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Bringing physics to life with experiential learning

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This talk will describe elements used in an introductory university physics course to bring physics to life and help students see and use the world around them as their lab. The audience will learn common challenges associated with this mission and discover the key principles to develop a framework for designing real-world experiential learning activities in physics courses at any level.

This initiative is motivated by the improved learning that results when students apply concepts from the classroom to the world around them and to themselves. This is true across many fields but is especially important in physics, where theoretical knowledge should be paired with hands-on experimentation and observation so that students can explore the full scope of the scientific method. Although labs try to achieve these goals, they often fall short, particularly when they focus on reproducing the expected outcome from a particular experimental setup. This is a missed opportunity for students to engage in open-ended inquiry and experimental design, and it does not lead to meaningful real-world connections.

At Minerva University, rather than simulate real-world phenomena in a lab, students make a lab out of the real world and themselves! Minerva is a 4-year liberal arts institution that combines an innovative general education curriculum, a pedagogical model centered around active learning, and a global experience in which students rotate through seven different cities over the four years. As one component of this approach, every course has a “location-based” assignment, meaning that it includes certain elements that require students to go out and interact with their city of residence. This talk will showcase an example of a location-based assignment in an introductory physics course in which students apply a variety of fundamental physics concepts, including mechanics, fluids, and thermodynamics. But rather than dealing with idealized systems of blocks, pulleys, and strings, students apply the concepts to themselves! Their own bodies become their laboratory, allowing for deeper, more tangible, connections with the course material. The talk will highlight the scalability of this initiative and outline how it can be adapted to various levels of physics.

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