

A Biopunk's HTBAA Biomanufacturing Compendium

2026-09-28 · BioPunk SF node · HTBAA Fall 2026

Biomanufacturing is the art of persuading living things to build what you want, and then measuring whether they actually did. This page is where the BioPunk SF node parks the good stuff for HTBAA Fall 2026.

Add what helped you. Found something cool? Share it here!

How to add

Find the roughly relevant week. Add a row at the bottom of that table and link into what you have, anyone is free to add.

Cell Title	What goes in it
Resource	The name, e.g course Syllabus reference doc
Type	Course resource
What it is	Central info doc on syllabus and related links
Why it helps	Is updated with ALLL the links to the lectures, recitations and HWs
Added by	TA

Guidelines

- Public links only or add access details
- Keep the summary to 1-2 lines
- If the resource is already here, add your take to the existing row as a comment rather than starting a second one.

Share whatever you found useful! The scrappy YouTube whiteboard explainer that made Gibson assembly click for you is often more useful than a complex Nature Paper.

Full HTBAA Syllabus

Twelve Tuesdays, September 15 to December 8. [Course Syllabus info doc is updated with Lecture recordings and and HW links throughout the course](#)

Use this table to find where your link goes.

Week	Date	Topic	Format
1	Sep 15	Course overview and introduction to biomanufacturing	Lecture
2	Sep 22	DNA design and applications	Lecture
3	Sep 29	Cell-free systems and cloud laboratories	Lecture, site visit
4	Oct 6	Lab 1, cloud-lab cell-free manufacturing	Lab
	Oct 13	No class	
5	Oct 20	Digital microfluidics	Lecture
6	Oct 27	Lab 2, microfluidic cell-free manufacturing	Lab
7	Nov 3	Measurement and assays, including mass spectrometry	Lecture, site visit
8	Nov 10	Lab 3, bacterial cell manufacturing	Lab
9	Nov 17	Genetic circuit design and assembly	Lecture
10	Nov 24	Lab 4, mammalian cell manufacturing	Lab
11	Dec 1	Non-model organisms	Lecture
12	Dec 8	Final project presentations	Presentations

The course ends in a project proposal for something you would like to make, with a chassis and an automation platform of your choosing. Links about writing proposals, ethics and scale-up are always useful so have a space for those in the end too!

Weeks 1 to 3, The essentials

Week 1 (Sep 15). What biomanufacturing is

The range of things people already grow rather than build: medicines, materials, sensors, fuel, and the occasional handbag.

Resource	Type	What it is	Why it helps	Added by
iGEM	Community	The student synthetic biology competition and its open archive of past projects	Hundreds of worked projects, most of them honest about what went wrong	Seed
Introduction to Biomanufacturing - NBC²	Website	A website with an online textbook separated by chapters, teaching the basics and applications of biomanufacturing.	It divides the biomanufacturing fundamentals in chapters so that you can check whatever you are inquiring about.	TAs

Week 2 (Sep 22). DNA design and applications

Designing DNA on purpose. Parts, plasmids, and the software that turns a sketch into something you can order in a tube.

Resource (Links)	Type	What it is	Why it helps/ Notes	Added by
Benchling	Platform	Sequence editor, plasmid maps, primer design, cloning simulation. Free for academics	Where you draft and annotate a construct before anyone spends money on it	Seed
Addgene	Platform	Non-profit plasmid repository, with maps, sequences and protocols	Somebody probably built your backbone already. Their beginner guides are excellent	Seed
iGEM Registry of Standard Biological Parts	Platform	Catalogue of promoters, RBSs, coding sequences and terminators	Vocabulary and worked examples for part-based design	Seed
Asimov kernel	Tool/ Platform	interface for designing and optimizing genetic constructs	BioPunk node login : 1) hello@biopunklab.com (pass: Biopunk2026!)	TAs

Resource (Links)	Type	What it is	Why it helps/ Notes	Added by
			2) listener@biopunklab.com (pass: *Z52qiik_2?M)=&) 3) student@biopunklab.com (pass: @nC=wBJZb5M@.jX)	
Vectorbee	Platform	Genetic engineering software	Some Committed Listeners thought about it while waiting for Kernel access, so it could be another platform like Benchling	TAs

Week 3 (Sep 29). Cell-free systems and cloud labs

Making protein in a tube of extract, with no living cell involved, plus the remote robot labs that run your experiment while you sleep.

