Computation has revolutionized the way that modern scientific research is done. From the synthesis of large data sets, through the simulations of impossible experiments, as well as the development of intuition about the behavior of complex systems. And yet, most of current science education does not reflect the importance of computation. In this talk, I will discuss the urgent need for such curricula in physics, and I will present research that investigates the challenges that one faces, from the institutional down to the student level. I will discuss how to leverage the research, in order to bring the computational revolution into science education. Also, I will suggest how the research can guide our understanding in the developing of institutional incentives, effective and evidence-based teaching practices, and valid assessment tools.

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