

**Education**

◦ **UNIVERSITY OF MARYLAND**

Ph.D. in Computer Science Sep 2014  
Dissertation title: “Neurocomputational Methods for Autonomous Cognitive Control”  
Committee chair: James Reggia  
M.S. in Computer Science May 2010  
Cumulative G.P.A. 4.00

◦ **UNIVERSITY OF NOTRE DAME**

B.S. in Computer Science, Magna cum Laude May 2006  
Cumulative G.P.A. 3.86

**Experience**

- **BOOZ ALLEN HAMILTON, Associate & Data Scientist** October 2014 – Present  
As a member of the Strategic Innovation Group, I have primarily worked to support a contract with Laboratory for Physical Sciences, a defense research organization. My work has focused on Machine Learning research, especially in the domain of computer security. I have developed software for feature extraction in cluster environments, and lead a project to evaluate deep learning techniques for our client. I am currently focusing on the synthesis of deep and recurrent neural architectures for application to non-natural languages and cyberdefense, as well as research in neuromorphic computing.
- **UMD SMITH SCHOOL, CTR. FOR COMPLEXITY IN BUSINESS, Doctoral Research Assistant** August 2012 – September 2014  
Studied the role of social networks on conversions to paid memberships in a freemium MMO game environment using large, dynamic, real-world network datasets. Developed software for large-scale data collection, analysis and visualization to study propagation of information and influence in Twitter and other social networks. (Research advisor: Dr. William Rand)
- **CENTER FOR ADVANCED STUDY OF LANGUAGE, Doctoral Research Assistant** August 2008 – July 2012  
Developed neurocomputational models of short-term working memory and executive function. Also investigated Machine Learning models to predict which subjects will benefit from working memory and language training regimes. (Research advisor: Dr. James Reggia)
- **UMD DEPT. OF COMPUTER SCIENCE, Graduate Research Assistant** January 2007 – July 2012  
Investigated topographic map formation in the sensory cortex through the use of Self-Organizing Map neural networks resulting in an article published in a top-3 AI journal, *Neural Networks*.
- **UMD DEPT. OF COMPUTER SCIENCE, Teaching Assistant** August – December 2006  
Taught twice weekly tutorials for two sections of CMSC 131 (Object Oriented Programming), and conducted lab and office hours in support of the same.
- **ND DEPT. OF COMPUTER SCIENCE & ENGINEERING, Teaching Assistant** August – December 2005  
Lead lab sessions and graded student work for “Advanced Programming in C/C++.”
- **NSF RESEARCH EXPERIENCE FOR UNDERGRADUATES, Summer Researcher** June – August 2005  
Conducted research in Machine Learning and Data Mining, focused on the application of Genetic Algorithms to heterogeneous ensemble formation, and the role of diversity in combining predictions. (Research advisor: Dr. Nitesh Chawla.)
- **QUANTUM-DOT CELLULAR AUTOMATA GROUP, Research Assistant** August 2004 – May 2005  
Designed and coded a logic-minimization tool to optimize the design of QCA-based processors, a quantum-molecular alternative to CMOS integrated circuits.
- **COMPUTER VISION RESEARCH LAB, Research Assistant** August 2003 – May 2004  
Acquired and processed digital images for the world’s largest biometrics research database using a variety of state-of-the-art software and hardware, including optical, infrared and laser-based 2D & 3D cameras.

