



DESIGN FOR EMERGING BIO

2024 WorkWonder Apprenticeship Program

ABOUT

Emerging biotech promises to transform the realms of agriculture, medicine, manufacturing, and beyond. From the development of new types of vaccines, to new fabrics, foods, and materials, emerging biotech could transform our world for the better.

How can we ensure we embed ethical principles that align with a world we want to live in? What systems could shift? What new systems could be created? As a human, what does it mean to create collaboratively with nature?

In this Deep Dive, you'll investigate emerging biotech applications and utilize design thinking to imagine the evolution of biotechnology. With that knowledge, you'll create artifacts using speculative design to imagine the evolution of biotechnology and its effects. Through making your own bio-art, you'll become acquainted with the basics of working and creating in a lab. The artifacts you create in this Deep Dive will enable you to facilitate conversation around ethics and emerging biotechnology.

WHAT YOU WILL LEARN

- Different types of microorganisms and what they can do.
- How to apply design thinking, speculative design, and systems thinking to creative problem solving in design for emerging biotech.
- How we can tap into the specialties of microbes for more sustainable products.
- Tech ethics/responsible design.
- Reality vs fiction: beyond the headlines, what's feasible and what's science fiction.
- Lab safety.
- Specific learnings from lab work with bacterial and/or yeast painting kits:
 - Creating agar Petri dishes to culture bacteria and yeast
 - Streaking cells
 - Incubating and growing cells / understanding the optical conditions (e. g. optimal temperature) needed by microorganisms for growth
 - Lab safety
 - Aseptic technique (using practices and procedures to prevent contamination from pathogens)
 - Antibiotic use for selective agar
 - Use appropriate terminology
 - Analyze ethical issues related to biotechnology
 - Learn about cells



JOB DESCRIPTION

- Learn about new applications and ideate around potential future applications.
- Research for problem solving and apply design thinking and speculative design to test out their ideas.
- Understand stakeholders and existing solutions via systems design and human-centered design.
- Delve into ethics to test the impacts of their idea.
- Lab safety and an introduction to design concepts in synthetic biology.

Helpful Prerequisite Skills: Google and/or Microsoft office; writing and design skills; curiosity and imagination; willingness to “tinker”; comfortability with researching; comfortable with Miro, Mural, or Figma digital whiteboard applications.

Expectations:

- Do the work: Keep up with reading and assignments.
- Engage with the group: Through teamwork, we can accomplish fantastic work.
- Ask questions: We may not have all the answers, but we can learn to ask good questions.
- Challenge yourself: Think and work outside of your comfort zone.

Meeting times

MONDAY

10:00AM – 12:00PM

Office hours: by request

1:00–2:30PM

Bayha Group meeting

TUESDAY

WEDNESDAY

10:00–11:45AM

Deep Dive session

THURSDAY

FRIDAY

Weekly activities

- What is synthetic biology? Researching existing approaches, applications and applications in the pipeline.
- Explore creative methodologies: design thinking, human-centered design, speculative design.
- In the lab: Learning lab skills and creative tinkering.
- Pulling it all together.
- Polish your project and get ready to share your skills and creations.
- Share your ideas and what you learned at the Expo!

Deep Dive Lead



KAREN INGRAM

Karen Ingram is a co-author of “BioBuilder: Synthetic Biology in the Lab, recognized as a universal reference for synbio. Ingram is an Emerging Technology Fellow at Stanford’s school, and contributes to REP, a K-12 magazine whose mission is to drive equity in tech design. She’s an affiliate with Bio.Polis (Bio Policy & Leadership in Society, Stanford Department of Bioengineering), supporting projects that guide biological innovation in the public interest. Ingram was part of the founding team of the Empiricist League, described by FiveThirtyEight as “ad-hoc, small-scale TED Talks for scientists and the New Yorkers who adore them.” She led sessions on creative strategy for NYU’s SHERP graduate program on “Entrepreneurial Journalism” and is an instructor for Genspace’s “Synbio for Creatives.” As a SynbioLEAP fellow, Ingram worked with a bioethicist to create “Fallacy Bingo,” a game for identifying fallacies. Ingram was also a Simons Foundation Science Sandbox/New Lab Fellow. She is a co-instructor for “Future (Im)perfect – Exploring the hidden ethics of emerging technologies” and teaches “Responsible Design: Design for Emerging Biotech” for SVA’s MFA Interaction Design Program. She enjoys painting with microbes in Petri dishes in her kitchen.

BAYHA
GROUP



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