflict of Interests 04  
UMR Research Excellence Award Committee 01-02, 04  
Co-Chair, Bioinformatics Faculty Search Committee 00-01  
Co-Chair, Bioinformatics Faculty Search Committee 01-02  
Distinguished Teaching Professor Selection Committee 03-06  
Curator's Professor Selection Committee 04-06  
Committee on Standards for Distinguished and Named Chairs 03  
Campus-wide Promotion and Tenure Committee (alternate) 03-06  
Faculty Excellence Awards Selection Committee, 00 , 04 – 08  
Member, CIO Search Committee, 2016

### **School of Engineering & Out of Department Level**

Distinguished Teaching Professor Nominating Committee 07  
Bernard Sarchet Professor Search Committee, Engineering Management, 05-06  
School of Engineering Third-Year Review Committee 02-04  
School of Engineering Promotion and Tenure Committee 02-04  
School of Engineering Third-Year Review ECE Representative, 2017 - present

### **ECE Department Level**

Chair, Electrical & Computer Engineering Promotion & Tenure Committee, 2017 - present  
Electrical & Computer Engineering Promotion and Tenure Committee Member 99 – present  
Promotion & Tenure Process Subcommittee 09 – 13  
Computer Science & Computer Engineering Working Group 08-09  
Chair, Electrical & Computer Engineering Post-Tenure Standards Committee 02  
Chair, Computer Engineering Search Committee 04  
Chair, Computer Engineering Search Committee 08  
Computer Engineering Search Committee (numerous times, every search so far)  
ECE Wilkins Chair Search Committee 01-02  
ECE Scholarship Committee 00-present  
ABET Accreditation Committee, 00-02  
Attended ABET EC2000 Open Enrollment Faculty Workshop, Baltimore, April 2000.  
ECE Graduate Studies Committee 02-03  
Ph.D. Qualifying Examiner 00 – present  
Chair, Cynthia Tang Missouri Distinguished Professor of Computer Engineering Search Committee, 2011-2014  
ECE Lab Committee 2016 – present

### **Community Service:**

St. Patrick Newman Center Board Member 2015-present  
St. Patrick Newman Center Director Search Committee Member 2017-2018  
Cub Scout Pack 85 Assistant Cubmaster 07-08

Cub Scout Pack 85 Chair of Pack Committee 08-10  
Boy Scout Troop 85 Assistant Scoutmaster 10-16  
Boy Scout Troop 85 Committee Member 18 - present  
Boy Scout River Trails District Merit Badge Counselor 10-present  
St. Patrick School Board 10 – 13  
Lector, St. Patrick’s Church, 07 – present  
Extraordinary Minister, St. Patrick’s Church, 16 – present  
Jury Foreman 08

**Prior to UMR / Missouri S&T:**

Occasional volunteer activity at St. John Neumann Church.  
Interview committee for Minority Engineering Program Director, 1993.  
Collaboration with Minority Engineering Program, including Reese Recruitment  
Concept, assistance with Grow Your Own proposal, recruitment of a  
distinguished minority guest speaker, and referrals of students to that program.  
Prolific Contributor to COE Strategic Planning Task Force Report, March 1995.  
Faculty Forum contributor.  
Active participant in Dean’s Strategic Planning Retreat, Fall 1995.  
Participant in exchange program with Fachschule Wilmhelmshafen, Germany, 98.  
Digital Electronics Curriculum Committee member.  
Graduate Curriculum Committee Member.  
Ph.D. preliminary examiner in communications.  
Departmental representative for numerous thesis examinations.  
Member, EE Chair Search Committee 95.  
Member, CS Chair Search Committee 98.  
Member, EE Faculty Search Committee 98, 99.

