biohack academy

Kolding BioHack Academy

February 23 – April 26, 2016

Waag Society &

University of Southern Denmark

BioHack Academy Lab : Buen 11, Kolding 6000, Denmark

BioHack Academy

The age of personal biotechnology is upon us! Engineers have turned biology into a design discipline and it's now up to us to shape it's applications. After completing the BioHack Academy (BHA) you will be able to grow your own fuel, food, filaments, pharmaceuticals, fragrances, fungi and much more funky bio stuff at home.

We'll teach you how to join the bio revolution and build your own BioFactory using the SDU Design Maker Space. You'll learn how to design, grow and extract your own biomaterials using only Open Source hardware you fabricate yourself. Whether it's a new type of bio ink, biopolymer or bio fuel, we'll share the skills so you can grow it yourself and share the results with others.

In just 2,5 months we will build up our own bio factories together. Every Tuesday evening a lecture will be live-streamed by BHA experts in Amsterdam. Participants will have access to our maker space Thursday and Friday during the day to build equipment and conduct experiments guided by local supervisors. The lectures will give insight into what kind of tool we are building and it's usefulness in the lab. They will also introduce safety and ethical protocols. Participants may choose to either replicate the design of the tutor, improve it or build their own device from scratch. It's up to them how sophisticated things may get.

All students are required to keep track of their progress on a BHA Github page, allowing them to learn from each other. Two weeks in advance of each lecture students will receive a recommended materials list and access to the tutor's design, allowing for enough time to purchase items or to seek alternatives.

The program is a hands-on bootcamp. By the end of the course participants will be turned into fully equipped biohackers, capable of growing a broad range of biomaterials. Ready to continue production independently at home. On completion of BHA, participants will receive a BHA BioFactory certificate.

The project Github page and Vimeo channel are open to the public to share the results with the Open Source biotech community at large. In possession of their own BioFactory, they may continue to advance their production skills, engage in directed evolution experiments, produce bio gas, purify water, bioremidate polluted soil, just to give a few examples. Bio has no limits!

SCHEDULE

10 weeks

biohack academy

1ST WEEK

- History of biohacking
- Safety & ethics
- 3D design in Sketchup
- Principles of electronics

Sterile hood   (device)

Digital
Fabrication

2ND WEEK

- Documentation (Github)
- Bio art / designed
- Analog electronics

Stirrer   (device)

Cultivating
microbes

3RD WEEK

- Biomaterials
- Coding Arduino
- Digital Electronics

Incubator   (device)

Isolating
microbes

4TH WEEK

- Optics
- Liquid culturing

Microscope   (device)

Microscopy
Cell staining

5TH WEEK

- Genetics
- Biosensing

Thermocycler
& Gelbox   (device)

DNA extraction
DNA profiling

6TH WEEK

- Midterm participants
- Presentations

Design your own
project

7TH WEEK

- Bioethics

Centrifuge   (device)

Field research
P2P reviewing

8TH WEEK

- Guest speaker

Pumps   (device)

Grow your own
Certificate

9TH WEEK

- Processing
- Bioinformatics

Spectrometer   (device)

PyMollodine
Clock Reaction

****** Every week there will be time to check the progress of projects more in-depth. Participants will do a brief presentation on their current status and documentation which can then be discussed by the group to provide further guidance.

10TH WEEK (Wk:17)

Graduation Show

The BioHack Academy Graduation Show will have an online and offline program. During the day participants will present their projects in an online marathon session. In the evening we will hold a public event – a show-and-tell fair – to which you can invite friends, family and press. A series of related events will be held throughout National Research Week (Forsknings Døgn, Week 17: 25 April – 1 May), to open up discussion and reflection about bioengineering and society.

What kind of people do we look for?

Artists, designers and hackers who are passionate about engaging with bioscience, educators and other interested people from around Kolding. We want to create a space of experimentation and making for people that may struggle finding the relevance of emerging science to their everyday lives. The aim is to give diverse people, no matter their background, the skills and knowledge to participate in the conversation around Bio Engineering. It does not matter what your background is or where you come from. If you want to get close to new technologies and science apply for participation!!!

After we receive your application...

...we will conduct interviews with potential participants to discuss your expectations and the content and the structure of the BioHack Academy.

Tuition fee

The BioHack Academy is being provided to the community free of charge by SDU Design, Kolding. Participants will only need to pay the material costs for equipment they will take home.

Expected material costs:
approximately 4000 kr.

What will we build? What will you learn?

