Jesse Roberts

Assistant Professor, Tennessee Tech University

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INTERESTS

Deep learning fundamentals · Large language models · Cherokee language NLP · Spiking neural networks · Tornado detection · Computational linguistics, machine cognition, robotics

EDUCATION

Vanderbilt University

Ph.D. Computer Science 2019-2024

- Dissertation Topic: "A Theoretical & Empirical Analysis of Language Model Behavior"
- Advisor: Doug Fisher

Tennessee Technological University

M.S. Electrical Engineering 2014-2017

- Thesis Topic: Machine Learning Improvement of Solar MPPT

B.S. Electrical Engineering 2011-2014

FACULTY EXPERIENCE

Tennessee Technological University

Assistant Professor 2024-Current

CSC 4320 (F2025) - Computer Architecture

CSC 2220 (F2025) - Artificial Intelligence for Everyone

CSC 4220/5220 (S2025) - Data Mining and ML

CSC 7970 (F2024 - F2025) - LLM Seminar

- Developed a course on LLMs. Surveys the important breakthroughs which have led to the emergence of large language models, their capabilities, and critical improvements.

AI 4200/5200 (S2025) - Deep Learning

- Developed the deep learning theory and practical course, the first AI prefix course at TnTech for the BS in AI program.

Tennessee Technological University

Lecturer 2021-2024

ECE 3270 (S2020 - S2024) - PLC Lecture & Lab

- Developed OER lab manuals for teaching beginner PLC programming, emphasizing good coding practices.

ECE 4961 & 4971 (F2021 - S2024) - Capstone Design I and II

- Complete redevelopment of curriculum to facilitate assessment and sustainability.

ECE 3540 (F2023 - S2024) - Physical Electronics

Vanderbilt University

Instructor 2020-2020

CS 1101 (Su2020) - Programming and Problem Solving (Java Based)

CONSULTING

Cumberland Gradient, Founder, Cookeville, Tennessee

Phoenix Rural Health

AI strategy consulting. 2024 - Present

Wilson Sports

Conducted full survey of the production process and analyzed it for automation and artificial intelligence opportunities. Developed a plan for retooling for the inclusion of automation and AI. 2025 - 2026

ATC Automation

Software development guidance and consulting for automation in the Siemens PLC platform. 2024

INDUSTRY EXPERIENCE

ATC Automation, Cookeville, Tennessee

Senior Controls Engineer

Designed, oversaw build, and programmed automation equipment to meet customer requirements and exceed expectations while maintaining profitability. Total value of projects oversaw in excess of 20 million dollars. 2014 - 2021

Co-op Program Manager

Developed a co-op program to improve recruitment. Oversaw hiring, training, and management of co-op employees. Acted as the liaison for the building and maintenance of industrial/academic relations. Obtained a $100K industry lab grant. 2018 - 2020

GRANTS

ERI: Data-Driven Expansion of Electrified Transportation Network 2025

- National Science Foundation · Award #2347337 · $195,769 · PI: Jesse Roberts

Collaborative Research: Conference: NAIRR Pilot Expansion: FA1: Mid-South Conferences on CyberInfrastructure Advances to Enable Interdisciplinary AI Research in Health (TN-THRIVE) 2025

- National Science Foundation · Award #2526362 · $125,133 · PI: Anthony Skjellum · Co-PIs: Jesse Roberts, Amr Hilal · tnthrive.ai

IEEE AESS Grant for the DARPA Triage Challenge S2024

- IEEE Aerospace and Electronic Systems Society

TnTech OER Development Grant F2023

- Tennessee Tech University

AWARDS AND HONORS

Fellowships

CORE Institute Fellow for Indigenous Language Revitalization 2027

- CORE Institute

Tennessee Technological University

Wings Up 100 Award 2026

Research Contract with Wilson Sports

ICML Silver Award for Excellence in Reviewing

Nominated for best paper at IJCNN

Nominated for the KEEN Foundation Rising Star Award S2024

Vanderbilt Carnegie Fellowship F2018

Vanderbilt University

Received the Vanderbilt Award for Doctoral Discovery Su2024

Nominated for the CF Chen best paper award S2024

Nominated for the Graduate Leadership Anchor Award S2021

Received the American Bureau of Shipping merit Scholarship F2021

MEDIA APPEARANCES

Interviewed on the radio about capstone project that leveraged ML to monitor parking lots. F2021

Herold Citizen article regarding work to use large language models to preserve the Cherokee language: Article S2025