**Teaching, Advising and Supervision**

Advised 22 completed Ph.D.’s

**Ph.D.’s**

Advisor for completed Ph.D.s of:

From Texas Tech

(all Electrical Engineering):

Danil Prokhorov, Toyota Research USA (Winner, INNS Young Investigator Award)

Mohammad Raonak-Uz-Zaman, Integrated Device Technologies

Emad Saad, Boeing

Shuhui Li, University of Alabama – Tuscaloosa, Associate Professor. (Co-advisor, with O’Hair)

From UMR / Missouri S&T:

(Computer Engineering)

Nian Zhang, University of the District of Columbia, Assistant Professor

Alexander Novokhodko, Microsoft  
Xiao Hu, GE Global Research, Manager, Data Analytics  
Xindi Cai, Schneider Electric, Research Engineer  
Brian Blaha (awarded posthumously)  
Ryan Meuth, Arizona State University, Lecturer  
John Seiffert, Truman State University, Assistant Professor  
Sejun Kim, Intel, Research Scientist  
Dao Lam, Washington University in St. Louis  
Seaar Al-Dabooni, Basrah Oil Company, (formerly South Oil Company), Iraq  
Khalid Al-Jabery, Basrah Oil Company, (formerly South Oil Company), Iraq  
Leonardo Enzo Brito de la Silva, Guise AI, Inc.

(Systems Engineering)

George Shannon, National Library of Medicine (Co-advisor with Corns)

(Computer Science)

Samuel Mulder, Sandia National Laboratories, Member of Technical Staff

(Electrical Engineering)

Wenxin Liu, Lehigh University, Associate Professor. (Co-advisor, with Venayagamoorthy)

Rui Xu, GE Global Research

Rohit Dua, Missouri S&T, Teaching Associate Professor (Co-advisor, with Watkins)

Tae-hyung Kim, Korea Telecom, Seoul

## **Advisor**

Serving as Ph.D. advisor for:

Computer Engineering:	Adam Sampson, Dustin Tanksley, Niklas Melton, Ronit Das, Sasha Petrenko, Blaine Allen
Electrical Engineering:	Sima Azizi
Systems Engineering:	
Computer Science:	Islam Elnarawaby, Tao Wu
Statistics:	Louis Steinmeister (Co-advisor with Hu)

Serving as M.S. advisor for:

Computer Engineering:	
Electrical Engineering:	Raghu Yelugam
Systems Engineering:	
Computer Science:	Edward Mwanza

Advisor for Completed MS of:

Electrical Engineering:	Amit Agarwahl, Vishwanathan Narayan, Xiao Hu, Rohit Dua, Qiang Yao, Huseyin Goksu, A.J. Shrestha, J. Adam Nisbett, Matt Strautmann
Computer Engineering:	Haiying Huang (posthumously awarded), Xindi Cai, Brian Blaha, Arvind Rapka Nath, Kevin Bollom, Ryan Meuth, Paul Robinette, Sejun Kim, Clayton Smith
Computer Science	Paul Pigg, Raghavendra Kotikalapudi
Systems Engineering	Pravan Aravpalli
Statistics	Louis Steinmeister (Co-advisor with Samaranayake)

Prior to UMR / Missouri S&T:

Served on numerous M.S. committees in EE and CS.

Served on Ph.D. committees of: Mike Morelli, Emre Kaymaz, Dogan Timucin, Surya Pemmaraju, Alok Kher, Mahesh Iyer and John Joe Anderson.

Advisor for completed M.S. Theses of: Worapoj Kreesuradej, Raonak Uz-Zaman, Hong Tan, Emad Saad, Paul Eaton, Ihab Saad, Nikita Visnevski, Dmitri Abramov.

Served as advisor or co-advisor, prior to leaving Texas Tech, for:

Dr. Murat Guven, Dr. Zhanyu Ge, Ravi Siringeedi, Madhu Kassymayolua, Ashish Pandaya, Dr. Sergey Maslyakov.

Selected as one of the favorite faculty in many graduating Seniors' exit interviews and polls.

## **Supervision of Visiting Scientists**

Zhao Yin, Univ. Science & Technology Beijing, 9/2019 – 9/ 2020

Prof. Ernst Kussul, Sabbatical, Universidad Autonoma Nacional de Mexico, Fall 2016

Prof. Tetyana Baidyk, Sabbatical, Universidad Autonoma Nacional de Mexico, Fall 2016

Prof. Pavlo Tymoshchuk, Univ. Lvov, Ukraine, Fulbright Fellow, Fall 2015 – Summer 2016

Yongliang Yang, Univ. Science & Technology Beijing, 1/2015 – 1/2017

Dr. Tayo Obafemi-Ajayi, Postdoctoral Fellow, Spring 2014 - Summer 2016

Lei Xue, Northeastern Univ. Nanjing, 1/2014 – 1/2015

Dr. Cameron Johnson, Postdoctoral Fellow, Fall 2008 – Spring 2009

Prof. Larry Pyeatt, Associate Professor, Texas Tech University, January 05 – August 06.