During each lecture you will learn the basic requirements for each machine you need in your BioFactory. It will be up to you to go on DIY style or be a bit more sophisticated, depending on your needs, budget and confidence. Here are some examples of what you could end up with using the SDU Design laser cutter and maker space:
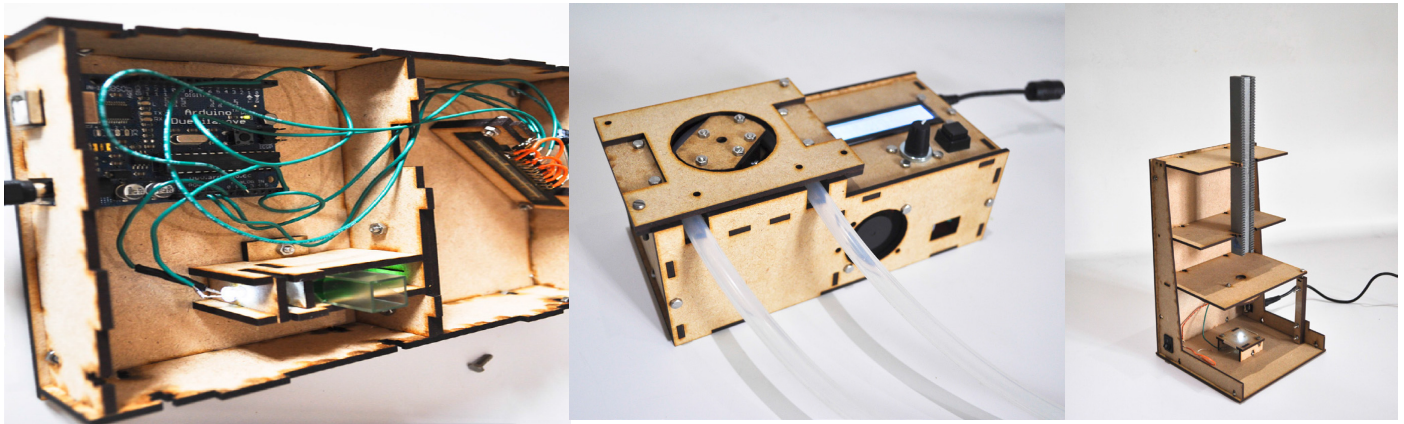
Skills you will learn:

- Microbiology
- Molecular biology
- Biotechnological reactor design
- Biorefinery
- Spectral analytics
- Bio informatics
- Analog electronics
- AVR microprocessor programming
- 3D drawing and parametric design
- 2D computer aided design
- 3D printing
- Image processing
- (Micro)fluid dynamics
- Thermodynamics
- Mechanics
- Open design licensing
- Chemical and biological safety

Tools you will learn to use:

- All the tools you will build yourself
- Lasercutter
- 3D printer
- Arduino processing language
- OpenSCAD 3D modeling
- Sketchup 3D modeling
- Fritzing electronic circuit design
- Inkscape 2D design
- Markdown language
- Wikimedia and Github

NOTE !

There is no specific knowledge required, just an inventive and creative attitude. We're not going to build the lab for you, you will have to do that yourself with the help of the instructors and the other participants.

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Application form:

First Name :

Last Name :

E-mail :

Date of Birth :

Nationality :

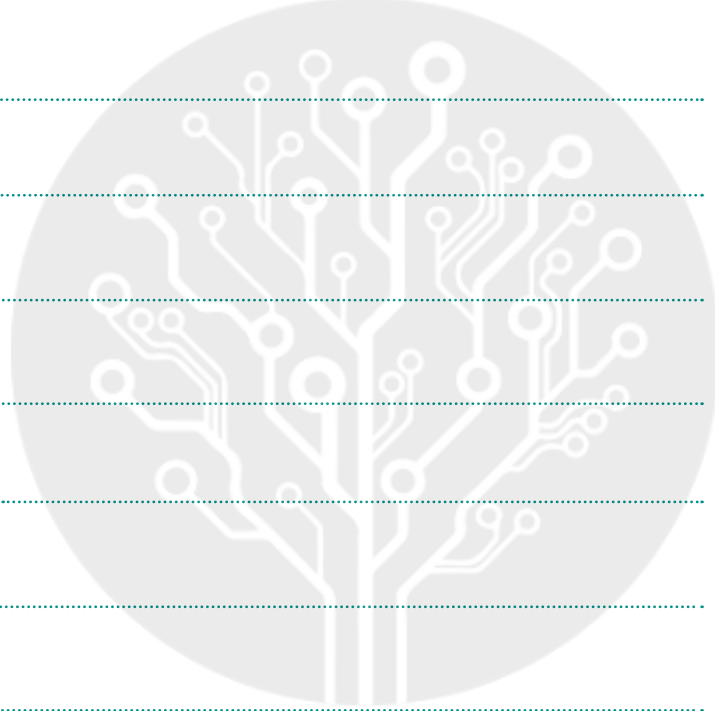Personal website :

Address :

Phone number :

Background :

Motivation :

What is your proficiency in the following (mark with x):

Skill	Low	Medium	High
Biotechnology			
Electronics			
Digital fabrication			
Programming			
2D and 3D modelling			

Build your own lab at the
BioHack Academy

Contact information :

If you have any further questions please contact Flemming Bech Thøisen : thoisen@sdu.dk

Core Team:

Project Leader:
Danielle Wilde, PhD, MA(RCA) associate professor
(Research), SDU Design, www.daniellewilde.com

Co-Lead / Workshop Manager SDU Kolding:
Flemming Bech Thøisen

Research Assistant, Participatory Innovation:
Mary Karida, ITPD (SDU)

Lab Assistant: Pia Spagnoli, BSc Analytical Biology

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