

ANIKA GUPTA

anikagupta@g.harvard.edu |  : anika18 | gupta-anika.github.io |  : @anikagupta18

I'm a PhD student working at the intersection of data science and high-throughput biology through the lens of single cell genomics. I'm passionate about data-driven biomedical innovation through venture creation.

EDUCATION

Harvard University

Doctor of Philosophy,
Bioinformatics and
Integrative Genomics

2018 - present

Massachusetts Institute of Technology

Bachelor of Science,
Computer Science and
Molecular Biology

2014 - 2018

Programming Languages

Python (keras, scikit-learn,
pandas, numpy, scipy), R,
HTML, Unix/Linux, LaTeX

Teaching Experience

Applied Machine Learning

Deep Learning for
Biomedical Data

Select Courses

Computational:

- Machine Learning
- Design and Analysis of Algorithms
- Computational Genomics

Biomedical:

- Genetics
- Human Pathology (HMS)
- Concepts in Genome Analysis

Biotech Entrepreneurship:

- Strategic Decision Making in the Life Sciences (Sloan)
- Business of Biotech (RA Capital)

RESEARCH EXPERIENCE

Broad Institute of Harvard and MIT, PI: Eric Lander

Jan 2019 - Present

Inferring causal gene regulatory interactions from high-throughput, time stamped single cell transcriptomic data. Goal is to systematically identify cellular pathways without perturbing cells.

Stanford University, PI: Dennis Wall

June 2017 - June 2018

Implemented coalitional game theory and unsupervised machine learning on the genomes of 4,610 individuals with autism spectrum disorder to map the combinatorial effect of genotype on ASD phenotypes.

Broad Institute, PIs: Aviv Regev, Kasper Lage

Sep 2015 - June 2018

Detected cancer vulnerabilities through a statistical framework that targets protein interaction networks under purifying selection—those that are rarely mutated due to their key role in tumor proliferation—in 4,700 cancer genomes

Foundation Medicine, Cancer Genomics Team

May 2016 - May 2017

Characterized the therapeutically targetable gene alteration landscapes—driver mutations, tumor mutational burden, and checkpoint inhibitors—of lung cancers, through analysis of >20,000 patient tumors towards precision medicine.

Merck, Bioinformatics Team

May - Aug 2015

Analyzed gene expression and signaling pathway data for 416 genes to predict immunotherapy combination gene signatures and enable synergistic therapeutic delivery against melanoma.

PROJECTS

The Data Pulse, Podcast Host

Jul 2020 - Present

I host a podcast at the intersection of data science & biomedical innovation, ranging from molecular to clinical and population scales, and spanning academia and industry. Season 1 has >10k downloads and >500 repeat listeners.

5AM Ventures, Fellow

Jul - Dec 2019

As one of two fellows, I guided strategic decisions in the venture creation arm. Designed the bioinformatics platform for an immuno-oncology company, outlined the translational biomarker strategy for a neurodegenerative disease company, and conducted scientific diligence in the regenerative medicine and RNA splicing domains for company builds.

Undiagnosed Diseases Network, Case Analysis Team

Oct - Dec 2018

Standardized and automated a genomic analysis (variant classification) pipeline for the Brigham Genomic Medicine team's efforts to uncover the genetic causes of four previously intractable, rare patient disease cases.

Flagship Pioneering, VentureLabs Intern

Jan - May 2017

Built quantitative models to enable key strategic decisions that could maximize value creation for a mitochondrial therapy-based Series A biotech company build.

LEADERSHIP

Models, Inference, and Algorithms, *Steering Committee*

Aug 2020 - Present

Guide the dialogue on machine learning within the Broad Institute & broader community as a committee member, inviting researchers to share their latest work, with a focus on the theoretical underpinnings and a discussion-based forum to foster collaborations at the interface of machine learning and biomedicine.

