



Above: 2023 Beckman Scholar Anthony Kelly at North Carolina State University, where he studies development of novel compounds with neurobiological activity in the lab of Professor Joshua Pierce.

Photo credit: NC State University

NC State Undergrad Aims to Improve Human Health through Small Molecule Research

In the lab of Professor Joshua Pierce at North Carolina State University, undergraduate Anthony Kelly is working on the development of novel compounds with neurobiological activity. It's a project he'll be engaged in for two summer terms and a full academic year, thanks to the Beckman Scholars Program, which provides funding through the Arnold and Mabel Beckman Foundation to support 15-month mentored research experiences for exceptional undergraduates in chemistry, biological sciences, and interdisciplinary combination

thereof. For Kelly, it's also the continuation of a culture of exploring your curiosity that was nurtured since childhood by his father and mother who have careers as an engineer and teacher, respectively. To him, becoming a scientist seemed only natural.

"Engaging with curiosities and learning by experimentation was encouraged in our household," he explained. "I mixed rocket fuels in the garage and lacto-fermented hot sauce in the kitchen. I attended the NC School of Science and Mathematics, where I was

inspired to rise to the challenges in health. I was particularly moved by a talk by Dr. Francis Collins on development of the mRNA vaccine. I found the science tantalizing; the impact on human health palpable, and very exciting.”

For some, the Beckman Scholars Program (BSP) represents an opportunity to gain experience in research, explore bench work, and weigh career options. For Kelly, who had already delved into that environment, the program was a chance to envision his own research project, which he saw as a rare privilege for an undergraduate.

“We were able to foster a new, interdisciplinary collaboration between labs,” Kelly shared. “BSP was enabling for my training as a researcher, but moreover, to do work that I’m truly impassioned about. I’m developing new psychedelic analogs. Recent clinical research suggests psychedelics may be effective therapeutics for neuropsychiatric disease, particularly stress-related disorders. Rapid and enduring therapeutic effects may be due to induced adaptive neuroplasticity. I’m developing a tetrahydropyridine scaffold, designed to retain the psychoplastogenic properties, without eliciting acute psychedelic effects.”

Kelly expects the research will yield a better understanding of the fundamental mechanisms that govern healthy and diseased brain states and increased knowledge about small-

molecule mediated neuroplasticity. Those advances may be key to the production of clinically useful therapeutics for diseases like depression, anxiety, and PTSD.

“I feel fortunate to be a part of the primary lab I work in, where I am raised by all of the graduate students like a village child,” he reflected. “Both my mentors have helped me to think like a researcher. There is a certain Zen and the Art of chemistry research, which is learned through experience. The mentorship I receive has been instrumental in my training as a researcher, and my personal development.”

It’s just the beginning for Anthony Kelly, who plans to pursue a career in scientific research. After graduation, his goals include a NIH post-bacc followed by graduate school in a chemical biology program.

“I want to create small molecules to leverage biology,” Kelly said, “with tangible effects on human health.” ■



Above: Anthony Kelly (r) joined by members of NC State’s BSP cohort, (from left) Isaac Ali, Alexa Kuyvenhoven, and Skylar Harrelson.
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