We all hold deeply-held ideas about how the world works, and undergraduate engineering students are no exception. Even though our students have years of formal instruction in physics and chemistry, it’s still possible for undergraduate chemical engineers to enter (or even leave!) courses on heat transfer and thermodynamics with alternate conceptions about how temperature relates to how an object feels, for example. A semester of typical instruction may alter students’ conceptual understanding very little, even if they demonstrate the ability to manipulate the relevant equations. In this talk, we’ll discuss the evidence for student learning in a variety of different environments and how our work demonstrates inquiry-based activities can be a useful approach for improving conceptual learning. By using inquiry-based learning approaches, we can double the learning gains seen in lecture-only courses. I’ll also discuss our work to make these activities more faculty-friendly and the impact those changes have on student learning.

ABOUT MARGOT
Margot Vigeant is a Professor of Chemical Engineering at Bucknell University and received her Ph.D. in Chemical Engineering from the University of Virginia. Margot’s broad research area is effective pedagogy in engineering, including approaches to conceptual learning, inquiry-based activities for thermodynamics and heat transfer, and entrepreneurially-minded learning in engineering. She is also interested in “making” in engineering, using educational and online technology to broaden engagement and access, and games as learning tools. She has given numerous workshops and talks in these areas, including a 2019 webinar for the AIChE Education Division on engaging students with food-based examples. She teaches chemical engineering thermodynamics, applied food science and engineering, and capstone design. She is an Apple Distinguished Educator and chair of the 2021 ASEE Chemical Engineering Summer School.