Prof. Frank Harary, Distinguished Visiting Professor, UMR, Spring 2000.

Prof. Meng Hiot Lim, Associate Professor, Nanyang Technological Institute, Singapore. Sabbatical Visit, UMR, Fall 1999 – Spring 2000.

Dr. Mahesh Iyer, Postdoctoral Fellow, Texas Tech, Spring, Summer 1998.

Dr. Serge Shishkin, Postdoctoral Fellow, Texas Tech, Fall 1996 – Summer 1999.

Prof. Witali Dunin-Barkowski, Research Professor, Texas Tech, Spring 1996 – Summer 1999.

## Classes

Fall 1988

EE 235 Linear Systems Analysis

Spring 1989

EE 235 Linear Systems Analysis

Spring 1993

EE 5380 Digital System Theory

2<sup>nd</sup> Summer 1993

EE 2372 Modern Digital System Design

Fall 1993

EE 2372 Modern Digital System Design

EE 4334 Project Laboratory V

Spring 1994

EE 4333 Project Laboratory IV

EE 5380 Digital Systems Theory

1<sup>st</sup> Summer 1994

EE 2303 Electrical Systems Analysis

2<sup>nd</sup> Summer 1994

EE 5335 Special Topic: Synthetic Intelligence (new)

Fall 1994

EE 2372 Modern Digital System Design

EE 3333 Project Laboratory III

Spring 1995

EE 2372 Modern Digital System Design

EE 3333 Project Laboratory III

Fall 1995

EE 2372 Modern Digital System Design

EE 4364 Digital Signal Processing

Spring 1996

EE 2372 Modern Digital System Design  
 EE 5363 Adaptive Image Processing  
 Fall 1996  
 EE 2372 Modern Digital System Design  
 Spring 1997  
 EE 2372 Modern Digital System Design  
 EE 3333 Project Lab III  
 Fall 1997  
 IS1100 The Freshman Seminar  
 EE 5328 Statistical Theory of Communications  
 Spring 1998  
 EE 3303 Linear Systems Analysis  
 Summer 1998  
 Artificial Intelligence (Advanced Undergraduate class, Fachhochschule Wilhelmshaven,  
 exchange program. Taught in English and German.)

Fall 1998  
 EE 2372 Modern Digital System Design  
 IS 1100 The Freshman Seminar  
 Spring 1999  
 EE 5331 Adaptive Critic Designs (new)  
 EE 2333 Project Lab 2  
 Fall 1999  
 ECE 243 Communication Systems  
 Winter 2000  
 CpE 111 Introduction to Computer Engineering  
 Fall 2000  
 CpE 213 Digital System Design (8051 – based)  
 Winter 2001  
 CpE 401 Markov Decision Processes (new)  
 Fall 2001  
 CpE 401 Adaptive Critic Designs (new)  
 Winter 2002  
 Cpe 401 Literature Search Techniques in Computer Engineering (new)  
 CpE 111 Introduction to Computer Engineering  
 Fall 2002  
 Cpe 401 Scientific Method in Computer Engineering (new)  
 CpE 111 Introduction to Computer Engineering  
 Winter 2003  
 CpE 111 Introduction to Computer Engineering (Two sections)  
 Fall 2003  
 CpE/EE 392 Senior Project Lab II  
 Winter 2004  
 CpE 111 Introduction to Computer Engineering  
 Fall 2004  
 CpE 111 Introduction to Computer Engineering

