ARIEL GERSHMAN, PhD

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ariel.gershman@gmail.com

EDUCATION

Johns Hopkins University, School of Medicine, Baltimore, MD. July 2018 – August 2022
PhD program: Biochemistry, Cellular, and Molecular Biology

University of California, Santa Barbara, Santa Barbara, CA Aug. 2014 – June 2018
Major: Pharmacology, Dean's List, Distinction

RELEVANT WORK EXPERIENCE

Delfi Diagnostics, Baltimore, MD September 2022 – present
Senior Bioinformatics Scientist

- Research and development for AI based lung cancer detection assay from patient plasma.
- Machine learning feature development and model construction.
- Basic science research connecting cell free DNA (cfDNA) fragmentation and epigenetics.

Johns Hopkins University, School of Medicine, Baltimore, MD March 2019 – August 2022
PhD Student, Laboratory of Dr. Winston Timp, PhD

- Genome and transcriptome assembly of human and non-model organisms with nanopore and Illumina sequencing.
- Completion of the first human genome and epigenetic annotation of the centromeres using nanopore long-read DNA sequencing and multi-omics methods.
- Analysis of multiple types of omics data including: RNA-seq, CUT&RUN, ChIP-seq, and nanopore RNA-seq, DNA sequencing, chromatin accessibility.

Telomere to Telomere Consortium, Baltimore, MD. March 2020 – August 2022
Epigenetics Global Group Lead

- Lead and managed researchers from laboratories all over the world and directed the goals and directions of the epigenetics group.
- Developed analysis tools for functional annotation of the first complete human genome (Gershman et al., *Science*).
- Assisted in bioinformatic benchmarking analyses of the first complete human genome (Nurk et al., *Science*).

Ultragenyx Pharmaceutical Inc., San Francisco, CA May 2021 – Sept. 2021
Analytical Development intern

- Summer intern for the Analytical Development group. Specialized in integrating NGS technologies into the drug production pipeline for mRNA therapeutics.
- Pipeline development with Snakemake and DNAnexus (SDK)

University of California, Santa Barbara, Santa Barbara, CA June 2017 – June 2018
Undergraduate researcher, Laboratory of Dr. Cherie Briggs

- Investigated how infection influences overall fitness in local amphibian populations.
- Evaluated the actions of *Batrachochytrium dendrobatidis,* a lethal fungus infecting amphibians, on amphibian activity, metabolic rate and ability to fight off other infectious agents.
- Designed experimental methods to determine the molecular mechanisms behind the function of ionic liquids as a potential therapeutic agent to combat *Batrachochytrium dendrobatidis.*

University of California, Santa Barbara, Santa Barbara, CA Sept. 2015 – June 2016

Undergraduate researcher, Laboratory of Dr. Susan Mazer

- Investigating the effects of UV proportion on pollen viability in *Clarkia unguiculata*

Lawrence Livermore National Laboratory (DOE) June 2015 – Sept. 2015

Summer intern

- Conducted bioterrorism research for the purpose of national security and non-proliferation
- Confidential security clearance

