

## Education

### University of Washington, Seattle

Ph.D. candidate in Genome Sciences (entering class of 2014)

### University of Washington, Seattle

B.S. in Bioengineering with College Honors (2012)

3.79 Departmental GPA; 3.69 Overall GPA

## Research Experience

### 10X Genomics

9/2016 – 1/2017

#### Consultant

- Software development for single-cell VDJ product.

### 10X Genomics

6/2016 – 9/2016

#### Computational Biology Intern

- R&D to enable co-measurement of paired expression profiles and VDJ sequences in single-cells.
- Developed interactive visualization tools using React/D3.js to explore complex single-cell VDJ datasets.
- Software development for cellranger, a distributed pipeline for single-cell RNA-seq and VDJ analysis.
- R&D support for V2 single-cell RNA-seq protocol.
- Co-developed and deployed secondary analysis toolkit for 10X single-cell RNA-seq datasets in R.

### Shendure Lab of University of Washington Department of Genome Sciences

9/2014 – Present

#### Ph.D. Candidate

- Computational and molecular biology methods development for:
  - Scalable genetic screens of protein-coding and regulatory regions using single-cell assays as readouts.
  - Large-scale atlases of chromatin accessibility in mammalian tissues using single-cell ATAC-seq and integration with existing single-cell RNA-seq atlases.
- Contributed to methods for prediction of cell types contributing to cell-free DNA in blood plasma samples from cancer patients using changes in inferred nucleosome positioning.
- Co-developer of an interactive data visualization tool to explore spatiotemporal measurement of gene expression in developing *C. Elegans* embryos ([EPICViz](#)).

### MacArthur Lab of Massachusetts General Hospital/Broad Institute of MIT and Harvard

9/2013 – 9/2014

#### Research Assistant

- Called and analyzed multi-nucleotide polymorphisms derived from ~65K exome sequencing samples that change variant interpretation compared to individual variants.
- Developed methods for automating detection of misannotated protein coding exons in GENCODE using metrics for evolutionary conservation, constraint in a large reference panel, and tissue expression levels.
- Developed python API to extract/refine data from Leiden Open Variation Databases.

### Tekscan, Inc.

9/2012 – 1/2014

#### Applications Engineer

- Conducted research on new applications of force and pressure sensors.
  - Implemented algorithms to estimate shoe-size from noisy pressure sensor data.
  - Signal processing and data analysis for IMU position/angle tracking of human gait.
- Developed automated test fixtures and data-analysis scripts with MATLAB and LabVIEW.
- Provided engineering support and/or training to customers and all internal departments.

## UW Biorobotics Lab (Professors Blake Hannaford and Howard Chizeck)

1/2010 – 6/2012

### *Undergraduate Research Assistant*

- Online Modeling of the *In Vivo* Mechanical Properties of Soft Tissue for Robotic Surgery
  - Designed, built, and programmed electromechanical device to quantify in vivo tissue dynamics.
  - Developed Unscented Kalman Filter/signal processing using MATLAB/C++.
- Co-developed hardware and microcontroller code for haptic-enabled glove.
- Developed hardware and microcontroller code to detect peg-contact in FLS block-transfer task.

## Professor Joan Sanders Lab

8/2009 – 1/2010

### *Undergraduate Research Assistant*

- Collected/analyzed data to calibrate tri-axis piezoelectric force sensor for amputee gait analysis.
- Designed and built Plexiglas housing for patient-mounted electronics.

## Publications

\* co-first authorship

- Molly Gasperini, **Andrew J. Hill**, José L. McFaline Figueroa, Beth Martin, Cole Trapnell, Nadav Ahituv, Jay Shendure. crisprQTL mapping as a genome-wide association framework for cellular genetic screens. **Biorxiv** **2018**. <http://dx.doi.org/10.1101/314344>
- **Andrew J Hill\***, José L McFaline-Figueroa\*, Lea M Starita, Molly J Gasperini, Kenneth A Matreyek, Jonathan Packer, Dana Jackson, Jay Shendure, Cole Trapnell. On the design of CRISPR-based single-cell molecular screens. February 2018. **Nature Methods** 15, 271–274.
- Xiaojie Qiu, **Andrew Hill**, Jonathan Packer, Dejun Lin, Yian Ma, Cole Trapnell. Single-cell mRNA quantification and differential analysis with Census. January 2017. **Nature Methods** 14, 309–315.
- Exome Aggregation Consortium, Monkol Lek, Konrad J Karczewski, Eric V Minikel, Kaitlin E Samocha, Eric Banks, Timothy Fennell, Anne H O'Donnell Luria, James S Ware, **Andrew J Hill**, Beryl B Cummings, Taru Tukiainen, Daniel P Birnbaum, Jack A Kosmicki, Laramie Duncan, Karol Estrada, Fengmei Zhao, James Zou, **[54 additional authors]**, Mark J Daly, Daniel G MacArthur. Combined analysis of protein-coding genetic variation in 60,706 humans. August 2016. **Nature** 536,285–291.
- Matthew W Snyder\*, Martin Kircher\*, **Andrew J Hill**, Riza Daza, and Jay Shendure. Cell-free DNA Comprises an *In Vivo* Nucleosome Footprint that Informs Its Tissues-Of-Origin. January 2016. **Cell**, 164(1-2), 57–68.
- Xinxian Deng\*, Wenxiu Ma\*, Vijay Ramani, **Andrew Hill**, Fan Yang, Ferhat Ay, Joel B. Berletch, Carl Anthony Blau, Jay Shendure, Zhijun Duan, William S. Noble, and Christine M. Disteche. Bipartite structure of the inactive mouse X chromosome. August 2015. **Genome Biology**, 16:152.

