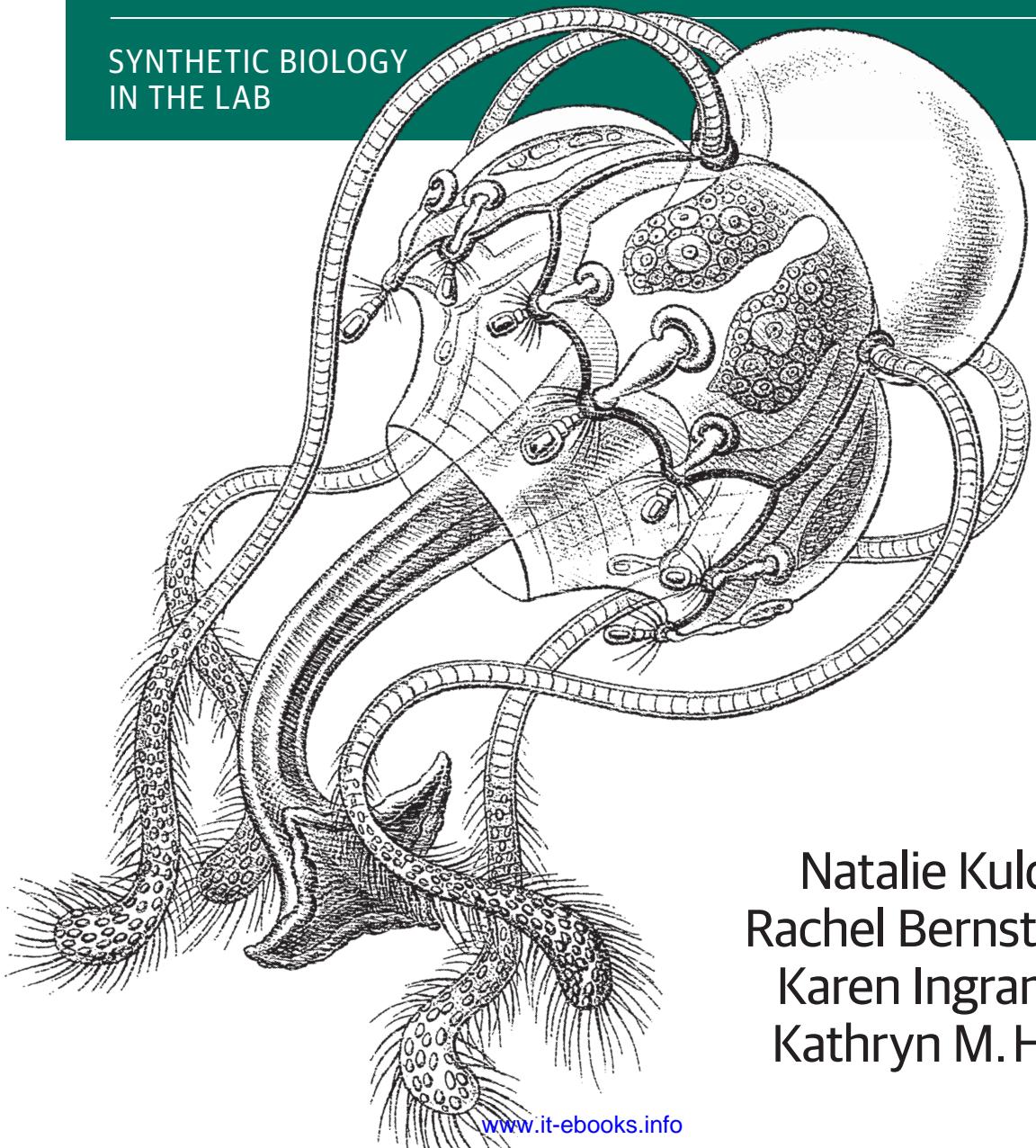


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BioBuilder

SYNTHETIC BIOLOGY
IN THE LAB



Natalie Kuldell,
Rachel Bernstein,
Karen Ingram &
Kathryn M. Hart

BioBuilder

Today's synthetic biologists are in the early stages of engineering living cells to help treat diseases, sense toxic compounds in the environment, and produce valuable drugs. With this manual, you can be part of it. Based on the BioBuilder curriculum, this valuable book provides open-access, modular, hands-on lessons in synthetic biology for secondary and post-secondary classrooms and laboratories. It also serves as an introduction to the field for science and engineering enthusiasts.

Developed at MIT in collaboration with award-winning high school teachers, *BioBuilder* teaches the foundational ideas of the emerging synthetic biology field, as well as key aspects of biological engineering that researchers are exploring in labs throughout the world. These lessons will empower teachers and students to explore and be part of solving persistent real-world challenges.

- Learn the fundamentals of biodesign and DNA engineering
- Explore important ethical issues raised by examples of synthetic biology
- Investigate the BioBuilder labs that probe the design-build-test cycle
- Test synthetic living systems designed and built by engineers
- Measure several variants of an enzyme-generating genetic circuit
- Model "bacterial photography" that changes a strain's light sensitivity
- Build living systems to produce purple or green pigment
- Optimize baker's yeast to produce β -carotene

"BioBuilder is the best place to start for those who wish to become citizens of biotechnology."

—Drew Endy, Ph.D

faculty of Bioengineering,
Stanford University;
president, The BioBricks Foundation

Natalie Kuldell is an instructor in the Department of Biological Engineering at MIT, and founder and president of the BioBuilder Educational Foundation.

Rachel Bernstein writes about science for a variety of educational and journalistic venues. Her work has appeared in *Science*, *Nature*, *Cell*, and the *Los Angeles Times*.

Karen Ingram's art has appeared in publications from *Die Gestalten*, *Scientific American*, and *Computer Arts* magazine. She's a SXSW Interactive board member and a 2015 Synbio LEAP fellow.

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SCIENCE/BIOLOGY

US \$49.99

CAN \$57.99

ISBN: 978-1-491-90429-9



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