PUBLICATIONS

1. **Ariel Gershman**, Michael E.G. Sauria, Paul W. Hook, Savannah J. Hoyt, Roham Razaghi , Sergey Koren , Nicolas Altemose , Gina V. Caldas, Mitchell R. Vollger, Glennis Logsdon, Arang Rhie , Evan E. Eichler, Michael C. Schatz , Rachel J. O'Neill, Adam M. Phillippy , Karen H. Miga & Winston Timp (2022). Epigenetic patterns in a complete human genome. ***Science***.
2. **Gershman, A.**, Romer, T. G., Fan, Y., Razaghi, R., Smith, W. A., & Timp, W. (2021). De novo genome assembly of the tobacco hornworm moth (Manduca sexta). ***G3*** , *11*(1).
3. **Gershman, Ariel**, Quinn Hauck, Morag Dick, Jerrica M. Jamison, Michael Tassia, Xabier Agirrezabala, Saad Muhammad, Rafaay Ali, Rachael E. Workman, Mikel Valle, G. William Wong, Kenneth C. Welch Jr., Winston Timp (2023). Genomic insights into metabolic flux in ruby-throated hummingbirds. ***Genome Research.***
4. Sergey Nurk, Sergey Koren, Arang Rhie, Mikko Rautiainen, Andrey V. Bzikadze, Alla Mikheenko, Mitchell R. Vollger, Nicolas Altemose, Lev Uralsky, **Ariel Gershman**,…, Evan E. Eichler, Karen H. Miga, Adam M. Phillippy. (2021). The complete sequence of a human genome. ***Science***.
5. Nicolas Altemose, Glennis A. Logsdon, Andrey V. Bzikadze, Pragya Sidhwani, Sasha A. Langley, Gina V. Caldas, Savannah J. Hoyt, Lev Uralsky, Fedor D. Ryabov, Colin J. Shew, Michael E.G. Sauria, Matthew Borchers, **Ariel Gershman**…, Karen H. Miga (2021). Complete genomic and epigenetic maps of human centromeres. ***Science***.
6. Savannah J. Hoyt, Jessica M. Storer, Gabrielle A. Hartley, Patrick G. S. Grady, **Ariel Gershman**, Leonardo G. de Lima, Charles Limouse, Reza Halabian, Luke Wojenski, Matias Rodriguez, Nicolas Altemose, Leighton J. Core, Jennifer L. Gerton, Wojciech Makalowski, Daniel Olson, Jeb Rosen, Arian F. A. Smit, Aaron F. Straight, Mitchell R. Vollger, Travis J. Wheeler, Michael C. Schatz, Evan E. Eichler, Adam M. Phillippy, Winston Timp, Karen H. Miga, Rachel J. O'Neill (2021). From telomere to telomere: the transcriptional and epigenetic state of human repeat elements. ***Science***.
7. Mitchell R. Vollger , Xavi Guitart, Philip C. Dishuck, Ludovica Mercuri , William T. Harvey, **Ariel Gershman**, Mark Diekhans, Arvis Sulovari, Katherine M. Munson, Alexandra M. Lewis, Kendra Hoekzema, David Porubsky, Ruiyang Li , Sergey Nurk, Sergey Koren, Karen H. Miga, Adam M. Phillippy, Winston Timp, Mario Ventura, Evan E. Eichler(2021). Segmental duplications and their variation in a complete human genome. *Science*.
8. Lee, I., Razaghi, R., Gilpatrick, T., Molnar, M., **Gershman, A.**, Sadowski, N., Sedlazeck, F. J., Hansen, K. D., Simpson, J. T., & Timp, W. (2020). Simultaneous profiling of chromatin accessibility and methylation on human cell lines with nanopore sequencing. ***Nature Methods***, *17*(12), 1191–1199.

9. Miga, K. H., Koren, S., Rhie, A., Vollger, M. R., **Gershman, A**., Bzikadze, A., Brooks, S., Howe, E., Porubsky, D., Logsdon, G. A., Schneider, V. A., Potapova, T., Wood, J., Chow, W., Armstrong, J., Fredrickson, J., Pak, E., Tigyi, K., Kremitzki, M., … Phillippy, A. M. (2020). Telomere-to-telomere assembly of a complete human X chromosome. ***Nature***, *585*(7823), 79–84.
10. Sholes, S. L., Karimian, K., **Gershman, A**., Kelly, T. J., Timp, W., & Greider, C. W. (2021). Chromosome-specific telomere lengths and the minimal functional telomere revealed by nanopore sequencing. ***Genome Research***. https://doi.org/10.1101/gr.275868.121
11. Clark, H. R., McKenney, C., Livingston, N. M., **Gershman, A.**, Sajjan, S., Chan, I. S., Ewald, A. J., Timp, W., Wu, B., Singh, A., & Regot, S. (2021). Epigenetically regulated digital signaling defines epithelial innate immunity at the tissue level. ***Nature Communications***, *12*(1), 1836.
12. Chin, A. C., Yovanno, R. A., Wied, T. J., **Gershman, A**., & Lau, A. Y. (2020). D-Serine Potently Drives Ligand-Binding Domain Closure in the Ionotropic Glutamate Receptor GluD2. *Structure*, *28*(10), 1168–1178.e2.
13. Pfab, F., DiRenzo, G. V., **Gershman, A**., & Briggs, C. J. (2020). Energy budgets for tadpoles approaching metamorphosis. ***Ecological***. https://www.sciencedirect.com/science/article/pii/S0304380020303318
14. DiRenzo, G. V., Chen, R., Ibsen, K., Toothman, M., Miller, A. J., **Gershman, A**.,
15. Mitragotri, S., & Briggs, C. J. (2020). Investigating the potential use of an ionic liquid (1-Butyl-1-methylpyrrolidinium bis(trifluoromethylsulfonyl)imide) as an anti-fungal treatment against the amphibian chytrid fungus, Batrachochytrium dendrobatidis. ***PloS One***, *15*(4), e0231811.