## Publications

- Raff, Zak, SYLVESTER, Cox, Yacci, and McLean. "An investigation of byte  $n$ -gram features for malware classification." *Journal of Computer Virology*. September, 2016.
- SYLVESTER and Reggia. "Engineering Neural Systems for High-Level Problem Solving." *Neural Networks*, vol. 79, pp. 37–52. 2016.
- Rand, Darmon, SYLVESTER, and Girvan. "Will My Followers Tweet? Predicting Twitter Engagement using Machine Learning." European Marketing Academy Conference. June, 2014.
- SYLVESTER, Healy, Wang, and Rand. "Space, time, and hurricanes: Investigating the spatiotemporal relationship among social media use, donations, and disasters." Proc. ASE Int'l Conf. on Social Computing. May, 2014.
- Reggia, Monner, and SYLVESTER. "The Computational Explanatory Gap." *Journal of Consciousness Studies*, vol. 21(9–10), pp. 153–178. 2014.
- SYLVESTER and Rand. "Keeping Up with the (Pre-Teen) Joneses: The Effect of Friendship on Freemium Conversion." Proc. Winter Conf. on Business Intelligence. February, 2014.
- Darmon, SYLVESTER, Girvan, and Rand. "Understanding the Predictive Power of Computational Mechanics and Echo State Networks in Social Media." *ASE Human Journal*, vol. 2(2), pp. 13–24. 2013.
- SYLVESTER, Reggia, Weems, and Bunting. "Controlling Working Memory with Learned Instructions." *Neural Networks*, vol. 41, Issue on Autonomous Learning, pp. 23–38. 2013.
- Darmon, SYLVESTER, Girvan, and Rand. "Predictability of User Behavior in Social Media: Bottom-Up v. Top-Down Modeling." Proc. ASE/IEEE Int'l Conf. on Social Computing, pp. 102–107. 2013.
- SYLVESTER and Reggia. "The Neural Executive: Can Gated Attractor Networks Account for Cognitive Control?" Proc. Ann. Mtg. of the Int'l Assoc. for Computing & Philosophy. 2013.
- Reggia, Monner, and SYLVESTER. "The Computational Explanatory Gap." Proc. Ann. Mtg. of the Int'l Assoc. for Computing & Philosophy. 2013.
- SYLVESTER, Reggia, and Weems. "Cognitive control as a gated cortical net." Proc. Int'l Conf. on Biologically Inspired Cognitive Architectures, pp. 371–376. 2011.
- SYLVESTER, Reggia, Weems, and Bunting. "A temporally asymmetric Hebbian network for sequential working memory." Proc. Int'l Conf. on Cognitive Modeling, pp. 241–246. 2010.
- SYLVESTER and Reggia. "Plasticity-induced symmetry relationships between adjacent self-organizing topographic maps." *Neural Computation*, vol. 21(12), pp. 3429–3443. 2009.
- SYLVESTER, Weems, Reggia, Bunting, and Harbison. "Modeling interactions between interference and decay during the serial recall of temporal sequences." Proc. Psychonomic Society Ann. Mtg. 2009.
- Reggia, SYLVESTER, Weems, and Bunting. "A simple oscillatory short-term memory." Proc. AAAI Biologically-Inspired Cognitive Architecture Symposium, pp. 103–108. 2009.
- Chawla and SYLVESTER. "Exploiting diversity in ensembles: Improving the performance on unbalanced datasets." Proc. Multiple Classifier Systems, pp. 397–406. 2007.
- SYLVESTER and Chawla. "Evolutionary ensemble creation and thinning." Proc. IEEE Int'l Joint Conf. on Neural Networks, pp. 5148–5155. 2006.
- SYLVESTER and Chawla. "Evolutionary Ensembles: Combining learning agents using genetic algorithms." Proc. AAAI Workshop on Multi-Agent Systems, pp. 46–51. 2005.

## Graduate Course Work

Neural Computation  
Cognitive Science & Artificial Intelligence  
Geographic & Spatial Information Systems  
Computational Geometry  
Advanced Computer Graphics  
Machine Learning

Statistical Pattern Recognition  
Complex Systems in Business: Agent-Based Modeling  
& Social Network Analysis  
Nature-Inspired Artificial Intelligence  
Algorithmic Game Theory (audited)

## Academic Interests

Neural Networks & Artificial Intelligence  
Machine Learning & Data Mining  
Complex systems modeling & simulation  
Graphics & data visualization

## Personal Interests

Digital & algorithmic art, abstract animation  
Woodworking, calligraphy & print-making  
Economics, finance & computational business  
Baking bread & brewing cider