**Introduction**

This is how I remember science making its way into my brain: drawing skulls and eggshells I found in the woods inside a sketchbook for my mother; watching how baking soda works; listening to Jane Goodall on NPR; reading about a bird I saw on our feeder; growing tadpoles in a jar; learning how to vaccinate a sheep. I cannot point to a single moment in my life that forever altered my trajectory towards science because I grew into it, like a hermit crab slowly acquiring larger shells to live in: I made a house out of what I found, and then it became a home. The home that I have found – the creative joy that can be found in science, and the community that supports that pursuit – is what pushes me to become a leader in exploring the diversity of life on Earth by integrating evolution and genomics.

**Background**

Growing up as the child of farmers in rural Virginia does not, at first glance, seem like a traditional place to discover a passion for evolutionary biology and genetics. However, there was no better way for me to begin to understand how questions we can ask at a microscopic level translate to macroscopic effects on the environment around us. Why did some roses bloom twice, and others only once? How do you know whether the soil is good for root vegetables? What does a chick look like inside the egg? This kind of curiosity and drive for knowledge led me to seek out educational opportunities that I couldn't find in my town – best known for not having a stoplight in a twenty-minute driving radius. Wellesley College, although not famed for its scientific prowess as a liberal arts undergraduate college, provided a unique environment where I first learned to believe in my potential as a scientist and leader.

At Wellesley, I knew I wanted to be part of the scientific community after my first-year seminar on organismal biology led me to a summer in the mountains of Spain collecting plants with Dr. Nick Barton's lab at the Institute of Science and Technology. I was collecting real specimens for downstream genetic analysis with my own hands for hours, and I knew my impact mattered. Even more importantly, I met absolutely fascinating postdocs, volunteers, and graduate students interested in genetics, ecology, plant biology, and pollinator interactions, which made our nightly field team dinners a place where I could ask wildly diverse questions and get a range of interesting, thoughtful answers. I wanted to be one of those people – for myself, to engage in those conversations and contribute something meaningful, but also for others, so that they could feel that same rush that I did when the cogs in my brain started whirring.

Returning to Wellesley my sophomore year, I won a small stipend that was designed to provide research experiences for students from low-income families. Because my parents were at the time self-employed, and much of our finances were going towards my father's cancer treatments, I was grateful to find this position within Dr. Andrea Sequeira's lab. By studying how two clonally reproducing, invasive insects adapt to a wide range of novel host plants using RNA-seq, we were able to observe how the differential expression of some genes are linked to the types of host plants available. Here, I was first exposed to how ecological information, sequencing technology, and evolutionary biology can integrate to ask questions that no one field can approach alone. From raising these insects in environmental rooms, to extracting total RNA, to analyzing the data in R, this project spanned three years and was the basis for my departmental honors thesis as well as a first-author publication in *PLOS One*[1]. I presented the many stages of this project at several conferences, including internal symposia at Wellesley and a poster presentation at the international Evolution conference in 2019. Working with wet-lab and computational tools that I had never encountered, I was still allowed to pursue my own questions and side projects, developing my own curiosity and independence as a researcher. As the eldest member of the lab, I also helped train members of the same program that brought me to the Sequeira lab, continuing to bring talented young women into the lab that trained me so well.

From my sophomore through senior years, I kept pursuing the fieldwork that had driven me into evolutionary biology and genomics in the first place. I learned how to apply bird tracking bands with the Institute for Bird Populations, and subsequently worked as a field assistant with Dr. Lars Gustaffson at Uppsala University in Sweden. With my growing experience in science, I was able to jump right into adding to a 40-year dataset of nesting habits for a population of migratory flycatchers to track how these populations evolve and migrate differently over time. I was able to engage and learn more from the talented

scientists and volunteers on the team, hear about what got them involved with science, and make a concrete impact on the team by logging remote field sites and using my unique mist net training to capture many of these birds in flight.

I also volunteered with Dr. Iara Lacher's lab at the Smithsonian Conservation Biology Institute, cataloging native orchid biodiversity on conserved estates in northern Virginia. This project was interested in employing citizen science to record observations of native orchids in areas of disturbance or local preservation. Here I was able to learn Geographic Informations Systems (GIS) analysis methods and forest canopy measurements while building a new user-friendly protocol to disseminate to local volunteers. Our outreach to members of my hometown and neighboring counties, giving these agricultural communities the tools to identify the biodiversity around them, was incredibly rewarding and taught me the value of good scientific communication This experience in plant ecology was so rewarding to me that I began working as a docent with the Wellesley College Botanical Gardens, where I gave tours to members of the local community focused on how plants' diversities of form are driven by unique evolutionary and environmental forces.

I graduated from Wellesley with a strong background in ecology and evolution, *magna cum laude* with departmental honors, a Sigma Xi nomination, and the Fiske award in Biology. After graduation, I aimed to gain more extensive skills in molecular biology, genomics, and computational analysis, to be truly well-equipped for pursuing the research that interests me most. To do so, I joined Dr. Pardis Sabeti's lab at the Broad Institute of Harvard and MIT as a Research Associate. My projects ranged from testing human noncoding variant impacts on gene expression with endogenous CRISPR editing, protocol development for high-throughput CRISPR interference screens to identify enhancer elements, and computational projects for sequencing analysis from these experiments. My computational and wet-lab work landed me a third-author slot on our *Nature Genetics* publication[2] describing one of these projects, and a manuscript is currently in preparation for another. Working alongside graduate students from Harvard and MIT every day and collaborating with them on their projects has further cemented my drive to pursue a graduate education. More importantly, working full-time as a researcher built my confidence and commitment to this area of biology, and I am prepared to approach my PhD as I have approached this job: with thoroughness, dedication, curiosity, and drive.

