

# Hyunghoon Cho

## *Curriculum vitae*

Schmidt Fellow  
Broad Institute of MIT and Harvard  
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## Academic Degrees

9/2013 – 6/2019  
Ph.D. in Electrical Engineering and Computer Science, advised by Prof. Bonnie Berger  
**Massachusetts Institute of Technology**

3/2012 – 6/2013  
M.S. in Computer Science (GPA 4.0/4.0)  
**Stanford University**

9/2009 – 6/2013  
B.S. in Computer Science with Honors (GPA 3.94/4.0), advised by Prof. Daphne Koller  
**Stanford University**

## Publications (\*equal contributions)

Emerging Technologies Towards Enhancing Privacy in Genomic Data Sharing  
Bonnie Berger\*, [Hyunghoon Cho](#)\*  
*Genome Biology* 20, Editorial, 2019

Geometric Sketching Compactly Summarizes the Single-Cell Transcriptomic Landscape  
Brian Hie\*, [Hyunghoon Cho](#)\*, Benjamin DeMeo, Bryan Bryson, Bonnie Berger  
*Cell Systems* 8(6), 2019 (cover article) and *RECOMB* 2019

Coexpression Uncovers a Unified Single-Cell Transcriptomic Landscape  
Brian Hie, [Hyunghoon Cho](#), Bryan Bryson, Bonnie Berger  
*bioRxiv*, 2019

Realizing Private and Practical Pharmacological Collaboration  
Brian Hie\*, [Hyunghoon Cho](#)\*, Bonnie Berger  
*Science* 362(6412), 2018

Large-Margin Classification in Hyperbolic Space  
[Hyunghoon Cho](#), Benjamin DeMeo, Jian Peng, Bonnie Berger  
*AISTATS*, 2019

Generalizable and Scalable Visualization of Single-Cell Data Using Neural Networks  
[Hyunghoon Cho](#), Bonnie Berger, Jian Peng  
*Cell Systems* 7(2), 2018 and *RECOMB* 2018

Secure Genome-wide Association Analysis using Multiparty Computation  
[Hyunghoon Cho](#), David J. Wu, Bonnie Berger  
*Nature Biotechnology* 36, 2018  
**Featured in Editors' Choice, Science 360(6393) and MIT News**

Compact Integration of Multi-Network Topology for Functional Analysis of Genes  
[Hyunghoon Cho](#), Bonnie Berger, Jian Peng  
*Cell Systems* 3(6), 2016  
**F1000Prime Recommended Article**

Reconstructing Causal Biological Networks through Active Learning  
Hyunghoon Cho, Bonnie Berger, Jian Peng  
*PLOS One* 11(3), 2016

Exploiting Ontology Graph for Predicting Sparsely Annotated Gene Function  
Sheng Wang\*, Hyunghoon Cho\*, ChengXiang Zhai, Bonnie Berger, Jian Peng  
*Bioinformatics* 31(12), 2015 and *ISMB/ECCB*, 2015

Diffusion Component Analysis: Unraveling Functional Topology in Biological Networks  
Hyunghoon Cho, Bonnie Berger, Jian Peng  
*RECOMB*, 2015

High-resolution Transcriptome Analysis with Long-read RNA Sequencing  
Hyunghoon Cho, Joe Davis, Kevin S. Smith, Alexis Battle, Stephen B. Montgomery  
*PLOS One* 9(9), 2014

Unraveling the Genetics of Human Diseases by Integrating Patterns for Epistasis Detection  
Hyunghoon Cho, Alexis Battle, Daphne Koller  
Undergraduate Honors Thesis, 2012

## Talks

Biomedical data sharing and analysis with privacy  
Harvard Medical School Dept. of Biomedical Informatics, September 2019

Biomedical data sharing and analysis with privacy  
Shannon Channel, May 2019

Realizing private and practical pharmacological collaboration  
RECOMB, **Highlight Talk**, April 2019

Biomedical data sharing and analysis with privacy  
CMU Computational Biology Department Seminar, February 2019

Biomedical data sharing and analysis with privacy  
MIT Applied Mathematics Colloquium, February 2019

Biomedical data sharing and analysis with privacy  
Stanford Electrical Engineering Colloquium, February 2019

Biomedical data sharing and analysis with privacy  
National Center for Biotechnology Information (NCBI), November 2018

Secure genome crowdsourcing for million-individual association studies  
ASHG Annual Meeting, Workshop on Genomic Privacy, October 2018

Biomedical data sharing and analysis with privacy  
iDASH Privacy and Security Workshop, **Plenary Talk**, October 2018

Biomedical data sharing and analysis with privacy  
Broad Institute of MIT and Harvard, MIA Seminar, October 2018

Secure genome crowdsourcing for million-individual association studies  
ISMB Translational Medicine, July 2018  
**Best oral presentation award**

Generalizable visualization of mega-scale single-cell data  
RECOMB, April 2018

Diffusion Component Analysis: unraveling functional topology in biological networks  
RECOMB, April 2015

Homomorphic encryption for genomic analysis  
iDASH Privacy and Security Workshop, March 2015

Identifying context-dependent community structure across multiple networks  
ISMB Network Biology, July 2014

## Work Experience

Research Intern, **Microsoft Research New England**, Summer 2014  
Worked with Jennifer Listgarten (now Professor at UC Berkeley) on using probabilistic topic models to understand biological processes underlying cancer mutations.

Business Development Intern, **Palantir Technologies**, Summer 2012  
Developed a web-based genomic analysis platform with a focus on seamlessly integrating different data sources and publicly available analytical tools.

## Teaching Experience

9/2018 - 12/2018  
Teaching Assistant, **6.867: Machine Learning**, taught by Prof. Devavrat Shah, Prof. Suvrit Sra, and Prof. David Sontag, MIT

2/2016 - 5/2016  
Teaching Assistant, **18.418: Topics in Computational Molecular Biology**, taught by Prof. Bonnie Berger, MIT

3/2013 - 6/2013  
Teaching Assistant, **CS228: Probabilistic Graphical Models**, taught by Prof. Daphne Koller, Stanford University

1/2011 - 12/2011  
Section Leader, **CS106A: Programming Methodology** and **CS106X: Programming Abstractions**, Stanford University

## Awards and Honors

Dimitris N. Chorafas Award, 2019 (MIT winner; two per institution)  
Best Oral Presentation Award at ISMB TransMed, 2018  
MIT EECS Great Educators Fellowship, 2013  
Kwanjeong Educational Foundation Scholarship for Graduate Studies, 2013  
Frederick Emmons Terman Engineering Scholastic Award, 2013  
Stanford Tau Beta Pi Engineering Honor Society, 2012  
President's Award for Academic Excellence in the Freshman Year, 2011  
Kwanjeong Educational Foundation Scholarship for Undergraduate Studies, 2009  
Second Award in Intel ISEF, 2008

## Patents

Secure pharmacological collaboration for drug discovery (pending)  
Brian Hie, Hyunghoon Cho, Bonnie Berger

Secure genome crowdsourcing for large-scale association studies (pending)  
Hyunghoon Cho, David J. Wu, Bonnie Berger

Computer graphical user interface with genomic workflow (US 20140282177 A1, 2013)  
Lekan Wang, Hyunghoon Cho, Abimanyu Raja, Elizabeth Caudill, Palantir Technologies, Inc.