

Closing the Sustainability Gap in Nano- and Microelectronics Research and Education

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Abstract

We are facing an existential sustainability crisis: we are destroying our environment and accelerating climate change, and this is driven by our choices and behavior: massive emissions of greenhouse gases, depletion of limited resources (e.g., water and some materials), use of toxic and environmentally persistent chemicals, and release of environmental pollutants. As scientists and engineers, we have the responsibility and ability to make sustainability a reality by creating and implementing sustainable materials and processes. It is, after all, the materialization of our needs and wants that have led to the situation. But we need to have the will to do it, know what to do, and how to do it: learn what sustainable options are possible, learn to choose among the options based on societal, environmental, and economic concerns, and learn how to work with others to make decisions that change the status quo. Nanoelectronics and microelectronics provide an ideal framework to test whether we have the resolve to change. With the US CHIPS Act including sustainability – environmental, economic, societal – and with the growing global need for an innovative workforce in nanoelectronics and microelectronics, we have started examining how to use sustainability education and research to change expectations and behavior. The key concepts will be presented for broad, open discussion.