

# Christopher Rohlicek

 [crohlicek](https://github.com/crohlicek) |  [crohlicek.github.io](https://github.com/crohlicek) |  [crohlice@broadinstitute.org](mailto:crohlice@broadinstitute.org) |  617.686.3089

## EDUCATION

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2020 - 2021 **Brown University** – ScM in Data Science (GPA: 4.0/4.0)

*Relevant Coursework:* Probability, Statistics, and Machine Learning; Data Engineering; Statistical Learning; Deep Learning and Special Topics in Data Science; Modern Applications of Probability and Statistics

2016 - 2020 **Harvard University** – AB in Applied Mathematics (GPA: 3.6/4.0)

*Relevant Coursework:* Matrix Methods in Data Analysis, Signal Processing, and Machine Learning; Decision Theory; Abstraction and Design in Computation; Computer Networks; Optimization; Honors Linear Algebra and Multivariable Calculus and Real Analysis; Theory of Groups and Vector Spaces; Vector Space Methods for Differential Equations

## WORK EXPERIENCE

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**Broad Institute of MIT and Harvard**

September 2021 - present

*Associate Computational Biologist – Popic Lab*

- Researching applications of novel deep learning approaches to detecting genomic structural variation
- Leading investigations of generative adversarial network (GAN) applications to histology imaging, novel evaluation metrics for GANs, and metric-learning approaches to measuring genomic relatedness
- Developing software pipelines for simulating genomic variation and benchmarking and analyzing results of variant callers
- Initiated, and co-leading, interdisciplinary reading group exploring machine learning and applications in computational biology

**Brown University – Carney Institute for Brain Science**

June 2020 - August 2021

*Research Assistant to Prof. Jason Ritt*

- Investigated dynamical dimensionality reduction of neurophysiological brain models
- Used recurrent neural networks to solve inverse problem posed by empirical neural spike data
- Developed method for dimensionality reduction of high-dimensional dynamical systems

**MIT Lincoln Laboratory**

May 2019 - August 2019

*Research Intern with Dr. Michael Brandstein*

- Applied signal processing and speech recognition techniques to identify bird species from flight call data
- Combined CNNs and k-nearest neighbors to improve on best published accuracy from 94% to 99%

**O&R Patent Law**

May 2018 – August 2018

*Software Intern*

- Developed Python-based productivity tools to save hundreds of person-hours
- Used Python and SQL to automate entity resolution and summarization of records for financial analysis

## PUBLICATIONS AND PRESENTATIONS

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Popic, V., Cunial, F., **Rohlicek, C.**, Hajirasouliha, I., Meleshko, D., Garimella, K., & Maheshwari, A. (2022) “A Deep Learning Framework for Structural Variant Discovery and Genotyping.” *Nature Methods* (in review).

**Rohlicek, C.**, Popic, V., (2022) “Complex Structural Variant Discovery in Short Reads Using Deep

Learning.” (*in preparation*).

Lecture titled ”Introduction to Neural Networks: Applications and Intuition” presented as part of a course taught by V. Popic at the *East European Bioinformatics and Computational Genomics School*; October 2022

Brendel, M. Honigsberg. R, Maharjan S., **Rohlicek, C.** “Weakly-supervised tumor purity prediction from HE stained slides.” Poster presented at 2022 Starr Cancer Consortium Retreat; April 2022; Cold Spring Harbor, NY.

“A deep learning approach to structural variant discovery” and “Cue: A framework for cross-platform structural variant calling and genotyping with deep learning,” presented with V. Popic at Models, Inference Algorithms Initiative interinstitutional seminar series, Broad Institute of MIT and Harvard, February 2022.

## SELECT PROJECTS

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### **Molecular Toxicity Prediction**

*Deep Learning and Special Topics in Data Science, Brown University*

Completed research on the use of CNNs and BERT-inspired models for the processing of SMILES molecule representations; implemented a novel strategy for predicting toxicity.

### **Neural Network Parameter Reduction Using Pruning and Matrix Decomposition**

*Matrix Methods, MIT (cross-registered)*

Conducted experiments in PyTorch comparing effects of magnitude-based pruning techniques to matrix decomposition methods of network size reduction.

## REVIEWS

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ISMB (Conference): 1 paper

## TECHNICAL SKILLS

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<b>Programming Languages</b>	Python, Java, OCaml, SQL, R, MATLAB, Julia, Bash
<b>Libraries</b>	PyTorch, Tensorflow, Keras, Pysam, Numpy, Pandas, Scikit-learn