Jack Lanchantin

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RESEARCH OVERVIEW

I am broadly interested in representation learning and interpretable models for sequence and graph structured data. In particular, I've focused on genomic sequences, protein sequences, and natural language. My research philosophy is centered around defining important, yet under-explored problems, and solving them using robust and interpretable models. In the **biology domain**, I have developed methods for predicting and interpreting properties of DNA and protein sequences. Primarily, I have worked on chromatin profile prediction (e.g. transcription factor binding), and gene expression prediction from DNA sequence inputs. Recently, I developed a novel method for predicting the interactions between human and SARS-CoV-2 proteins. We are extending this work for antibody evasion prediction in collaboration with the UVA Medical School and Google. In the **natural language domain**, I have sought to define and discover adversarial examples in text. In the **computer vision domain,** I have worked on multi-label classification and video generation.

EDUCATION

Doctor of Philosophy in Computer Science
University of Virginia (2014-2021)
GPA: 4.0/4.0

Master of Science in Computer Science
University of Virginia (2014-2017)
GPA: 4.0/4.0

Bachelor of Science in Computer Engineering
Binghamton University, State University of New York (2010-2014)
GPA: 3.97/4.0

EMPLOYMENT

Microsoft AI and Research - Redmond, Washington
Research Intern (2018)

IBM Systems and Technology Group - Poughkeepsie, New York
Software Engineering Intern (2013)

Rensselaer Polytechnic Institute - Troy, New York
Research Assistant (2013)

RESEARCH HIGHLIGHTS AND AWARDS

- 15 Publications, 3 Preprints, 1,300+ citations, h-index of 7 (as of February 2021)
- Google Cloud COVID-19 Research Credit Grant Award (2020)
- Olsson Endowed Graduate Engineering Fellow (2018, 2020)
- ARCS Metro Washington Chapter Award Recipient (2019)
- UVA Presidential Fellow in Data Science (2019)

- NeurIPS TIML Workshop Best Paper Award (Deep Motif Dashboard) (2017)
- UVA Computer Science Outstanding Teaching Award (2017)
- NIH Biomedical Data Sciences Training Grant (2016)

PUBLICATIONS

Jack Lanchantin, Tianlu Wang, Vicente Ordonez-Roman, Yanjun Qi. General Multi-label Image Classification with Transformers. *Conference on Computer Vision and Pattern Recognition* ***(CVPR) 2020***

Jack Lanchantin, Tom Weingarten, Arshdeep Sekhon, Clint Miller, Yanjun Qi
Transfer Learning with Motif Transformers for Predicting Protein-Protein Interactions Between a Novel Virus and Humans. ***NeurIPS Covid-19 Symposium 2020***, Machine Learning in Computational Biology ***(MLCB) 2020***

John X. Morris, Eli Lifland, **Jack Lanchantin**, Yangfeng Ji, Yanjun Qi. Reevaluating Adversarial Examples in Natural Language. ***EMNLP Findings 2020***

Jack Lanchantin, Yanjun Qi. Graph Convolutional Networks for Epigenetic State Prediction Using Both Sequence and 3D Genome Data. ***Bioinformatics 2020***

Derrick Blakely, Eamon Collins, Ritambhara Singh, Andrew Norton, **Jack Lanchantin**, Yanjun Qi. FastSK: Fast Sequence Analysis with Gapped String Kernels. ***Bioinformatics 2020***

Jack Lanchantin, Arshdeep Sekhon, Yanjun Qi. Neural Message Passing for Multi-Label Classification. *European Conference on Machine Learning* ***(ECML-PKDD) 2019***

Ji Gao, **Jack Lanchantin,** Mary Lou Soffa, Yanjun Qi. Black-Box Generation of Adversarial Text Sequences to Evade Deep Learning Classifiers. *Deep Learning & Security Workshop* ***(DLS) 2018***

