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Reichert Award Talk: Preparing Physics Students in an Era of Virtual Reality

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Like many other institutions with a large and active faculty, the University of Michigan Physics Department has a rich curriculum of undergraduate courses that focus on the use of 19th Century mathematics to understand the behavior of matter and energy. Most people who have pursued a career in this field appreciate that success usually depends on a much wider variety of skills. Addressing those needs has been the major emphasis of our undergraduate advanced lab program. This covers a broad range of topics. First of all, physics will continue to enlarge its encroachment into new areas. Thus, we have added experiments in radio astrophysics and non-linear dynamics. Computational and statistical methods are integrated into the experiments as appropriate and development of effective communication skills is heavily stressed. While there are efforts elsewhere to replace traditional hands- on experimentation with simulations, interactive video-based laboratory modules, and remotely controlled laboratory experiments, we consider these tools to be appropriate only for pre-lab and post-lab activities. None of these tools can provide the long-lasting experimental skills and knowledge-packed memories that a well-designed teaching experiment can. Hence, we choose to focus on providing a comprehensive list of experiments in a safe, well-equipped, teaching environment. The overall guiding principle is to provide a multi-faceted introduction to a rewarding career in science.