

Sean T. Bresnahan

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Education

- **Ph.D.** (in progress) - Penn State University, Molecular, Cellular, and Integrative Biosciences program. Committee members: Christina Grozinger, Michael Axtell, Shaun Mahony, Heather Hines, Amro Zayed.
- **B.Sc.** (2019) - University of Nebraska at Omaha, Neuroscience program, Dept of Biology.

Technical

Bioinformatics

- Languages: R, python, bash
- Reproducibility: RMarkdown, Github
- Tools for working with NGS and sequence data: BWA, GATK, bowtie, tophat, STAR, ShortStack, freebayes, samtools, bamtools, bedtools, bcftools, sra-tools, fastp, seqtk, BLAST command line tools
- Transcriptome analysis: DESeq2, WGCNA
- Statistics and machine learning: ANOVA, LMs, GLMs, SVMs, hierarchical clustering, k-means clustering

Molecular biology

- Nucleic acid extraction and QC (nanodrop, qubit, bioanalyzer, tapestation)
- PCR, qPCR, allele-specific qPCR
- ChIP
- NGS library preparations: sRNA-seq (in-house), mRNA-seq (Illumina), ChIP-seq (in-house)
- NGS platforms: Illumina NextSeq 2000
- Molecular cloning & subcloning
- RNAi & CRISPR

Animal husbandry

- Zebrafish (*Danio rerio*), breeding and rearing - 2017-2019
- Honey bees (*Apis mellifera*), queen rearing, instrumental insemination, general colony management - 2019-present

Publications

Bresnahan, S. T., Döke, M., A., Giray, T., and Grozinger, C. M. (2021). "Tissue-specific transcriptional patterns underlie seasonal phenotypes in honey bees (*Apis mellifera*)". *Molecular Ecology*, 31, 174-184. <https://doi.org/10.1111/mec.16220>

Bresnahan, S. T., Lee, E., Clark, L., Ma, R., Rangel, J., Grozinger, C. M., Li-Byarlay, H. (2023). “Examining parent-of-origin effects on transcription and RNA methylation in mediating aggressive behavior in honey bees (*Apis mellifera*)”. in review. <https://doi.org/10.21203/rs.3.rs-2621698/v1>

Crone, M., Boyle, N., **Bresnahan, S. T.**, Biddinger, D., Grozinger, C. M. (2023). “More than mesolectic: Are *Osmia cornifrons* nutritional generalists or specialists?” in review.

See my publications on Google Scholar.

Talks & posters

- November 2022: (**international invited talk**) Inspirational Advances in Social Insect Evolution using ‘Omic’ Approaches - “Intragenomic Conflict and its Epigenetic Basis in Honey Bees”. Entomological Society of American/Canada/British Columbia, Vancouver, BC.
- July 2022: (**invited talk**) My Parents Made Me Do It (Epigenetic Inheritance in Social Insects) - “Intragenomic Conflict and its Epigenetic Basis in Honey Bees”. International Union for the Study of Social Insects, San Diego, CA.
- January 2022: (**invited talk**) Workshop on Honey Bee Genomics - “Evaluating piRNAs as a Mechanism of Intragenomic Conflict in Honey Bees”. Plant and Animal Genomics, San Diego, CA.
- May 2021: (**invited talk**) The Center for Pollinator Research Symposium - “Tissue-Specific Transcriptional Patterns Underlie Seasonal Phenotypes in Honey Bees”. Penn State University, State College, PA.
- January 2021: Biology and Genomics of Social Insects - “Evaluating Intragenomic Conflict in Altruistic, Pheromone-Mediated Honey Bee Behaviors”. Cold Spring Harbor Laboratory (virtual).
- January 2020: Regulatory and Non-Coding RNAs - “Evaluating the Role of PIWI/piRNAs in Intragenomic Conflict in Honey Bees (*Apis mellifera*)”. Cold Spring Harbor Laboratory (virtual).
- May 2019: University of Nebraska Research and Creative Activity Fair - “A Large Scale Dynamical Model of Macrophage-HIV Interactions” & “Investigating COMT Influence on the Proactive-Reactive Stress Coping Axis in Zebrafish”. University of Nebraska at Omaha, NE.
- May 2017: University of Nebraska Research and Creative Activity Fair - “Utilizing the CRISPR/Cas9 System in Zebrafish”. University of Nebraska at Omaha, NE.

Fellowships

- 2019-present: Graduate Research Fellowship Program - National Science Foundation
- 2019-present: Integrative Pollinator Ecology Training Program - The Center for Pollinator Research, Penn State University
- 2019: University Graduate Fellow - Penn State University

Teaching & mentoring

- 2022-present: Undergraduate research mentor (R, molecular biology, and honey bee husbandry)
- 2021 (Fall): TA for ENT 222, Honey Bees and Humans (general ed course for undergraduates). Instructors: Christina Grozinger, Harland Patch

Outreach

- 2022: The Arboretum at Penn State. Led exhibit on honey bee behavior at the Pollinator and Bird Garden dedication.
- 2021: East Richmond Beekeepers Association. Gave talk entitled “Cooperation and Conflict: Genetic Building Blocks of Sociality”.
- 2019: The Great Insect Fair at Penn State. Assisted in exhibit on educational game “Pollinator Panic”.
- 2017: NeuroWOW - The University of Nebraska at Omaha. Assisted in educational exhibits and activities related to neuroscience and behavior for K-6 grade students

Collaborations

- Ongoing research collaboration with labs at Central State University and Texas A&M University.
- Ongoing international research collaboration with lab at the Hebrew University of Jerusalem

Manuscript reviews

- Genome Biology & Evolution
- Molecular Ecology