

Alexander Ororbia II

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My research focuses on the development of computational models and algorithms in the space of biomimetic intelligence and brain-inspired computing. I design cognitive control architectures as well as modeling frameworks for neural circuits and agent systems in the context of neurorobotics, machine learning, computational neuroscience, and cognitive science.

Education

Academic Qualifications.....

Pennsylvania State University, University Park

Ph.D., Information Sciences & Technology

2013–2018

Minor in Social Data Analytics

Bucknell University, Lewisburg

B.S. Computer Science & Engineering

2009–2013

Minor in Mathematics and a Minor in Philosophy

Employment

Rochester Institute of Technology

Tenure-Track Assistant Professor, Computer Science

2018–present

Affiliate Professor, Psychology; Affiliate Faculty, Center for Applied Neuroscience

Research Experience.....

University of Massachusetts, Amherst

Research Externship

2015

Visiting scholar for Dr. Andrew McCallum in the IESL Laboratory, worked on language modeling using deep neural architectures.

Pennsylvania State University, University Park

Graduate Assistantship

2013–2018

Doctoral researcher under Dr. C. Lee Giles & Dr. David Reitter.

Pennsylvania State University, University Park

Summer Research Position

2013–2014

Summer research assistant for Dr. C. Lee Giles, worked on intelligent, topical web crawling.

Bucknell University, Lewisburg

Spring & Summer Research Position

2013–2014

Worked with Dr. Joseph V. Tranquillo (Biomedical Engineering) on computational modeling of creative dynamical systems.

Bucknell University, Lewisburg

Interpreters: Spring Semester Research Position

2013–2014

Worked with Dr. Benoit Razet & Dr. Lea Wittie in developing an educational Lambda Calculus interpreter.

Bucknell University, Lewisburg

Embedded Systems: Summer Research Position

2012–2013

Platform Development with Android and Integration of the Kernel-Space Component of the FINS Framework, Advisor Dr. Michael Thompson, Professor Electrical Engineering Department.

Bucknell University, Lewisburg

Graphics: Summer Research Position

2010–2011

The Collection and Organization of Facts Pertaining to the History of Computer Graphics Hardware, Advisor Dr. Joshua Steinhurst, Asst. Professor Computer Science Department.

Teaching Experience.....

The Pennsylvania State University, University Park

IST 597 (Foundations of Deep Learning)

2017

Co-lecturer, teaching assistant, designed course assignments/syllabus and worked with Dr. C. Lee Giles to design the course.

The Pennsylvania State University, University Park
CSE/IST 597 (Advances & Applications in Deep Learning) 2017
Co-lecturer (general machine learning, deep learning), helped design/prepare the course.

The Pennsylvania State University, University Park
CSE 597 (Computational Linguistics) 2017
Guest lecturer (neural language modeling/dialogue modeling).

The Pennsylvania State University, University Park
Mentorship 2017
Mentoring Shikun Liu, undergraduate student in Electrical Engineering. Project focused on learning latent variables models of voxelized 3D shapes.

The Pennsylvania State University, University Park
Mentorship/Management 2016-present
Joint project lead with Dr. Jian Wu for neural compression team (on behalf of Dr. Lee Giles). Mentored one undergraduate student (Scott O'Connell) & two Masters students (Yanbo Sun & Ankur Mali). Project has focused on designing algorithms and neural models for efficient, large-scale image compression.

The Pennsylvania State University, University Park
Mentorship 2016-2017
Mentored Yanbo Sun, Masters student in Electrical Engineering (passed defense summer 2016). Project involved building neural-based, video compression systems.

Work Experience.....

New Providence, New Jersey
Interactions, LLC 2016-2017
Summer intern for Dr. Ryan Price and Patrick Haffner, conducted an exploratory study on neural language models.

The Pennsylvania State University, University Park
Part-time Summer Research Consultant 2014
Worked with Darla Lindberg of the architecture department on initial design of resource management and recommendation software system for charitable food distribution facilities.

Bucknell University, Lewisburg
Classroom and Events Support L&IT 2009-2012
Office of Diversity & Equity, and later for Bertrand Library.

Grants

2022-Present: Cisco Corporate Grant Funding/Gift - \$100,000, funded
Project: *Disentangled Representation Learning Through Predictive Coding* (PI: Alexander G. Ororbia II)

2022-Present: MiQroTech Corporate Grant Funding - \$52,317, funded
Project: *Predictive Analytics Using Streaming IoT Data* (PI: Alexander G. Ororbia II)

2022-Present: NSF - Cyber-Physical Systems (CPS) - \$499,899, funded
Project: *CPS: Small: Informed Contextual Bandits to Support Decision-Making for Intelligent CPS*
(PI: Daniel Krutz; Co-PI: Travis Desell, Alexander G Ororbia II; 9/22 - 9/25)

2022-Present: Meta Reality Labs Funding - \$299,555, funded
Project: *Improved Semantic Segmentation with Natural Gaze Dynamics (SOW2)*
(PI: Gabriel Diaz, co-PI: Reynold Bailey, Senior Personnel: Alexander G. Ororbia II)

2021-Present: RIT Dean's Research Initiation Grant (D-RIG) Seed Funding - \$15,000, funded
Project: *Machine Learning for Visually Guided Action Through Active Inference*
With: Gabriel Diaz, Reynold Bailey, Brett Fajen (RPI)

2019-Present: RIT Grant Writers Boot Camp Seed Funding - \$5,000, funded
Project: *Neurocognitively-Motivated Conversational Assistants Based on Distributed Representations*

Courses Taught

2023, Spring: CSCI 736: Neural Networks & Machine Learning, Rochester Institute of Technology

2022, Fall: CSCI 635: Introduction to Machine Learning, Rochester Institute of Technology

2022, Spring: CSCI 633: Biologically-Inspired Intelligent Systems, Rochester Institute of Technology

2021, Fall: CSCI 635: Introduction to Machine Learning, Rochester Institute of Technology

2021, Spring: CSCI 736: Neural Networks & Machine Learning, Rochester Institute of Technology

2020, Fall: CSCI 635: Introduction to Machine Learning, Rochester Institute of Technology
2020, Spring: CSCI 736: Neural Networks & Machine Learning, Rochester Institute of Technology
2019, Fall: CSCI 635: Introduction to Machine Learning (listed as CSCI 739 at this time), Rochester Institute of Technology
2019, Spring: CSCI 633: Biologically-Inspired Intelligent Systems, Rochester Institute of Technology
2018, Fall: CSCI 630: Introduction to Intelligent Systems, Rochester Institute of Technology

Activities and External Service

Reviewing.....

2023–present: Reviewer for PLOS Computational Biology
2023–present: Reviewer for Neural Networks
2020–present: Reviewer for Nature Communications
2022–present: Reviewer for IEEE Transactions on Artificial Intelligence
2022: Senior programming committee member for the Conference on Lifelong Learning Agents (CoLLAs).
2021–present: Reviewer for MDPI Entropy
2019–present: Reviewer for IEEE Transactions on Neural Networks and Learning Systems
2019–2020: Reviewer for Human Factors: The Journal of the Human Factors and Ergonomics Society
2019: Reviewer for Uncertainty in Artificial Intelligence (UAI)
2019: Reviewer for International Conference of Machine Learning (ICML)

Book Chapters

Travis Desell, AbdElRahman ElSaid and **Alexander G. Ororbia II**. “Investigating Deep Recurrent Connections and Recurrent Memory Cells Using Neuro-Evolution”. In *H. Iba and N. Noman: Deep Neural Evolution – Deep Learning with Evolutionary Computation*. 36 pages. Springer. 2020.

Publications

2023.....

Timothy Zee, Ankur Mali, **Alexander G. Ororbia II**, Ifeoma Nwogu. “A Robust Backpropagation-Free Framework for Images”. In: *Transactions on Machine Learning Research* (In Press; *arXiv:2206.01820 [cs.NE, cs.LG]*).

Alexander G. Ororbia II, Karl Friston. “Mortal Computation: A Foundation for Biomimetic Intelligence”. *arXiv:2311.09589 [q-bio.NC]*.

Alexander G. Ororbia II, Mary Alexandria Kelly. “A Neuro-mimetic Realization of the Common Model of Cognition via Hebbian Learning and Free Energy Minimization”. *arXiv:2310.15177 [q-bio.NC, cs.AI]*.

Tommaso Salvatori, Ankur Mali, Christopher L. Buckley, Thomas Lukasiewicz, Rajesh P. N. Rao, Karl Friston, **Alexander G. Ororbia II**. “Brain-Inspired Computational Intelligence via Predictive Coding”. *arXiv:2308.07870 [cs.AI]*.

AbdElRahman ElSaid, Karl Ricanek, Zimeng Lyu, **Alexander G. Ororbia II**, Travis Desell. “Backpropagation-free 4D Continuous Ant-based Neural Topology Search”. In: *Applied Soft Computing* (Volume 147, November 2023: 110737.)

Zimeng Lyu, **Alexander G. Ororbia II**, Travis Desell. “Online Evolutionary Neural Architecture Search for Multivariate Non-stationary Time Series Forecasting”. In: *Applied Soft Computing* (Volume 145, September 2023: 110522.)