## Selected Awards and Honors

- National Science Foundation Graduate Research Fellowship (5 year fellowship, 3 years funding)
- Mary Gates Research Scholarship
- USA Gymnastics Men's Program Scholarship
- 4-time USA Gymnastics Junior Olympic National Championships Competitor
- Friends of Gymnastics Scholarship

## Invited Talks

- *High-throughput molecular profiling of single cells with combinatorial indexing.* 2018 GECCO Investigator Meeting.
- *Expanding the scope of genetic screens with single-cell genomics.* Advanced Genomic Technology Development Grantee Meeting. May 2017.
- *Phased annotation of protein-coding variants across 60,706 human exomes.* 65<sup>th</sup> Annual Meeting of The American Society of Human Genetics. October 2015.
- *Pseudotemporal ordering of cells undergoing immune stimulation and perturbations to cell-cell signaling.* Genome Training Grant Symposium invited trainee speaker. July, 2015.
- *Calibration and Synchronized Data Acquisition for High-Speed Applications.* Tekscan North American Distributor Meeting. Boston, MA. April, 2013.
- *Online Modeling of the In Vivo Mechanical Properties of Soft Tissue for Robotic Surgery.* University of Washington Mary Gates Undergraduate Research Symposium. May 2012.

## Selected Coursework

Data Visualization (CSE 512)                      Applied Biostatistics I/II (BIOSTAT 514/517)                      Linear algebra/Diff. Equations  
Embedded Microcomputer Systems (EE 472)                      Digital Signal Processing                      Computational Molecular Biology

## Independent Coursework

- Machine Learning                      Coursera (Stanford)
- Algorithms Design and Analysis – Part 1                      Coursera (Stanford)
- Circuits and Electronics                      MIT Open Courseware
- Manual Machining and Layout (Mill and Lathe)                      Artisan's Asylum

## Skills

- **Computing:** Python, R, bash, Java, MATLAB, parallel computing with SGE/LSF, LabVIEW
- **Web Development:** HTML, CSS, JavaScript, D3.js, React.js
- **Operating Systems:** Mac OSX, Linux, Windows
- **Embedded Systems:** ARM and Arduino embedded system programming
- **Machining:** CNC mill, lathe, band-saw, drill-press, various hand tools

## Coaching and Teaching Experience

**Genome Science 466: Cancer Genetics**                      Winter 2018  
*Teaching Assistant*

**Genome Sciences 361: Fundamentals of Genetics and Genomics**                      Autumn 2016  
*Teaching Assistant*

**iD Tech Camps**                      Summer 2012  
*Summer Camp Instructor: Programming in Java and Adventures in Robotics*

**UW Bioengineering Department Circuitry Workshops**                      Winter 2012  
*Volunteer Instructor*

**UW Bioengineering Outreach Program**                      12/2011 – 6/2012  
*Ultrasound Education Module Co-Developer and Instructor*

**United States Gymnastics Training Camps**                      Summers 2005 – 2010  
*Counselor and Coach*

## Leadership Experience and Activities

<b>Dana-Farber Cancer Institute, Brigham and Women's Hospital</b> <i>Volunteer – Kraft Family Blood Donor Center</i>	9/2012 – 4/2013
<b>UW Biomedical Engineering Society</b> <i>Vice President and Webmaster</i>	6/2011 – 6/2012
<b>UW Honors Department</b> <i>Peer Mentor</i>	9/2008 – 9/2009
<b>Washington Men's Gymnastics Team</b> <i>Team Member</i>	8/2008 – 10/2009

## Study Abroad

– Creative Travel Writing and Sustainability in Ecuador	Summer 2010
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