|  |  |
| --- | --- |
| Jared Sylvester, Ph.D. | Curriculum Vitæ |

4649 Hallowed Stream, Ellicott City, MD 21042 *[◦](http://www.jsylvest.com/)*301 *[·](https://twitter.com/jsylvest)* 922 *[·](https://twitter.com/jsylvest)* 2576 [jared@jsylvest.com](mailto:jared@jsylvest.com) *◦*[www.jsylvest.com](http://www.jsylvest.com/) *◦*[@jsylvest](https://twitter.com/jsylvest)

Summary

I am a Computer Scientist and Data 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 cybersecurity, computer vision, AI ethics, biometrics, circuit design, cognitive psychology, social networks, and marketing. I received my doctorate in 2014 for work in biologically-inspired AI. For the last five years I worked as a Data Scientist and Machine Learning researcher at Booz Allen Hamilton, mostly doing research in Deep Learning with application to cybersecurity. More recently I have moved to Amazon to help them establish a Data Science team to support AWS Security.’ This is a moving target, and Donald Knuth defined science as ‘everything you can explain to a computer.

I am interested in the application of algorithmic techniques to those fields where we can’t (*yet*) explain things fully to a computer.

Education

*◦***University of Maryland**   
 Ph.D. in Computer Science September 2014 Dissertation: “Neurocomputational Methods for Autonomous Cognitive Control”  
 Committee chair: James Reggia   
 M.S. in Computer Science May 2010

*◦***University of Notre Dame**   
 B.S. in Computer Science, Magna cum Laude May 2006

Experience

*◦*Amazon Web Services   
 *Data Scientist, AWS Security*

August 2019 – Present

I build very large scale data analytic tools to enhance the security of AWS and its customers. These tools are deployed and active 24/7 , operating up to the petabyte scale to defend some of AWS’ most used ser-vices by extracting actionable patterns to support both automatic mitigations and hands-on investigations.

*◦*University of Maryland, Baltimore County   
 *Adjunct Professor, Master of Professional Studies in Data Science*

January 2019 – December 2019

I taught the introductory course to professionals seeking certificates and masters degrees in Data Sci-ence. I was responsible for weekly lectures, preparation of presentations *&* demos, course assignments and grading. The course covered elementary Python, data gathering *&* cleaning, exploratory data analysis, relevant mathematics, machine learning and visualization.

|  |  |
| --- | --- |
| Jared Sylvester | *2* |

*◦*Booz Allen Hamilton   
*Senior Lead Data Scientist / Lead Associate Lead Data Scientist / Associate*   
*Staff Data Scientist / Senior Consultant*

January 2019 – August 2019 January 2017 – December 2018 October 2014 – December 2016

As a member of the Strategic Innovation Group, I primarily worked to support a contract with the Lab-oratory for Physical Sciences, a defense research organization. My work focused on Machine Learning research, especially in the domain of computer security. I developed software for feature extraction in cluster environments, and lead a project to evaluate deep learning techniques for our client. I focused on deep neural architectures for application to non-natural languages and cyberdefense, as well as research in neuromorphic computing. I also worked on internal investment projects developing machine learning techniques to mitigate algorithmic bias. Additionally, I assisted my team administratively by acting as our liaison for recruiting.

*◦*UMD Smith School of Business, Center 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 en- vironment 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 in-vestigated Machine Learning models to predict which subjects will benefit from working memory and

language training regimes.

*◦*UMD Department of Computer Science *Graduate Research Assistant*

(Research advisor: Dr. James Reggia)

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*.

*Teaching Assistant*  August – December 2006 Taught twice weekly tutorials for two sections of CMSC 131 (Object Oriented Programming), and con-ducted lab and office hours in support of the same.

|  |  |
| --- | --- |
| *◦*ND Department of Computer Science *&* Engineering *Teaching Assistant* | August – December 2005 |

Lead lab sessions and graded student work for “Advanced Programming in C/C++.”  
*Summer Researcher, NSF Research Experience for Undergraduates*  June – August 2005 Research in Machine Learning and Data Mining, particularly focused on the application of Genetic Algo-rithms for heterogeneous ensemble formation, and the role of diversity in combining predictions.

(Research advisor: Dr. Nitesh Chawla.) *Research Assistant, Quantum-dot Cellular Automata Group*  August 2004 – May 2005 Designed and coded a logic-minimization tool to optimize the design of QCA-based processors, a quan-tum-molecular alternative to CMOS integrated circuits.

|  |  |
| --- | --- |
| Jared Sylvester | *3* |

Publications

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

**Journal Papers**

*◦*J.Sylvester and E.Raff. “Trimming the thorns of AI Fairness research.” *IEEE Data Engineering*, vol. 43(4),

pp. 76–90. 2020. (Invited.)

