Alex Velez-Arce

AI full-stack developer · Software / ML Engineer

129 Franklin St, Cambridge, MA 02139, United States

+1 628-777-8455 | amva13@alum.mit.edu | alejandrovelez.com | amva13 | alejandrovelezarce | @avelezarce

Professional Experience

2024-2025 **Research Associate**, Zitnik Lab, Department of Biomedical Informatics, Harvard Medical School

- Spotlight paper for NeurIPS'24 AIDrugX
- Scaled Therapeutic Data Commons to 30K peak MAU
- Deployed single-cell foundation models via Huggingface Transformers and Huggingface Model Hub with 1000+ downloads
- Implemented transformer llm models
- Implemented llm agents
- collaborated on papers in llm agents and contrastive learning
- **Machine Learning Engineering**: model inference APIs and server development, model training, model benchmarking, llm agents, fine-tuning, model implementation, development, and architecture, RAG
- **Data Engineering**: data processing pipelines, ingestion, transformations, retrieval APIs
- **Full-stack**: API-first design, microservices, software design patterns
- **Skills**: Python, PyTorch, Huggingface Transformers, OpenAI, MS Azure, Next.js, Typescript

2022-2024 **Entrepreneurship**, Misc

- Built webapp which scaled to thousands of users
- Deployed diffusion model for molecular docking
- **Machine Learning Engineering**: LLMs, diffusion models, model server development, ML APIs
- **Full-stack**: dApps, RESTful APIs
- **Skills**: Python, Javascript, React.js, Tensorflow, PyTorch, Huggingface spaces, AWS, MS Azure

2022 **Sr. ML Engineer**, Cruise Automation

2021 **SDE II**, Prime Video, Amazon

2018-2021 **Software Engineer**, Pinterest Inc.

- Implemented optimizations on the Pinterest Ads ranking model
- Built a gpu frameowork for streamlining AI inferencing and deployment
- Developed full-stack features for the online a/b experimentation platform
- Redesigned proprietary time-series database and published work in Pinterest Engineering blog
- **Machine Learning Engineering**: model inference APIs and server development, model training, model validation tooling development, custom operators, ranking models
- **Data Engineering**: data processing pipelines, ingestion, transformations, retrieval APIs
- **Full-stack**: RESTful APIs
- **Skills**: C++, Python, Tensorflow Serving, PyTorch, CUDA and GPUs, TensorRT, AWS, Spark, HBase, Flask, React.js

2017-2018 **Undergraduate Research Assistant**, Computer Science and Artificial Intelligence Lab, MIT

Education

Massachusetts Institute of Technology (MIT) *Cambridge, MA*

BS Computer Science and Engineering *2013 - 2018*

Publications

Published

Velez-Arce, Alejandro, Xiang Lin, Michelle M. Li, Kexin Huang, Wenhao Gao, Tianfan Fu, Bradley L. Pentelute, Manolis Kellis, Marinka Zitnik. 2024. Signals in the Cells: Multimodal and Contextualized Machine Learning Foundations for Therapeutics. AI for New Drug Modalities at NeurIPS 2024.

In Review

Shen, Wanxiang, Chao Cui, Xiaorui Su, Zaixi Zhang, Alejandro Velez-Arce, Jianming Wang, Xiang Cheng Shi, Yan Bing Zhang, Jie Wu, Yu Zong Chen, Marinka Zitnik. 2024. Activity Cliff-Informed Contrastive Learning for Molecular Property Prediction. ChemRxiv.

Acknowledged in

Gao, Shanghua, Ada Fang, Yepeng Huang, Valentina Giunchiglia, Ayush Noori, Jonathan Richard Schwarz, Yasha Ektefaie, Jovana Kondic, Marinka Zitnik. 2024. Empowering biomedical discovery with AI agents. Cell. Volume 187, Issue 22, p6125-6151.

Duchin, Moon, Bridget Eileen Tenner. 2024. Discrete geometry for electoral geography. Political Geography, 2024 - Elsevier.

Industry Literature

Velez-Arce, Alejandro, and Parag Kesar. "PinalyticsDB: A Time Series Database on Top of HBase." Pinterest Engineering Blog, 26 Sept. 2019, https://medium.com/pinterest-engineering/pinalyticsdb-a-time-series-database-on-top-of-hbase-946f236bb29a.

Presentations

Invited Talks

Western Bioinformatics Research Seminar Series November 2024. *Signals in the Cells: Multimodal and Contextualized Machine Learning Foundations for Therapeutics*. Seminar talk at Western University's Schulich School of Medicine and Dentistry: Western Bioinformatics Research Seminar Series, Schulich School of Medicine & Dentistry, Western University, London, Ontario, Canada.

Poster Presentations

(Spotlight) MoML 2024. June 2024. Spotlight Poster Presentation at Molecular Machine Learning Conference. MoML2024 Spotlight Poster: Mila - Institut québécois d'IA, Montreal, Quebec, Canada.

(Spotlight) AI for New Drug Modalities at NeurIPS 2024. December 2024. *Signals in the Cells: Multimodal and Contextualized Machine Learning Foundations for Therapeutics*. Poster presentation for the AI for New Drug Modalities Workshop at NeurIPS 2024. AIDrugX at NeurIPS Spotlight Paper: NeurIPS Conference, Vancouver, BC, Canada.

Teaching Experience

Spring 2018	**6.009 - Fundamentals of Programming**, Lab Assistant	*MIT*
Fall 2017	**6.009 - Fundamentals of Programming**, Lab Assistant	*MIT*
Spring 2015	**6.042 - Math for Computer Science**, Grader	*MIT*
2014	**8.01L - Physics I: Mechanics**, Grader	*MIT*

Extracurriculars

Leadership Positions

2014-2017	**Phi Delta Theta Fraternity**, Social Chair, Secretary, New Member Educator
2013-2017	**Association of Puerto Rican Students**, Athletics Chair, Intramural Soccer team captain, Founding Newsletter Chair, Social Chair
2013-2014	**MIT Baker House Leadership**, Vice President of External Relations