

# A Focus on RNA and Breast Cancer Research

## Samuel Harvey, Medical Scientist Training Program



Samuel Harvey, a second-year MD/PhD student in [Northwestern University's Medical Scientists Training Program](#), studies the relationship between RNA processing and breast cancer in the laboratory of Chonghui Cheng, MD/PhD, assistant professor of Hematology/Oncology in the department of medicine.

Harvey earned a Bachelor of Science degree in biology from the College of William & Mary in Williamsburg, Va. After pursuing research projects in high school and during his undergraduate studies, he knew graduate school was a natural fit for scientific research.

## Q&A

### Where is your hometown?

I grew up in the small town of Salem, nestled in the Roanoke Valley of southwestern Virginia, only minutes from the Appalachian Trail. My childhood in a more rural area was full of natural beauty and wonder, but we were also fortunate to live only a short drive from the larger community of Roanoke, which offered access to more urban amenities.

### What are your research interests?

My favorite biological macromolecule is ribonucleic acid, or RNA, and currently I am studying the relationship between RNA processing and breast cancer. In particular, I study alternative splicing of RNA, the process whereby one gene encoded in DNA is transcribed into pre-RNA that can then be recombined and reconfigured via splicing into different splice isoforms that sometimes have distinct functions once they are translated into protein.

Alternative splicing is a major gene regulatory mechanism responsible for generating the diversity of the human proteome, and I am particularly interested in how changes in alternative splicing can promote breast cancer metastasis.

### What exciting projects are you working on?

Recently I have been studying the heterogenous nuclear ribo-

nucleoprotein M, abbreviated hnRNPM. hnRNPM is a splicing factor, a protein that binds to RNA and drives alternative splicing towards particular splice isoforms and shortly before I joined, the lab discovered that hnRNPM drives a global splicing program in breast cancer that strongly promotes breast cancer metastasis. We have some insight into the mechanism by which hnRNPM drives metastasis, but the protein modulates the splicing of thousands of different transcripts. If hnRNPM is as powerful a metastasis-promoter as we think, there is much to learn in how hnRNPM causes breast cancer cells to metastasize as well as what we can do to abrogate this function.

### What attracted you to the MD/PhD program?

I have been interested in science and medicine ever since I was a child. Many of these interests stemmed from the influence of my parents. My father is an engineer and taught me the value of precision and systematic thinking, and my mother is a clinical nurse specialist with a PhD in nursing who introduced me to the beauty of the medical profession and how well research integrates within the medical mission.

My first glimpse into the MD/PhD career was in high school when I attended a life sciences summer camp at Virginia Commonwealth University. This was the first time I interacted with MD/PhDs and other physician-scientists and after that summer program I was convinced that the union of medicine and scientific research was the career for me. I endeavored all through college on various research projects and tried to make myself competitive to apply to MD/PhD programs like the one here at Northwestern. In my opinion, the integrated MD/PhD training program offers an unparalleled medical and research education and I am so grateful for the opportunity to pursue my training here at Feinberg.

### What has been your best experience at Feinberg?

The most meaningful experience I have had through Feinberg was provided by a generous travel grant afforded by the Robert H. Lurie Comprehensive Cancer Center. I relished the opportunity to attend the 20th Annual RNA Society meeting in Madison, WI with my research mentor, members of my lab and other students from the Feinberg community, where I presented the work from my first year of PhD research. This meeting was especially important for my development as a young scientist within a global research field, and I am thankful that Feinberg provides students the opportunity to grow as communicators of science and to share their research with the wider world.

### What are your plans for after graduation?

I am currently most interested in pursuing a residency in anatomic pathology with specialization in the molecular genetics of solid tumors. After residency I hope to work at an academic medical center as a principle investigator of my own research program.