David Eric Austin

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Research Interests

I study how language models take part in the social processes by which people make meaning. Speakers choose among several valid ways of conceptualizing the same thing (e.g. a riot vs. a protest). In humans, this choice is negotiated between partners over repeated interaction and can stabilize into conventions across a community. How does this process change when LLMs are conversation partners? I am working in two directions at the moment:

(1) Lexical choice in LLMs. What drives how models select a conceptualization in LLM-LLM and LLM-human interaction? Conceptualization affects task success — my Semantic Bandits paper showed that how an environment is labeled changes how LLMs explore it. Outside of toy settings there is rarely one objectively correct labeling.

(2) The role of LLMs in social meaning-making. LLMs offer a new way to interface with cultural knowledge, potentially influencing how we articulate and make sense of our own experience. How can lessons from earlier shifts in cultural technology (writing, print, search) inform the role we envision for LLMs within the larger process of meaning-making?

Publications

C=Conference, J=Journal, S=In Submission, T=Thesis

[S.1] **Austin DE***, Suleman K, & Cheung JCK (2026). **In-Context Exploration-Exploitation is Biased by Semantic Priors**. Accepted in *COLM '26*. October 2026, San Francisco, USA. DOI: N/A

[C.3] Spinoso-Di Piano C*,**Austin DE***, Piantanida P, & Cheung JCK (2025). **(RSA)^2: A Rhetorical-Strategy-Aware Rational Speech Act Framework for Figurative Language Understanding**. In *ACL '25*. July 2025, Vienna, Austria. DOI: 10.18653/v1/2025.acl-long.1019

[C.2] **Austin DE**, Korikov A, Toroghi A, & Sanner S (2024). **Bayesian Optimization with LLM-Based Acquisition Functions for Natural Language Preference Elicitation**. In *RecSys '24*. October 2024, Bari, Italy. DOI: 10.1145/3640457.3688142

[J.2] Abdul-Samad K, Ma S, **Austin DE,** et al. (2024). **Comparison of machine learning and conventional statistical modeling for predicting readmission following acute heart failure hospitalization.**. *American Heart Journal*, Vol. 277, pp. 93-103. DOI: 10.1016/j.ahj.2024.07.017

[C.1] Gao Y, Kim S, **Austin DE**, & McIntosh C (2024). **MEDBind: Unifying Language and Multimodal Medical Data Embeddings**. In *MICCAI '24*. October 2024, Marrakesh, Morocco. DOI: 10.1007/978-3-031-72390-2_21

[J.1] **Austin DE**, Lee DS, Wang CX, Ma S, Wang X, Porter J, Wang B (2022). **Comparison of machine learning and the regression-based EHMRG model for predicting early mortality in acute heart failure.**. *International Journal of Cardiology*, Vol. 365, pp. 78-84. DOI: 10.1016/j.ijcard.2022.07.035

Education

- **MILA - Quebec AI Institute / McGill University** — *2025 - 2030 (expected)*
  PhD, Computer Science — Montreal, QC
  - Supervisor: Jackie CK Cheung
  - GPA: A
  - *Coursework*: Natural Language Processing, Natural Language Understanding with Deep Learning
- **MILA - Quebec AI Institute / McGill University** — *2024 - 2025*
  Master's of Science (Thesis), Computer Science (Did Not Complete - Fast-tracked to PhD) — Montreal, QC
  - Supervisor: Jackie CK Cheung
  - GPA: A
  - *Coursework*: Probabilistic Graphical Models, Large Language Models, Evaluation of NLP Systems
- **University of Waterloo** — *2018 - 2023*
  Bachelor of Computer Science, Minor in Statistics — Waterloo, ON
  - Major Average: 89.6%
  - *CS Coursework*: Algorithms, Operating Systems, Data Structures, Object-Oriented Software Development, User Interfaces, Computer Security and Privacy, Intro to AI, Intro to ML, Logic and Computation, Computer Networks
  - *Math Coursework*: Mathematical Statistics, Computational Statistics and Data Analysis, Introduction to Combinatorics, Linear Algebra 1 & 2, Sampling and Experimental Design, Stochastic Processes, Stochastic Simulation Methods