Alexander G. Ororbia II. “Learning Spiking Neural Systems with the Event-Driven Forward-Forward Process”. *arXiv:2303.18187 [cs.LG]*.

Alexander G. Ororbia II, Ankur Mali. “Active Predicting Coding: Brain-Inspired Reinforcement Learning for Sparse Reward Robotic Control Problems”. In: *IEEE International Conference on Robotics and Automation (ICRA)*

Alexander G. Ororbia II, Ankur Mali. “Convolutional Neural Coding: Scaling Predictive Coding to Natural Images”. In: *Proceedings of the Annual Meeting of the Cognitive Science Society*. Volume 45

Alexander G. Ororbia II. “Spiking Neural Predictive Coding for Continual Learning from Data Streams”. In: *Neurocomputing* (Volume 544, August 2023: 126292.)

Alexander G. Ororbia II, Ankur Mali. “The Predictive Forward-Forward Algorithm”. *Proceedings of the Annual Meeting of the Cognitive Science Society*. Volume 45 (Abstract; *arXiv:2301.01452 [cs.LG]*).

Authors marked by a * contributed equally.

2022.....

Alexander G. Ororbia II*, Ankur Mali*, Dan Kifer, and C. Lee Giles. "Large-Scale Gradient-Free Deep Learning with Recursive Local Representation Alignment". In: *Thirty-Seventh AAAI Conference on Artificial Intelligence (AAAI)* *arXiv:2002.03911 [cs.LG]* (Accepted Paper).

Alexander G. Ororbia II, Ankur Mali, Daniel Kifer, and C. Lee Giles. "Lifelong Neural Predictive Coding: Learning Cumulatively Online without Forgetting". In: *Thirty-sixth Conference on Neural Information Processing Systems (NeurIPS)*. ArXiv Link: *arXiv:1905.10696 [cs.LG]* (Accepted Paper.).

Camille Mince, Skye Rhomberg, Cecilia Alm, Reynold Bailey, and **Alexander G. Ororbia II**. "Multimodal Modeling of Task-Mediated Confusion". In: *Proceedings of the 2022 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies: Student Research Workshop*.

Alexander G. Ororbia II and M. Alex Kelly. "Learning using a Hyperdimensional Predictive Processing Cognitive Architecture". In: *15th International Conference on Artificial General Intelligence*.

Alexander G. Ororbia II and M. Alex Kelly. "CogNGen: Constructing the Kernel of a Hyperdimensional Predictive Processing Cognitive Architecture". In: *Proceedings of the Annual Meeting of the Cognitive Science Society*. Volume 44.

Alexander G. Ororbia II and Dan Kifer. "The Neural Coding Framework for Learning Generative Models". In: *Nature Communications* Volume 13 (pg 1-14). (**Selected to be in Editors' Highlights in Applied Physics and Mathematics, and Selected to be featured in "Neuromorphic Computing and Hardware" Collection.**)

Alexander G. Ororbia II and Ankur Mali. "Backprop-Free Reinforcement Learning with Active Neural Generative Coding". In: *Thirty-Sixth AAAI Conference on Artificial Intelligence*. (AAAI).

Hitesh Ulhas Vaidya, Travis Desell, and **Alexander G. Ororbia II**. "Reducing Catastrophic Forgetting in Self-Organizing Maps with Internally-Induced Generative Replay". In: *Thirty-Sixth AAAI Conference on Artificial Intelligence*. (AAAI).

2021.....

Ankur Mali, **Alexander G. Ororbia II**, Daniel Kifer, and C. Lee Giles . "Investigating Backpropagation Alternatives when Learning to Dynamically Count with Recurrent Neural Networks". In: *International Conference on Grammatical Inference (ICGI)*. PMLR.

Ankur Mali, **Alexander G. Ororbia II**, Daniel Kifer, and C. Lee Giles . "Recognizing Long Grammatical Sequences using Recurrent Networks Augmented with an External Differentiable Stack". In: *International Conference on Grammatical Inference (ICGI)*. PMLR.

Alexander G. Ororbia II. "Continual Competitive Memory: A Neural System for Online Task-Free Lifelong Learning". *arXiv:2105.07308 [cs.LG]*.

Nikhil Kaushik, Reynold Bailey, **Alexander G. Ororbia II**, Cecilia O Alm. "Eliciting Confusion in Online Conversational Tasks". In: *9th International Conference on Affective Computing and Intelligent Interaction Workshops and Demos (ACIIW)*.

Alexander G. Ororbia II and M. Alex Kelly. "Towards a Predictive Processing Implementation of the Common Model of Cognition". In: *Proceedings of the 19th International Conference on Cognitive Modelling (ICCM)*. (Extended Abstract).