MIT Biotechnology Group, *Founder and Co-President*

June 2015 - June 2017

Established the undergraduate chapter of MIT's first (now >1,000-member) biotech initiative as a liaison between students and the biotech industry. Organized pitch competitions, speaker panels, interactive workshops, mentorship programs, due diligence groups, and interactive symposiums to foster student entrepreneurship within the biotech industry.

PUBLICATIONS

- Horn H, Fagre C, **Gupta A**, Tsafou K, Fornelos N, Neal JT, Lage K (2020). Using protein interaction networks to identify cancer dependencies from tumor genome data. *bioRxiv*.
- Sun M*, **Gupta A***, Varma M, Paskov K, Jung J, Stockham N, Wall D (2019). Coalitional game theory facilitates identification of noncoding variants associated with autism. *Journal of Biomedical Informatics Insights*.
- Frampton GM, Hartmaier R, Sokol E, **Gupta A**, Greenbowe J, Roels S, Gay L, Stephens PJ (2018). Novel CDH1 mutations in breast invasive lobular carcinoma. *Cancer Research*. Volume 79, pp. 2363.
- Gupta A***, Sun M*, Paskov K, Stockham N, Jung J, Wall D (2018). Coalitional game theory as a promising approach to identify candidate autism genes. *Pac Symp Biocomputing*. pp. 436-447.
- Gupta A***, Horn H*, Razaz P, Kim A, Lawrence M, Getz G, Lage K (2017). Detecting cancer vulnerabilities through gene networks under purifying selection in 4,700 cancer genomes. *bioRxiv*

CONFERENCE PRESENTATIONS

- Gupta A***, Siraj L*, Jones TR, Bloemendal A, Subramanian V, Lander ES (2019). Systematically learning cellular programs from single-cell transcriptional and chromatin accessibility data. *33rd Conference on Neural Information Processing Systems: Learning Meaningful Representations for Life workshop*. Vancouver, CA.
- Gupta A***, Siraj L*, Jones TR, Bloemendal A, Subramanian V, Lander ES (2019). Systematically learning biological pathway signatures from single cell gene expression data. *3rd Annual Women in Data Science Conference*. Cambridge, MA.
- Gupta A**, Horn H, Razaz P, Kim A, Lawrence M, Getz G, Lage K (2018). Detecting cancer vulnerabilities through gene networks under purifying selection. *American Society of Human Genetics Annual Meeting*. San Diego, CA.
- Gupta A***, Sun M*, Paskov K, Stockham N, Jung J, Wall D (2018). Identifying candidate autism genes via coalitional game theory. *American Medical Informatics Association Informatics Summit*. San Francisco, CA.
- Gupta A***, Sun M*, Paskov K, Stockham N, Jung J, Wall D (2018). Coalitional game theory as a promising approach to identify candidate autism genes. *23rd Annual Pacific Symposium on Biocomputing*. Big Island, HI.
- Frampton G, Hartmaier R, Sokol E, **Gupta A**, Greenbow J, Roels S, Gay L, Stephens P (2018). Novel CDH1 mutations in breast invasive lobular carcinoma. *American Association for Cancer Research Annual Meeting*. Chicago, IL.
- Frampton G, **Gupta A**, Connelly C, Fabrizio D, et al (2017). Hybrid-capture based comprehensive genomic profiling of lung adenocarcinoma identifies patients who may benefit from targeted therapies as well as immunotherapies using tumor mutational Burden (TMB), a new predictive biomarker of response to immune checkpoint inhibitors. *Laboratory Investigation*.
- Gupta A**, Chalmers Z, Connelly C, Frampton G, Chmielecki J, Ali S, Suh J, Schrock A, Ross J, Stephens P, Miller V (2016). The druggable mutation landscape of lung cancer. *IASLC 17th World Conference on Lung Cancer*. Vienna, Austria.
- Gupta A**, Horn H, Lawrence M, Getz G, Lage K (2015). Identifying and targeting gene networks under purifying selection. *11th Annual Broad Institute Symposium*. Cambridge, MA.