

My research career thus far has been varied, with every experience leading me toward a career in comparative genomics research. I believe that excelling in this field will require the training provided by dual VMD and PhD degrees. My dreams of becoming a veterinarian began as a child, but my interest in research was piqued in college when I joined my General Chemistry professor, Dr. Russell Schmehl's, research group. While I was excited to develop my independent laboratory skills, I soon recognized that my passions were in other areas of science. After spending a summer interning in the pharmaceutical industry within the field of immuno-oncology and finding the material much more stimulating, I chose to pursue a more direct human impact and sought employment at the Broad Institute of MIT and Harvard after college. I joined the Genetic Perturbation Platform (GPP) where, in the last three years, I have been able to work hands-on with cutting edge CRISPR technologies.

While at the Broad, I was first exposed to the field of comparative medicine when I saw Dr. Elinor Karlson and members of her group present on their vertebrate genomics research at a *Science for all Seasons* seminar. Afterward, I was able to connect with several veterinarians, including the Broad's attending veterinarian, Dr. Tyler Caron, and several Broad affiliates including Dr. Lisa Moses and Dr. Michelle White, who work for Harvard University and Dr. Karlson's Vertebrate Genomics group, respectively. In meeting with each of them, I realized how much their passions for animal welfare and comparative research resonated with me and I easily envisioned myself in any of their roles. It was through these conversations that I was introduced to UPenn's dual degree program. Since then, I have explored other ways to combine research and veterinary medicine by shadowing at the Division of Comparative Medicine (DCM) at the Massachusetts Institute of Technology (MIT), where the areas of research reach beyond genomics. I am inspired by the directions in which comparative medicine is moving, and I am particularly interested in comparative genomics, a field where I see CRISPR playing a large role.

It is an exciting time to be in this arena. CRISPR research and its applications have expanded in just the few years that I have been with the Broad, from the establishment of gene therapy companies like Verve and Beam, to the advent of prime editing, and there is still so much room for growth and discovery. One direction where I see great potential is the use of these genetic perturbation technologies for the study of non-human species. In GPP alone, we have received requests for guide RNA libraries for everything from cow to dog to chicken and salmon cell lines, but these remain one-off projects, and screens are often limited by a lack of genetic information and a need for technology optimization. When it comes to working with these tools in other animal species, there is still so much improvement to be made and the potential for important discoveries.

I would like to extend the technologies that I am currently using in human cancer cells to animal model systems, with the goal of informing animal and human health and medicine. As humans we have much in common with other animal species, and there are many disease states, such as cancer in canines, which serve as direct models. But, our biology differs in a myriad of ways and a deep understanding of the animal is critical to the proper interpretation of these differences. There is much left to explore when it comes to interesting and unique mammalian phenotypes, such as the ability of certain birds to regenerate hair cells for hearing loss or for some animal species to hibernate for extended periods of time. Not only can these genetic discoveries be used to inform animal biology and the study and treatment of diseases in those species, but they can also be harnessed for the development of therapeutics and human medicine. The past ten years have been transformative in the human genomics space. Looking forward to the next ten years, I would like to help extend the emphasis on genomics to animals too. To be

successful, I will need to learn everything that a veterinarian knows about animal behavior, anatomy, and physiology, in order to be able to identify interesting questions and understand where and when there are opportunities for translation to humans.

I am uniquely poised to enter the field with the skills to think critically about genomics, but want to pursue both a VMD/DVM and a PhD in order to develop a stronger research base, hone my investigational skills as a researcher, and understand how to effectively work with different species. Following residency or post-doctoral training, I would like to focus on research at a blended academic institution, similar to the Broad and MIT's DCM, where I can conduct cutting edge research without necessarily needing an appointment as a professor. I particularly like the duality that the DCM offers, where veterinarians can pursue their research interests and still work with animals hands on, putting their clinical skills to use and choosing how to split their time between the two roles. I envision research playing a dominant role in my career, but I would also like to make use of my clinical training whether that be through my main employment or through sporadic relief work.

The Veterinary Medical Scientist Training Program at UPenn is my ideal program for achieving my goals as a veterinary research scientist. I am excited by the research being conducted by principal investigators such as Dr. Nicola Mason, Dr. Paula Henthorn and Dr. David Roos, and I know that they represent only a sampling of the hundreds of researchers that make up the Biomedical Graduate Studies group. The abundance of opportunity is invigorating and inspiring, which is why I greatly appreciate the flexibility to move across departments within BGS. Given my genomics research experience, my interest in comparative medicine, and the abundance of cutting edge science that is home to the many Penn facilities, I cannot think of a better alignment of interests.