PRESENTATIONS

Ariel Gershman, Winston Timp. Long-reads give insights into sugar flux in hummingbirds. ***Plenary Talk*** **London Calling 2020** (London, UK)

Ariel Gershman, Michael E.G. Sauria, Paul W. Hook, Savannah J. Hoyt, Roham Razaghi , Sergey Koren , Nicolas Altemose , Gina V. Caldas, Mitchell R. Vollger, Glennis A. Logsdon, Arang Rhie , Evan E. Eichler, Michael C. Schatz , Rachel J. O'Neill, Adam M. Phillippy , Karen H. Miga & Winston Timp. Epigenetic patterns in a complete human genome ***Plenary Talk*** **Telomere to Telomere/Human Pangenome Meeting 2020** (Seattle, USA)

Ariel Gershman, Michael E.G. Sauria, Paul W. Hook, Savannah J. Hoyt, Roham Razaghi , Sergey Koren , Nicolas Altemose , Gina V. Caldas, Mitchell R. Vollger, Glennis A. Logsdon, Arang Rhie , Evan E. Eichler, Michael C. Schatz , Rachel J. O'Neill, Adam M. Phillippy , Karen H. Miga & Winston Timp. Epigenetic patterns in a complete human genome ***Talk*** **American Society of Human Genetics 2020** (San Diego, USA)

Ariel Gershman, Michael E.G. Sauria, Paul W. Hook, Savannah J. Hoyt, Roham Razaghi , Sergey Koren , Nicolas Altemose , Gina V. Caldas, Mitchell R. Vollger, Glennis A. Logsdon, Arang Rhie , Evan E. Eichler, Michael C. Schatz , Rachel J. O'Neill, Adam M. Phillippy , Karen

H. Miga & Winston Timp. Epigenetic patterns in a complete human genome ***Plenary Talk*** **Oxford Nanopore Community Meeting 2020** (New York City, USA)

Ariel Gershman, Michael E.G. Sauria, Paul W. Hook, Savannah J. Hoyt, Roham Razaghi , Sergey Koren , Nicolas Altemose , Gina V. Caldas, Mitchell R. Vollger, Glennis A. Logsdon, Arang Rhie , Evan E. Eichler, Michael C. Schatz , Rachel J. O'Neill, Adam M. Phillippy , Karen H. Miga & Winston Timp. Epigenetic patterns in a complete human genome ***Plenary Talk*** **Oxford Nanopore 2020 Collection Webinar** (Tokyo, Japan)

Ariel Gershman, Michael E.G. Sauria, Paul W. Hook, Savannah J. Hoyt, Roham Razaghi , Sergey Koren , Nicolas Altemose , Gina V. Caldas, Mitchell R. Vollger, Glennis A. Logsdon, Arang Rhie , Evan E. Eichler, Michael C. Schatz , Rachel J. O'Neill, Adam M. Phillippy , Karen H. Miga & Winston Timp. Epigenetic patterns in a complete human genome ***Poster.*** **CSHL Genome Biology** 2020.

Gershman A. R., DiRenzo G.V., Sweet S., Drawert B., Raffel T., Altman K., Johnson P., Brunner J., Briggs C. 2017. Co-infection influences metabolic rate in tadpoles. ***Poster*** **at Ecology and Evolution of Infectious Diseases** University of California, Santa Barbara on 25 June 2017.

AWARDS

National Science Foundation Research Experience Undergraduates Grant (2016)
UC Santa Barbara Undergraduate Research and Activities Grant (2016)
NSF GRFP Honorable Mention (2017)
NSF GRFP Honorable Mention (2018)

MENTORSHIP AND OUTREACH

Graduate Mentor 2019 – present

- Mentor undergraduates in the Timp lab.
- Training graduate students on nanopore sequencing and genomics for collaborative projects.
- My student Quinn Huack is a co-author on a manuscript in prep and his work in the lab won him the Provost's Undergraduate Research Award at Johns Hopkins.

R-ladies Baltimore 2018 – present

Volunteer

- Attend meetings and present R tutorials for the purpose of promoting gender diversity in the R community worldwide.

Python for Biology 2020

Teacher's assistant

- Assisted course instructor for a graduate level programming class with 25+ students. Created and managed Microsoft Azure instance for students to access their home directory and perform all programming projects. All course instruction was done through Jupyter notebooks.

UCSB Campus Learning and Assistance Services (CLAS) 2016 – 2018

Organic Chemistry Tutor/Section Instructor

- Lead and teach hour-long organic chemistry sections 4 days a week to 65 undergraduate students, review materials from lecture, create practice exams and worksheets, support questions and tutor.

UCSB 5th Grade Chemistry Outreach 2015

Lab Volunteer

- Performed demonstrations in a chemistry lab at UCSB for groups of 20-30 fifth grade students
- Taught the students about properties of matter and basic chemical principles

B'nai Brith Camp, Lincoln City, Oregon 2015

Camp Counselor

- Cared for 20-40 special needs children with daily activities to enrich their summer experience

City of Pleasanton Nature Camp 2014

Volunteer

- Lead nature hikes with 30-40 elementary age children to better their understanding of the environment
- Discussed topics of conservation and environmental biology at elementary level in order to educate children on conservation biology