

## EDUCATION

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### University of Massachusetts Amherst

M.S./Ph.D. in Computer Science, Advisor: Cameron Musco

Amherst, MA

*2018–Present*

### Dartmouth College

B.S. in Computer Science, B.S. in Engineering Physics, Minor in Mathematics

Hanover, NH

*2014–2018*

## RESEARCH INTERESTS

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I am broadly interested in machine learning involving network data and graph-based algorithms. My recent work centers around learning or inverting low-dimensional, continuous representations for networks. I am more generally interested in connections between recent, “deep” methods and classical methods and how these connections can inform theoretical understanding of deep learning as well as new simplifications and advancements.

## PROJECTS

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### Network Embeddings for Downstream Tasks and Reconstruction

*2019–Present*

Research Assistant to Prof. Cameron Musco

- Derived new expressions for the DeepWalk objective in the infinite window-size limit, showing equivalency to classical spectral embedding. Showed that addition of a simple nonlinearity to spectral embedding approximates DeepWalk and evaluated the performance of this approximation on node classification for real-world networks.
- Responding to prior working showing that node embeddings fail to capture local network structure under certain assumptions, applied a logistic PCA algorithm which, under a slight relaxation of those assumptions, demonstrated exact low-dimensional factorization of several real-world networks.

### Adversarial Machine Learning for Malware Identification

*Jan. 2018–Jun. 2018*

Dartmouth Leave Term Grant / Senior Honors Thesis with Prof. V.S. Subrahmanian

- Created and evaluated a genetic algorithm for data poisoning attacks on black-box classifiers.

### DG Schemes with L1 Regularization in Hyperbolic PDE Solvers

*Jun. 2017–Oct. 2017*

Dartmouth Leave Term Grant with Prof. Anne Gelb

- Extended then-recent research on regularization-based shock stabilization schemes used to enhance finite difference and spectral methods. Implemented and evaluated enhanced discontinuous Galerkin (DG) methods on discontinuous fluid dynamics test problems.

### Plot Structure Characterization and Visualization Using Subtitle Files

*Jun. 2016–Sep. 2016*

Neukom Scholars Grant with Prof. Allen Riddell

- Processed subtitle files of television shows to extract n-grams which are semantically characteristic to parts of episodes. Created continuous visualizations of n-gram frequency distributions across parts of episodes and series release period using KDE.

## PUBLICATIONS

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1. **InfiniteWalk: Deep Network Embeddings as Laplacian Embeddings with a Nonlinearity**  
Sudhanshu Chanpuriya and Cameron Musco. *Knowledge Discovery in Databases (KDD)*, 2020.
2. **Node Embeddings and Exact Low-Rank Representations of Complex Networks**  
Sudhanshu Chanpuriya, Cameron Musco, Konstantinos Sotiropoulos, and Charalampos Tsourakakis. *Neural Information Processing Systems (NeurIPS)*, 2020.

## TEACHING

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- **Teaching Assistant** at UMass Amherst *Fall 2018–Present*  
*Computer Systems Principles (COMPSCI 230)*
- **Teaching Assistant** at UMass Amherst *Summer 2019*  
*Introduction to Structured Query Language (COMPSCI 197Q)*