



# Synthetic Biology

July 23 - August 6, 2024 Applications Due: March 31, 2024

## Instructors

**Christian Cuba Samaniego**, Carnegie Mellon University

**Karmella Haynes**, Emory University

**Vincent Noireaux**, University of Minnesota

**Eric Young**, Worcester Polytechnic Institute

## 2024 Lecturers

**Khalid Alam**, Stemloop

**Annia Baetica**, Drexel University

**Caleb Bashor**, Rice University

**Francesca Ceroni**, Imperial College London, United Kingdom

**Tara Deans**, University of Utah

**Tom Ellis**, Imperial College London, United Kingdom

**Chelsea Hu**, Texas A&M University

**Chris Myers**, University of Colorado Boulder

**Dan Siegal**, Ginkgo Bioworks, Inc.

**Kevin Solomon**, University of Delaware

This course focuses on how the complexity of biological systems can be combined with traditional engineering approaches to result in new design principles for synthetic biology.

The centerpiece of the course is an immersive laboratory experience in which students work in teams to learn the practical and theoretical underpinnings of synthetic biology research. Broadly, the course explores how cellular regulation (transcriptional, translational, post-translational, and epigenetic) can be used to engineer cells that accomplish well-defined goals.

## Laboratory Modules Cover

- Cell-free transcription and translation systems to characterize genetic circuits and RNA regulators
- Modeling gene expression using ordinary differential equations
- DNA Assembly and Design of Expression Cassettes
- CRISPR technologies for genome editing and gene regulation