Jordan Tschida, PhD

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Education

- **Arizona State University** — Tempe, AZ
  Doctor of Philosophy in Computer Science — *August 2022*
    - NSF Research Trainee Fellow
    - Citizen Centered Smart Cities and Smart Living

- **Arizona State University** — Tempe, AZ
  Master of Science in Computer Science — *May 2022*
- **Austin Peay State University** — Clarksville, TN
  Bachelor of Science in Computer Science — *Dec 2018*
    - Minors in Mathematics and Physics

Research Experience

- **Oak Ridge National Laboratory** — Oak Ridge, TN
  Postdoc, Advanced Computing for Health Sciences — *September 2022 – Present*

    - **Utilized HuggingFace BERT tokenizer on cancer abstract reports** to create pre-trained word embeddings from ClinicalBERT. Implemented methodology optimized to run on HPC systems to reconstruct subword tokens to word tokens. Employed affinity propagation clustering algorithm on the word embeddings for unsupervised data labeling. The labeled data will be used for weak supervised learning with Transformers model BioMistral. This initiative will allow for complex, real-world data to obtain ground truth labels for machine learning classification tasks.

    - **Developed a comprehensive chemotherapy drug and regimen database** that combines 7 datasets using SQL for the National Cancer Institute. This initiative provides a unified dataset of all publicly available chemotherapy drug and regimen information for all cancer types allowing for multi-label classification tasks to be implemented on National Cancer Institute cancer abstract reports.

    - **Implemented methodology to measure how anxiety related diagnostic terms change over time** using Word2Vec, cosine similarity, and mixed linear model on 63 million clinical notes. Optimized to run on HPC systems. This initiative allows Cincinnati Children's Hospital clinicians to track when diagnostic terms contextually change which can decrease data quality and may impact downstream clinical decision support systems that leverage NLP leading to unreliable predictions. This methodology provides feedback on which data may be leading to incorrect diagnoses and can be implemented on any clinical decision support system that utilizes text data.

    - **Development of LSTM + Word2Vec for temporal modeling of 1.3 million pediatric patients for clinical anxiety diagnosis.** This initiative allowed Cincinnati Children's Hospital clinicians to determine if a patient would be diagnosed with clinical anxiety at least 30 days before an official diagnoses. This initiative allows for early detection and patient intervention to improve quality of life.

    - **Implemented Random Forest models to classify 104,216 anxiety patients from 757,199 non-anxiety patients** using word embeddings generated from 61 million clinical notes written by the Cincinnati Children's Hospital clinicians. This analyzed the variations in the expert vocabulary usage between mental health and non-mental health clinicians and quantified the accuracy of using expert vocabulary vocabulary for clinical decision support systems. This analysis assessed the vocabularies potential as a valuable tool in developing interpretable and accurate predictive models for anxiety disorder detection.

    - **Created a workflow to investigate algorithmic bias using traditional machine learning** (F1 scores, recall, precision) and **bias metrics** (balance error rate, demographic parity, equalized odds, and equalized opportunity). Optimized to run on HPC systems. This initiative ensures that clinical models being deployed by the National Cancer Institute do not exacerbate bias from biased data.

- **Moving Beyond One-Sided Conversation in Social Robotics** Tempe, AZ
  PhD Dissertation *August 2019 – August 2022*

  - **Full Title:** "Can I Consider You My Friend?": Moving Beyond One-Sided Conversation in Social Robotics
  - **Committee**: Troy McDaniel, PhD (Chair); Katina Michael, PhD; Nancy Cooke, PhD; Chris Bryan, PhD; Baoxin Li, PhD

  - **Deployed a Wizard-of-Oz study to investigate how older adults want a social robot to behave during a conversation** to move beyond one-sided conversations commonly seen in literature. This study lasted 8 months and recruited 16 seniors. Our study underscored the necessity of crafting social robots capable of engaging in authentic, two-way conversations with users rather than merely delivering monologues. Even when participants initiated conversations themselves, they still yearned for more interaction and feedback from the robot.
  - **Designed counter-balanced (2 × 2) Wizard-of-Oz experiment.** The four distinct conditions provided a within and between studies statistical analysis to measure for differences. This design allowed for the assessment of which features participants enjoyed or did not.
  - **Completed 2 IRB Applications** for conducting human research. The IRB application included: all recruitment material, a pre-screening script, two surveys, an interview, and a consent form. This ensured participants were safe during the experiments.
  - **Utilized a graphical interface** to interact with participants via the robot during the Wizard-of-Oz experiments. The interface provided access to 7 present emotions, common phrases, and a text box for responses. This allowed the experimenter to quickly respond to the participant, reducing long pauses between responses.
  - **Deployed multiple data collection methods** (i.e., surveys, conversations with the robot, and interviews) and analysis methods (i.e., statistical analysis, conversational analysis, and qualitative analysis) to statistically evaluate statistical significance of results. By using multiple analysis methods,
  - **Secured** $140,000 **from Zimin Foundation to fund project**. This enable interdisciplinary research by providing 3 professors salary for involvement on the project (computer science, social science, and human-centered AI). Additionally, this money provided 3 students (2 Ph.D students, 1 MS) for salary for a summer semester.
  - **Utilized a co-design framework** to involve participants, caretakers, social scientists, computer scientists, and medical professionals to design the study. By deploying a co-design methodology, we ensured we develop technology that older adults feel is useful and more likely to adopt.