Travers Ching, Daniel S Himmelstein, Brett K Beaulieu-Jones, Alexandr A Kalinin, Brian T Do, Gregory P Way, Enrico Ferrero, Paul-Michael Agapow, Wei Xie, Gail L Rosen, Benjamin J Lengerich, Johnny Israeli, **Jack Lanchantin**, Stephen Woloszynek, Anne E Carpenter, Avanti Shrikumar, Jinbo Xu, Evan M Cofer, David J Harris, Dave DeCaprio, Yanjun Qi, Anshul Kundaje, Yifan Peng, Laura K Wiley, Marwin HS Segler, Anthony Gitter, Casey S Greene. Opportunities and Obstacles for Deep Learning in Biology and Medicine. *Journal of the Royal Society Interface* ***(JRSI) 2018***

Ritambhara Singh, **Jack Lanchantin,** Arshdeep Sekhon, Yanjun Qi. Attend and Predict: Understanding Gene Regulation by Selective Attention on Chromatin. *Advances in Neural Information Processing Systems* ***(NeurIPS) 2017***

Jack Lanchantin, Ritambhara Singh, Yanjun Qi. Memory Matching Networks for Genomic Sequence Classification. *International Conference on Learning Representations* ***(ICLR) Workshop Track 2017***

Ritambhara Singh, Arshdeep Sekhon, Kamran Kowsari, **Jack Lanchantin**, Beilun Wang, Yanjun Qi. GaKCo: a Fast GApped k-mer string Kernel using COunting. *European Conference on Machine Learning* ***(ECML-PKDD) 2017***

Jack Lanchantin, Ritambhara Singh, Beilun Wang, Yanjun Qi. Deep Motif Dashboard: Visualizing and Understanding Genomic Sequences Using Deep Neural Networks. *Pacific Symposium on Biocomputing* ***(PSB) 2017***

Jack Lanchantin, Ritambhara Singh, Zeming Lin, Yanjun Qi. Deep Motif: Visualizing Genomic Sequence Classifications. *International Conference on Learning Representations,* ***(ICLR) Workshop Track 2016***

Ritambhara Singh, **Jack Lanchantin**, Gabriel Robins, and Yanjun Qi. DeepChrome: Deep-learning for predicting gene expression from histone modifications. *European Conference on Computational Biology **(ECCB) 2016***

Ritambhara Singh, **Jack Lanchantin**, Gabriel Robins, and Yanjun Qi. Transfer String Kernel for Cross-Context DNA-Protein Binding Prediction. *IEEE/ACM Transactions on Computational Biology and Bioinformatics **(TCBB) 2016***

Zeming Lin, **Jack Lanchantin**, Yanjun Qi. MUST-CNN: A Multilayer Shift-and-Stitch Deep Convolutional Architecture for Sequence-based Protein Structure Prediction. *The 30th AAAI Conference on Artificial Intelligence **(AAAI) 2016***

TEACHING, MENTORING, LEADERSHIP

Teaching Assistant

Undergraduate Machine Learning, Head TA (2020)
Graduate Machine Learning, Head TA (2017)
Algorithms (2015)
Intro to Programming, Head TA (2015)
Operating Systems (2014)

Mentoring

Undergraduate Researcher, Kevin Ivey (2020-Present)
Undergraduate Researcher, Dillon Lue (2020-Present)
Undergraduate Researcher, Jack Morris (2019-2020)
REU Summer Intern, Bhairavy Puviindran (2019)

Leadership and Service

UVA Computer Science Faculty Search Committee - Member (2020)
UVA Computer Science Graduate Student Group - Member (2017-2020)
Conference on Computer Vision and Pattern Recognition (CVPR) - Reviewer 2021
Research in Computational Molecular Biology (RECOMB) - Reviewer 2020
Machine Learning in Computational Biology (MLCB) - Program Committee 2020
Machine Learning in Computational Biology (MLCB) - Program Committee 2019

SKILLS

Languages: Python, Pytorch, Lua, Torch7, Java
Platforms: Linux, Mac OS, Windows, Microsoft Azure, AWS, Google Cloud
Applicable Coursework: Deep Learning on Graph Structured Data, Advanced Deep Learning, Machine Learning, Large Scale Machine Learning, Learning Theory, Computer Vision, Information Retrieval, Data Science in Software Engineering, Cloud and Big Data, Algorithms