

EDUCATION**University of Maryland**

Ph.D. in Computer Science Sep 2014
Dissertation: “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

SUMMARY

I am a Computer Scientist with a background in Neural Networks, Machine Learning and Computational Modeling. I have been programming since the age of 11, and researching since 19. I have applied my skills to fields including data mining, biometrics, circuit design, cognitive psychology, finance, social networks, and marketing. I received my doctorate in 2014 for work in biologically-inspired AI. For the last two years I have been working as a Data Scientist at Booz Allen Hamilton. Donald Knuth defined science as ‘everything you can explain to a computer.’ This is a moving target, and I am interested in the application of algorithmic techniques to those fields where we can’t (yet) explain things fully to a computer.

EXPERIENCE

- **BOOZ ALLEN HAMILTON** October 2014 – Present
Associate & Data Scientist
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 OF BUSINESS, CTR. FOR COMPLEXITY IN BUSINESS August 2012 – September 2014
Doctoral Research Assistant
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 August 2008 – July 2012
Doctoral Research Assistant
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 January 2007 – July 2012
Graduate Research Assistant
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 August – December 2006
Teaching Assistant
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 August – December 2005
Teaching Assistant
Lead lab sessions and graded student work for "Advanced Programming in C/C++."
- NSF RESEARCH EXPERIENCE FOR UNDERGRADUATES June – August 2005
Summer Researcher
Research in Machine Learning and Data Mining, particularly focused on the application of Genetic Algorithms for heterogenous ensemble formation, and the role of diversity in combining predictions. (Research advisor: Dr. Nitesh Chawla.)
- QUANTUM-DOT CELLULAR AUTOMATA GROUP August 2004 – May 2005
Research Assistant
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 August 2003 – May 2004
Research Assistant
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

(Papers are available for download at www.jsylvest.com/home.html#pubs)

Journal Papers

- E. Raff, R. Zak, J. SYLVESTER, R. Cox, P. Yacci, and M. McLean. "An investigation of byte n -gram features for malware classification." *Journal of Computer Virology*. September, 2016.
- J. SYLVESTER and J. Reggia. "Engineering Neural Systems for High-Level Problem Solving." *Neural Networks*, vol. 79, pp. 37–52. 2016.
- J. Reggia, D. Monner, and J. SYLVESTER. "The Computational Explanatory Gap." *Journal of Consciousness Studies*, vol. 21(9–10), pp. 153–178. 2014.
- D. Darmon, J. SYLVESTER, M. Girvan, and W. 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.
- J. SYLVESTER, J. Reggia, S. Weems, and M. Bunting. "Controlling Working Memory with Learned Instructions." *Neural Networks*, vol. 41, Issue on Autonomous Learning, pp. 23–38. 2013.
- J. SYLVESTER and J. Reggia. "Plasticity-induced symmetry relationships between adjacent self-organizing topographic maps." *Neural Computation*, vol. 21(12), pp. 3429–3443. 2009.

Conference Proceedings

- W. Rand, D. Darmon, J. SYLVESTER, and M. Girvan. "Will my followers tweet? Predicting Twitter engagement using machine learning." Proc. of the European Marketing Academy Conference. June, 2014.
- J. SYLVESTER, J. Healy, C. Wang, and W. 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.
- J. SYLVESTER and W. Rand. "Keeping up with the (pre-teen) Joneses: The effect of friendship on freemium conversion." Proc. Winter Conf. on Business Intelligence. February, 2014.
- D. Darmon, J. SYLVESTER, M. Girvan, and W. 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.
- J. SYLVESTER and J. Reggia. "The Neural Executive: Can gated attractor networks account for cognitive control?" Proc. Ann. Mtg. of the Int'l Assoc. for Computing & Philosophy. 2013.
- J. Reggia, D. Monner, and J. SYLVESTER. "The computational explanatory gap." Proc. Ann. Mtg. of the Int'l Assoc. for Computing & Philosophy. 2013.
- J. SYLVESTER, J. Reggia, and S. Weems. "Cognitive control as a gated cortical net." Proc. of the Int'l Conf. on Biologically Inspired Cognitive Architectures, pp. 371–376. 2011.

- J. SYLVESTER, J. Reggia, S. Weems, and M. Bunting. "A temporally asymmetric Hebbian network for sequential working memory." Proc. of the Int'l Conf. on Cognitive Modeling, pp. 241–246. 2010.
- J. SYLVESTER, S. Weems, J. Reggia, M. Bunting, and I. Harbison. "Modeling interactions between interference and decay during the serial recall of temporal sequences." Proc. of the Psychonomic Society Annual Meeting. 2009.
- J. Reggia, J. SYLVESTER, S. Weems, and M. Bunting. "A simple oscillatory short-term memory." Proc. of the AAAI Biologically-Inspired Cognitive Architecture Symposium, pp. 103–108. 2009.
- N. Chawla and J. SYLVESTER. "Exploiting diversity in ensembles: Improving the performance on unbalanced datasets." Proc. Int'l Conf. on Multiple Classifier Systems, pp. 397–406. 2007.
- J. SYLVESTER and N. Chawla. "Evolutionary ensemble creation and thinning." Proc. of the IEEE Int'l Joint Conf. on Neural Networks, pp. 5148–5155. 2006.
- J. SYLVESTER and N. Chawla. "Evolutionary ensembles: Combining learning agents using genetic algorithms." Proc. of the AAAI Workshop on Multi-Agent Systems, pp. 46–51. 2005.

Reports

- J. SYLVESTER, J. Reggia, and S. Weems. "Predicting improvement on working memory tasks with machine learning techniques." UMD Center for Adv. Study of Languages. Technical Report. 2011.

In Preparation & Submitted

- J. SYLVESTER and J. Reggia. "Iteratively Refined One-Shot Learning: Balancing Improvement with Task-Switching on the WCST." Submitted.
- J. SYLVESTER. "Maximizing Diffusion on Dynamic Social Networks." Under revision.
- J. SYLVESTER and J. Reggia. "Modeling Cognitive Control of Working Memory as a Gated Cortical Network." Invited book chapter. In preparation.

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
Multi-agent systems
Graphics & data visualization

PROGRAMMING & TECHNICAL SKILLS

| | | |
|------------|---------------|------------------|
| C/C++ | Python | Shell scripting |
| Matlab | JavaScript | (Bash, Sed, Awk) |
| Ruby | Maya & MEL | Perl |
| Processing | Spark | SQL |
| LaTeX | Caffe & Keras | Hive |

PERSONAL INTERESTS

Digital & algorithmic art, abstract animation
Woodworking, calligraphy & print-making
Economics, finance & the application of computation to business
Baking bread & brewing cider

Compute what is computable and make computable what is not so.