



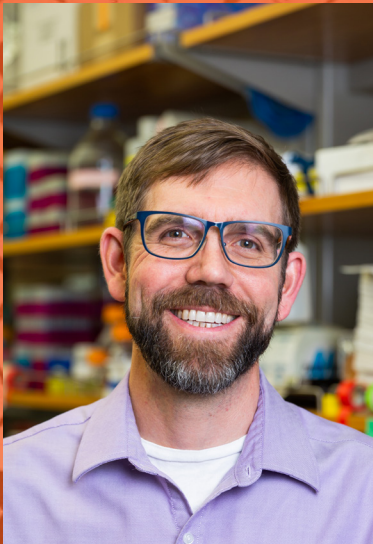
Chemical Engineering

Fall 2022 Seminar Series

<http://cheme.mit.edu/seminar-series/>

**Bioengineering beyond cells to
enable a fair and sustainable
21st bio-century**

Mike Jewett



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and Biological Engineering
Director of the Center for
Synthetic Biology at Northwestern**

October 21, 2022

66-110

3:00-4:00pm

2:45pm Reception

Biochemical engineering is one of the most promising fields of research for the 21st century. It offers powerful ways to improve human health, build the global economy, manufacture sustainable materials, and address climate change. However, current access to biotechnology breakthroughs is unequal, largely due to bottlenecks in infrastructure and education. Here, I describe our efforts to re-think the way we engineer biology using cell-free systems to address these bottlenecks. We show how the ability to readily store, distribute, and activate low-cost, freeze-dried cell-free systems by simply adding water has opened new opportunities for on-demand biomanufacturing of vaccines for global health, point-of-care diagnostics for environmental safety, and education for synthetic biology literacy and citizenship. By integrating cell-free systems with artificial intelligence (AI), we also show the ability to accelerate the production of carbon-negative platform chemicals. Looking forward, advances in engineering tools and new knowledge underpinning the fundamental science of living matter will ensure that biochemical engineering helps solve humanity's most pressing challenges.