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### **Nurturing a More Inclusive STEM Pipeline**

When your kitchen sink leaks, do you blame the water? The answer to this seemingly rhetorical question reveals a fatal paradox in the STEM pipeline metaphor, which is often invoked to explain the loss of female and minority talent in the science, technology, engineering and mathematics fields. Of course, when it comes to your kitchen, you blame the plumbing, and you call a plumber to fix the pipe. Yet scientific communities have historically blamed women and minorities – aka the water – for dropping out of the STEM pipeline. In this talk I will present data to explain where, how and why women leave STEM fields and how we can plug the leaks of this talent pool. These data show that a “fixing the women” approach will never achieve the inclusive excellence we seek as a community and as a nation for the future of STEM. To move forward, I will highlight ideas and evidence-based good practices showing how we can all nurture a more inclusive STEM pipeline that reflects the diversity of our world.

### **Microbial Hot Potato**

Although our existence appears deterministic, randomness underlies all molecular processes. We have explored this phenomenon using the quality control system engineered for outer membrane protein (OMP) biogenesis in bacteria. In the absence of any external energy, bacteria have an amazing ability to capture and directionally sort their OMPs to their proper cellular locations. Bacteria do this by essentially playing “hot potato” in which the client OMPs are passed around the periplasmic cellular compartment by a stochastic series of binding and release steps. Catch and toss steps are very quick, and the instantaneous bound lifetimes are short, much like the catch and toss of a hot potato. Computer modeling of this process explains how this biological network functions and highlights the integration of scientific disciplines ranging from microbial genetics to detailed biophysics.