Cpe 401	Literature Search Techniques in Computer Engineering (new)
Winter 2005	
CpE 401	Markov Decision Processes (new, team taught with Larry Pyeatt)
Cpe 401	Scientific Method in Computer Engineering (new)
Fall 2005	
CpE 111	Introduction to Computer Engineering
CpE 458	Adaptive Critic Designs (team taught with Larry Pyeatt)
Winter 2006	
CpE 401	Markov Decision Processes (new, team taught with Larry Pyeatt)
Fall 2006	
CpE 111	Introduction to Computer Engineering
Winter 2007	
CpE 111	Introduction to Computer Engineering
Cpe 401	Scientific Method in Computer Engineering
Fall 2007	
CpE 111	Introduction to Computer Engineering
Cpe 412	Advanced Digital Logic Design
Winter 2008	
Cpe 401	Clustering
Fall 2008	
CpE 111	Introduction to Computer Engineering
CpE 300	Introduction to Robotics (new, with Ryan Meuth)
Winter 2009	
CpE/EE 392	Senior Project Lab II
Fall 2009	
CpE 111	Introduction to Computer Engineering
CS 345	Robotic Manipulation (with Paul Robinette)
Winter 2010	
CpE 111	Introduction to Computer Engineering
Cpe 401	Clustering
Fall 2010	
CpE 111	Introduction to Computer Engineering
CpE/EE 392	Senior Project Lab II
Winter 2011	
CpE 111	Introduction to Computer Engineering
CS 345	Robotic Manipulation (with Adam Nisbett)
Fall 2011	
CpE 111	Introduction to Computer Engineering
CpE/EE 391	Senior Project Lab I
Winter 2012	
CpE 457	Clustering
CpE/EE 392	Senior Project Lab II
Fall 2012	
CpE 111	Introduction to Computer Engineering
Spring 2013	
CpE 458	Adaptive Critic Designs
CpE/EE 392	Senior Project Lab II

Fall 2013		
	CpE/EE 392	Senior Project Lab II
	CpE 358	Computational Intelligence
Spring 2014		
	CpE 457	Clustering
	CpE/EE 392	Senior Project Lab II
Fall 2014		
	CpE 5310	Computational Intelligence
	CpE/EE 4097	Senior Project Lab II
Spring 2015		
	CpE 6320	Adaptive Dynamic Programming
	CpE/EE 4097	Senior Project Lab II
Fall 2015		
	CpE 2210	Digital Logic Design
	CpE 5310	Computational Intelligence
Spring 2016		
	CpE 2210	Digital Logic Design
	CpE 6330	Clustering
Fall 2016		
	CpE 2210	Digital Logic Design
	CpE 6310	Markov Decision Processes
Spring 2017		
	CpE 2210	Digital Logic Design
	CpE 6320	Adaptive Dynamic Programming
Fall 2017		
	CpE 6001	Advanced Computational Intelligence
Spring 2018		
	CpE 6330	Clustering
Summer 2018		
	CpE 4999	Undergraduate Independent Study / Research
Fall 2018		
	CpE 6310	Markov Decision Processes
Spring 2019		
	CpE 6320	Adaptive Dynamic Programming
Fall 2019		
	CpE 6001	Advanced Computational Intelligence
Spring 2020		
	CpE 6330	Clustering
Fall 2020		
	CpE 6001	Adaptive Resonance Theory and Applications

## **Course Creation**

Created the following courses, new at its institution:  
Synthetic Intelligence, Artificial Intelligence, Adaptive Image Processing, Adaptive Critic Designs, Markov Decision Processes, Scientific Method in Computer Engineering, Clustering, Introduction to Robotics, Adaptive Dynamic Programming, Advanced Computational Intelligence, Adaptive Resonance Theory and Applications.

## **Languages**

English (native)  
German (fluent, capable of university-level lectures)  
Spanish (functional)  
Limited ability (traveler's level) in Russian, Vietnamese, and Mandarin

## **Consulting**

GoGetter, Inc. and its subsidiary, Guise AI (Scientific Advisor to the CEO)  
Intel, New Business Initiatives  
DeTao Group, Shanghai  
Chief Executive Officer, ASSET LLC (sold in 2016 to co-Founder Bryce Schumacher)  
Sandia National Laboratories  
White Sands Missile Range  
Accurate Automation Corporation  
Rockwell International  
Texas Tech University  
Boston University  
American University in Cairo  
Universita Degli Studi di Siena  
SAIC  
Idaho EPSCOR  
Greensfelder, Hemker and Gayle

## **Clearance**

Secret (During Boeing MX Missile Electromagnetic Pulse analysis. Currently inactive.)

