

Tyler J. Banks

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EXPERTISE	Computer Science, Machine Learning, Computational Neuroscience, Software Engineering, Research, Publication, Infrastructure Automation, Cyber Security
EDUCATION 2023	University of Missouri Columbia, Missouri PhD, Computer Science – Computational Neuroscience/Machine Learning Dissertation: Neural Modeling Case Studies at Biophysical, Machine Learning, and Automation Levels [pdf] Advisor: Dr. Satish Nair
2016	University of Missouri Columbia, Missouri Master of Computer Science Thesis Project: CNN-Fold: Protein Fold Recognition by Deep Convolutional Neural Networks Advisor: Dr. Jainlin Cheng
2013	University of Texas at San Antonio San Antonio, Texas BBA Infrastructure Assurance (Cyber Security) Minor: Computer Science Advisor: Dr. Nicole Beebe
INDUSTRY EXPERIENCE	More than a decade working full-time in the professional computing field, with experience in software engineering, artificial intelligence, devops infrastructure, cybersecurity and academia.
2022-Present	Software Engineer - Machine Learning Pipeline Team, Techcyte Inc. , Orem, UT <ul style="list-style-type: none">• Developed software for and maintained the machine learning pipeline responsible for classification and post-processing of blood, spore, and vet-related image scans.• Wrote monitoring solutions and improved classifier stability using Python, Golang, Docker• Completed AWS projects using EC2, Elastic Container Service, SQS, CloudWatch, IAM• Responsible for deployment of several new classification stacks and major architecture changes
2018-2023	Co-Founder and CTO, VUCA News Inc. [https://vucanews.com], Bethesda, MD <ul style="list-style-type: none">• Developed a modular, docker-based, API microservice-style infrastructure. Facilitated all aspects of web development, data collection, processing and presentation.• Utilization and development of supervised, unsupervised, and reinforcement learning-based machine learning models to predict future geo-political trends• Wrote grant applications for various government agencies for funding
2017-2022	Cyber Security Analyst , City of Columbia, Columbia, Missouri <ul style="list-style-type: none">• Developed web-based vulnerability reporting systems responsible for reducing network vulnerabilities by more than 90% over the course of one year.• Established and managed a comprehensive, multi-year security training curriculum for more than 1400 City employees. This includes yearly mandatory web-based training, phishing campaigns and weekly cybersecurity information updates citywide.• Wrote City-wide cybersecurity policy, procedures, and incident response plans that put the City of Columbia ahead of its peers using industry metrics• Security Information and Event Management (SIEM) development using the ELK stack, UNIX system management and automation, PowerShell and UNIX scripting, PKI/Crypto

- 2015-2017 **Software Developer II**, Shelter Insurance, Columbia, Missouri
- SCRUM/Team-based, interdepartmental programming projects -used Java, HTML, PHP, JavaScript SQL, jQuery, REST, Spring/Boot and git.
- 2012 **Cyber Security Intern**, Pacific Northwest National Laboratory, Richland, Washington
- Identified web-based attacks on the company network, developed scripts, documented policy
- 2009 - 2011 **Computer/Media Technician**, Lackland Independent School District, San Antonio, Texas
- Supported staff, developed student ID system, maintained technology infrastructure

TEACHING EXPERIENCE

Broad range of topics covered as a Teaching Assistant over many years, with experience designing curriculum, developing new teaching tools, grading, overseeing labs, and lecturing

- 2022 - Present **Adjunct – Computer Science**, Department of Computer Science and Cybersecurity, University of Central Missouri
- CS 4150: Object Oriented Programming and Data Structures
 - Developed curriculum and delivered lectures to incoming graduate students coming from diverse academic backgrounds
- Fall 2018 – Fall 2023 **Teaching Assistant**, Department of Electrical Engineering and Computer Science, University of Missouri
- CMP_SC 4970W & 4980W: Computer Science Senior Capstone Design I & II
 - Aided in designing prototype CS senior projects and feedback on essays
- 2020 **Teaching Assistant**, Department of Electrical Engineering and Computer Science, University of Missouri
- CMP_SC 7580/4580: Neural Models and Machine Learning
 - Developed curriculum for machine learning and pipeline automation tasks
 - Lead a team of developers and designed an original docker-based cyber infrastructure that allows students to access and run to all software needed for their course. [lab.cyneuro.org]
- Summer 2018 **Teaching Assistant**, Department of Electrical Engineering and Computer Science, University of Missouri
- ECE 4995: Undergraduate Honors Research in Computational Neuroscience (13 students)
 - Lecturing position, assisted in development of curriculum (Hodgkin-Huxley theory)
- Fall/Spring 2016 **Teaching Assistant**, Department of Computer Science, The University of Missouri
- CMP_SC 4320: Software Engineering (50+ students)
 - Supervised and assisted 14 team programming projects using Scrum software development
- 2012 - 2013 **Undergraduate TA**, Department of Business, The University of Texas at San Antonio
- Java I and Java II - Instructional aid for student programming homework and projects

RESEARCH EXPERIENCE

Broad range of research in the cross section of machine learning and neuroscience

- 2018 – 2023 **Veterans Health Administration (VHA/VA) WOC Affiliate Researcher**
Harry S. Truman Memorial Veterans' Hospital, Columbia, Missouri
- Data Scientist position – deep neural network, random forest, and linear regression modeling
- 2017 – 2023 **Neural Engineering Laboratory Researcher**
University of Missouri, Columbia, Missouri
- Contributed to a team of PhD student researchers aiming to analyze biologically realistic neural networks. Projects include single cell crustacean cardiac ganglion, Hippocampal Theta models, 27,000 cell+ Amydala models, micturition, and LFP prediction using machine learning

