Tyler Heist, Ph.D.

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Education

Princeton University, Princeton, NJ — September 2015 – September 2019
Ph.D.: Quantitative and Computational Biology (conferred September 2019) — GPA: 3.94
M.A.: Quantitative and Computational Biology (conferred April 2017)

University of Richmond, Richmond, VA — August 2011 – May 2015
B.S.: Biology (Honors) and Computer Science, minor in Integrated Science — GPA: 3.92

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, *Cliona varians*

Work Experience

After Graduate School

September 2019 – present: Research Software Developer at Epic Systems, Madison WI.

- Design and develop software to better support clinical research workflows and data capture in Epic's Electronic Health Record (EHR) system
- Lead research using EHR data to provide insights into the COVID-19 patient population, with a focus on comorbidities and clinical outcomes

In 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')

In 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) Tutor
Spring 2013 – Fall 2013: Biology Department Laboratory Prep Assistant
Fall 2012 – Spring 2013: 'Integrated Quantitative Science' (IQS) Tutor
Summer 2013: A&S Summer Undergraduate Researcher
Summer 2012: HHMI Summer Undergraduate Researcher

Awards

2017: NSF Graduate Research Fellowship Program – Honorable Mention
2011 – 2015: "All A's" distinction, Dean's List.
2015: Phi Beta Kappa
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
2014: Richmond Alumni Association Scholarship
2013: Omicron Delta Kappa
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. **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
2. 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
3. Lim B*, **Heist T***, Levine M, Fukaya T. Visualization of transvection in living *Drosophila* embryos. *Molecular Cell* 2018, 70:287-296.e6
4. 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
5. 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.
6. 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. 13th 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. 59th 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. 22nd 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. 45th 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. 2nd 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. 12th International Coral Reef Symposium, Cairns, Australia.

Skills

Languages: English (native), Latin (working professional proficiency)
Computer: Python, MATLAB, R, C++, SQL, Java, Unix, Imaris, and ImageJ
Laboratory: PCR, qPCR, CRISPR/Cas9 genome editing, RNAseq, molecular cloning, confocal microscopy, fly husbandry, fly genetics, *in situ* hybridization

Service

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 peer review session
2013 – 2015: University of Richmond Build-It Program
2011 – 2015: Bonner Scholars Program