104.7 Radio Interview regarding Cherokee preservation with AI S2025

WBIR channel 10 Interview regarding Cherokee preservation with AI: Article S2025

News channel 5 Nashville Interview with Forest Sanders regarding Cherokee preservation with AI Article S2025

Interviewed by the Knoxville ledger regarding Cherokee preservation with AI: Article F2025

WORKSHOP ORGANIZATION AND TEACHING

Classes without quizzes at TnTech CS - How do Language models work? S2025

TnTech College of Engineering CAFE Workshop - Using LLMs in Research S2025

PUBLICATIONS

2026

- A Werth, G Hahn, R Borges Hink, E Piesciorovsky, SJ Prowell, ... “Augmenting LLM-Based Agents for Improved Performance in Pentesting and Commissioning Operational Technology in Critical Infrastructure.” *Oak Ridge National Laboratory (ORNL), Oak Ridge, TN (United States)*, 2026.
- H Sawyer, **J Roberts**, S Matei. “Calibrating Urban Traffic Simulation from Sparse Road Observations via Genetic Optimization.” *arXiv preprint arXiv:2606.03823*, 2026.

- M Rentschler, **J Roberts**. “Exploitation Is All You Need... for Exploration.” *2026 International Joint Conference on Neural Networks (IJCNN), 1-6*, 2026. Cited by 5.
- T Lee, M Ismail, **J Roberts**. “Generation and Validation of Configuration Management Code for Cyber Range Environments Using Large Language Models.” *The International FLAIRS Conference Proceedings 39 (1)*, 2026.
- K Moore, **J Roberts**, D Watson, W Ward, G Heyboer. “Human-Alignment, Calibration, and Activation Patterns in Large Language Model Uncertainty.” *arXiv preprint arXiv:2605.30675*, 2026.
- K Moore, **J Roberts**, D Watson, P Wisniewski. “Investigating Human-Aligned Large Language Model Uncertainty.” *The International FLAIRS Conference Proceedings 39 (1)*, 2026. Cited by 3.
- J Scott, **J Roberts**. “KARMA: Karma-Aligned Reward Model Adaptation.” *Findings of the Association for Computational Linguistics: EMNLP 2026, 48030 …*, 2026. Cited by 1.
- K Rainey, **J Roberts**. “Leveraging BART to Assess CS1 C++ Programming Assignments using Rubric-based Criteria.” *arXiv preprint arXiv:2606.03814*, 2026.
- M Soare, A Elshazly, **J Roberts**, M Ismail. “Multimodal Language Model Vision Analysis for Leader Drone Identification in Adversarial Swarms.” *IEEE Internet of Things Journal*, 2026.
- M Rentschler, **J Roberts**. “Reinforcement learning from meta-evaluation: Aligning language models without ground-truth labels.” *arXiv preprint arXiv:2601.21268*, 2026. Cited by 5.
- J Scott, **J Roberts**. “Reward-Guided Fine-Tuning of Language Models with Social Feedback.” *The International FLAIRS Conference Proceedings 39 (1)*, 2026. Cited by 1.
- J Brooks, **J Roberts**, P McCloud. “SAGE 0.2: LLMs for DOM Informed Internet Guidance.” *The International FLAIRS Conference Proceedings 39 (1)*, 2026.
- D Ndayegamiye, **J Roberts**, B Frey. “Systematic Analysis of Tokenization Properties in Low-Resource Polysynthetic NMT.” *The International FLAIRS Conference Proceedings 39 (1)*, 2026.
- F Doane, **J Roberts**. “When Prediction Isn’t Enough: Decision-Criteria-Informed Learning for Threshold-Based Decisions.” *2026 25th International Conference on Machine Learning and Applications …*, 2026.