- **AI Summer Institute** Oak Ridge, TN
  Collaboration with Multiple Departments *June – August 2019*
  - Used PyTorch to develop convolutional neural network to classify imperfections in spent nuclear fuel canisters. This algorithm was executed on NVIDA GPUs.

- **Undergraduate Research** Clarksville, TN
  Simultaneous Localization and Accurate Mapping *January 2017 – December 2018*
  - Towards the development a small autonomous robot capable of accurate localization and positioning by deploying a computer vision ball tracking algorithm for the robot to track a small circles in a square around a piece of paper.
  - Implementeda a PID controller to control robot movements.

- **REU at Florida Atlantic University** Boca Raton, FL
  Computer Vision *June – August 2018*
  - Utilized OpenCV techniques to detect if road loans were present for self-driving cars

- **REU at University of South Carolina** Columbia, SC
  Simultaneous Localization and Accurate Mapping *May – July 2017*
  - Developed technique to cut down 3D mapping time using Colmap and ORB-SLAM

Publications

- ***In Review*** Jordan Tschida, Mayanka Chandrashekar, Alina Peluso, Zachary Fox, Patrycja Krawczuk, Dakota Murdock, John Gounley, Xiao-Cheng Wu, Heidi A. Hanson. Evaluating Algorithmic Bias on Biomarkers of Breast Cancer Pathology Reports in Six SEER Registries. JAMIA Open Special Issue AI Showcase. 2024.

- ***In Review*** Jordan Tschida, Mayanka Chandrashekar, Heidi A. Hanson, Ian Goethert, Surbhi Bahatnagar, Daniel Santel, Anuj Kapadia, John Pestian, Tracy Glauser, Greeshma Agasthya. Temporal Drift in the Semantic Meaning of Pediatric Anxiety Terms in Electronic Healthcare Records. Journal of Pediatrics. 2024.

- ***In Review*** Jordan Tschida, Troy McDaniel. Aging with Companionship: Exploring Social Robots for Healthy Older Adults. IEEE Technology and Society. 2024.

- ***In Review*** Jordan Tschida, Katina Michael, Troy McDaniel. Characteristics of Social Robots: A Framework for Development. IEEE Potentials. 2024.

- ***In Review*** Mayanka Chandrashekar, Jordan Tschida, Heidi A. Hanson, Ian Goethert, Surbhi Bahatnagar, Daniel Santel, Anuj Kapadia, John Pestian, Tracy Glauser, Greeshma Agasthya. Comparison of Expert Vocabulary Usage Patterns between Mental Health and Non-Mental Health Clinicians when Diagnosing Pediatric Anxiety Disorder. Journal of Pediatrics. 2024.

- ***In Review*** Ensuring Equity in AI Healthcare: A Study on Racial Bias in Cancer Site Classification Models. Abhishek Shivanna, Adam Spannaus, Jordan Tschida, John Gounley, Heidi A. Hanson. 2024.

- Jordan Miller. "Can I Consider You My Friend?" Moving Beyond One-Sided Conversation in Social Robotics. Order No. 29319671. Order No. 29319671, Arizona State University, United States – Arizona, 2022. ISBN: 9798841781202.

- Jordan Miller. "Social Robots: Friend of the Future of Mechanical Mistake?." *IEEE Technology and Society Magazine*, vol. 41, no. 2, pp. 47-48, June 2022, DOI: 10.1109/MTS.2022.3173311

- Jordan Miller and Troy McDaniel. "I enjoyed the chance to meet you and I will always remember you: Healthy Older Adults Conversations with Misty the Robot." *2022 17th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, Sapporo, Japan, 2022, pp. 914-918, DOI: 10.1109/HRI53351.2022.9889523

- Jordan Miller and Troy McDaniel. "Social robots to address isolation and depression among the aging during and after COVID-19". In: Stephanidis, C., Antona, M., Ntoa, S. (eds) HCI International 2021 - Posters. HCII 2021. Communications in Computer and Information Science, vol 1420. Springer, Cham. DOI: 10.1007/978-3-030-78642-7_22

- Jordan Miller and Troy McDaniel. "Socially Assistive Robots for Storytelling and Other Activities to Support Aging in Place." T. McDaniel and X. Liu (Eds.), Multimedia for Accessible Human Computer Interfaces, Springer, 2021. DOI: 10.1007/978-3-030-70716-3_6

- Jordan Miller, Troy McDaniel, and Michael J. Bernstein. "The Next Steps of Social Robotics in an Aging World." in *IEEE Technology and Society Magazine*, vol. 40, no. 3, pp. 21-23, Sept. 2021, DOI: 10.1109/MTS.2021.3101931

- Jordan Miller, Troy McDaniel, and Michael J. Bernstein. "Aging in Smart Environments for Independence." 2020 *IEEE International Symposium on Technology and Society (ISTAS)*. Tempe, AZ, USA, 2020, pp. 115-123, DOI: 10.1109/ISTAS50296.2020.9462211.

