UNDERGRADUATE MOLECULAR SPECTROSCOPY APPROACHES IN RESEARCH AND TEACHING AS AN EXPERIENTIAL LEARNING ENTERPRISE AT MISSOURI S&T

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As most every person at this conference can appreciate, spectroscopy, especially at the undergraduate level, is often considered one of the most difficult subjects to undertake and, due to this mentality, is often avoided at all costs. To overcome this stigma and make the material resonate with undergraduates, it is important to give them avenues by which to actually get involved in the processes of spectroscopy. In this way, the students become invested in some aspect of the subject which is applicable to their own personal interests. At Missouri S&T, this is achieved in multiple ways. In the research lab, students are given tasks that align with their interest, but also achieve a common goal of a spectrometer enhancement or molecular target of interest in microwave spectroscopy. They are given the tools and instruction to succeed as well as the leeway to fail in a project as this is the cornerstone of discovery. When given this freedom, they become leads in a project, guided and mentored by both the graduate students and myself. If a student is interested in teaching, we have had undergraduates create physical chemistry labs and instruct them in order to guide other students through the process of learning, thereby augmenting their own knowledge. For expanded or more general undergraduate spectroscopy outreach, I serve as the physical chemistry lab instructor and the Associate Advisor of our university's Mars Rover Design Team, which always builds and implements an onboard spectrometer for field analyses. The overarching theme of the talk is to get students interested early and keep them involved. The university helps with this by having programs that will get the students involved as young as the high school level. How we have utilized these programs, reached, and kept student interest while also mitigating the costs of such endeavors at Missouri S&T will be discussed.