

# Tyler J. Banks

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<b>EXPERTISE</b>	Computer Science, Machine Learning, Computational Neuroscience, Software Engineering, Research, Publication, Infrastructure Automation, Cyber Security
<b>EDUCATION</b> 2023	<b>University of Missouri</b> Columbia, Missouri <b>PhD, Computer Science – Computational Neuroscience/Machine Learning</b> <b>Dissertation:</b> Neural Modeling Case Studies at Biophysical, Machine Learning, and Automation Levels [ <a href="#">pdf</a> ] Advisor: Dr. Satish Nair
2016	<b>University of Missouri</b> Columbia, Missouri <b>Master of Computer Science</b> <b>Thesis Project:</b> CNN-Fold: Protein Fold Recognition by Deep Convolutional Neural Networks Advisor: Dr. Jainlin Cheng
2013	<b>University of Texas at San Antonio</b> San Antonio, Texas <b>BBA Infrastructure Assurance</b> (Cyber Security) Minor: Computer Science Advisor: Dr. Nicole Beebe
<b>INDUSTRY EXPERIENCE</b>	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	<b>Senior Software Engineer - Machine Learning Pipeline Team, Techcyte Inc.</b> , Orem, UT <ul style="list-style-type: none"><li>• Developed software for and maintained the machine learning pipeline responsible for classification and post-processing of blood, spore, and vet-related image scans.</li><li>• Researched and implemented a new image-segmentation software stack with Mask RCNN</li><li>• Wrote monitoring solutions and improved classifier stability using Python, Golang, Docker</li><li>• Completed AWS projects using EC2, ECS, SQS, CloudWatch, IAM, Lambda</li><li>• Responsible for deployment of several new classification stacks, major architecture changes, and web applications (eg. client-side DICOM de-identification app)</li></ul>
2018-2023	<b>Co-Founder and CTO, VUCA News Inc.</b> [ <a href="https://vucanews.com">https://vucanews.com</a> ], Bethesda, MD <ul style="list-style-type: none"><li>• Developed a modular, docker-based, API microservice-style infrastructure. Facilitated all aspects of web development, data collection, processing and presentation.</li><li>• Utilization and development of supervised, unsupervised, and reinforcement learning-based machine learning models to predict future geo-political trends</li><li>• Designed and developed a FastAPI-based infrastructure for serverless collection of web information. Utilized AWS Lambda, Elasticsearch, automated testing, and Gitlab CI/CD.</li></ul>
2017-2022	<b>Cyber Security Analyst</b> , City of Columbia, Columbia, Missouri <ul style="list-style-type: none"><li>• Developed web-based vulnerability reporting systems responsible for reducing network vulnerabilities by more than 90% over the course of one year.</li><li>• 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.</li><li>• Wrote City-wide cybersecurity policy, procedures, and incident response plans that put the City of Columbia ahead of its peers using industry metrics</li><li>• Security Information and Event Management (SIEM) development using the ELK stack, UNIX system management and automation, PowerShell and UNIX scripting, PKI/Crypto</li></ul>

2015-2017	<b>Software Developer II</b> , Shelter Insurance, Columbia, Missouri <ul style="list-style-type: none"> <li>• SCRUM/Team-based, interdepartmental programming projects -used Java, HTML, PHP, JavaScript SQL, jQuery, REST, Spring/Boot and git.</li> </ul>
2012	<b>Cyber Security Intern</b> , Pacific Northwest National Laboratory, Richland, Washington <ul style="list-style-type: none"> <li>• Identified web-based attacks on the company network, developed scripts, documented policy</li> </ul>
2009 - 2011	<b>Computer/Media Technician</b> , Lackland Independent School District, San Antonio, Texas <ul style="list-style-type: none"> <li>• Supported staff, developed student ID system, maintained technology infrastructure</li> </ul>
<b>TEACHING EXPERIENCE</b>	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	<b>Adjunct – Computer Science</b> , Department of Computer Science and Cybersecurity, University of Central Missouri <ul style="list-style-type: none"> <li>• CS 4700: Artificial Intelligence [<a href="#">course link</a>]</li> <li>• CS 4150: Object Oriented Programming and Data Structures</li> <li>• Developed curriculum and delivered lectures to incoming graduate students coming from diverse academic backgrounds</li> </ul>
Fall 2018 – Fall 2023	<b>Teaching Assistant</b> , Department of Electrical Engineering and Computer Science, University of Missouri <ul style="list-style-type: none"> <li>• CMP_SC 4970W &amp; 4980W: Computer Science Senior Capstone Design I &amp; II</li> <li>• Aided in designing prototype CS senior projects and feedback on essays</li> </ul>
2020	<b>Teaching Assistant</b> , Department of Electrical Engineering and Computer Science, University of Missouri <ul style="list-style-type: none"> <li>• CMP_SC 7580/4580: Neural Models and Machine Learning</li> <li>• Developed curriculum for machine learning and pipeline automation tasks</li> <li>• 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. [<a href="#">lab.cyneuro.org</a>]</li> </ul>
Summer 2018	<b>Teaching Assistant</b> , Department of Electrical Engineering and Computer Science, University of Missouri <ul style="list-style-type: none"> <li>• ECE 4995: Undergraduate Honors Research in Computational Neuroscience (13 students)</li> <li>• Lecturing position, assisted in development of curriculum (Hodgkin-Huxley theory)</li> </ul>
Fall/Spring 2016	<b>Teaching Assistant</b> , Department of Computer Science, The University of Missouri <ul style="list-style-type: none"> <li>• CMP_SC 4320: Software Engineering (50+ students)</li> <li>• Supervised and assisted 14 team programming projects using Scrum software development</li> </ul>
2012 - 2013	<b>Undergraduate TA</b> , Department of Business, The University of Texas at San Antonio <ul style="list-style-type: none"> <li>• Java I and Java II - Instructional aid for student programming homework and projects</li> </ul>
<b>RESEARCH EXPERIENCE</b>	Broad range of research in the cross section of machine learning and neuroscience
2018 – 2023	<b>Veterans Health Administration (VHA/VA) WOC Affiliate Researcher</b> Harry S. Truman Memorial Veterans' Hospital, Columbia, Missouri <ul style="list-style-type: none"> <li>• Data Scientist position – deep neural network, random forest, and linear regression modeling</li> </ul>

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
- Maintained [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**

Tuna T\*, **Banks T\***, Glickert G, Sevinc C, Nair S, Unal G, “**Basal forebrain innervation of the amygdala: an anatomical and computational exploration**” *Brain Structure and Function* 230, 30 (2025). <https://doi.org/10.1007/s00429-024-02886-1> [[open access link](#)]

Omelyusik V, Shehzad K, **Banks T**, Rao P, Nair S, “**On Scaling Neuronal Network Simulations Using Distributed Computing**”, *SC24-W: Workshops of the International Conference for High Performance Computing, Networking, Storage and Analysis*, Atlanta, GA, USA, 2024, pp. 745-749, doi: <https://doi.org/10.1109/SCW63240.2024.00105>. [[open access link](#)] [[ppt](#)]

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

**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](#)]

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

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, Samarath 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 ISC<sup>2</sup> CISSP
- 2009 - Comptia A+, Network+, Security+
- Society for Neuroscience (SFN) student member
- IEEE member