Alex Bie

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I am an ML researcher and engineer with graduate school training + 2 years of industry experience + publications in top ML conferences, looking for full-time research & research engineering roles.

EDUCATION

UNIVERSITY OF WATERLOO
MMath in Computer Science
2021-2023 (Expected)
Grade: 94/100
Advisors: Gautam Kamath & Shai Ben-David
Thesis topic: Differentially private machine learning.
1 paper accepted at **NeurIPS'22** [1,].

UNIVERSITY OF WATERLOO
BMath in Computer Science
2016-2021
Grade: 92/100 (Dean's Honours)
Minor: Pure Mathematics

PUBLICATIONS

[1] **A. Bie**, G. Kamath, V. Singhal. *Private Estimation with Public Data*. **NeurIPS 2022**.

[2] T. Cao, **A. Bie**, A. Vahdat, S. Fidler, K. Kreis. *Don't Generate Me: Training Differentially Private Generative Models with Sinkhorn Divergence*. **NeurIPS 2021**.

[3] **A. Bie**, G. Kamath, G. Zhang. *Private GANs, Revisited*. **NeurIPS 2022 SyntheticData4ML Workshop**.

[4] **A. Bie**, B. Venkitesh, J. Monteiro, M.A. Haidar, M. Rezagholideh. *Fully Quantizing Transformer-Based ASR for Edge Deployment*. **ICLR 2021 HAET Workshop**.

[5] T. Cao, **A. Bie**, K. Kreis, S. Fidler, A. Vahdat. *Differential Privacy Dataset Generation Using Generative Models*. **US Patent App. 17/317,698**.

SKILLS

Languages: Python • C/C++ • Java • JavaScript • SQL • OCaml • R

Technologies: NumPy/PyTorch /TensorFlow • Node.js • Unity • Linux

Coursework: Object-Oriented Programming **(93)** • Operating Systems **(92)** • Algorithms **(100)** • Graphics • Computer Vision • Machine Learning • Real Analysis

EXPERIENCE

HUAWEI | Research Engineer
May 2022 - Nov 2022, Sept 2019 - Jan 2020 | Montreal

- Implemented and evaluated techniques for speeding up model inference of **Transformer** deep learning systems for on-device **speech recognition** [4,]. Used **PyTorch** + **fairseq** to implement model training and **quantization**.
- Collaborated with product team to prototype Chinese speech recognition systems on internal datasets, using **Tensorflow** + Huawei's **GPU cloud cluster** (ROMA).
- Developed and improved over state-of-the-art **GAN** approaches for generating **synthetic data** under differential privacy guarantees [3,] **(reducing error rate from 17% → 5%)** by identifying and mitigating flaws prevalent in prior work.
- Added functionality, wrote documentation, and performed code reviews for the development of our federated learning codebase.

NVIDIA | Research Engineer
May 2020 – Oct 2020 | Toronto

- Proposed, implemented, and iteratively improved a novel **generative modelling** approach (post) for producing synthetic versions of privacy-sensitive datasets.
- Designed and wrote the **Python** + **PyTorch** codebase (repo) used to run experiments on NVIDIA's **GPU cloud cluster** (NGC).
- Wrote a paper [2,] based on this work, which was accepted for publication at **NeurIPS'21**. We also filed a **patent** [5,].

NATIONAL RESEARCH COUNCIL | Research Assistant
Jan 2019 – May 2019 | Ottawa

- Implemented and benchmarked models from natural language processing **(NLP)** research papers applying **LSTM sequence models with attention** for style-conditioned natural language generation in **PyTorch** and **Tensorflow.**

TRADEREV | Software Developer
May 2018 – September 2018 | Toronto

- Carved out and refactored financial system components living inside a legacy **Groovy** + **SQL** monolith into **Node.js** microservices.
- Implemented a banking integration mock service and utilized testing frameworks to **improve code-coverage** of financial systems in pre-production environments.
- Performed production debugging on **$2M/day-throughput** financial system.

PROJECTS

Compiler (C++,). Compiler for Joos 1W (subset of Java 1.3), supporting **control flow**, **classes**, and **inheritance**. Implements lexical/syntatic analysis, name resolution + type-checking, and code generation.

Text Editor (C++,). `vim`-like modal text editor designed with **object-oriented design principles** in mind. Supports a limited set of `vim` commands.

AWARDS

2023	**Scotiabank Data Science Challenge**	(1st place out of 29 teams, $2,000)
2022	**Ontario Graduate Scholarship**	($15,000)
2021	**Vector Scholarship in Artificial Intelligence**	($17,500)
2021	**David R. Cheriton Graduate Scholarship**	($20,000)
2016	**Governor General's Bronze Medal**	(Highest grade in HS graduating class)
2012	**CEMC Gauss Math Contest**	(1 of 27 perfect scores out of 12,000 students)