2025

- H Sawyer, **J Roberts**, K Moore. “Basic Categories in Vision Language Models: Expert Prompting Doesn’t Grant Expertise.” *Twelfth Annual Conference on Advances in Cognitive Systems 2025, 177*, 2025.
- **J Roberts**, K Moore, D Fisher. “Do Large Language Models Learn Human-Like Strategic Preferences?” *Proceedings of the 1st Workshop for Research on Agent Language Models (REALM …*, 2025. Cited by 11.
- S Hadlock, **J Roberts**, J Lee. “Enhancing Post Earnings Announcement Drift Measurement with Large Language Models.” *Proceedings of The 10th Workshop on Financial Technology and Natural …*, 2025. Cited by 1.
- L Roberts, **J Roberts**. “Harnessing the Power of AI in Honors: Equipping Students to Leverage Tools Effectively.” *Journal of the National Collegiate Honors Council 26 (1), 51-59*, 2025.
- SMM Hossain, A Altarawneh, **J Roberts**. “Leveraging large language models and machine learning for smart contract vulnerability detection.” *2025 IEEE 15th Annual Computing and Communication Workshop and Conference …*, 2025. Cited by 24.
- YR Matinez, **J Roberts**. “LLMs as Agentic Cooperative Players in Multiplayer UNO.” *International Conference on Machine Learning Applications 2025*, 2025.
- M Rentschler, **J Roberts**. “RL+ Transformer= A General-Purpose Problem Solver.” *Proceedings of the 1st Workshop for Research on Agent Language Models (REALM …*, 2025. Cited by 3.
- W Eberle, A Hilal, A MacKenzie, **J Roberts**, A Skjellum, D Talbert. “Tennessee Tech University: Action Plan for Artificial Intelligence Education, Workforce Development, Research, and Infrastructure Needs.” 2025.
- E Brown, **J Roberts**, D Talbert. “Toward the Use of LLMs to Support Curriculum Mapping to Established Frameworks.” *American Society of Engineering Education*, 2025. Cited by 3.

2024

- **JTN Roberts**. “A Theoretical & Empirical Analysis of Transformer Language Model Behavior.” 2024. Cited by 1.
- K Moore, **J Roberts**, T Pham, D Fisher. “Chain of thought still thinks fast: Apricot helps with thinking slow.” *Proceedings of the Annual Meeting of the Cognitive Science Society 47*, 2024. Cited by 14.
- **J Roberts**. “Do Large Language Models Learn to Human-Like Learn?” *Proceedings of the AAAI 2024 Spring Symposium Series 3 (1), 588-591*, 2024. Cited by 2.
- R Umphrey, **J Roberts**, L Roberts. “Investigating Expert-in-the-Loop LLM Discourse Patterns for Ancient Intertextual Analysis.” *4th International Conference on Natural Language Processing for Digital …*, 2024. Cited by 14.
- **J Roberts**, K Moore, T Pham, O Ewaleifoh, D Fisher. “Large language model recall uncertainty is modulated by the fan effect.” *28th Conference on Computational Natural Language Learning, 303–313*, 2024. Cited by 9.
- **J Roberts**, L Roberts, A Reed. “Supporting the digital autonomy of elders through llm assistance.” *Proceedings of the AAAI Symposium Series 4 (1), 182-186*, 2024. Cited by 7.
- K Moore, **J Roberts**, T Pham, O Ewaleifoh, D Fisher. “The base-rate effect on llm benchmark performance: Disambiguating test-taking strategies from benchmark performance.” *Findings of the Association for Computational Linguistics: EMNLP 2024, 2283–2288*, 2024. Cited by 10.
- **J Roberts**, K Moore, D Wilenzick, D Fisher. “Using artificial populations to study psychological phenomena in neural models.” *Proceedings of the aaai conference on artificial intelligence 38 (17), 18906 …*, 2024. Cited by 10.

2023

- **J Roberts**. “How Powerful are Decoder-Only Transformer Neural Models?” *2024 International Joint Conference on Neural Networks (IJCNN), 1--8*, 2023. Cited by 68.

2021

- **J Roberts**. “Finding an Equilibrium in the Traveler's Dilemma with Fuzzy Weak Domination.” *2021 IEEE Conference on Games (CoG), 1-5*, 2021. Cited by 1. **Nominated for best paper.**

2020

- **J Roberts**, DH Fisher. “Extending the Philosophy of Computational Criticism.” *ICCC, 358-361*, 2020. Cited by 1.
- **J Roberts**, D Fisher. “pReview: The artificially intelligent conference reviewer.” *2020 19th IEEE International Conference on Machine Learning and Applications …*, 2020. Cited by 7.

2019

- **J Roberts**, DA Talbert. “Biologically Extending the Gen 2 ANN Model.” *FLAIRS, 132-135*, 2019.

2017

- **J Roberts**, I Bhattacharya. “Improving any arbitrary MPPT hill climber with ANN estimations.” *2017 IEEE 44th Photovoltaic Specialist Conference (PVSC), 3083-3087*, 2017. Cited by 2.
- **JT Roberts**. “MNFIS+; or, a Better Hybrid Heuristic Maximum Power Point Tracker.” *Tennessee Technological University*, 2017.

2016

- **J Roberts**, I Bhattacharya. “MNFIS and other soft computing based MPPT techniques: A comparative analysis.” *2016 IEEE 43rd Photovoltaic Specialists Conference (PVSC), 3247-3251*, 2016. Cited by 4.

