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Using a Research-based Approach to Transform Upper-division Laboratory Courses

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Preparing undergraduate physics majors for future careers in experimental science is one of the main goals of our current physics education system. Upper-division lab courses and undergraduate research experiences are the natural places where this training can take place. At the University of Colorado Boulder, traditional and PER faculty have been working together to comprehensively transform our Advanced Lab course and evaluate the impacts of these changes. I will discuss our two-year effort to establish learning goals, transform the course, and measure the impact of the transformation on students' scientific process skills. As part of this effort, we developed a validated survey (E-CLASS) to assess students' attitudes and beliefs about experimental physics. This online survey is available to instructors at any institution whom would like to learn more about the impact of their lab courses at all levels on students' attitudes about experimental physics. The survey is designed to give instructors actionable feedback to help them improve their courses.