The intellectual caliber of the Sabeti lab made me want to invest and give what I could to this community, and as such I routinely helped organize early-career casual group activities for the other 20 RAs in the lab. I became involved with an inter-lab evolution-focused reading group, interacting with staff scientists and graduate students to discuss our ideas, and began to attend Boston Evolution Supergroup meetings, where some of the greatest evolution thinkers in the Boston area present their work. Additionally, as my first experience doing science was at a Historically Women's College, I was particularly aware of representation and gender discrimination in the workplace. I became involved in the BroadRATS' (Research Associates and Technicians) Sexual Harassment and Discrimination Working Group, where we were involved in providing and advertising resources to prevent and address workplace harassment and discrimination. During my time on this committee, we were closely involved in the hiring of an Ombudsperson to act as an impartial resource for all Broad employees, building safety and communication pathways for the community at large.

After establishing myself in the Sabeti lab, the postdoc I worked most closely with, Dr. Steven Reilly, was impressed by my commitment to my work and invited me to move with him as lab manager to start his new lab at the Yale School of Medicine. The projects that I helped develop traveled with us to Yale, where we continue to ask questions about noncoding genome evolution, develop high-throughput functional genomics assays, and mechanisms of gene expression regulation. This adventure in setting up a new faculty lab at a top-tier school is giving me valuable experience in how to effectively set up workflows, external relationships, and expectations for opening a new lab, to do so on my own one day.

**Future Goals**

After my experience working with scientists from around the world in ecology, evolution, and genomics, I seek to go to graduate school to become one of those scientists. I hope to integrate evolution

and bioinformatics in real-world species and ecosystem contexts, to understand the diversity of life from the molecular level to the systemic level. Inevitably, my interests in these areas will equip me to deal with questions of conservation biology and climate change in the era of anthropogenic climate change, and I hope to use my expertise to ensure that we are able to preserve Earth's biodiversity effectively. My ultimate goal is to remain in academia to continue the pursuit of interesting questions in the intersections of these fields, and mentor the next generation of evolutionary genomicists to maximize my long-term impact in science.

**Intellectual Merit**

Through my involvement with multiple labs, I have contributed to multiple dimensions of various evolutionary biology projects I am interested in, ranging from ornithology, to botany, to human biology. I have a multi-field track record of presenting my work publicly and publishing my science with collaborators[1,2] at the local and international levels. Taken together, these achievements demonstrate my unique capabilities as a dedicated, interdisciplinary, flexible, and communicative scientist, well suited for the increasingly integrative requirements of science in the 21st century. My history of repeatedly engaging above expectations to communicate and learn from other evolutionary biologists at local and international levels through journal clubs, seminar series, and volunteer fieldwork shows my drive to seek out the science that I want to be a part of, which is exactly why I am pursuing graduate school. Because I am pursuing the research that I find fulfilling, I am deeply invested in the work I am a part of. I aim to leverage that not only for my research output, but also as a role model for other trainees, to demonstrate that academia can be a place for pursuing your dreams holistically. All in all, my breadth of experience and commitment to my scientific training have led me towards pursuing a graduate degree in evolutionary biology, to give back to the community that gave me space to grow and achieve intellectually. The time I've taken to grow as a professional scientist at Harvard, MIT, and Yale have given me the scientific and personal skills I need to pursue this degree, and the people who have inspired me to get there have created a uniquely powerful support network for my trajectory throughout the PhD process.

**Broader Impact**

Through my involvement with the Wellesley Botanic Gardens and the Smithsonian Conservation Biology Institute, I have prioritized engaging with the public and communicating my interest in science to broader audiences beyond my field. Although this was interrupted by the COVID-19 pandemic, I found new avenues for engagement by using my background at a historically women's college to advocate for safe workplaces and gender equality. Having seen many male-dominated sectors of biological research after leaving Wellesley, I am particularly invested in ensuring that everyone who is interested in science has an opportunity to explore it, and that current scientists feel safe and supported in their places of work. I want to be a role model and an effective communicator for the science I'm so passionate about, especially for a topic like evolution that still drives so much political controversy. Evolutionary biology and conservation in particular will become increasingly relevant as my generation deals with the impacts of anthropogenic climate change, which means it's a crucial time to be a biologist. I am especially excited to serve as a role model for other young scientists, telling my story as the first woman on either side of my family to pursue a doctorate in a STEM field. Through my engagement with the public, my dedication to ensuring accessibility and equity in research, and desire to lead by example, I hope that my pursuit of the science that I love will impact the United States culturally and scientifically.

References: [1] Mackay-Smith, A. *et. al*. (2021) *PLOS One*. [2] Reilly, S. K. and Gosai, S. J. *et al.* (2021) *Nat. Gen.*