From Google Scholar, November 8, 2026.

PRESENTATIONS

Invited Talks

How Generative AI Really Works. Chattanooga State Community College. Slides — October 2026

Foundation Models and Responsible AI. TN-THRIVE-AI. — April 2026

Artificial Intelligence: All Hype or a Revolution? Maryville College. — November 2024

Conference Presentations

Upcoming talk on AI. National Collegiate Honors Council (NCHC) Annual Conference, New Orleans, LA. — November 2026

When Artificial Code Mirrors God's Image: Toward a Post-Anthropocentric Imago Dei. Baylor Symposium on Faith and Culture, "Technology and the Human Person in the Age of AI," Waco, TX. — February 2026

A Few-Shot Learning Method for SMS Phishing Detection and Explanation Using SLMs (poster). IEEE Symposium on Security and Privacy (S&P), San Francisco, CA. — May 2025

Seyed Mohammad Sanjari, Jesse Roberts, Mir Mehedi A. Pritom

PROFESSIONAL MEMBERSHIPS

The Association for the Advancement of Artificial Intelligence (AAAI)	2023 - Current
Association of Computational Linguistics (ACL)	2024 - Current
Institute of Electrical and Electronics Engineers (IEEE)	2021 - Current
Computational Intelligence Society (IEEE CIS)	2024 - Current

FACULTY SERVICE

Tennessee Technological University

AI Faculty Search Committee	2026
Undergraduate Program Committee	Fall 2021 - Current
ACME Building Design College Committee	Spring 2022 - Current
ABET Assessment Departmental Committee	Fall 2021 - Current
Founding Advisor to the Rock Climbing Club	Fall 2022 - Current
IEEE Robotics Team Coach	Fall 2021 - Current

RESEARCH SERVICE

Organizer for the TN-THRIVE-AI Workshop	April 2026
Empirical Methods in Natural Language Processing (EMNLP)	2026
Conference on Computational Natural Language Learning (CoNLL)	2024-2026
International Conference on Machine Learning (ICML)	2026
Track Chair for Florida Artificial Intelligence Research Symposium (FLAIRS)	2026
International Conference on Learning Representations (ICLR)	2025
12th Annual Conference on Advances in Cognitive Systems (ACS)	2025 - 2026
Natural Language Processing for the Digital Humanities	2025
Association for the Advancement of Artificial Intelligence (AAAI)	2025
Florida Artificial Intelligence Research Symposium (FLAIRS)	2025
Association of Computational Linguistics (ACL)	2025
Behavioral Sciences Journal	2025
Research on Agent Language Models (REALM) at ACL	2025
Session Chair for World Congress on Computational Intelligence	2024
Natural Language Processing for the Digital Humanities	2024
EPJ Data Science Journal	2024
International Joint Conference on Neural Networks	2022-2025
IEEE Conference on Games (AI & Game Theory)	2022-2024

TEACHING ASSISTANT EXPERIENCE

Vanderbilt University

Project in Artificial Intelligence	S2021
Programming and Problem Solving (Java Based)	F2020
Compiler Construction	S2020
Database Management Systems	F2019

RESEARCH ASSISTANT EXPERIENCE

Vanderbilt University

Researched computational sustainability — Su2021

- Funded by NSF Grant No. 1521672

GRADUATE COURSES TAKEN

Vanderbilt University

CS6388 - Model Integrated Computing	F2020
CS8395 - Neurodiversity Inspired Science & Engineering	F2020
CS6360 - Advanced Artificial Intelligence	S2020
CS5260 - Artificial Intelligence	S2020
CS6362 - Advanced Machine Learning	F2019
CS8395 - Computation & Cognition	F2019

Tennessee Technological University

CSC6903 - Learning Theory	F2018
CSC7980 - Stock Market Prediction Models	S2018
FIN6020 - Financial Management	S2018
CSC7240 - Intelligent Information Systems	F2017
CSC6903 - Advanced Reverse Engineering	F2016
ECE6580 - Instrument Transducer Technology	F2016
ECE6900 - Intelligent System Design	F2015
ECE6040 - Signal Analysis	S2015
ECE6250 - Random Signals & Systems	S2015
ECE6170 - High Performance Embedded System Design	F2014
ECE6200 - Linear Systems Analysis	F2014
ECE6600 - Computer Methods for Power System Analysis	F2014

LANGUAGES

- English (Native proficiency)
- Spanish (Elementary proficiency)

- Irish (Elementary proficiency)

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