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Educational Transformation at a Critical Time:why us and why now – the promises of disciplinary engagement

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Significant, perhaps unprecedented, attention is being paid to the needs for transformation within the fields of science, technology, engineering, and mathematics (STEM) education at the undergraduate level. This talk examines how higher education STEM disciplines, and physics departments in particular, are positioned to contribute to these discussions. I will review the growth of our own program in physics education research (PER) at CU-Boulder. This work develops a new theoretical line of inquiry in physics education research through experimental work at the individual, the course, and the departmental scales. I present samples of these scales reviewing: how we can build on work at the introductory level to transform our upper division courses (E/M and advanced laboratories), studies of how our environments do and do not support women in physics, and time permitting, an examination of what the data say about teaching physics through a massively open online course (MOOC).