TC Weerasooriya, **Alexander G. Ororbia II**, Christopher H. Homan. "Improving Label Quality by Jointly Modeling Items and Annotators". *arXiv:2106.10600 [cs.LG]*.

AbdElRahman ElSaid, Joshua Karns, Zimeng Lyu, **Alexander G. Ororbia II**, and Travis Desell. "Continuous Ant-Based Neural Topology Search". In: *International Conference on the Applications of Evolutionary Computation (EvoStar)*.

Ankur Mali, **Alexander G. Ororbia II**, and C. Lee Giles. "The Neural State PushDown Automaton". In: *IEEE Transactions on Artificial Intelligence*.

Tharindu Ranasinghe, Diptanu Sarkar, Marcos Zampieri, **Alexander Ororbia**. "WLV-RIT at SemEval-2021 Task 5: A Neural Transformer Framework for Detecting Toxic Spans". *arXiv:2104.04630 [cs.LG]*.

Ankur Mali, **Alexander G. Ororbia II**, Dan Kifer, and C. Lee Giles. "Recognizing and Verifying Mathematical Equations using Multiplicative Differential Neural Units". In: *Thirty-Fifth AAAI Conference on Artificial Intelligence*. (AAAI).

Ankur Mali, **Alexander G. Ororbia II**, Daniel Kifer, and C. Lee Giles . "An Empirical Analysis of Recurrent Learning Algorithms In Neural Lossy Image Compression Systems". In: *2021 Data Compression Conference (DCC)*. IEEE.

2020.....

Alexander G. Ororbia II*, Ankur Mali*, C. Lee Giles, and Daniel Kifer. "Continual Learning of Recurrent Neural Networks by Locally Aligning Distributed Representations". In: *IEEE Transactions on Neural Networks and Learning Systems*.

Ankur Mali, **Alexander G. Ororbia II**, and C. Lee Giles . "Sibling Neural Estimators: Improving Iterative Image Decoding with Gradient Communication". In: *2020 Data Compression Conference (DCC)*.

AbdElRahman ElSaid, Joshua Karns, Zimeng Lyu, and Daniel Krutz, **Alexander Ororbia II**, Travis Desell. "Improving Neuroevolutionary Transfer Learning of Deep Recurrent Neural Networks through Network-Aware Adaptation". In: *The Genetic and Evolutionary Computation Conference (GECCO)*.

AbdElRahman ElSaid, Joshua Karnas, Zimeng Lyu, and Daniel Krutz, **Alexander G Ororbia II**, Travis Desell . “Neuro-Evolutionary Transfer Learning Through Structural Adaptation”. In: *International Conference on the Applications of Evolutionary Computation*.

Travis Desell, AbdElRahman ElSaid, and **Alexander G. Ororbia II** . “An Empirical Exploration of Deep Recurrent Connections and Memory Cells Using Neuro-Evolution”. In: *International Conference on the Applications of Evolutionary Computation*.

AbdElRahman ElSaid, **Alexander G. Ororbia II**, and Travis Desell. “Ant-based Neural Topology Search (ANTS) for Optimizing Recurrent Networks”. In: *International Conference on the Applications of Evolutionary Computation*.

2019.....

Ankur Mali, C. Lee Giles, and **Alexander G. Ororbia II**. “The Neural State Pushdown Automata”. *arXiv:1908.08655 [cs.LG]*.

Alexander G. Ororbia II, Ankur Mali, Matthew Kelly, and David Reitter. “Like a Baby: Visually Situated Neural Language Acquisition”. In: *The 57th Annual Meeting of the Association for Computational Linguistics (ACL)*.

Alexander G. Ororbia II*, AbdElRahman ElSaid, and Travis Desell*. “Investigating Recurrent Neural Network Memory Structures using Neuro-Evolution”. In: *The Genetic and Evolutionary Computation Conference (GECCO)*.

Alexander G. Ororbia II*, Ankur Mali*. “Biologically Motivated Algorithms for Propagating Local Target Representations”. In: *Thirty-Third AAAI Conference on Artificial Intelligence (AAAI)*.

Alexander G. Ororbia II, Ankur Mali, Jian Wu, Scott O’Connell, David Miller, and C. Lee Giles. “Learned Iterative Decoding for Lossy Image Compression Systems”. In: *Data Compression Conference (DCC)*.

Anand Gopalakrishnan, Ankur Mali, Daniel Kifer, C. Lee Giles, and **Alexander G. Ororbia II**. “A Neural Temporal Model for Human Motion Prediction”. In: *Conference on Computer Vision and Pattern Recognition (CVPR)*.