- Designed programs ([SimAgent](#), [BMTools](#), and [SimBuilder](#)) in Python/Tkinter that streamlined the process of designing and running large-scale neural simulations on supercomputers.
- Mentored undergraduate seniors in the design of senior projects – eg: automation of parameter selection in small networks and automated rejection sampling
- Maintaining [CyNeuro.org](#) website (PHP, HTML, CSS)
- Listed contributor to the Allen Institute’s Brain Modeling Toolkit ([BMTK](#)) on GitHub

2011 – 2013

Research Assistant

University of Texas at San Antonio, San Antonio, Texas

- Developed offsite malware analysis facilities to study statistical prevalence of malicious code
- Custom software and scripts (Bash, Python) written to facilitate the needs of a government client

DISTINCTIONS

- Alumni –
 - Dr. Satish Nair’s Neural Engineering Lab, 2023
 - Dr. Jainlin Cheng’s Bioinformatics, Data Mining and Machine Learning Lab, 2016

AWARDS

- NSF SFS **Grant** Recipient 2011 – **\$50,000** award that financed final two years of undergraduate education

**PUBLICATIONS
AND POSTERS**

Banks T, Scherrer J, Tung T, Uhlmann J, Nair SS (2023) Predicting opioid use disorder before and after the opioid prescribing peak in the United States: a machine learning tool using electronic healthcare records, *Health Informatics Journal* [[open access link](#)]

Tuna T#, **Banks T**#, Glikert G, Sevinc C, Nair SS, Unal G, “**Anatomical and Computational Investigation of Basal Forebrain Innervation of the Amygdala**” (to be submitted to *Brain Structure and Function*) 2024

Banks T, Omelyusik V, Nair S, “Pipeline for Biophysical Modeling of a Large Class of Neurons” Manuscript fully drafted, 2024

Banks T “Neural Modeling Case Studies at Biophysical, Machine Learning, and Automation Levels” University of Missouri Dissertation [[pdf](#)]

Opsal N, Canfield P, **Banks T**, Nair S, “**An Efficient Pipeline for Biophysical Modeling of Neurons,**” IEEE EMBS Conference on Neural Engineering (NER’21), [Paper](#), May 4-6, 2021

Banks T, Tuna T, Canfield P, Unal G, Nair SS “Model of the Generation of the Amygdala Theta Rhythm” IEEE EMBS Conference on Neural Engineering (NER’21), [Poster](#), May 4-6, 2021

Banks T, Guntu V, Hummos A M, Nair S, “Resonant and synchronizing mechanisms in a hippocampal theta model,” Japan Neuroscience Society [Presentation](#) and [Poster](#), Kobe, Japan, Jul 31, 2020

Wei Q, **Banks T**, Latimer B, Chen Z, Nair S, “**Automating development of biophysical single cell models**” Society for Neuroscience [Poster](#), Chicago, IL, Oct 21, 2019

Nair S, **Banks T**, Latimer B, Chen Z, Lyu Z, Chen Z, Dopp D, Fotoohighiam A, Calyam P, Joshi T, Xu D, “**Software automation for research and training in neural engineering,**” Society for Neuroscience [Poster](#), Chicago, IL, Oct 21, 2019

Banks T, Guntu V, Hummos A M, Nair S, “**Characterizing resonant and synchronizing mechanisms in a hippocampal theta model**,” Society for Neuroscience Poster, Chicago, IL, Oct 20, 2019

Dopp D, **Banks T**, Samarath P, Kick D, Schulz D, Nair S, “**Detailed biologically realistic model of a crustacean cardiac ganglion network**,” Society for Neuroscience Poster, Chicago, IL, Oct 20, 2019

Latimer B, **Banks T**, Gahl M, Guntu V, Schulz D, Nair S, “**Computational modeling of the neural circuit of rodent lower urinary tract**,” Society for Neuroscience Poster, Chicago, IL, Oct 19, 2019

Latimer B, Chen Z, **Banks T**, Ho D, V Kanta Chantzi, D B Headly, D Pare, Nair SS, “**Artificial neural networks for prediction of the local field potential**,” Society for Neuroscience Poster, San Diego, Ca, Nov 7, 2018.

Banks T, Wang J, Samarth P, Kick D, Schulz DJ, Nair SS, “**Structure of large cells in crab cardiac ganglion - a computational study**,” Society for Neuroscience Poster, San Diego, Ca, Nov 5, 2018.

Latimer B, **Banks T**, Ankathatti A, Calyam P, Nair SS, “**Software automation for biologically realistic neuro big data simulations**,” Big Data Neuroscience Workshop: Organized by the Advanced Computational Neuroscience Network (ACNN), Cleveland, OH, Sept 6-7, 2018

Banks T “**CNN-Fold: Protein Fold Recognition by Deep Convolutional Neural Networks**”, Unpublished Master Thesis Project, University of Missouri, Columbia, Missouri, May 2016 [pdf] [ppt]

SKILLS AND QUALIFICATIONS

Computing skills: Programming, Computer Science, Machine Learning, Artificial Intelligence, Algorithms, Languages: Python, Golang, Java, C, C++, C#, Sed, Awk, MATLAB, Octave, JavaScript, TypeScript, PHP, SQL, Cypher

- Public speaking, training, and speechwriting
- Outstanding written and oral communications
- Knowledge of the university environment and tools
- Highly adaptable and capable of learning new skills quickly

PROFESSIONAL ASSOCIATIONS

- 2011 - Associate of ISC² CISSP
- 2009 - CompTIA A+, Network+, Security+
- Society for Neuroscience student member
- IEEE member