

# Tyler Heist, Ph.D.

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## Education

Princeton University, Princeton, NJ

Ph.D.: Quantitative and Computational Biology (conferred September 2019)

M.A.: Quantitative and Computational Biology (conferred April 2017)

September 2015 – September 2019

GPA: 3.94

University of Richmond, Richmond, VA

B.S.: Biology (Honors) and Computer Science, minor in Integrated Science

August 2011 – May 2015

GPA: 3.92

## Work Experience

May 2023 – Present

**Senior Data Engineer, Joyn Insurance, Remote**

- Architected a re-design of Joyn's entire data ecosystem— moving from a series of tightly-coupled serverless functions to a modern data stack approach using Apache Airflow, DBT, DLT, Fivetran, and Snowflake, decreasing downtime by >90% and increasing confidence in data across the organization.
- Implemented reverse ELT integrations to clients (e.g., insurance brokers), vendors (e.g., CRM, Billing), and regulatory reporting agencies (e.g., local and state insurance offices), ensuring compliance and saving tens of human-hours weekly while providing high-quality data.
- Mentored data analyst in writing high quality SQL and enabled them to rapidly write their own Apache Airflow DAGs without prior experience in Python via paired work and templates for internal reporting.

October 2021 – April 2023:

**Data Engineer, Data Product Manager, and Data Scientist, Cerebral, Remote**

- Managed and implemented for Cerebral's data products area, which included real-time and embedded data solutions in Cerebral's Electronic Medical Record, such as Clinical Decision Support (assisting >500 clinicians in providing optimal treatments to >10k patients) and Crisis Message Detection (helping >4000 patients get aid from crisis specialists in <10 minutes rather than the baseline support time of >12 hours).
- Designed and implemented robust ELT processes ingesting data from multiple, disparate sources (e.g., Electronic Health Record (EHR), marketing, user behavior data, messaging) using a variety of processes (e.g., custom, Fivetran, Stitch, Apache Kafka, DBT) orchestrated in Apache Airflow.
- Led data quality efforts for the data team, which included implementing various tools like DBT (data transformations), Monte Carlo (data observability), and Atlan (data catalog) as well as creating and organizing twice-quarterly one-day hackathons to address data quality and infrastructure gaps, resulting in a reduction in up to 75% of tech debt tickets per quarter.
- Mentored data analysts and data scientists in software development best practices, such as version control, documentation, and testing.

September 2019 – September 2021:

**Data Scientist and Software Developer at Epic Systems, Madison WI.**

- Designed, led, and executed research using Electronic Health Record (EHR) data to provide insights into the COVID-19 patient population, with a focus on comorbidities and clinical outcomes.
- Collaborated with several external groups (e.g., FDA COVID-19 evidence accelerator, Kaiser Family Foundation) in addition to researchers at academic institutions (e.g., University of Chicago)
- Designed, trained, and validated predictive models for clinical and operational use in Epic's EHR system.

*During Graduate School (Princeton University)*

Fall 2015 – Summer 2019: Graduate Research Assistant

Spring 2018: Instructor for MOL348 ('Cell and Developmental Biology')

Fall 2017: Instructor for QCB302 ('Research Topics in Quantitative and Computational Biology')

### *During Undergraduate (University of Richmond)*

Summer 2014 – Summer 2015: Beckman Scholar Undergraduate Researcher

Spring 2014 – Spring 2015: Laboratory Teaching Assistant for the Department of Biology ('Genetics', 'Microbiology', 'Integrative Principles in Biology')

Spring 2013 – Spring 2015: Grader and Laboratory Teaching Assistant for the Department of Mathematics and Computer Science ('Calculus I', 'Scientific Computing', 'Discrete Structures', 'Software Systems Development')

Fall 2013 – Spring 2014: 'Science, Mathematics, and Research Training' (SMART) Course Tutor

Spring 2013 – Fall 2013: Biology Department Laboratory Prep Assistant

Fall 2012 – Spring 2013: 'Integrated Quantitative Science' (IQS) Course Tutor

Summer 2013: A&S Summer Undergraduate Researcher

Summer 2012: HHMI Summer Undergraduate Researcher

## Research Experience

Summer 2016 – Summer 2019: Graduate Student, Levine Lab, Princeton University

- Investigated how transcription occurs across large genomic distances during early development in *Drosophila* embryos
- Developed an image processing pipeline to segment nuclei and identify transcriptional foci from traditional confocal and super-resolution microscopy

