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2020

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# A TALE OF TWO STRANDS

## FROM GENOMES TO ORIGAMI, VACCINES, DATA STORAGE, AND BACK

**Dr.  
Mark Bathe**

PROFESSOR,  
DEPARTMENT  
OF BIOLOGICAL  
ENGINEERING

Co-Chair,  
MIT New  
Engineering  
Education  
Transformation

**DATE**  
December 3

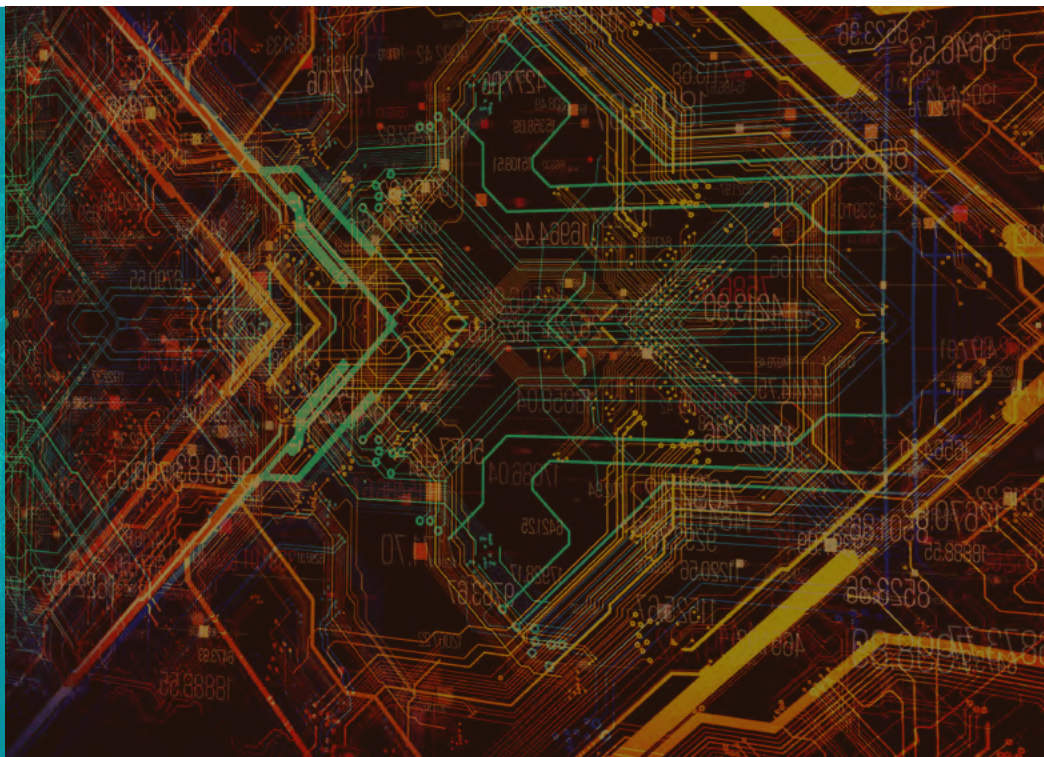
**TIME**  
11 am - 12 pm

**LOCATION**  
YouTube

MASSACHUSETTS  
INSTITUTE OF  
TECHNOLOGY



National Science Foundation  
WHERE DISCOVERIES BEGIN



## **A TALE OF 2 STRANDS: FROM GENOMES TO ORIGAMI, VACCINES, DATA STORAGE, AND BACK**

Society faces innumerable grand challenges in the 21st Century, ranging from uncontrolled pathogenic outbreaks to exponentially growing data and computational needs that exceed the world's supply of silicon, to next-generation sensing requirements for safe autonomous vehicle navigation and health monitoring. As scientists explore diverse material substrates to help address these challenges, DNA has emerged as a powerful biological medium due to its unique ability to fabricate arbitrary, virus-like structures at the nanometer-scale, store information at a density that vastly exceeds even flash memory, perform logic-based sensing and computing, as well as organize photonic elements to mimic quantum processes in photosynthetic bacteria and plants. In this presentation Dr. Bathe will share work in several of these areas, with a focus on fabricating virus-like particles to rapidly screen vaccine candidates for emergent pathogens, and using DNA as a “hard-drive” with random access capabilities that could in principle operate at the yottabyte-scale for archival data.

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# ABOUT THE SPEAKER

Mark Bathe is a Professor in the Department of Biological Engineering at MIT, Associate Member of the Broad Institute of MIT & Harvard, and Co-Chair of the MIT New Engineering Education Transformation. He obtained his Doctoral Degree at MIT working in the Departments of Mechanical, Chemical, and Biological Engineering before moving to the University of Munich to carry out his postdoctoral research in Biological Physics. He returned to MIT in 2009 to join the faculty in the Department of Biological Engineering, where he runs an interdisciplinary research group focused on engineering nucleic acids for application to vaccines, therapeutic delivery, structural biology, and computing.



# UPCOMING LECTURES 2020/2021

## **NSF Bioeconomy Coordinating Committee Distinguished Lecture Series**

NSF invests in fundamental research to support biotechnology and advance the U.S. bioeconomy across all fields of science and engineering.

Presented by NSF's Bioeconomy Coordinating Committee and NSF Directorates, this distinguished lecture series will bring in individual speakers and panels representing the science and technology funded by a Directorate every month. Speakers will present on research and broader impacts in areas associated with biotechnology and the bioeconomy that are of interest broadly across the foundation.

**All sessions will be conducted virtually.**

**THURSDAY, JANUARY 14, 2021**

11:00 a.m. – 12:00 p.m.

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**LASHANDA KORLEY, PHD**  
University of Delaware

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**THURSDAY, MARCH 18, 2021**

11:00 a.m. – 1:00 p.m.

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**LYDIA CONTRERAS, PHD**  
University of Texas

**DOUG DENSMORE, PHD**  
Boston University

**JULIUS LUCKS, PHD**  
Northwestern University

**JENNIFER NEMHAUSER, PHD**  
University of Washington

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**Further lectures to be announced**

**For more information,** refer to the NSF Bioeconomy Distinguished Lecture Series [website](#) or contact **Jared Dashoff** at [jdashoff@nsf.gov](mailto:jdashoff@nsf.gov).

**WEBSITE**  
[www.nsf.gov](http://www.nsf.gov)

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