## **Awards and Recognition**

INNS Ada Lovelace Service Award 2019  
Missouri University of Science & Technology Faculty External Recognition Award, 2016  
INNS Gabor Award, 2015

IEEE Fellow  
INNS Fellow  
INNS Senior Fellow (Leader of INNS Fellows) 2007-2014  
IEEE Electron Devices Society Distinguished Lecturer, 2005 - 2014  
IEEE Computational Intelligence Society Distinguished Lecturer, 2011-2014  
Charles Hedlund Distinguished Visiting Professor – American University in Cairo,  
National Science Foundation CAREER Award,  
Eta Kappa Nu, Phi Kappa Phi  
Academician, International Academy of Technological Cybernetics  
Academician, International Informatization Academy  
Halliburton Award for Excellence 94-95  
Who's Who in Science and Engineering 1999 - present.  
Selected to appear in “Four Noted Professors” for RollaMO '07 (the Yearbook).  
Beta Gamma Sigma  
Eagle Scout

### **Previous and Current Funding**

Over \$11 million of which my share of credit is over \$6.5 million. Sources include NSF, Boeing, DARPA, Sandia National Laboratories, Army Research Office, Ford Research Labs, and others. I served as sole or lead investigator in most of these contracts, and am highly skilled in both competitive and negotiated fundraising. Several of these contracts involved scouting for funds in non-obvious sources. These skills are transferable; I have learned them from others and passed them along to others. (Full list follows.)

## Funding Details

Amount	Wunsch credit	Agency	Dates	Title (Wunsch sole PI except were indicated)
\$ 12,500	\$ 12,500	CFAR	9/93 - 8/94	Intelligent Computing Project
\$ 225,800	\$ 225,800	NSF	9/94-8/97	Adaptive Critic Designs and Implementations
\$ 22,000	\$ 22,000	CFAR	9-94 - 8/95	ACIL
\$ 150,000	\$ 150,000	Cascade	9/94-8/95	VLSI Design Software Grant
\$ 90,000	\$ 90,000	ANRCP	6/95 - 1/97	Neural Network Surety Analysis
\$ 13,000	\$ 13,000	Army AI Ctr	8/95 - 12/96	Neural Network Radar Scheduling
\$ 112,000	\$ 112,000	ARO	9/95 - 8/98	AASERT (matching grant Army AI Center Project)
\$ 320,000	\$ 250,000	NSF	9/95 - 8/96	Academic Research Infrastructure Wunsch, PI, S. Mitra, Co-PI
\$ 14,000	\$ 14,000	CFAR	9/95 - 8/96	ACIL
\$ 10,500	\$ 10,500	NSF	9/95 - 8/96	REU Supplement (for Adaptive Critic Designs)
\$ 19,000	\$ 19,000	AAC	11/95 - 10/96	SBIR Subcontract: Neurocontrol Models
\$ 159,800	\$ 79,900	TX ARP	1/96 - 8/97	Neural Network Modeling of Cotton Wunsch, PI, D. Ethridge, Co-PI
\$ 48,295	\$ 48,295	Ford	1/96 - 11/97	Neurocontrol Research Contract
\$ 10,317	\$ 10,317	Boeing	5/96 - 8/96	Ejection Seat Research Contract
\$ 23,000	\$ 11,500	CFAR	9/96 - 8/97	Neural Mapping for Wind Energy Wunsch, PI, E. O'Hair, Co-PI
\$ 17,000	\$ 17,000	CFAR	9/96 - 8/97	ACIL
\$ 20,000	\$ 20,000	Boeing	5/97 - 8/97	Neural Networks Aerospace Control Applications
\$ 300,000	\$ 300,000	NSF	7/97 - 6/99	CAREER:Adaptive Intelligent Agents for Internet (Later transferred)