Fall 2015 – Spring 2016: Rotation Student in Troyanskaya, Levine, and Devenport Labs, Princeton University

- Worked to characterize canonical drug-response pathway genes from microarray data using machine learning methods (e.g., SVMs) in the Troyanskaya lab
- Investigated the onset of zygotic transcription in early *Ciona* development using single-cell RNAseq in the Levine lab
- Characterized the role of the dermal papilla in hair follicle development in the Devenport Lab

Summer 2014 – Summer 2015: Honors Research, Biology Department, University of Richmond

- Worked with Dr. Malcolm Hill, Dr. April Hill, and Dr. Barry Lawson
- Designed and developed agent-based modeling of intracellular symbiont dynamics, using sponge:algae relationships to inform parameterization

Fall 2011 – Spring 2014: Undergraduate Research, Biology Department, University of Richmond

- Worked with Dr. Malcolm Hill and Dr. April Hill
- Explored symbiont relationships between marine sponges and intracellular algae using a variety of methods, such as microscopy and genetic analysis
- Pioneered bioinformatic work in the lab, involving the organization and analysis of several RNAseq datasets of a non-model organism, *Ciona varians*

## Awards

2017: NSF Graduate Research Fellowship Program – Honorable Mention

2011 – 2015: "All A's" distinction, Dean's List.

2015: Phi Beta Kappa Honor Society

2014 – 2015: Arnold and Mabel Beckman Fellowship

2014: Barry M Goldwater Scholarship

2014: Award for Outstanding Achievement as a Junior in Biology

2014: Mortar Board Honor Society

2014: Richmond Alumni Association Scholarship

2013: Omicron Delta Kappa Honor Society

2013: Cole Memorial Scholarship Recipient (Biology Departmental Award)

2013: School of Arts and Sciences Summer Research Fellowship

2013: Beta Beta Beta Biological Honor Society

2012: Certificate of Commendation from Phi Beta Kappa

2012: HHMI Summer Research Fellowship

2012: Golden Key Honor Society

2012: Phi Eta Sigma Honor Society

2011: Bonner Scholar

## Publications (\* denotes equal contribution)

1. Swaminathan A, López I, Mar RAG, **Heist T**, McClintock T, Caoili K, Grace M, Rubashkin M, Boggs MN, Chen JH, Gevaert O, Mou D, Nock MN. Natural language processing system for rapid detection and intervention of mental health crisis chat messages. *npj Digital Medicine* 2023, 6:213
2. **Heist T**, Fukaya T, Levine M. Large distances separate coregulated genes in living *Drosophila* embryos. *Proceedings of the National Academy of Sciences* 2019, 116:15062-15067
3. Lim B, Fukaya T, **Heist T**, Levine M. Temporal dynamics of pair-rule stripes in living *Drosophila* embryos. *Proceedings of the National Academy of Sciences* 2018, 115:8376-8381
4. Lim B\*, **Heist T\***, Levine M, Fukaya T. Visualization of transvection in living *Drosophila* embryos. *Molecular Cell* 2018, 70:287-296.e6
5. Treen N, **Heist T**, Wang W, Levine M. Depletion of maternal Cyclin B3 contributes to zygotic genome activation in the *Ciona* embryo. *Current Biology* 2018, 28:1150-1156.e4
6. Lawson B, Hill M, Hill A, **Heist T**, Hughes C. An Agent-Based Simulation Model Of Sponge:Algae Symbiotic Relationships. *Proceedings of the 2015 Winter Simulation Conference*, Huntington Beach, CA, December 2015.
7. Riesgo A, Peterson K, Richardson C, **Heist T**, Strehlow B, McCauley M, Cotman C, Hill M, Hill A. Transcriptomic analysis of differential host gene expression upon uptake of symbionts: a case study with *Symbiodinium* and the major bioeroding sponge *Cliona varians*. *BMC Genomics* 2014, 15:376

