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Abstract for an Invited Paper for the MAR14 Meeting of the American Physical Society

Supporting students in building interdisciplinary connections across physics and biology¹ CHANDRA TURPEN, Department of Physics, University of Maryland, College Park

Our research team² has been engaged in the iterative redesign of an Introductory Physics course for Life Science (IPLS) majors to explicitly bridge biology and physics in ways that are authentic to the disciplines. Our interdisciplinary course provides students opportunities to examine how modeling decisions (e.g. knowing when and how to use different concepts, identifying implicit assumptions, making and justifying assumptions) may differ depending on canonical disciplinary aims and interests. Our focus on developing students' interdisciplinary reasoning skills requires 1) shifting course topics to focus on core ideas that span the disciplines, 2) shifting epistemological expectations, and 3) foregrounding typically tacit disciplinary assumptions. In working to build an authentic interdisciplinary course that bridges physics and biology, we pay careful attention to supporting *students* in constructing these bridges. This course has been shown to have important impacts: a) students seek meaningful connections between the disciplinary ideas. Although our focus has been on building interdisciplinary coherence, we have succeeded in maintaining strong student learning gains on fundamental physics concepts and allowed students to deepen their understanding of challenging concepts in thermodynamics. This presentation will describe the shifts in course content and the modern pedagogical approaches that have been integrated into the course, and provide an overview of key research results from this project. These results may aid physicists in reconsidering how they can meaningfully reach life-science students.

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