2018.....

Alexander G. Ororbia II, Ankur Mali, Daniel Kifer, and C. Lee Giles. “Deep Credit Assignment by Aligning Local Distributed Representations”. *arXiv:1803.01834 [cs.LG]*.

Shikun Liu, C. Lee Giles, and **Alexander G. Ororbia II***. “Learning a Hierarchical Latent-Variable Model of 3D Shapes”. In: *International Conference on 3D Vision (3DV)*. (* Senior author.)

Qinglong Wang, Kaixuan Zhang, **Alexander G. Ororbia II**, Xinyu Xing, Xue Liu, and C Lee Giles. “A Comparison of Rule Extraction for Different Recurrent Neural Network Models and Grammatical Complexity”. *arXiv:1801.05420 [cs.LG]*.

Alexander G. Ororbia II. “Coordinated Local Learning Algorithms for Continuously Adaptive Neural Systems”. Ph.D. Thesis. <https://etda.libraries.psu.edu/catalog/15737ago109>.

2017.....

Alexander G. Ororbia II, Patrick Haffner, David Reitter, and C. Lee Giles. “Learning to Adapt by Minimizing Discrepancy”. *arXiv:1711.11542 [cs.LG]*.

Alexander G. Ororbia II, Tomas Mikolov, and David Reitter. “Learning Simpler Language Models with the Differential State Framework”. In: *Neural Computation* (Volume 29, Issue 12, pp. 3327-3352).

Iulian Serban*, **Alexander G. Ororbia II***, Joelle Pineau, and Aaron Courville. “Piecewise Latent Variables for Neural Variational Text Processing”. In: *Proceedings of Empirical Methods in Natural Language Processing*, Copenhagen, Denmark (pp. 422-432).

Dafang He, Xiao Yang, Chen Liang, Zihan Zhou, **Alexander G. Ororbia II**, Daniel Kifer, C Lee Giles. “Multi-scale FCN with Cascaded Instance Aware Segmentation for Arbitrary Oriented Word Spotting In The Wild”. In: *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, Honolulu, Hawaii (pp. 3519-3528).

Alexander G. Ororbia II, C. Lee Giles, and Daniel Kifer. “Unifying Adversarial Training Algorithms with Data Gradient Regularization”. In: *Neural Computation* (Volume 29, Issue 4, pp. 867-887).

Alexander G. Ororbia II, David Reitter, and C. Lee Giles. “The Temporal Neural Coding Network: Towards Lifelong Language Learning”. 11th Annual Machine Learning Symposium. <https://www.nyas.org/events/2017/11th-annual-machine-learning-symposium/>. (Peer-reviewed, accepted poster and spotlight talk).

Qinglong Wang, Wenbo Guo, Kaixuan Zhang, **Alexander G. Ororbia II**, Xinyu Xing, Xue Liu, and C. Lee Giles. “Adversary Resistant Deep Neural Networks with an Application to Malware Detection”. In: *Proceedings of the 23rd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, Halifax, Nova Scotia, Canada (pp. 1145-1153).

Qinglong Wang, Kaixuan Zhang, **Alexander G. Ororbia II**, Xinyu Xing, Xue Liu, C. Lee Giles. “An Empirical Evaluation of Rule Extraction from Recurrent Neural Networks”. *arXiv:1709.10380 [cs.LG]*.

Bill McDowell, Nathanel Chambers, **Alexander G. Ororbia II**, and David Reitter. “Event Ordering with a Generalized Model for Sieve Prediction Ranking”. In: *Proceedings of the 8th International Joint Conference on Natural Language Processing (IJCNLP)*, Taipei, Taiwan.

Xiao Yang, Dafang He, Wenyi Huang, **Alexander G. Ororbia II**, Zihan Zhou, Daniel Kifer, C Lee Giles. "Smart Library: Identifying Books on Library Shelves Using Supervised Deep Learning for Scene Text Reading". In: *Proceedings of ACM/IEEE Joint Conference on Digital Libraries (JCDL)*, Toronto, Ontario, Canada (pp. 245-248).

2016.....

C. Lee Giles and **Alexander G. Ororbia II**. "Recurrent Neural Networks: State Machines and Pushdown Automata". The 33rd International Conference on Machine Learning (ICML): Neural Nets Back To the Future Workshop, Crowne Plaza in New York City, NY, USA. <https://sites.google.com/site/nnb2tf/>. (Invited talk).

Alexander G. Ororbia II. "Deep Learning Applied". *2016 International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRIMS)*, Washington DC, USA. (Accepted tutorial).