Skills

- **Natural Languages:** English (Native), French (B2)
- **Programming Languages:** Python, C, C++, R, Java, JavaScript
- **Scientific Computing:** Pytorch, NumPy, Pandas, Sk-learn, Matplotlib, Slurm
- **Web Technologies:** Flask, HTML/CSS, REST APIs
- **Misc Tools:** Git, Bash, LaTex, HuggingFace

Research Experience

- **McGill University** *May 2024 - Ongoing*
  Student Research Assistant Montreal, QC
  - Supervisor: Dr. Jackie Cheung
  - Investigating the use of LLMs to interface between natural language and explicit models of communication. Currently working on pragmatic models of multi-agent communication in collaborative distributed problem solving settings.
  - Two first-authored publications at major NLP conferences on 1) Rational Speech Act framework and 2) critiquing agentic evaluation
- **University of Toronto** *September 2023 - April 2024*
  Research Intern Toronto, ON
  - Supervisor: Dr. Scott Sanner
  - Led a research project with two Ph.D. students to extend model-based preference elicitation methods to an unbounded language space using LLMs
  - Resulted in a first-authored peer-reviewed long paper at RecSys'24
- **Vector Institute** *September 2023 - April 2024*
  Faculty Affiliate Researcher Toronto, ON
  - Supervisor: Dr. Chris McIntosh
  - Resulted in co-authorship on a peer-reviewed long paper at MICCAI'24
  - Assisted two PhD students with the implementation and benchmarking of a large multimodal model which leveraged text as an embedding space to link clinical modalities such as chest x-rays and ECGs
  - Explored and benchmarked methods for distributed multi-GPU training and model scalability
  - Adapted model pipeline to new modalities and cluster architectures
- **University Health Network** *May 2019 - September 2020*
  Research Student Toronto, ON
  - Supervisors: Drs. Douglas Lee and Bo Wang
  - Resulted in a first-authored, peer-reviewed journal publication
  - Investigated the performance of machine learning methods vs traditional statistical methods for heart failure prognosis
  - Worked on independent projects with MIMIC-III, a time-series multimodal ICU database

Awards

- **Building 21 BLUE Fellowship** *January 2026 - April 2026*
  $3,000 McGill University
  - Four-month research fellowship at Building 21, McGill's interdisciplinary ideas accelerator exploring semiotics and sociolinguistics
  - Selected among ∼25 funded scholars through a competitive application process
- **Alice Eisen Leadership Award** *September 2021*
  $780 University of Waterloo
  - Awarded by competition for solid academic ability, commitment to community life, and leadership; two awards per year
- **Lucinda Robertson Scholarship** *September 2020*
  $780 University of Waterloo
  - Awarded by competition for solid academic ability and commitment to community life; two awards per year
- **President's Scholarship** *September 2018*
  $2,000 University of Waterloo
  - Entrance scholarship for students with an admission average above 90%

Work Experience

- **Huawei Canada** *May 2022 - August 2022*
  AI Developer Waterloo, ON
  - Led a research project to prototype multimodal ML pipelines for classifying document corpora based on information sensitivity
  - Conducted literature reviews on document classification and multimodal models
  - Implemented and benchmarked models including transformers, early-fusion text/image multimodal models, and LSTMs
  - Implemented an API for model training and inference
- **Wish** *September 2021 - December 2021*
  Software Engineer Intern - Infrastructure Security Remote
  - Developed and deployed developer tools for data security and privacy using Go, K8s, Docker, and AWS
  - Developed proxy endpoints for adding HTTPS to traffic between microservices
- **Geminare** *January 2021 - April 2021*
  Machine Learning Developer Remote
  - Lead full stack developer of machine learning-based cybersecurity intrusion detection system
  - Implemented clustering models and feature extraction pipelines while improving interpretability
  - Received praise for my ability to concisely communicate business-relevant insights to CEO in weekly team meetings

Teaching Experience

- **McGill University** *September 2025 - December 2025*
  Introduction to AI Montreal, QC
  - Designed and implemented a competitive game environment for a class-wide agent tournament as final project; built scoring and matchup infrastructure to evaluate student-submitted agents head-to-head.

Additional Information

Languages: English (Fluent), French (Around B2)
Interests: Guitar, Bass, History, Basketball, Volleyball, Recommendation Systems