17 Bay St. Apt 3L
Cambridge, MA 02139

Chris Viets

(505) 659-1627
cviets@mgh.harvard.edu

github.com/cviets chrisviets.com linkedin.com/in/chrviets

Education

Massachusetts Institute of Technology **May 2024**
Cambridge, MA

- Double B.S. degrees in Physics and Biology. GPA: 4.9/5.0
- Relevant coursework: Systems Biology, Human Genetics and Genomics, Linear Algebra, Differential Equations, Genetics, Quantitative and Clinical Physiology, Metakaryotic Biology and Epidemiology

Research Experience

MGH Department of Neurology **August 2024 – present**
Advisor: Professor Brian Wainger Boston, MA
Generating and assaying iPSC models of amyotrophic lateral sclerosis (ALS)

- Probe genetic modifiers of ALS proteinopathy by generating CRISPRi knockdown iPSC lines, differentiating iPSCs into cortical neurons, and visualizing protein solubility, subcellular localization, and post-translational modifications via immunofluorescence and Western blotting
- Deploy advanced Python, MATLAB, and FIJI pipelines to streamline processing of high throughput imaging data, and quantify hallmarks of ALS neurodegeneration in processed images
- Perform high-content screening to assay genetic and pharmacological modifiers of neuronal survival and neurite outgrowth, elucidating molecular pathways for potential therapeutic intervention in ALS
- Conduct bioinformatic analyses of diverse ALS omics datasets to detect transcriptional signatures of ALS, such as non-coding RNA or GO terms that are differentially expressed across ALS models
- Develop workflows for analyzing human and mouse post-mortem immunohistochemistry images

MIT Department of Biological Engineering
Advisors: Professors Katharina Ribbeck and Angela Belcher
Immune cell motility in mucus **August 2022 – August 2024**
Cambridge, MA

- Visualized 3-dimensional neutrophil trajectories in mucosal environments utilizing confocal microscopy, probing the influence of mucus on neutrophil chemotaxis, and phagocytosis
- Independently constructed comprehensive cell track analysis pipeline in Python (trackscan), instrumental in characterizing changes in cell motility and morphology caused by mucus

Bacterial motility in mucus **August 2022 – August 2024**
Cambridge, MA

- Investigated how gram-positive and gram-negative bacteria move through the viscoelastic mucus network using fluorescence microscopy
- Conducted cell tracking of wildtype and flagella-mutant *E. coli* via fluorescence microscopy to determine how mutations in flagella affect movement through mucus
- Developed and deployed advanced data analysis protocols in Python and MATLAB that detect and rectify cell tracking artifacts, as well as accurately measure bacterial swimming speeds from corrected cell trajectories

MIT Department of Physics **December 2023 – May 2024**
Stability analysis of gene regulatory networks (GRNs) Cambridge, MA

- Independently established Python workflow (booleangene) to analyze the stability of GRNs
- Computationally predicted cell responses to a wide range of environmental stimuli by applying analysis to 80 published models of GRNs
- Employed stability analysis framework to investigate statistically significant correlations between GRNs and topological features of networks such as clusters and loops

University of New Mexico Department of Chemistry **May – August 2020**
Advisor: Professor John Grey **May – August 2019**
Charge transport in organic solar cells Albuquerque, NM

- Collaborated in developing Python and C++ models of organic photovoltaic solar cell devices

Publications

- **Viets, C.**, & Stevens, C. A. (2025). Measuring and Analyzing Bacterial Movement in Mucus. In I. Brockhausen (Ed.), *Dynamics of Bacteria-Mucus Interactions* (pp. 187–197). doi:10.1007/978-1-0716-4627-4_16
- Grimm, R. T., Deb, P., Walwark, D. J., Jr, **Viets, C.**, & Grey, J. K. (2020). Implications of Trap-Assisted Nongeminate Charge Recombination on Time- and Frequency-Domain Photocurrent Degradation Signatures of Organic Solar Cells. *The Journal of Physical Chemistry C*, *124*(31), 16838–16848. doi:10.1021/acs.jpcc.0c05114

Relevant Skills

Bench techniques: Human iPSC & HEK-293 culture; lentivirus production; iPSC differentiation; RT-qPCR; Western blot; immunofluorescence; high-content screening; time-lapse imaging; CRISPRi sgRNA design & production; bacterial transformation; scanning electron microscopy; isolation of neutrophils from whole human blood

Software: Python (+ SciPy, NumPy, PyTorch, pandas), MATLAB (+ image processing & parallel processing toolboxes), FIJI (+ macros), R (+ Bioconductor packages), Bash (+ STAR, samtools, HTCondor, Slurm), Microsoft Office, Adobe Illustrator, SnapGene, PyMOL, LaTeX, Java, JavaScript (+ React, NextJS), HTML/CSS

Languages: English (native), Spanish (native), French (fluent)

Presentations and Posters

- Disruption of Autophagy and Endosomal Pathways Promotes TDP-43 Pathology — **Projected November 2025**
  Forthcoming poster: Society for Neuroscience 2025
- Clusters and Loops are Overly Abundant in Oscillatory Gene Regulatory Networks — **April 2024**
  Poster: MIT Department of Biological Engineering undergraduate research symposium
- Stable Fixed Points are Abundant in Boolean Gene Networks — **January 2024**
  Presentation MIT Physics Directed Reading Program
- Mucins Enhance Neutrophil Motility — **April 2023**
  Poster: MIT Department of Biological Engineering undergraduate research symposium
- Dynamics of Spatially Extended Populations: Exploring the Fisher-Kolmogorov Equation — **January 2023**
  Slides delivered for MIT Physics Directed Reading Program

Additional Coursework

AI@MBL (non-credit granting) — **August – September 2024**
Directed by Jan Funke (HHMI Janelia) and Shalin Mehta (CZ Biohub) — Woods Hole, MA

- Two-week intensive course on developing, training, and applying deep-learning models to solve microscopy image analysis tasks such as denoising, segmentation, and object tracking

Harvard Extension School — **January – May 2024**

- Took Organic Chemistry of Life (equivalent to Organic Chemistry II) and Graduate Biochemistry, receiving an A, the highest possible grade, in both courses — Cambridge, MA

Awards

- Sigma Pi Sigma physics honor society inductee — **2024**
- MIT Koch Institute for Integrative Cancer Research Image Award co-recipient — **2024**
- MIT Integration Bee qualifier — **2023**
- SpeakOUT Boston LGBTQ Scholarship recipient — **2022**
- Hispanic Scholarship Fund recipient — **2020**

Leadership and Teaching Experience

BioResearch Academy — **June – July 2024**
Teaching and Residential Assistant — Boston, MA

- Supported highly motivated and advanced high school students through a rigorous, three-week intensive summer biology course, with an emphasis on modeling Alzheimer's disease

MIT Department of Physics — **January – May 2024**
Student Mentor, Waves and Vibrations — Cambridge, MA

- Guided mentees through practice problems and provided individualized exam preparation
- Advised newly declared physics majors through their first non-introductory physics course

MIT Department of Physics — **January – May 2022**
Teaching Assistant, Electricity and Magnetism — Cambridge, MA

- Instructed small groups of students through practice problems, and graded exams and problem sets

Student Mentor, Electricity and Magnetism

- Assisted mentees outside of class in course material and problems, and for the inquisitive, provided advanced instruction in topics beyond the course curriculum