Qinglong Wang, Wenbo Guo, Kaixuan Zhang, **Alexander G. Ororbia II**, Xinyu Xing, C. Lee Giles, and Xue Liu. "Learning Adversary-Resistant Deep Neural Networks". *arXiv:1612.01401 [cs.LG]*.

Shuting Wang, **Alexander G Ororbia II**, Zhaohui Wu, Kyle Williams, Chen Liang, Bart Pursel, and C Lee Giles. "Using Prerequisites to Extract Concept Maps from Textbooks". In: *Proceedings of the 25th ACM International on Conference on Information and Knowledge Management*, Indianapolis, Indiana, USA (pp. 317-326).

Qinglong Wang, Wenbo Guo, **Alexander G. Ororbia II**, Xinyu Xing, Lynn Lin, C. Lee Giles, Xue Liu, Peng Liu, and Gang Xiong. "Using Non-invertible Data Transformations to Build Adversary-Resistant Deep Neural Networks". *arXiv:1610.01934 [cs.LG]*.

Alexander G Ororbia II, Fridolin Linder, and Joshua Snoko. "Using Neural Generative Models to Release Synthetic Twitter Corpora with Reduced Stylometric Identifiability of Users". *arXiv:1606.01151 [cs.LG]*.

2015.....

Alexander G. Ororbia II, C. Lee Giles, and David Reitter. "Online Semi-Supervised Learning with Deep Hybrid Boltzmann Machines and Denoising Autoencoders". *arXiv:1511.06964 [cs.LG]*.

Alexander G. Ororbia II, David Reitter, Jian Wu, and C Lee Giles. "Online learning of deep hybrid architectures for semi-supervised categorization". In: *Proceedings of Joint European Conference on Machine Learning and Knowledge Discovery in Databases*, Porto, Portugal (pp. 516-532).

Alexander G Ororbia II, C Lee Giles, and David Reitter. "Learning a Deep Hybrid Model for Semi-Supervised Text Classification". In: *Proceedings of Empirical Methods in Natural Language Processing*, Lisbon, Portugal (pp. 471-481).

Alexander G Ororbia II, Yang Xu, Vito D'Orazio, David Reitter. "Error-Correction and Aggregation in Crowd-Sourcing of Geopolitical Incident Information". In: *Proceedings of Social Computing, Behavioral-Cultural Modeling, and Prediction: 8th International Conference*, Washington, DC, United States (pp. 381-387).

Alexander G Ororbia II, Jian Wu, Madian Khabsa, Kyle Williams, and C. Lee Giles. "Big Scholarly Data in CiteSeerX: Information Extraction from the Web". In: *Proceedings of the 24th International Conference on World Wide Web*, Florence, Italy (pp. 597-602).

Hung-Hsuan Chen, **Alexander G Ororbia II**, and C Lee Giles. "ExpertSeer: a Keyphrase Based Expert Recommender for Digital Libraries". *arXiv preprint arXiv:1511.02058*.

2014.....

Alexander G Ororbia II, Jian Wu, and C Lee Giles. "CiteSeerX: Intelligent Information Extraction and Knowledge Creation from Web-Based Data". *4th Workshop on Automated Knowledge Base Construction (AKBC) (at NIPS 2014)*, Montreal, Canada.

Jian Wu, **Alexander G Ororbia II**, Kyle Williams, Madian Khabsa, Zhaohui Wu, and C Lee Giles. "Utility-based control feedback in a digital library search engine: Cases in CiteSeerX". *9th International Workshop on Feedback Computing (Feedback Computing 14) (USENIX)*, Philadelphia, Pennsylvania, USA.

Jian Wu, Kyle Williams, Hung-Hsuan Chen, Madian Khabsa, Cornelia Caragea, **Alexander G Ororbia II**, Douglas Jordan, and C Lee Giles. "CiteSeerX: AI in a Digital Library Search Engine". *Annual Conference on Innovative Applications of Artificial Intelligence (IAAI)*, Quebec City, Quebec, Canada. (Best Application Paper).

Zhaohui Wu, Jian Wu, Madian Khabsa, Kyle Williams, Hung-Hsuan Chen, Wenyi Huang, Suppawong Tuarob, Sagnik Ray Choudhury, **Alexander G Ororbia II**, Prasenjit Mitra, and C Lee Giles. "Towards building a scholarly big data platform: Challenges, lessons and opportunities". In: *Proceedings of the 14th ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL)*, London, United Kingdom.

Service

External Service.....

2023: NSF Intelligent Information Systems (IIS) panelist member (reviewer for Robust Intelligence)

2022: NSF Intelligent Information Systems (IIS) panelist member (reviewer for Robust Intelligence)

University Service.....