\$ 84,500	\$ 84,500	NSF	7/97 - 6/99	Adaptive Critic Designs (Accomplishment-Based Renewal) (Later transferred)
\$ 10,000	\$ 10,000	CFAR	7/97 - 8/98	ACIL
\$ 40,000	\$ 40,000	CER	7/97 - 8/00	CAREER: Adaptive Int...(matching grant)
\$ 45,000	\$ 45,000	CFAR	7/97 - 8/00	Adaptive Critic Designs (matching grant)
\$ 141,018	\$ 141,018	TX ARP	1/98 - 7/99	Detection of Tornadoes
\$ 296,000	\$ 148,000	INEEL	1/98 - 12/00	Intelligent Agents
				Wunsch, PI, J. Dunityak, Co-PI
\$ 25,372	\$ 25,372	Sandia	9/98 - 2/99	Adaptive Critic Designs in Intelligent Agents
\$ 37,118	\$ 37,118	Sawtek	11/98 - 5/99	Nonlinear Global Optimization
\$ 25,500	\$ 25,500	NSF	7/99 - 7/99	NSF/ACIL Neuro...Opportunities Workshop
\$ 496,000	\$ 248,000	NSF	10/99 - 9/02	CRCD Multidisciplinary Comp Eng (Later transferred)
				Wunsch, PI, J. Dunityak, Co-PI
\$ 241,500	\$ 241,500	NSF *	7/99 - 6/01	CAREER: Adaptive Intelligent Agents for the Internet
\$ 41,200	\$ 41,200	NSF *	7/99 - 6/00	Adaptive Critic Designs (Accomplishment-Based Renewal)
\$ 236,831	\$ 239,000	TTU *	10/99 - 9/02	Subcontract: NSF CRCD Multidisciplinary ...
				* The above three contracts were transferred from
				TTU to UMR and thus are not counted in the total,
				to avoid double counting.
\$ 25,967	\$ 25,967	Boeing	5/00 - 8/00	Summer 00 Research Contract 1
\$ 25,967	\$ 25,967	Boeing	5/00 - 8/00	Summer 00 Research Contract 2
\$ 23,536	\$ 23,536	Boeing	9/00 - 5/01	Decision Algorithms Integrated Vehicle Health Management
\$ 431,401	\$ 21,570	NSF	9/00 - 8/01	Development of Virtual ... Manufacturing
				(M. Leu, PI, et. al.)
\$ 12,500	\$ 625	MO Ent	7/00 - 6/01	Development of Virtual ... Manufacturing

				(M. Leu, PI, et. al.)
\$ 429,560	\$ 266,724	NSF	10/00 - 9/03	ACD Neurocontrollers for Nonlinear Large Scale ...
				Wunsch, PI, R. Harley, Co-PI
\$ 40,001	\$ 40,001	Sandia	11/00 - 9/01	Intrusion Detection
\$ 20,006	\$ 20,006	Boeing	5/01 - 8/01	Diagnostic / Prognostic Algorithms for IVHM
\$ 10,000	\$ 10,000	MO-RTC	8/01 - 8/01	Match for Diagnostic / Prognostic Algorithms for IVHM
\$ 37,449	\$ 37,449	Boeing	6/02 - 8/02	Integrated Vehicle Health Management
\$ 12,316	\$ 12,316	Boeing	6/02 - 8/02	Integrated Vehicle Health Management II
\$ 210,000	\$ 210,000	NSF	5/03 - 4/06	Scalable, Cellular Architectures, for Improving Solutions with Experie
\$ 103,458	\$ 103,458	Boeing	3/03 - 9/04	Technical Support for Vibration Diagnostic Algorithms
\$ 25,547	\$ 25,547	Boeing	3/03 - 9/03	Technical Support for Discrete Diagnostic Algorithms
\$ 70,000	\$ 17,500	NSF	11/02 - 10/03	SGER: Intelligent Adaptive Control of FACTS Devices in Distributed
				(Venayagamoorthy, PI, et. al.)
\$ 33,500	\$ 11,167	NSF	8/03 - 8/05	US- Brazil Collaborative Research: Feasibility Studies to Implement N
				(Venayagamoorthy, PI, et. al.)
\$ 45,159	\$ 45,159	NSF	9/03 - 8/06	Supplement: ACD for control of MEMS
\$ 230,000	\$ 57,500	NSF	6/04 - 5/07	Neural Network Based Wide Area Coordination and Local Control of
				(Crow, PI, et. al.)
\$ 230,751	\$ 230,751	Sandia	10/04 - 9/07	Knowledge Discovery via Sensor Fusion in Ad-Hoc Networks Project
\$ 42,112	\$ 42,112	Boeing	11/04 - 012/05	Engine Unbalance Detection in the Internal Stages
\$ 185,000	\$ 185,000	BBN - DARPA	1/05 - 3/06	Survivable Policy Influenced Networking: Disruption-tolerance throug
\$ 71,977	\$ 71,977	Boeing	11/05 -	Health Based Adaptive System Algorithms

