UNIVERSITY OF MISSISSIPPI

HONORS REPORT

FALL 2020

Nathan Hammer, Margaret McLean Coulter Professor of Chemistry and Biochemistry (left) and Austin Howard, M.D.

'REAL GENIUS'

AUSTIN HOWARD
(SMBHC 09, UMMC 13)

Though only an undergraduate with one semester of physical chemistry under my belt, I made an appointment with a recently hired assistant professor, whom I hoped would help me fulfill a requirement of the Sally McDonnell Barksdale Honors College and take the first step toward writing and defending an honors thesis. Stepping into Dr. Nathan Hammer's lab was exciting even for someone not well acquainted with his field. The lasers, dry ice and racks of electronics hearken back to a 1985 movie — and one of my favorites — called "Real Genius," the definitive depiction of physical chemistry in a film. I'd later learn that "Real Genius" was one of Dr. Hammer's favorite movies too.

In our first meeting to discuss my honors thesis, I learned that Dr. Hammer did have an undergraduate project in mind. His Ph.D. mentor had given him an instrument known as a Raman spectrometer. A Raman spectrometer is a tabletop device, occupying roughly the area of half a pingpong table, that contains rotating reflective elements for measuring

scattered light at different wavelengths. A laser shines through a chemical, and the pattern of this measured light gives some idea as to the molecular structure and energy of the chemicals. The project was to restore this device to working order.

What would follow over the next several months was not unlike the "Real Genius" montage of Val Kilmer's Chris Knight building a powerful laser as his senior research project. During that time, Dr. Hammer taught me about stepper motors and photomultiplier tubes. We soldered our own cables from diagrams in faded, decades-old manuals. In the end, the spectrometer came to life again. With Dr. Hammer's help, I had not only an honors thesis but several peer-reviewed publications as a result.

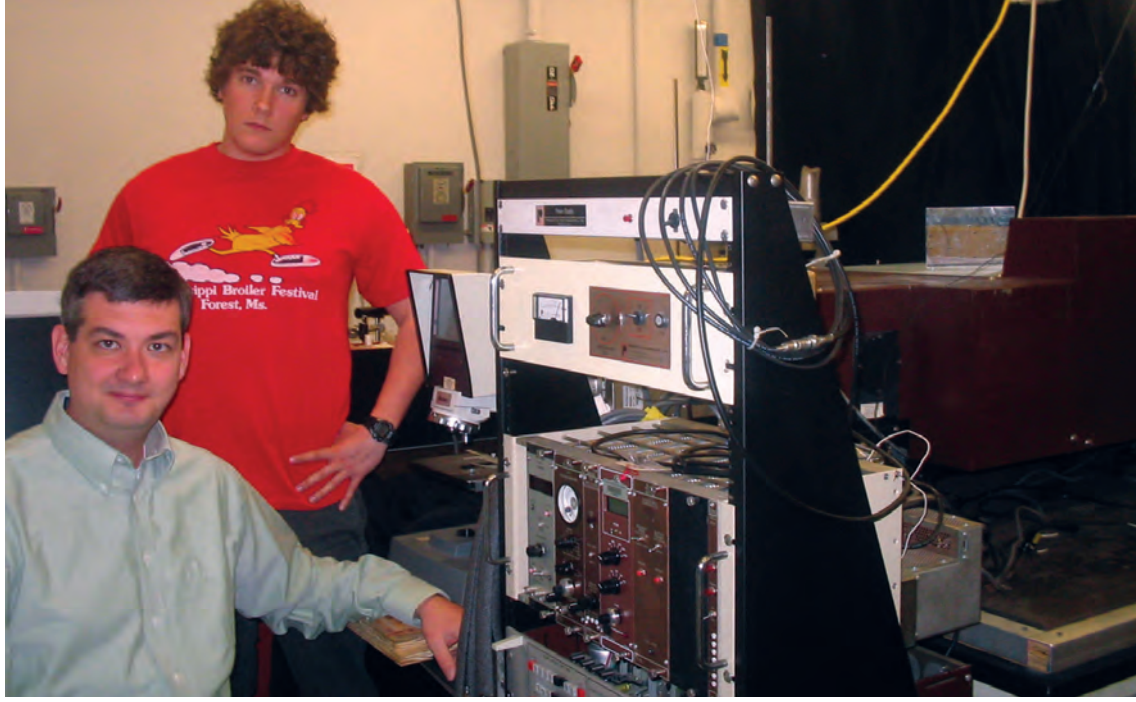
I worked in Dr. Hammer's lab until I started medical school. While Dr. Hammer was an excellent adviser on those matters for my honors thesis, he also provided more general mentorship, which serves me to this day.