2023: Served as faculty recruiter volunteer for the RIT Future Faculty Career Exploration Program at the SREB Institute on Teaching and Mentoring (COMPACT Conference)

2023: Cognitive Science / Psychology Hiring Committee - member

2023: Cognitive Science Joint Program Committee - Program Liason for Computer Science

2022-Present: Served on the Submissions Committee for the annual Graduate Education Week Symposium

2022-Present: Served as mentor/speaker for the RIT Future Faculty Career Exploration Program

Departmental Service.....

2023-Present: Co-chair of RIT NSF AWARE-AI winter retreat

2023-Present: Co-coordinator of RIT NSF AWARE-AI lab rotations

2021-Present: Hiring Committee - member

2019: MS Curriculum Committee - member

2018-Present: Colloquium Committee - member

2018-Present: ICPC Programming Competition Coach

Department and University Proposals.....

2020: Was a co-writer of/contributor to the "Strategic Incremental Cluster Faculty Hire in Computing-Education Research" proposal submitted to the Provost (on behalf of the Department of Computer Science)

2019-Present: Was a co-writer of the "Doctor of Philosophy in Cognitive Science" proposal submitted to the Provost to push for the development of Cognitive Science department at RIT (was one of the first to plan the program design with leads Dr. Alm and Dr. Rantanen), proposal has made it through several rounds of approval to date

Advising

Ph.D. Graduate Students.....

2023-Present: Faezeh Habibi

Research: Predictive coding, causal learning and disentanglement

2022-Present: Viet Dung Nguyen

Research: Active inference and robotic control, domain adaptation

2021-Present: William Gebhardt

Research: Spiking neural networks, Reinforcement learning, cognitive modeling

2019-Present: Zhizhuo Yang (Co-advised w/ Dr. Reynold Bailey at RIT)

"Generalizing Active Inference to Modeling Perception, Action, and Continual Learning"

2022-Present: Hong Yang (Co-advised w/ Dr. Travis Desell at RIT)

Research: Model uncertainty, out-of-distribution/outlier Detection

2018-2022: Ankur Mali (Co-advised w/ Dr. C. Lee Giles at Pennsylvania State University)

"Theoretically Deriving Computational Limits of Artificial Neural Networks with Bounded Precision and Time", Dissertation Committee Member/Co-Advisor/Mentor

2019-2020: AbdElRahman ElSaid (Co-advised w/ Dr. Travis Desell at RIT)

"Nature-Inspired Topology Optimization of Recurrent Neural Networks", Dissertation Committee Member/Co-Advisor

MSc Graduate Students.....

2023-Present: Daniel Fishbein

Project/Research: Spiking neural networks and audio signal processing

2021: Goldy Malhotra (graduated)

"Investigating Vector Space Embeddings for Database Schema Management"

2019-2021: Hitesh Ulhas Vaidya (graduated)

"Reducing Catastrophic Forgetting in Self-Organizing Maps"

2019-2020: James Le, MSc Thesis (graduated)

"MetaRec: Meta-Learning Meets Recommendation Systems", Thesis Chair

2019-2020: Michael Peechat (graduated)

"DANIEL: Towards Automated Bug Discovery By Black Box Test Case Generation & Recommendation", Thesis Chair

B.Sc. Honors Thesis Undergraduate Students.....

2023-Present: Chanel Cheng (Honors Thesis)

Research: Spiking neural networks and dynamic control, reward-modulated spike-timing dependent plasticity

MSc & Ph.D. Committee Member.....

2021: Goldy Malhotra, MSc Thesis

“Investigating Vector Space Embeddings for Database Schema Management”, Reader (Co-Advisor w/ Dr. Michael Mior)

2021: Antonio Carta, Ph.D. Dissertation (University of Pisa, Italy)

“Memorization in Recurrent Neural Networks”, Invited External Reviewer

2021: Diptanu Sarkar, MSc Thesis

“An Empirical Study of Offensive Language in Online Interactions”, Reader (Mentor)

2020: Sahaj Gandhi, MSc Thesis

“Context Sensitive Image Denoising and Enhancement using U-Nets”, Reader

2019: Igor Khokhlov, Ph.D. Dissertation

“Integrated Framework for Data Quality and Security Evaluation on Mobile Devices”, Dissertation Committee Member

2018: Yanbo Sun, MSc Thesis (Penn State University)

“An Experimental Analysis of Predictive Coding Based On Artificial Neural Networks for Image Decoding”, Thesis Committee Member (Mentor)

Student Research Activities.....

