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

Senior Software Engineer - Machine Learning Pipeline Team, Techcyte Inc., Orem, UT
- Developed software for and maintained the machine learning pipeline responsible for classification and post-processing of blood, spore, and vet-related image scans.
- Researched and implemented a new image-segmentation software stack
- 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
- 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
- Designed and developed a FastAPI-based infrastructure for serverless collection of web information. Utilized AWS Lambda, Elasticsearch, automated testing, and Gitlab CI/CD.

2017-2022

Cyber Security Analyst, City of Columbia, Columbia, Missouri
- 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
	Veterans Health Administration (VHA/VA) WOC Affiliate Researcher
2018 – 2023	Harry S. Truman Memorial Veterans' Hospital, Columbia, Missouri • Data Scientist position – deep neural network, random forest, and linear regression modeling
	Neural Engineering Laboratory Researcher
2017 – 2023	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

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 ISC^2 CISSP
- 2009 - Comptia A+, Network+, Security+
- Society for Neuroscience (SFN) student member
- IEEE member