CALEB MUSFELDT

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EDUCATION

Master of Science, Cognitive and Computational Neuroscience 09/2025 to Present
Université de Montréal - Département de Psychologie
Supervisor: Dr. Taylor Webb

Honors Bachelor of Science, Data Science (Computer Science track) 12/2024
Arizona State University – School of Mathematics and Statistical Sciences; Barrett, the Honors College
Minor: Philosophy | **Certificate:** Symbolic, Cognitive and Linguistic Systems
Thesis: *Development of a Python-Based Software for Calculating the Jones Polynomial: Insights into the Behavior of Polymers and Biopolymers.*
Director: Dr. Eleni Panagiotou | **Committee Member:** Dr. Andrea Richa
Coursework: Foundations of Machine Learning, Introduction to Artificial Intelligence, Data Structures and Algorithms, Math Tools for Data Science, Design & Analysis of Algorithms, Applied Linear Algebra, Discrete Math Structures, Calculus II for Engineers
Awards: Magna Cum Laude, Dean's List

RESEARCH POSITIONS

Research Aide IV 03/2024 to 05/2025
Dr. Derek Powell – Cognitive Data Science Lab, Arizona State University
- Investigating the internal reasoning processes of large language models (LLMs) by examining how the generation of reasons for previously produced statements influences the model's confidence in its own outputs.
- Exploring the taxonomical flexibility of model edits, focusing on how changing the properties of a category (e.g., a cobra) can lead to a reclassification (e.g., as a dog), and studying the implications of bias injection on model performance and generalization.

Research Aide I 03/2023 to 03/2024
Dr. Eleni Panagiotou – Applied Knot Theory Group, Arizona State University
- Developed a Python-based software that significantly improved the calculation of the Jones polynomial from $O(2^n)$ to $O(2^{(n-k)/2})$ by applying parallel computing and recursive algorithms built from novel mathematical expressions.
- Implemented advanced mathematical concepts into software including Graph Theory, Linear Algebra, Combinatorics, and Computational Algebra for biological science goals.

Barrett College Fellow 03/2023 to 03/2024
Dr. Candace Lewis – The BEAR Lab, Arizona State University
- Selected by Barrett, the Honors College as an undergraduate fellow where I was matched with the BEAR Lab to lead the Data Science team in research to study the interplay between experiences and biology.
- Used Python and R to perform advanced statistical analysis and machine learning techniques on large neuroscientific datasets. This active involvement in every project resulted in three poster presentations earning four awards including "Most Interdisciplinary Research".

PROJECTS

Computer Vision and Object Tracking for Sports
Capstone Project, Arizona State University – School of Mathematics and Statistical Sciences
- Engineered object tracking software using pre-trained CNNs, ViT, and the COCO dataset for analyzing player hotspots during sports games, integrating feature extraction with transformer-based methodologies.
- Utilized real-time visualization techniques to optimize decision-making based on player activity heatmaps.

Sentiment Analysis Facial Recognition System
Honors Project, Arizona State University – Barrett, the Honors College
- Engineered a facial recognition system leveraging pre-trained deep learning models and OpenCV for efficient and accurate feature matching.
- Applied multimodal data fusion techniques to combine facial expression analysis with natural language processing (NLP) inputs, achieving a holistic understanding of user sentiment.

PRESENTATIONS

Lifshitz, D., Balducci, J., **Musfeldt, C.,** Li, G., Marre-Surges, D., Schwarz, J., Algibez Flores, B., Cron, G., Gupta, L., Hanson, T.,

Harker, S., Delight, C., Semple, M. G., & Lewis, C. R. (2024). PTSD severity predicts improvements in psychological functioning after MDMA-assisted therapy. Presented at the 2024 Arizona Psychology Undergraduate Research Conference, Tempe, AZ; 31st Annual School of Life Sciences Undergraduate Research Symposium, Tempe, AZ; Interdisciplinary Neuroscience Symposium, Tempe, AZ.

- **Award:** Most Interdisciplinary Research

Delight, C., Semple, M. G., Algibez Flores, B., Marre-Surges, D., Gupta, L., Lifshitz, D., Balducci, J., **Musfeldt, C.**, Mennenga, S., & Lewis, C. R. (2024). The "High" road to drug education through social media. Presented at the 2024 Arizona Psychology Undergraduate Research Conference, Tempe, AZ; 31st Annual School of Life Sciences Undergraduate Research Symposium, Tempe, AZ; Interdisciplinary Neuroscience Symposium, Tempe, AZ.

- **Award:** Second Prize - Biology and Social Issues Category
- **Award:** Poster Title Award

Gupta, L., Semple, M. G., Algibez Flores, B., Delight, C., Balducci, J., Cron, C. G., Li, G., Lifshitz, D., Marre-Surges, D., **Musfeldt, C.**, Schwarz, J., Hanson, T., Harker, S., Mennenga, S., & Lewis, C. R. (2024). PTSD severity predicts improvements in self-compassion scores following MDMA-assisted therapy. Presented at the 2024 Arizona Psychology Undergraduate Research Conference, Tempe, AZ; 31st Annual School of Life Sciences Undergraduate Research Symposium, Tempe, AZ; Interdisciplinary Neuroscience Symposium, Tempe, AZ.

- **Award:** Third Prize - Neuroscience Category

INDUSTRY POSITIONS

Data Engineer Intern 12/2021 to 09/2023
HireRising – www.HireRising.com

- Cleaned/organized data using Python and Excel to build and visualize financial reports that utilized Machine Learning methods.
- Developed a performance metric system to manage/improve employee production by 9-18%.

Junior Data Analyst 05/2019 to 08/2019
Ethisphere Institute – www.Ethisphere.com

- Regularly cleaned/organized data using Excel to improve the client database.
- Conducted thorough research on potential clients/programs to build out both quantitative and qualitative reports to present to the CEO and CMO.

TECHNICAL SKILLS

Programming Languages: Python, R, C/C++, MATLAB
Data Science & Analytics: Data Preprocessing/Engineering, Statistical Modeling, Time Series Analysis, Visualization (Matplotlib, Seaborn)
Primary Tools: TensorFlow, PyTorch, Scikit-learn, Pandas, Jupyter Notebooks, LaTeX, HuggingFace

LEADERSHIP, AWARDS, AND CERTIFICATIONS

Founder/President 08/2022 to 08/2023
Advisor 08/2023 to Present
Consciousness Club – Arizona State University

- Organized and developed a club, curriculum, and events to expand the university's reach within the intersection of fields such as Neuroscience, Computer Science, Philosophy of Mind, Psychology, etc.
- Under my leadership, the organization grew the roster to 200+ members, received $10,000+ in funding, and was selected as a finalist for Most Promising New Student Organization from 1,500+ student organizations.

Achievement and Influence Seminar 04/2023
Leadership Reimagined – Arizona State University

- One of 30 participants selected among active ASU student body leaders, including undergraduate and graduate, to develop leadership skills from the inter/intrapersonal to the organizational.

Google Data Analytics Professional Certification 07/2022
Google Data Analytics – Google

- Master data analysis using tools like R, SQL, and Tableau to gain valuable insights and inform decisions.
- Developed invaluable soft skills such as critical thinking, problem-solving, reasoning, and communication.