Jake Sansom

Email: jhsansom@umich.edu
LinkedIn: jhsansom
GitHub: github.com/jhsansom

About Me

I am a master's student at the University of Michigan. I aim to leverage my teaching, research, and professional experience in NLP to develop new technologies that benefit society. I am seeking a full-time position after I graduate this May.

Skills

- **Languages:** C++, Python, MATLAB, Bash, Batch
- **Software Tools:** PyTorch, Jax, NLTK, SpaCy, Transformers/HuggingFace, W&B, Scikit-Learn, NumPy, SciPy, Git, Docker, OpenMP
- **Other:** DSP, FEA, CFD, Global Optimization

Education

The University of Michigan — Ann Arbor, MI
M.S. in Computer Science and Engineering, GPA: 4.00/4.00 — 2022–Current

- Year 1: Natural Language Processing, Randomness and Computation, Computational Modeling of Cognition
- Year 2: Machine Learning, Reinforcement Learning, Advanced Compilers, Computer and Network Security

The University of Texas at Austin — Austin, TX
B.S. in Computational Engineering, Certificate in Evidence and Inquiry, GPA: 3.68/4.00 — 2016–2020

- Thesis: "Cognitive Processes: A Whiteheadian Perspective"
- Major Coursework: Probability, Stochastic Processes, Differential Eq., Linear Algebra, Scientific Computation
- Certificate Coursework: Mathematical Neuroscience, Neural Systems I and II, Philosophy of Mind

Research Experience

LG AI Research — Ann Arbor, MI
Research Intern — 2023–Current

- Designed and implemented a cloud-hosted Docker infrastructure to collect a large dataset of internet navigation trajectories via Amazon Mechanical Turk
- Investigating the use of LLMs for automated internet navigation and sequential decision making

Situated Language and Embodied Dialogue (SLED) Lab — Ann Arbor, MI
Research Assistant — 2022–Current

- Proposed and developed a novel method for evaluating Theory of Mind capacity within LLMs
- Studying grounded language acquisition in embodied AI agents for applications in robotics

Willerson Center for Cardiovascular Modeling and Simulation — Austin, TX
Research Assistant — 2018–2020

- Co-developed FM-Track, an open-source Python package that processes 3D microscope imagery
- Helped create a hierarchical model of AVIC activation, a phenomenon that frequently causes valve diseases
  - Simulated novel experimental procedures using computational techniques such as ML and FEA
  - Used empirical data to develop models of cell activation using the math of continuum mechanics

Henkelman Research Group — Austin, TX
Research Assistant — 2017

- Doubled the efficiency of a Python algorithm used for high-dimensional, non-convex, global optimization

Teaching Experience

- **Graduate Student Instructor** at the University of Michigan **(Outstanding GSI Award)** Winter & Fall 2023
  Introduction to Natural Language Processing (EECS 487)

Publications

[1] Z. Ma, **J. Sansom**, R. Peng, and J. Chai, "Towards A Holistic Landscape of Situated Theory of Mind in Large Language Models", in *Findings of EMNLP*, 2023.

[2] E. Lejeune, A. Khang, **J. Sansom**, and M. Sacks, "FM-Track: A Fiducial Marker Tracking Software for Studying Cell Mechanics in a Three-Dimensional Environment", in *SoftwareX 11*, 2020, p. 100 417.

[3] A. Khang, A. Rodriguez, M. Schroeder, **J. Sansom**, E. Lejeune, and M. Sacks, "Quantifying Heart Valve Interstitial Cell Contractile State Using Highly Tunable Poly(Ethylene Glycol) Hydrogels", in *Acta Biomaterialia 96*, 2019, pp. 354–367.

Engineering Experience

Northrop Grumman San Diego, CA
Systems Engineer (Technical Level II), Pathways Rotational Training Program 2020–2022

- Leveraged my expertise in the HW-, SW-, and algorithm-level architecture of a fielded, software-defined radio to:
  - Assist a cross-organizational team with the design and deployment of a novel DSP algorithm
  - Author and obtain customer funding for a proposal detailing improvements to a fielded DSP algorithm
- Created the AI Corporate Catalog, a company-wide database of AI/ML capabilities
- Led a small team in the design and deployment of a C++ unit testing infrastructure

Ansys Government Initiatives (formerly Analytical Graphics Inc.) Exton, PA
Corporate Systems Engineering Intern Summer 2019

- Used Python to quantify the accuracy of orbital decay forecasts in STK, AGI's primary software offering
- Helped develop multiple simulations that modeled orbital dynamics, communications links, and terrain effects
- Outlined a strategy to bolster STK's collaborative capabilities and presented it to the senior development team

Scholarships and Awards

- CSE Department Outstanding Graduate Student Instructor Award Winter 2023
  Awarded to less than 3% of graduate/undergraduate student instructors in the computer science department
- Northrop Grumman BRAVO to our Stars 2021–2022
  Awarded on occasion to high-performing employees. Won once for operational efficiency and twice for performance
- FSTI Award for Excellence in Chemistry Spring 2018
  For poster presentation at Undergraduate Research Forum at UT Austin. Awards given to less than 6% of participants
- TIDES Advanced Summer Research Fellowship Summer 2017
  Fellowship for computational chemistry research at the Henkelman Group under the Freshman Research Initiative
- Engineering Honors Scholarship 2016–2020
  Undergraduate honors program and scholarship awarded to roughly 10% of the UT Austin engineering class
- Polymathic Scholars Interdisciplinary Humanities and Natural Science Honors 2016–2020
  Multidisciplinary thesis program that allows students to design their own certificate

Presentations

- X. Feng, A. Khang, **J. Sansom**, N. West, D. Ilitzky, N. Aufiero, E. Lejeune, and M. Sacks, "A Simulation of Heart Valve Interstitial Cell Contractile Behavior in 3D Gels", presented at the BMES 2020 Virtual Annual Meeting, Oct. 2020.
- A. Khang, E. Lejeune, **J. Sansom**, N. West, and M. Sacks, "Quantifying the 3D Mechanical Tractions of the Aortic Heart Valve Interstitial Cell", presented at the BMES 2019 Virtual Annual Meeting, Oct. 2019.
- **J. Sansom** "Investigating Methodology for Global Optimization," presented at the College of Natural Sciences Undergraduate Research Forum. April 13th, 2018; Austin, TX. **(FSTI Award for Excellence in Chemistry)**

Extracurricular Activities

- Chair of Northrop Grumman Pathways Professional Development Committee 2021–2022
  Planned and successfully launched a new technical mentorship program for early-career engineers
- Volunteer at the Arc and the Rosedale School 2018–2019
  Helped adults and children with cognitive disabilities develop life skills and provided constant positive feedback
- Undergraduate Representative for the Society for Industrial and Applied Mathematics 2018–2019
  Worked with leaders to offer membership and resources to the new undergraduate computational sciences program
- Eagle Scout and Troop Guide in the Boy Scouts of America 2016
  Led a team of 30 to construct shelves for a homeless shelter. Taught younger scouts various scouting skills