Francois Roewer-Despres

Education

Ph.D. – Computer Science Sep 2021 – Present (**expected: May 2025**)
University of Toronto (Vector Institute)
- GPA: 4.0/4.0

M.Sc. – Computer Science Sep 2018 – Aug 2021
University of Toronto (Vector Institute)
- GPA: 4.0/4.0

B.Sc. (Double Honours) – Computer Science & Economics Sep 2013 – Apr 2018
University of Saskatchewan
- Minor in **Statistics**
- GPA: 98/100

Skills

Technical – Large Language Models, Natural Language Processing, Dialogue Systems, AI Safety

Research – Analytical Thinking, Statistics, Technical Writing, Leadership, Organization Skills

Programming Languages – Python, Java, LaTeX

Spoken Languages – English (fluent), French (fluent), German (intermediate)

Research Experience

Ph.D. Graduate Researcher – OGS funded Aug 2021 – Present
Vector Institute & University of Toronto
- Create a **counterfactual reasoning** dataset to measure overreliance of **large language models (LLMs)** on inductive biases over knowledge-grounded **multi-hop reasoning** (*research in progress*).
- **Collaborate** with cardiologist on developing a question-aware **medical dialogue** understanding model with the goal of producing state-of-the-art results in **explainable prediction** of cardiovascular patient readmission rates from **doctor-patient conversations** (*research in progress*).
- Built `coma` (https://coma.readthedocs.io), a **Python** library that has accelerated development on **5 research projects to date** by removing boilerplate for building configurable command-based programs for **deep learning** and **machine learning** projects.

M.Sc. Graduate Researcher – VSAI & NSERC CGS-M funded Sep 2018 – Aug 2021
Vector Institute & University of Toronto
- Built the `Dialogue Learning Environment` (DLE), analogous to the `Atari Learning Environment` (ALE), where LLMs learn **dialogue games** using **reinforcement learning (RL)**. DLE incentivizes development of generalist **dialogue LLMs** that are proficient in many different tasks simultaneously.
- **Initiated** and **directed** expansion of group project in **natural language processing** course on **phonemic confusion** into successful publication (see (1) in Publications).
- **Winner** (out of ∼20 submissions) of 2019 **ACM SIGAI Student Essay Contest** by proposing a framework that incentivizes **collaborative development** between all stakeholders of AI systems (e.g., **LLMs**) in high-impact domains (see (3) in Publications). **Published** and **presented** revised framework at *NeurIPS* workshop (see (2) in Publications).

B.Sc. Research Assistant – NSERC USRA funded 2015 – 2017 (May – Aug)
University of Saskatchewan

- Introduced parallel and probabilistic simulation capabilities to *ArtiSynth* (www.artisynth.org), a **Java** toolkit for **speech and vocal tract** simulations, by designing a novel domain-specific specification language for embarrassingly-parallel **Monte Carlo sampling** (see (6) in Publications), which proved instrumental to the methodology of **9 publications to date** (e.g., (4, 5, 7, 8) in Publications).
- Improved simulation compute time **10 fold** (on average) by employing **deep neural networks** to predict probabilistic **speech simulation** results in *ArtiSynth* (see (4) in Publications).
- **Mentored** and **managed** new research assistants (**1 per year**) by liaisoning with supervisor, prioritizing *ArtiSynth* **project development** directions, and giving tutorial presentations on *ArtiSynth*.

Selected Scholarships and Awards – 7 of 19

Ontario Graduate Scholarship (OGS) Jul 2022
University of Toronto & Province of Ontario Value: $15000 total

Vector Scholarship in Artificial Intelligence (VSAI) Jan 2019
Vector Institute Value: $17500 total

- Merit-based entrance scholarship awarded to **top students** pursuing M.Sc. in AI.

Governor General's Academic Medal (Undergraduate Level) Jun 2018
University of Saskatchewan Value: Medal of Honour

- Awarded to undergraduate with **highest GPA** amongst **all graduating students** that year.

Canada Graduate Scholarship, Master's (CGS-M) Apr 2018
Natural Sciences and Engineering Research Council of Canada (NSERC) Value: $17500 total

Undergraduate Student Research Award (USRA) – 3 times 2015, 2016, 2017
Natural Sciences and Engineering Research Council of Canada (NSERC) Value: $4500/year

Selected Publications – 8 of 14

1. **Francois Roewer-Despres**, Jinyue Feng, Zining Zhu, and Frank Rudzicz. ACCORD: Closing the Commonsense Measurability Gap. *Under Review; arXiv preprint arXiv:2406.02804*, 2024
2. **Francois Roewer-Despres**, Arnold YS Yeung, and Ilan Kogan. Towards Detection and Remediation of Phonemic Confusion. *18th SIGMORPHON Workshop on Computational Research in Phonetics, Phonology, and Morphology*, 2021
3. **Francois Roewer-Despres** and Janelle Berscheid. Continuous Subject-in-the-Loop Integration: Centering AI on Marginalized Communities. In *Workshop on Resistance AI at the 34th Conference on Neural Information Processing Systems (NeurIPS)*, 2020
4. Janelle Berscheid and **Francois Roewer-Despres**. Beyond Transparency: A Proposed Framework for Accountability in Decision-Making AI Systems. *AI Matters*, 5(2):13–22, 2019
5. **Francois Roewer-Despres**, Najeeb Khan, and Ian Stavness. Towards Finite Element Simulation Using Deep Learning. In *15th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering*, 2018
6. Bryan Gick, Blake Allen, **Francois Roewer-Despres**, and Ian Stavness. Speaking Tongues are Actively Braced. *Journal of Speech, Language, and Hearing Research*, 60(3):494–506, 2017
7. **Francois Roewer-Despres** and Ian Stavness. BatchSim: A General Framework for Parallel and Probabilistic Biomechanical Simulations in ArtiSynth. In *4th International Workshop on Biomechanical and Parametric Modeling of Human Anatomy*, Aug 2016