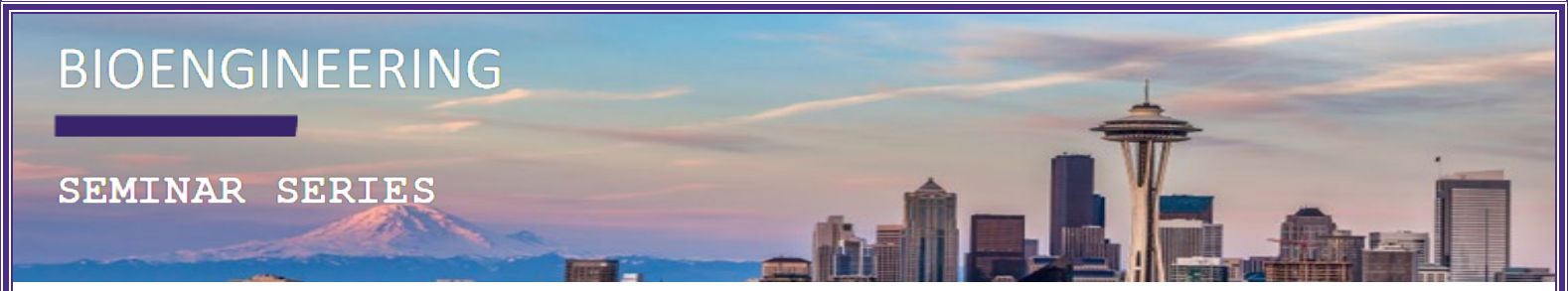


# Ahmad (Mo) Khalil, Ph.D.

**Associate Professor, Boston University**
Department of Biomedical Engineering

## April 4th, 2024

**12:30 – 1:00 PM Coffee/Pastry Mixer**
**1:00 – 1:50 PM, Foege N130**
**live stream: https://washington.zoom.us/j/94375637567**

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## *"Synthetic Reconstitution of Complex Cellular Behavior"*

**ABSTRACT:** Cells use genetically-encoded molecular circuits to execute diverse biological functions. We are developing novel tools of synthetic biology that allow us to construct regulatory circuitry inside living cells that recapitulate complex functions like those seen in nature. In this talk, I will describe how we use this approach to achieve three objectives. First, I will demonstrate how synthetic reconstitution provides a powerful way to understand fundamental principles of regulatory networks, which we have applied to guide discoveries in eukaryotic transcription regulation and epigenetics. Second, I will describe our advancements in developing synthetic circuit technologies that enable precise, instructive control of therapeutic human cell function to address challenges in emerging cellular therapies, such as CAR-T cells for cancer. Finally, I will share a future vision of how synthetic reconstitution can be used to engineer cells with little or no intrinsic therapeutic potential into powerful and scalable engines for generating custom, therapeutically-relevant molecules. Overall, by learning how to build biological systems from scratch, our broad goal is to connect the basic molecular building blocks of life to complex cellular behavior and ultimately to clinical applications.

**BIO:** Ahmad (Mo) Khalil is a Professor of Biomedical Engineering, Dorf-Ebner Distinguished Faculty Fellow, and Founding Associate Director of the Biological Design Center at Boston University. He is also a Visiting Scholar at the Wyss Institute for Biologically Inspired Engineering at Harvard University, and Co-Director of a NIH/NIGMS T32 PhD Training Program in synthetic biology. His laboratory develops synthetic biology tools to investigate fundamental principles of cellular regulatory networks, and in turn uses these insights to program therapeutically-useful cellular functions for next-generation gene- and cell-based therapies. His team also develops novel continuous evolution technologies that are automated and scalable, which they are using to generate biomolecules with radically altered or new functions to address unmet needs in biology, medicine, and biotechnology. He is the recipient of numerous awards, including a Schmidt Science Polymath Award, Presidential Early Career Award for Scientists and Engineers (PECASE), DoD Vannevar Bush Faculty Fellowship, W.M. Keck Medical Research Award, NIH New Innovator Award, NSF CAREER Award, DARPA Young Faculty Award, and Hartwell Foundation Biomedical Research Award, and he has received numerous awards for teaching excellence at both the Department and College levels. Mo is co-founder of K2 Biotechnologies and Fynch Biosciences, and serves on the SAB for numerous biotechnology companies, including Chroma Medicine and Senti Biosciences. Mo was an HHMI Postdoctoral Fellow with Dr. James Collins at Boston University. He obtained his Ph.D. from MIT and his B.S. (Phi Beta Kappa) from Stanford University.