2022: AWARE-AI NSF Research Traineeship (NRT)

Served as Faculty Mentor

2023: Brock Dyer, Undergraduate Independent Study/Capstone

“Metaheuristic Optimization Benchmarking and Statistical Evaluation”, Mentor/Advisor

2023: Tanner Bradford, MSc Capstone

“On Evaluating Generative Adversarial Networks and Variational Autoencoders”, Mentor/Advisor

2022-Present: NSF - Research Experiences for Undergraduates (REU)

Served as Faculty Team Advisor & Project Lead (Team #5)

2021: NSF - Research Experiences for Undergraduates (REU)

Served as Faculty Team Advisor & Project Lead (Team #5)

2021: Matthew Smith, MSc Capstone

“Analysis of Feature Imputation Methods for Statistical Sports/Athlete Modeling”, Mentor/Advisor

2021: Anthony Dicarolo, MSc Capstone

“Building Statistical Sports Models with Sparse Data”, Mentor/Advisor

2020-2021: Kedar Nadkarni, MSc Capstone (graduated)

“Learning Distributed Representations of Database Schemas”, Co-Advisor (w/ Dr. Michael Mior)

2020: Sagar Khanna, MSc Capstone (graduated)

“Column Name Prediction Using Recurrent Neural Networks”, Co-Advisor (w/ Dr. Michael Mior)

2019-2020: Xu Sun, MSc Capstone (graduated) (Preceded by MSc Independent Study)

“Improving Medical Data Quality with Statistical Learning Approaches”, Advisor

2019-2020: Perry Deng, Undergraduate Independent Study (graduated)

“Realistic Differentiable Garment Estimation and Dressing”, Mentor/Advisor

2019: Nate Glod, Undergraduate Independent Study (graduated)

“Argicida: Robust Adversarial Patches Against BlackBox Object Recognition Architectures”, Mentor/Advisor

2019: Eric Moss, Undergraduate Independent Study (graduated)

“Robust Adversarial Vision Architectures”, Mentor/Advisor

Awards & Honors

- Nominated to be plenary speaker for AAAI 2023 Fall Symposium Series: Integration of Cognitive Architectures and Generative Models
- Selected Feature Article in Nature Communications “Neuromorphic Hardware and Computing” Collection (2023) - “The Neural Coding Framework for Learning Generative Models”
- Nature Communications Editor’s Choice Article (2022) - “The Neural Coding Framework for Learning Generative Models”

- Nengo Summer School (2019, accepted participant)
- CIFAR-CRM Deep Learning Summer School (2016, accepted participant)
- Alfred P. Sloan Scholar (2014-2015 cohort, merit-based)
- NSF IGERT Fellow (2014-2016, merit-based)
- Jordan Rednor Fellow (2013, merit-based)
- Bunton Waller Scholar (2013-2014, 2016-2017, merit-based)

Affiliations

- Penn State Alumni Association
- Bucknell Alumni Association
- Alpha Lambda Delta Honor Society
- Omicron Delta Kappa Honor Society
- Bucknell Engineering Alumni Association
- Association of Computing Machinery (Student member)
- Society of Hispanic Engineers (Founder & charter member of local Bucknell chapter)
- The National Society of High School Scholars

Professional Activities

- Association for Computing Machinery (ACM) - Member
- Invited Speaker - "Towards a Predictive Processing Implementation of the Common Model of Cognition", VSA Webinar Series, Department of Computer Science, Electrical and Space Engineering, Luleå University of Technology (2021)
- Invited Speaker - "Neurobiologically-Inspired Lifelong Machine Learning with Neural Generative Coding", Colloquium Speaker Series, Department of Cognitive Science, Rensselaer Polytechnic Institute (2021, recieved honorarium)
- Invited Speaker - "Continual Learning of Recurrent Neural Networks by Locally Aligning Distributed Representations", ContinualAI, Online Speaker Series (2020)
- Invited Speaker - "Neurobiologically-Motivated Lifelong Machine Learning", Salesforce Research, Palo Alto, CA (2019)
- Bucknell National Society of Hispanic Engineers (2011-2012) Drafted club's constitution - charter member, Vice President
- Bucknell Association of Computing Machinery (2010-2012) - Treasurer
- Bucknell Engineering Student Research Symposium Presented "The Collection and Analysis of Facts Surrounding the History of Graphics Hardware" research (2011)
- Bucknell Engineering Student Research Symposium Presented "The Collection and Organization of Facts Pertaining to the History of Computer Graphics Hardware" research (2010)
- Bucknell Big Questions/Answers Symposium (2009)
- Bucknell Engineering Student Research Symposium, Presented 3D Modeling/Animation independent research (2009)
- Bucknell Issues of the 21st Century Symposium (Participant) (2008)