## Presentations

1. **Heist T**, Lim B, Fukaya T, Levine M (2018) Topological regulation of enhancers in cis and in trans. 13<sup>th</sup> EMBL Conference on Transcription and Chromatin, Heidelberg, Germany.
2. **Heist T**, Lim B, Levine M, Fukaya T (2018) Visualization of transvection suggests the occurrence of transcription hubs in living *Drosophila* embryos. 59<sup>th</sup> Annual Drosophila Research Conference, Philadelphia, PA.
3. **Heist T**, Fukaya T, Levine M (2017) Visualization of transcriptional dynamics underlying long-range enhancer-promoter interactions. 2017 NHGRI Research Training and Career Development Annual Meeting, St. Louis, MO.
4. Chen K, Parsons L, Wang W, **Heist T**, Levine M (2016) Using *Ciona* as a model system to understand the conservation and adaption of regulatory strategies for Zygotic Genome Activation. 22<sup>nd</sup> International Congress of Zoology, Okinawa, Japan.
5. Hill M, Fundakowski G, **Heist T**, Hughes C, Rahman N, Toolsidass S, Wang T, Hill A, Lawson B, Cain JW (2016) Exploring factors favoring coevolutionary specialization: agent based and deterministic modeling with tests involving sponge:*Symbiodinium* symbioses. 45<sup>th</sup> Annual Benthic Ecology Meeting, Portland, ME.
6. **Heist T**, Hughes C, Hill A, Lawson B, Hill M (2015) Investigating intracellular symbiont dynamics in sponge:*Symbiodinium* relationships. Beckman Scholars Symposium, Irvine, CA.
7. **Heist T**, Hughes C, Hill A, Lawson B, Hill M (2014) Modeling establishment of intracellular symbiont populations: a case study informed by sponge:*Symbiodinium* relationships. 2<sup>nd</sup> International Symposium on Sponge Microbiology, Baltimore, MD. (**oral and poster**)
8. Hill M, Hill A, Cotman C, Friday S, **Heist T**, McCauley M, Peterson K, Richardson C, Riesgo A, Strehlow B (2013) Evolutionary and ecological significance of sponge-*Symbiodinium* symbioses: genetic regulation of uptake and maintenance in sponges. Annual Biomedical Research Conference for Minority Students, Nashville, TN.
9. Hill M, Hill A, Cotman C, Friday S, **Heist T**, McCauley M, Peterson K, Richardson C, Riesgo A, Strehlow B (2013) Evolutionary and ecological significance of sponge:*Symbiodinium* symbioses: genetic regulation of uptake and maintenance in sponges. Society for Integrative and Comparative Biology, San Francisco, CA.
10. Hill M, Strehlow B, Richardson C, Peterson K, Cotman C, McCauley M, Friday S, **Heist T**, Riesgo A, Hill A (2012) Genetic regulation of zooxanthella uptake and maintenance in sponges. 12<sup>th</sup> International Coral Reef Symposium, Cairns, Australia.

## Skills

Languages: English (native); Latin (working professional proficiency)

Technical: Python (*pandas*, *dlt*, etc.); R (*tidyverse*, *tidymodels*, etc.); SQL (*Postgres*, *Snowflake*, *MySQL*); NoSQL (*MongoDB*); Streaming (*Apache Kafka*, *Red panda*); Statistics; Machine Learning; Containerization (*Docker*, *Kubernetes*); Version control (*git*, *subversion*); Workflow orchestration (*Apache Airflow*); CI/CD (*Github Actions*, *Azure DevOps*); Infrastructure as Code (*Terraform*); Cloud Computing (*AWS*, *Azure*); Data modeling (*DBT*); Data Observability (*Monte Carlo*); Shell scripting (*Bash*, *Zsh*); BI Tools (*Looker*, *PowerBI*);

Laboratory: PCR; qPCR; CRISPR/Cas9 genome editing; RNAseq; molecular cloning; confocal microscopy; fly husbandry; fly genetics; *in situ* hybridization

## Service

2018 – present: Goldwater scholar mentor and panelist

2015 – present: University of Richmond alumni recruitment committee member

2011 – present: National Senior Classical League

2007 – present: National Junior Classical League

2015 – 2019: Princeton Graduate Molecular Biology Outreach Program (GMOP)

2017: Panelist for NHGRI grant review session

2013 – 2015: University of Richmond Build-It Program

2011 – 2015: Bonner Scholars Program