*◦*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*, vol. 14(1), pp. 1–20. 2018.

*◦*J.Sylvester and J.Reggia. “Engineering Neural Systems for High-Level Problem Solving.” *Neural Net-*

*works*, 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 Instruc-

tions.” *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**

*◦*E.Raff, J.Sylvester, S.Forsyth and M.McLean. “Barrage of Random Transforms for Adversarially Robust

Defense.” Conference on Computer Vision and Pattern Recognition (CVPR). 6–20 June, 2019.

*◦*W.Fleshamn, E.Raff, J.Sylvester, S.Forsyth and M.McLean. “Non-Negative Networks Against Adversar-

ial Attacks.” AAAI Workshop on Artificial Intelligence for Cyber Security (AICS). 27 January, 2019.

*◦*E.Raff and J.Sylvester. “Linear models with many cores and CPUs: A stochastic atomic update scheme.”

IEEE Conference on Big Data. 10–13 December, 2018.

*◦*E.Raff, J.Sylvester and C.Nicholas. “Engineering a Simplified 0-Bit Consistent Weighted Sampling.” Con-

ference on Information and Knowledge Management (CIKM). 22–26 October, 2018.

*◦*E.Raff and J.Sylvester. “Gradient Reversal Against Discrimination: A Fair Neural Network Learning Ap-

proach.” IEEE Conference on Data Science and Advanced Analytics (DSAA). 1–4 October, 2018.

*◦*E.Raff and J.Sylvester. “Gradient Reversal Against Discrimination.” Fairness, Accountability & Trans-

parency in Machine Learning (FAT/ML). 15 July, 2018.

*◦*J.Sylvester and E.Raff. “What about applied fairness?” ICML: The Debates. 15 July, 2018.

*◦*E.Raff, J.Sylvester and S.Mills. “Fair Forests: Regularized Tree Induction to Minimize Model Bias.”

AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society (AIES). February, 2018.

*◦*E.Raff, J.Barker, J.Sylvester, R.Brandon, B.Catanzaro and C.Nicholas. “Malware detection by eating a

whole EXE.” AAAI Workshop on Artificial Intelligence for Cyber Security (AICS). February, 2018.

|  |  |
| --- | --- |
| Jared Sylvester | *4* |

*◦*E.Raff, J.Sylvester and C.Nicholas. “Learning the PE header: Malware detection with minimal domain

knowledge.” ACM Workshop on Artificial Intelligence and Security (AISec), pp. 121–132. October, 2017 .

*◦*W.Rand, D.Darmon, J.Sylvester and M.Girvan. “Will my followers tweet? Predicting Twitter engage-

ment 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 spatiotem-

poral 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 se-

quential 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 interfer-

ence 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 algo-

rithms.” Proc. of the AAAI Workshop on Multi-Agent Systems, pp. 46–51. 2005.

**Talks**

*◦*J.Sylvester and W.Fleshman. “Resisting adversarial attacks on machine learning malware detectors.”

GPU Technology Conference DC. 22–24 October, 2018.

*◦*J.Sylvester, E.Raff and R.Brandon. “Malware Detection by Eating a Whole EXE.” GPU Technology Con-

ference DC. October, 2017 .

|  |  |
| --- | --- |
| Jared Sylvester | *5* |

*◦*E.Raff and J.Sylvester. “Fighting Malware with Machine Learning.” GPU Technology Conference DC. October, 2016.

*◦*J.Sylvester. “Predictability of User Behavior in Social Media: Bottom-Up v. Top-Down Modeling.” AAAI Fall Symposium on Social Networks and Social Contagion. November 2013. (Invited.)

*◦*J.Sylvester and D.Darmon. “Predictability of User Behavior in Social Media.” Complexity in Business Conference. November 2013.

Graduate Course Work

Neural Computation   
Machine Learning   
Statistical Pattern Recognition   
Cognitive Science *&* Artificial Intelligence   
Geographic *&* Spatial Information Systems   
Computational Geometry   
Advanced Computer Graphics   
Complex Systems in Business: Agent-Based Modeling *&* Social Network Analysis Nature-Inspired Artificial Intelligence   
Algorithmic Game Theory (audited)

Programming *&* Technical Skills

|  |  |  |
| --- | --- | --- |
| Spark | Python | Shell scripting |
| Matlab | C/C++ | Perl |
| Ruby | Maya *&* MEL | SQL, Presto |
| Processing | Keras, Tensorflow *&* PyTorch | LaTeX |

Certified Instructor, NVIDIA Deep Learning Institute

Academic Interests   
Machine Learning *&* Artificial Intelligence Neural Networks

Personal Interests   
Digital *&* algorithmic art, abstract animation Woodworking, calligraphy *&* print-making

Complex systems modeling *&* simulation Baking bread

Multi-agent systems

Graphics *&* data visualization

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