

# Future Leaders in CEE

## Diversity, Equity and Inclusion Research Talk and Lunch Series

Join the MIT Civil and Environmental Department for its seminar series that brings together speakers from diverse backgrounds who are considered future leaders in STEM and civil and environmental engineering to share their journey to achieve success.

### Self-Healing Materials: Toward Smart and Adaptive Materials for the Environment

#### Presenter: Dr. Bezawit Getachew

Unlike biological systems, most materials we use every day cannot recover from physical or chemical damage on their own. Self-healing materials are a class of materials that can do just this, but their development and application has mostly been limited to inert and moisture-free systems. This presentation will discuss the design of self-healing materials for environmental applications using water filtration membranes as an example. Two different approaches to self-healing will be discussed. One approach is to embed microscopic capsules or capillary tubes within a material. These containers serve like a network of blood vessels that can deliver various healing agents. When a material is damaged, a “healant” that is loaded within this network flows out and reacts with the outside environment to solidify in place and seal the damage. The second approach relies on the capacity of polymeric chains or other molecules to diffuse, reorganize, and re-form bonds with one another. If at least part of the underlying covalent or secondary bonds that hold the material together can re-form easily after breaking, this will allow the material to recover from damage. In both of these approaches, factors to take into account when designing self-healing materials for other environmentally oriented applications in general will also be discussed. Finally, I will discuss my academic journey and share my experience navigating the start of a tenure-track faculty position.



**Tuesday, May 25, 2021**  
**2-3 p.m. EDT**

[Zoom Link](#)  
**Passcode:549889**

#### About the Presenter:

Dr. Getachew is an Assistant Professor in Environmental Engineering at Rice University. She completed her Ph.D. and M.Sc. in Chemical and Environmental Engineering at Yale University, where she developed the first autonomously self-healing water filtration membranes. She also holds a B.S. in Chemical Engineering (ABET) from Yale. Prior to joining Rice University, Dr. Getachew spent two years as a Postdoctoral Associate at the Department of Materials Science and Engineering at Massachusetts Institute of Technology. Her current research focuses on understanding the performance of “smart materials” in the context of water treatment technologies and resilient water infrastructure.