- Theodore Papamarkou, Hayley Guy, Bryce Kroencke, Jordan Miller, Preston Robinette, Daniel Schultz, Jacob Hinkle, Laura Pullum, Catherine Schuman, Jeremy Renshaw, et al. "Automated detection of corrosion in used nuclear fuel dry storage canisters using residual neural networks". *Nuclear Engineering and Technology*, 53(2):657665, 2021. DOI: 10.1016/j.net.2020.07.020

Conferences

- **Oak Ridge Postdoc Association** Oak Ridge, TN
  Evaluating Algorithmic Bias on Biomarkers of Breast Cancer Pathology Reports July 2024
- **American Medical Informatics Association** Minneapolis, MN
  Detecting Semantic Drift in Pediatric Anxiety Electronic Healthcare Records May 2024
- **Ninth Computational Approaches for Cancer Workshop** Denver, CO
  Evaluating Algorithmic Bias on Triple Negative Breast Cancer Data November 2023
- **Human Computer Interaction International 2021** Virtual
  Social Robotics to Address Isolation and Depression Among the Aging July 2021
- **IEEE ISTAS 2020** Virtual
  Aging in Smart Environments November 2020
- **Artificial Intelligence Summer Institute Poster Session** Oak Ridge, TN
  Detecting Corrosion in Nuclear Canisters with Pytorch August 2019
- **2018 ACM Midsoutheast** Gatlinburg, TN
  Visual Positioning Algorithm for a Table-Top Robot November 2018
- **Nation Conference for Undergraduate Research 2018** Edmond, OK
  Development of a Visual PID Positioning Algorithm for a Table-Top Robot April 2018

Invited Presentations

- **AI4Eq Workshop Panelist** Virtual
  Social Robots: The Friend of the Future of Mechanical Mistake? October 2021
  - Link: https://youtu.be/GmH6RmxjFAA?si=uoVYwSqMPrwathiT
- **PIT Colloquium** Virtual
  Conversations with Misty the Robot October 2021
  - Link: https://youtu.be/Fj-bs2yFoPY?si=9CupJ1KVtG7UM8Ka
- **Maricopa Association of Governments, Arizona** Virtual
  Conversations with Misty the Robot December 2021

Fellowships & Scholarships

- National Science Foundation National Research Trainee Fellow *August 2019 – August 2022*
  Citizen-Centered Smart Cities and Smart Living

- NSF GRFP Fellowship Honorable Mention *May 2021*

- Fulton Department Fellowship *August 2019 – April 2020*

Grants

- Awarded $140,000, Zimin Institute for Smart & Sustainable Cities *July 2021*
- Awarded $3,000, APSU Undergraduate Research Enrichment Funds *May 2017*

Certifications

- CITI Training for Human Subjects Research *September 2022 - Present*
- HIPPA Certification *September 2022 - Present*
- Google Project Management *August 2021*
- Natural Language Processing with Classification and Vector Spaces *July 2020*

Honors & Awards

- Peoples Choice Award at ORNL Postdoc Association Symposium *July 2024*
- ORNL Outstanding Postdoc *December 2023*
- Award for Advocate in Diversity at APSU *April 2018*
- APSU Vice Presidents Leadership Award *April 2018*

Leadership Positions

- Postdoctoral Group Leader *April 2023 - March 2024*
- NSF NRT Student Council Chair *August 2019 – August 2021*
- Technology Access Fee Allocation Committee Student Representative *Spring 2018*
- President of Women in Science and Engineering *January 2016 – April 2018*
- President & Founder of Women in Science and Engineering *January 2016*

Technical Skills

- **Technical Concepts**: Human-Robot Interaction, Human-Computer Interaction, Teleoperated Robotics Artificial Intelligence, Natural Language Processing, Data Mining

- **Interdisciplinary Skills:** Design of Experiments, Interdisciplinary Research, Co-Design, Stakeholder Engagement, IRB Certifications, Qualitative & Quantitative Analysis,

- **Programming Languages:** C++, Python, Java, Javascript, HTML, CSS, D3, SQL

- **Software & Hardware:** Pandas, Transformers, SKLearn, OpenCV, PyTorch, ORB-SLAM, Colmap, Raspberry Pi

- **HPC:** Slurm, NVIDA GPU

- **Communication**: Securing Funding, Publishing, Seminar Presentations