Jonah E. Einson

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I am a computational biologist by training, interested in applying tools from data science to address real world challenges in healthcare and biomedicine. My expertise is in functional interpretation of genetic variants across the allele frequency spectrum.

Education

Columbia University Irving Medical Center *New York, NY*
Graduate School of Arts and Sciences
Ph.D; Department of Biomedical Informatics – Bioinformatics Track *Fall 2017 – Summer 2022*

- Advised by Dr. Tuuli Lappalainen
- PhD Research within the Department of Systems Biology and the New York Genome Center
- Half year abroad at SciLifeLab - Stockholm, Sweden

University of Massachusetts Amherst *Amherst, MA*
Dual B.S; Biochemistry and Molecular Biology & Mathematics – Statistics *Fall 2013 – Spring 2017*

- GPA: 3.697/4.0, Cum Laude
- Commonwealth Honors College

Research Experience

Lappalainen Lab | Columbia University & New York Genome Center *New York, NY*
PhD Thesis Research *Summer 2018 – Present*
"Common and rare genetic effects on the transcriptome and their contributions to human traits"

- Conducted an independent research project on genetic drivers of incomplete penetrance.
- Analyzed RNA-seq and WGS datasets from projects including GTEx, SSC, and TOPMed. Performed QTL mapping, colocalization, and fine mapping on these data.
- Tested a new method for identifying functional rare variants using allelic expression.
- Worked collaboratively with groups from Stanford and Johns Hopkins.
- Presented research updates to fellow lab members at weekly lab meetings.
- Selected for a talk at the 2019 GRC Human Genetics and Genomics conference, and presented posters at Biology of Genomes and American Society for Human Genetics.
- Currently writing dissertation and finalizing two publications for submission.

Rabadan & Vitkup Labs | Columbia University *New York, NY*
PhD Rotation Projects *Fall 2017 - Spring 2018*

- Investigated the role of Epstein-Barr virus peripheral T-cell lymphoma microenvironments.
- Studied ecological dynamics of the human gut microbiome.
- Supplemented previous work by predicting metabolic pathways from microbial 16S data.

Sela Lab | University of Massachusetts Amherst *Amherst, MA*
Undergraduate Capstone Research *Fall 2014 – Spring 2017*

"The environmental microbiomes of an industrial food fermentation facility"

- Collected and processed environmental swab samples for culture-free microbial ecology. Processed the resulting data to call OTUs and perform statistical association analyses.
- Studied the effects of food additives on the murine gut microbiome using similar techniques.
- Awarded the ASM Undergraduate Research Fellowship and a Summer Research Fellowship

Publications

Jonah E. Einson, Dafni A. Glinos, Pejman Mohammadi, Stephane E. Castel, Tuuli Lappalainen, 2022. "Genetic control of mRNA splicing as a potential mechanism for incomplete penetrance of rare coding variants." *In Progress, submission ASAP*.

Jonah. E. Einson, Mariia Minaeva, Faiza Rafi, Tuuli Lappalainen, 2022. "The impact of genetically controlled splicing on exon inclusion and protein structure." *In Progress, intended submission in September*

Ferraro, Nicole M., Benjamin J. Strober, **Jonah E. Einson**, Nathan S. Abell, Francois Aguet, Alvaro N. Barbeira, Margot Brandt, et al. 2020. "Transcriptomic Signatures across Human Tissues Identify Functional Rare Genetic Variation." *Science* 369 (6509). https://doi.org/10.1126/science.aaz5900.

Mohammadi, Pejman, Stephane E. Castel, Beryl B. Cummings, **Jonah E. Einson,** Christina Sousa, Paul Hoffman, Sandra Donkervoort, et al. 2019. "Genetic Regulatory Variation in Populations Informs Transcriptome Analysis in Rare Disease." *Science* 366 (6463): 351–56. https://doi.org/10.1126/science.aay0256.

Jonah E. Einson, Asha Rani, Xiaomeng You, Allison A. Rodriguez, Clifton L. Randell, Tammy Barnaba, Mark K. Mammel, Michael L. Kotewicz, Christopher A. Elkins, and David A. Sela. 2018. "A Vegetable Fermentation Facility Hosts Distinct Microbiomes Reflecting the Production Environment." *Applied and Environmental Microbiology* 84 (22). https://doi.org/10.1128/AEM.01680-18.

Sturgeon, Susan R., David A. Sela, Eva P. Browne, **Jonah E. Einson,** Asha Rani, Mohamed Halabi, Thomas Kania, et al. 2021. "Prediagnostic White Blood Cell DNA Methylation and Risk of Breast Cancer in the Prostate Lung, Colorectal, and Ovarian Cancer Screening Trial (PLCO) Cohort." *Cancer Epidemiology and Prevention Biomarkers*, January. https://doi.org/10.1158/1055-9965.EPI-20-1717.

You, Xiaomeng, **Jonah E. Einson,** Cynthia Lyliam Lopez-Pena, Mingyue Song, Hang Xiao, David Julian McClements, and David A. Sela. 2017. "Food-Grade Cationic Antimicrobial ε-Polylysine Transiently Alters the Gut Microbial Community and Predicted Metagenome Function in CD-1 Mice." *NPJ Science of Food* 1 (December). https://doi.org/10.1038/s41538-017-0006-0.

Conference Attendance and Presentations

Computational Genomics Summer Institute, UCLA *Summer 2022*

Biology of Genomes, Poster Presentation *Spring 2022*
Genetic control of mRNA splicing is affected by purifying selection, with exon properties and downstream protein structure as potential drivers

Biology of Genomes (Virtual Meeting) *Spring 2021*

American Society for Human Genetics, ePoster *Fall 2020*
Genetic control of mRNA splicing as a mechanism for incomplete penetrance

Gordon Research Conference, Genetics and Genomics *Summer 2019*
Allele specific expression analysis of population scale transcriptome data is sensitive to rare genetic variation

Leadership / Teaching Experience

S. Jay Levy Fellowship Program *New York, NY*

Mentor *Summer 2021*

- Mentored a high performing college student from CCNY through a summer internship project, which produced meaningful results to be included in an upcoming publication.

Science Honors Program *New York, NY*

Co-Instructor *Spring 2019 – Present*

- Designed and taught an introductory course on Bioinformatics as a part of Columbia's SHP
- Classes attended by ~40 high school students every Saturday for 10 weeks per semester

Science Matters Research Internship Program *New York, NY*

Mentor *Spring 2019 & Spring 2020*

- Guided two high school students in an independent computational biology research project

TA Experience - *Graduate courses at Columbia University*

- Genomic Innovation – Tuuli Lappalainen & Neville Sanjana – Fall 2020
- Computational Methods – Adler Perotte – Fall 2019
- Introduction to Computer Applications in Biomedicine – Nick Tatonetti – Spring 2018

Other Activities & Interests

Avid traveler, cyclist, and outdoor enthusiast. Social Chair of the Graduate Student Organization at CUIMC for 2 years. Treasurer of the Graduate Initiative in Diversity at CUIMC.