# JITHENDARAA SUBRAMANIAN

# 🗘 Github 🔸 🛅 LinkedIn 🔸 🕱 Scholar 🔸 🌐 Webpage 🔸 🖾 Email 🔶 Citizenship: USA

## **EDUCATION**

McGill University, Mila Quebec AI Institute M.Sc. (Thesis), Computer Science Advisors: Derek Nowrouzezahrai, Samira Ebrahimi Kahou Courses: Applied ML, Matrix Computations, Causal Inference and ML, Mathematical Tools for Computer Science

National	Institute	of Techno	logy, T	`iruchi	irappalli	
B.Tech, P	roduction	Engineering	g with	minor	in Comp	uter Science

### SKILLS

Deep learning frameworks: JAX, PyTorch, TensorFlow, Flax, dm-haiku Programming Languages: Python, C++ Other: Multi-GPU training, CPU Multiprocessing, Large-scale data processing Git, Shell scripting, WandB, SQL

# **INDUSTRIAL RESEARCH**

ServiceNow Research

Visiting researcher

Supervisors: Valentina Zantedeschi, Alexandre Drouin

- Change point detection for time series causal discovery.
- Benchmarking foundation models on text-conditioned forecasting.

#### **Amazon Science**

Research scientist intern

• Lead on developing long-term revenue forecasting models for Amazon Fresh and Amazon Go. The proposed transformerbased solution resulted in 44% lower error rate over the best baselines.

- Scaled the approach to train the model on a billion transactions, with distributed, multi-GPU training.
- Model to be deployed internally for use in basket recommendation and to quickly iterate over business strategies.

# ACADEMIC RESEARCH

# De novo Protein Design

• Reinforcement Learning with Protein Language Models as a reward model for de novo protein design.

### Latent DAG GFlowNets

 Extending DAG-GFlowNets to learn an approximate joint posterior over latent variables and causal structures from low-level data. Currently exploring GFlowNet-EM to alternatingly learn the reward of the GFlowNet and the joint posterior.

# Centralized Codebase for Benchmarking Bayesian Causal Discovery Algorithms

• Co-led the effort on building a central codebase for running Bayesian Causal Discovery algorithms. The repository currently supports synthetic data generation, running over 10 algorithms off-the-shelf, and contains numerous metrics for evaluating model performance in a systematic manner.

# **BIOLS: Bayesian Inference over Latent Structural Causal Models**

• Led research on developing BIOLS, an approximate inference method to learn a joint distribution over structural causal models from low-level data like pixels, for linear Gaussian models. Scales upto atleast 50 causal variables.

Accepted at ICML 2022 Workshop on Spurious Correlations, Invariance and Stability. Under review at NeurIPS 2024.

#### Mila Quebec AI Institute, École de Technologie Supérieure Montreal Nov 2020 - Sep 2021

Physical reasoning tasks (PHYRE), video prediction using Neural ODEs, disentangled representations for videos.

Carnegie Mellon Univ	ersity
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Research intern, RoboTutor Team Advisor: Jack Mostow

Designed a Reinforcement Learning framework for personalizing Intelligent Tutoring Systems (ITS) for underprivileged

Sep 2021 - Apr 2024 GPA: 4.0 / 4.0

Sep 2017 – May 2021

GPA: 8.3 / 10.0, CS GPA: 9.67 / 10.0

Apr 2024 – present Montreal, Quebec

Jun 2023 - Sep 2023

San Diego, California

Nov 2023 - present

Jan 2023 - present

### **C** Code

Apr 2020 – Feb 2021 **C** Code students in Africa. Proposed algorithm was instantiated in the context of the RoboTutor app, one of the five **\$1M Finalists in the \$15M Global Learning XPRIZE competition**, and deployed in Tanzania.

• Spotlight presentation at the Educational Data Mining 2021 Workshop on RL for Education.

University of California, Berkeley

Research intern

Advisor: Dawn Song, Lun Wang

- Secure architectures for Machine Learning programs: Created stub libraries for commonly used ML libraries like TensorFlow, PyTorch, scikit-learn, XGBoost, and pandas to perform static analysis of programs.
- Generated and enforced arbitrary privacy policies on DataFrames to make them compliant with privacy regulations like GDPR. Performed case studies on around 60 Kaggle programs to ensure privacy policies were enforced.
- Presented findings at the NeurIPS 2020 Workshop on Dataset Curation and Security, and at USENIX Security, 2022.

# PUBLICATIONS AND PREPRINTS

Reinforcement Learning for Sequence Design Leveraging Protein Language Models Jithendaraa Subramanian, Shivakanth Sujit, Niloy Irtisam, Umong Sain, Derek Nowrouzezahrai, Samira Kahou, Ria Under review at NeurIPS	shat Islam
Learning Latent Structural Causal Models Jithendaraa Subramanian, Yashas Annadani, Ivaxi Sheth, Nan Rosemary Ke, Tristan Deleu, Stefan Bauer, Derek Nowr Samira Ebrahimi Kahou ICML 2022 Workshop on Spurious Correlations, Invariance, and Stability   Under review at NeurIPS	Paper ouzezahrai,
Joint Bayesian Inference of Graphical Structure and Parameters with a Single Generative Flow Network Tristan Deleu, Mizu Nishikawa-Toomey, <u>Jithendaraa Subramanian</u> , Nikolay Malkin, Laurent Charlin, Yoshua Bengi Accepted at <b>NeurIPS 2023</b>	Paper o
Bayesian Learning of Causal Structure and Mechanisms with GFlowNets and Variational Bayes Mizu Nishikawa-Toomey*, Tristan Deleu*, <u>Jithendaraa Subramanian,</u> Yoshua Bengio, Laurent Charlin GCLR Workshop at <b>AAAI 2023</b>   Under review at <b>TMLR</b>	Paper
PrivGuard: Privacy Regulation Compliance Made Easier Lun Wang, Usmann Khan, Joseph Near, Qi Pang, <u>Jithendaraa Subramanian</u> , Neel Somani, Peng Gao, Andrew Low, I <b>USENIX Security 2022</b>	Paper Dawn Song
Deep Reinforcement Learning to Simulate, Train, and Evaluate Instructional Sequencing Policies <u>Jithendaraa Subramanian,</u> Jack Mostow <b>Spotlight at Educational Data Mining 2021</b> Workshop on Reinforcement Learning for Education	Paper
Awards & Honours	
<ul> <li>♦ McGill graduate student award worth 1500\$</li> </ul>	2023
• Awarded an AI Talent Bursary of <b>1500</b> \$ for the AI Week at the Alberta Machine Intelligence Institute (Amii)	2022, 2023
• Finalist at the Smart India Hackathon Software Edition: Top 1% among 0.5 million participants	2020

• Winner of TransfiNITTe Hackathon v2, intra-university hackathon at NIT Trichy. Awarded 200\$. 2019

# Volunteering & Responsibilities

◆ Lead TA for ECSE 343 Numerical Methods in Engineering, McGill University	Winter 2022
◆ Head of the web operations team at E-Cell, NIT Trichy	2018 - 2021

• Core member of Delta Force, NIT Trichy's programming club. Mentored several students and helped them take their first steps into Machine Learning.

Sep 2019 - May 2020