"Dr. Hammer is my adviser, and I went to him about advice on studying abroad. He told me with my major, it is nearly impossible. Instead of ending the meeting right then and there, he came up with a solution for me that no one else would do. He is one of the few professors that I have had that I feel has actually gotten to know me and wants me to be successful. He goes out of his way to help a student succeed whether it is an extension on a due date, studying for a test, recommendation letters or just life questions in general. He shows that being a professor is not just about research or furthering their career but making sure students have the right tools to start theirs."

— Sarah Peterson (SMBHC 21)

"Dr. Hammer was a huge help to me during my undergraduate career. When I joined his lab, he made me feel welcomed and included right away. From conducting research, to writing my honors thesis, to applying for the Goldwater scholarship and eventually graduate school at Princeton, I found that Dr. Hammer was always there to provide helpful advice or an encouraging word. I'm so grateful to have had such a supportive mentor and advocate during my time at UM."

— Anna Hailey Rubinstein, M.D. (SMBHC 11)



Austin Howard (standing) and Nathan Hammer are shown alongside the equipment Howard restored for Hammer's lab in 2009. (Photo courtesy Austin Howard)

Although Dr. Hammer is a tough professor, his constant ambition for perfection in his students, through challenging them to improve their level of work and by encouraging them as qualified students, is what sets him apart."

— Dawson Buettner (SMBHC 19)

"I am so thankful that Dr. Nathan Hammer took a chance on me three-and-a-half years ago by allowing me to join his research group. I do not believe that I would be where I am today if it was not for his unwavering encouragement, support and opportunities for growth that he has provided me. He pushed me to achieve my full potential by helping me realize what I am capable of, even when I was unsure of myself. I am grateful for his trust and support throughout my college career.

"Thanks to his guidance and his ability to motivate me to be my best self, I am able to continue pursuing my research interests for the next two years at the National Institutes of Health. Moreover, his passion and care that he has for his students' success is truly unparalleled. He is incredibly effective at enabling students to achieve their full potential and helping people realize their goals. One of my favorite memories comes from finals week when he brought cinnamon rolls for the entire class. Although the final was challenging, it is evident that he truly cares about the well-being of his students."

— Genevieve A. Verville (SMBHC 20)

I still organize my computer in the manner he suggested to me, which makes every piece of work I produce readily available. I was able to reference my thesis and defense for this very article. I frequently give PowerPoint presentations and continue to hold myself to his standards, avoiding the "canned" themes and using only high-resolution images.

I still publish research articles, and I still use skills fostered in his lab, whether that is in my gathering of references or in my preparation of figures, tables and graphs that don't just provide data but look good in addition.

I continue to keep everything I did in that lab on my CV. It must be quite confusing to my potential employers these days, but I am much too proud of that work to remove it. Somewhat surprisingly, in my current field of cardiac electrophysiology, I do still happen to use some of the electronics concepts I learned in Dr. Hammer's lab. I did not know at the time that my career would involve matters of high and low pass filters, shielding, electromagnetic interference, or direct and alternating current, but I received a practical education in these matters from Dr. Hammer.

Occasionally, I look through Dr. Hammer's website and marvel at the number of students who have come through his lab in the 10 years plus since my time there. The University of Mississippi and the SMBHC are incredibly lucky to have him mentoring their students, regardless of their future field and its relationship to an experimental physical chemistry lab. I certainly count myself lucky to have been in that group. ■ **HR**