Resource	Type	What it is	Why it helps	Added by
Recitation #3 Video	Recitation recording (Oct 1):	Field trip to Ginkgo Bioworks (Seaport, Boston)	A glimpse into autonomous labs	TA
BioBits CFPS kit explainer	Explainer Video	Simple explanation of the CPFS system in the miniPCR kit	Nice simple overview of what is going on in the tube at the transcription and translations stages- for the kit used in In-person lab	TA
Overview of the PURE CFPS system	Explainer video	Nice walkthrough of the PURE system and OG paper	Demystifies PURE in simple terms	TA
Towards automation of the Design-Build-Test-Learn (DBTL) bioengineering cycle	Paper	Research paper of automated process	A walkthrough example of using automation via an OT2 to test and characterize bio parts at scale	TA
https://coopetition.tgaa.org/	HW submission link- sign in required	Place to make and submit CFPS design to be	HW submission link- sign in required - Submission deadline for CL is Oct 20th	TA

Resource	Type	What it is	Why it helps	Added by
		run on cloud labs		

Weeks 4 to 6, cell-free and microfluidics

Week 4 (Oct 6). Lab 1, cloud-lab cell-free manufacturing

Lab week. A cell-free expression run on cloud-lab hardware, read out on a plate reader. Protocol design, liquid handling and plate data all count as on-topic.

Resource	Type	What it is	Why it helps	Added by
protocols.io	Platform	Open repository of versioned, step-by-step wet-lab protocols	Published protocols you can adapt and cite instead of reinventing	Seed

Week 5 (Oct 20). Digital microfluidics

Steering droplets around a chip with electricity, so one chip runs a hundred small reactions instead of one big hopeful one.

Resource	Type	What it is	Why it helps	Added by

Week 6 (Oct 27). Lab 2, microfluidic cell-free manufacturing

Lab week. Many cell-free reactions at once on a digital microfluidic platform, with DNA designs and conditions compared side by side.

Resource	Type	What it is	Why it helps	Added by

Weeks 7 to 9, measure it, grow it, program it

Week 7 (Nov 3). Measurement and assays

How you know you made the thing, and not something that merely glows like it. Mass spectrometry, plus the everyday readouts you reach for first.

Resource	Type	What it is	Why it helps	Added by
Crash Course - Organic Chemistry Ch. 5	Video	Educational video that teaches the basics of both instrumental methods	It gives you a glimpse of how each method works, the components of the instruments and it gives you examples on how to interpret common graphs that are made by each machine.	TAs

Week 8 (Nov 10). Lab 3, bacterial cell manufacturing

Lab week. Engineered bacteria on a benchtop liquid handler: induction, OD readings, strain comparisons, and a first honest look at fermentation and scale-up.

Resource	Type	What it is	Why it helps	Added by
Opentrons documentation	Tool	Docs and the Python protocol API for the OT-2 and Flex liquid handlers	Read it once and the lab robot stops being a black box	Seed

Week 9 (Nov 17). Genetic circuit design and assembly

Sensors, logic and feedback, and the assembly methods that turn a circuit diagram into actual DNA.

Resource	Type	What it is	Why it helps	Added by

Weeks 10 to 12, mammalian cells, odd organisms, and the finish

Week 10 (Nov 24). Lab 4, mammalian cell manufacturing

Lab week. Getting genetic circuits into mammalian cells and reading out what they do. Circuit design platforms, Culture basics and transfection methods.

Resource	Type	What it is	Why it helps	Added by

Week 11 (Dec 1). Non-model organisms

Life past E. coli, yeast and HEK cells. Why odd microbes matter for manufacturing, and the work it takes to make an unfamiliar one engineerable.

Resource	Type	What it is	Why it helps	Added by

Week 12 (Dec 8). Final project presentations

The proposal, presented: ethics, DNA design, chassis, process, measurement and scale-up, compressed into a talk. Slide craft and presentation links go here. Proposal writing sits in the next section. Useful all term.

Resource	Type	What it is	Why it helps	Added by

Things that refuse to belong to one week.

Tools, platforms and databases

Resource	Type	What it is	Why it helps	Added by
NCBI	Platform	GenBank sequences, BLAST and PubMed in one place	Where you check a sequence is what you think it is	Seed
UniProt	Platform	Curated protein sequences, domains and function	Look up the protein you want to make before designing the DNA for it	Seed

Ethics, biosafety and biosecurity

Resource	Type	What it is	Why it helps	Added by

Writing the proposal, and reading around it

Grant writing, scientific writing, newsletters, podcasts, and anything that made you smarter about the field without being assigned.

Resource	Type	What it is	Why it helps	Added by

The BioPunk SF corner

Where the node meets, who to ask, and the Bay Area community labs, meetups and open Biopunk nights.

Resource	Type	What it is	Why it helps	Added by

Node TAs and contacts: add your name and the best way to reach you.

Dan Wright TA djwrister@gmail.com or (424) 222-9529

Add Edit Suggestions here: