

AVA MACKAY-SMITH

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EDUCATION

Duke University Graduate School

August 2022-present

Ph.D. student, University Program in Genetics and Genomics.

Wellesley College

August 2016-May 2020

Bachelor of Arts, Biological Sciences, *magna cum laude*.

Unweighted GPA: 3.8

RESEARCH EXPERIENCE

Yale School of Medicine, Department of Genetics

Sep 2021 - Present

Lab Operations Manager and Research Assistant, Reilly Lab

- Managing the lab opening of Dr. Steven Reilly, my postdoctoral mentor from the Sabeti lab
- Overseeing the management of lab setup, ordering, assistance with hiring, coordination with the department and outside vendors, and the development of lab workflows, standards of operation, and shaping lab culture
- Active contributor to the ENCODE4 Consortium CRISPR screen working group as part of the Sabeti Functional Characterization Center
- Performing cell culture, CRISPR editing experiments, transcription factor ChIP-qPCR, Illumina sequencing, and training of undergraduate students in the lab

Broad Institute of MIT and Harvard

Jul 2020 - Sep 2021

Research Associate I, Sabeti Lab

- Contributed to a project in the Sabeti lab focusing on the functional characterization of positively selected human variants, specifically those within genetic regulatory elements or linked to disease traits, including the protocol development for HCR-FlowFISH
- Assisted with graduate student work on human-specific conserved deletions and variants in noncoding regions, characterizing their activity through luciferase reporter assays, ChIP-qPCR, CRISPR-Cas9/Cas12a genome editing, etc.
- Responsible for data management for the Sabeti lab in its capacity as a Functional Characterization Center for the ENCODE consortium

Wellesley College Department of Biological Sciences

Sept 2017 - May 2020

Thesis Candidate and Student Researcher in the Sequeira lab

- Completed an honors thesis on species introduction and differential gene expression of *Naupactus* polyphagous parthenogenetic weevils with Dr. Andrea Sequeira, addressing broader evolutionary questions regarding epigenetics and gene expression using molecular methods.
- Maintained short-term live adult and juvenile insect specimens and preserved specimens in long-term storage
- Routinely performed DNA and RNA extraction, several PCR and purification protocols, gel imaging, amplified fragment length polymorphism analysis, and Sanger sequencing and RNA-seq data
- Managed grant finances, stock orders, and negotiation with exterior institutions and companies

Wellesley College Botanic Gardens

February 2019 - May 2020

Curations Assistant and Gardens Docent

- Collaborated with horticultural personnel to index existing and new collections, handling multi-platform data input and purchasing records over multiple data collection years
- Researched and protected IUCN-listed rare specimens and other plants of special interest
- Followed plant handling techniques and IPM protocols for preserving healthy specimen plants in WCBG collections

Uppsala University

Summer 2018

Field Research Assistant in the Gustafsson lab

- Banded adult birds using portable mist-netting and nest trapping techniques with Dr. Lars Gustafsson's group, alongside regularly handling and banding young chicks and fledglings from Collared Flycatcher nests on the island of Gotland
- Worked 12-hour days in the field in unmarked forests using GPS and compass coordinates for navigation
- Maintained 450 nest boxes for cavity-nesting bird species in a 10-person field team
- Learned standardized data measurement techniques to contribute to a 39-year dataset

Institute of Science and Technology, Vienna

Summer 2017

Field Research Assistant in the Barton lab

- Spent 10- to 14-hour days in field teams collecting plant samples from mountainous slopes, accessed via abseiling and rock-climbing
- Collected over 1000 biological samples of plant tissue, and processed samples to prepare for further lab work
- Logged detailed, custom GIS data using Trimble 3000 GPS systems for *in situ* samples

VOLUNTEER AND LEADERSHIP EXPERIENCE**Broad Institute of Harvard and MIT**

Jan 2021 - Aug 2021

BroadRATS Working Group for Sexual Harassment and Discrimination Member

- Collaborated with other Research Associates and Technicians to develop better reporting procedure for workplace sexual harassment and discrimination
- Expanded the resource list for understanding and intervening in bystander situations
- Worked with external Ombuds office to improve resources available to all Broad employees for a safe and equitable workplace

MSPCA-Angell West Medical Center

December 2019 - Aug 2021

Trainer and Volunteer Advisory Council Member

- Co-ordinated new volunteer shadowing and training to prepare for solo shifts
- Interfaced between clients and veterinary nurses/technicians/doctors for medical questions and visiting around procedure times
- Developed knowledge-related resources and event programming to improve the quality of the training experience and ensure multiple routes for volunteer growth & commitment
- 2020 MSPCA-Angell Volunteer Certificate of Achievement in Communications Planning

FELLOWSHIPS AND AWARDS

2022 - present James B. Duke Fellowship, Duke University Graduate School
2022 - present National Science Foundation Graduate Research Fellow
2022 ENCODE4 Consortium Team Science Award: CRISPR Working Group
2020 Wellesley College Fiske Prize in Biology
2020 Wellesley Camellia Student Leadership Nominee
2020 Wellesley Summer Research Grant recipient
2019 Wellesley College Research Grant recipient

PROFESSIONAL ASSOCIATIONS

Society of Duke Fellows, 2022 -
Sigma Xi Scientific Research Honor Society, 2020 -
American Society of Naturalists, 2019 -

POSTER AND ORAL PRESENTATIONS

Host-specific gene expression and invasiveness in parthenogenetic weevils

ASN, SSE, SSB Evolution National Meeting 2019

Colonization histories and epigenetic variation in the parthenogenetic, invasive weevil

Naupactus cervinus

Wellesley Ruhlman Conference 2019

PUBLICATIONS

Rodriguero MS, Confalonieri VA, **Ava Mackay-Smith**, Dornon MK, Zagoren E, Palmer A, Sequeira AS. Genetically depauperate and still successful: few multilocus genotypes of the introduced parthenogenetic weevil *Naupactus cervinus* (Coleoptera: Curculionidae) prevail in the Continental United States. Manuscript under review (2022).

Xue JR, **Mackay-Smith A**, Mouri K, Zoonomia Consortium, Tewhey R, Sabeti PC, Reilly SK. The functional and evolutionary impacts of human-specific deletions in conserved elements. Manuscript under review (2021).

Reilly SK, Gosai SJ, Gutierrez A, **Mackay-Smith A**, Ulirsch JC, Kanai M, Mouri K, Berenzy D, Kales S, Butler GM, Gladden-Young A, Bhuiyan RM, Stitzel ML, Finucane HK, Sabeti PC, Tewhey R. Direct characterization of cis-regulatory elements and functional dissection of complex genetic associations using HCR-FlowFISH. *Nat Genet* 53, 1166–1176 (2021).

Mackay-Smith A, Dornon MK, Lucier R, Okimoto A, Mendonca de Sousa F, Rodriguero M, Confalonieri V, Lanteri AA, Sequeira AS. Host-specific gene expression as a tool for introduction success in *Naupactus* parthenogenetic weevils. *PLoS ONE* 16(7): e0248202 (2021).