			8/06	
\$ 240,000	\$ 60,000	NSF	5/06 - 4/09	Impulse Control of Nonlinear Systems with Uncertainties Using Neural Networks (Balakrishnan, PI, Wunsch, Co-PI)
\$ 37,075	\$ 37,075	Boeing	11/06 - 9/07	Health Based Adaptive System Algorithms
\$ 37,075	\$ 37,075	Boeing	11/06 - 9/07	Health Based Adaptive System Algorithms
\$ 299,986	\$ 239,989	NSF	8/07 - 7/10	Computer Go -- A Proxy for Key Open Challenges and Opportunities (Wunsch, PI, Venayagamoorthy, Co-PI)
\$ 80,000	\$ 80,000	21st Century Systems	9/07 - 3/08	Hybrid Intrinsic Cellular inference Network (STTR Subcontract)
\$ 32,250	\$ 8,063	NSF	8/07 - 4/09	Singapore supplement to Impulse Control of Nonlinear Systems with Uncertainties (Balakrishnan, PI, Wunsch, Co-PI)
\$ 89,840	\$ 89,840	Boeing	10/07 - 9/08	Health Based Adaptive System Algorithms
\$ 2,000,183	\$ 750,069	NSF	11/08 - 10/12	EFRI-COPN: Neuroscience and Neural Networks for Engineering the Next Generation (Venayagamoorthy, PI, Wunsch, Harley, Potter, Courzine, Co-PI's)
\$ 140,201	\$ 140,201	Boeing	10/08 - 9/09	Intelligent Adaptive System Algorithms
\$ 105,121	\$ 105,121	21st Century Systems	10/08 - 9/09	Hybrid Intrinsic Cellular inference Network (STTR Subcontract)
\$ 82,395	\$ 82,395	Boeing	5/09 - 9/09	Self-Aware Autonomous Swarms Testbed Integration
\$ 150,000	\$ 75,000	ONR	4/09 - 3/10	DURIP: A GPU-based High Performance Computing Cluster for Multi-Sensor Data Fusion (Wunsch, PI; Agarwahl, Tauritz, Venayagamoorthy, Co-PI's)
\$ 359,964	\$ 179,999	NSF	8/11 - 7/15	Collaborative Research: Wind Power - Neural Network Control, Multi-Sensor Data Fusion
\$ 16,052	\$ 16,052	Dept. Transportatio	08/13-12/13	CIES: Adapting Risk Management & Computational Intelligence Networks

		n		
\$ 217,780	\$ 47,836	NSF / UA	9/14 - 8/17	Toward Commercialization: Development of Neural Network Control
\$ 15,000	\$ 7,500	MST Innovation Fund	9/15 - 5/16	In-Memory Data Analytics System to Support Visualization in Autism
\$ 300,000	\$ 10,000	NSF / ASU	9/14 - 8/17	NSF EAGER: Building a Starting Core for No-Boundary Education and
\$ 922,744	\$ 138,412	Dept Education	8/15 - 7/19	Interdisciplinary GAANN Program in Electrical Engineering and Engi
\$ 202,000	\$ 202,000	DARPA / ARL	10/18 - 9/20	M2L for L2M: Mixed Modality Learning for Lifelong Learning
\$ 235,194	\$ 164,636	Army Leonard Wood Institute	4/19 - 8/20	Traumatic Brain Injury Statistical and Unsupervised Learning Analysis
\$ 114,974	\$ 114,974	Army NVESD	5/19-9/20	M2L for L2M Tech Transition
\$ 12,500	\$ 3,125	Ozark Biomedical Initiative	5/2019 - 4/2020	Validation of a novel method of nighttime activity analysis using clust
\$ 200,000	\$ 40,000	NSF	06/15/2020 - 05/31/2021	RAPID: A Novel Detector for Mitigating the Covid-19 Pandemic based on Phase Interrogated Ultra- sensitive Microwave Resonance, Huang, PI, Wunsch, Co-PI
\$ 200,000	\$ 200,000	Army NVESD	04/20 – 03/21	M2L for L2M Tech Transition continuation
<b>\$ 11,174,261</b>	<b>\$ 6,524,012</b>			