

Welcome to 20.109(Fa19) T/R section!

Laboratory fundamentals of biological engineering

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MOD0: Orientation/Lab Tour

09/05/19

1. EHS training
2. Let's get to know each other
3. Intro to 20.109 lab
4. Start lab orientation: your first protocol!
5. Prep for M1D1

Core missions of 20.109

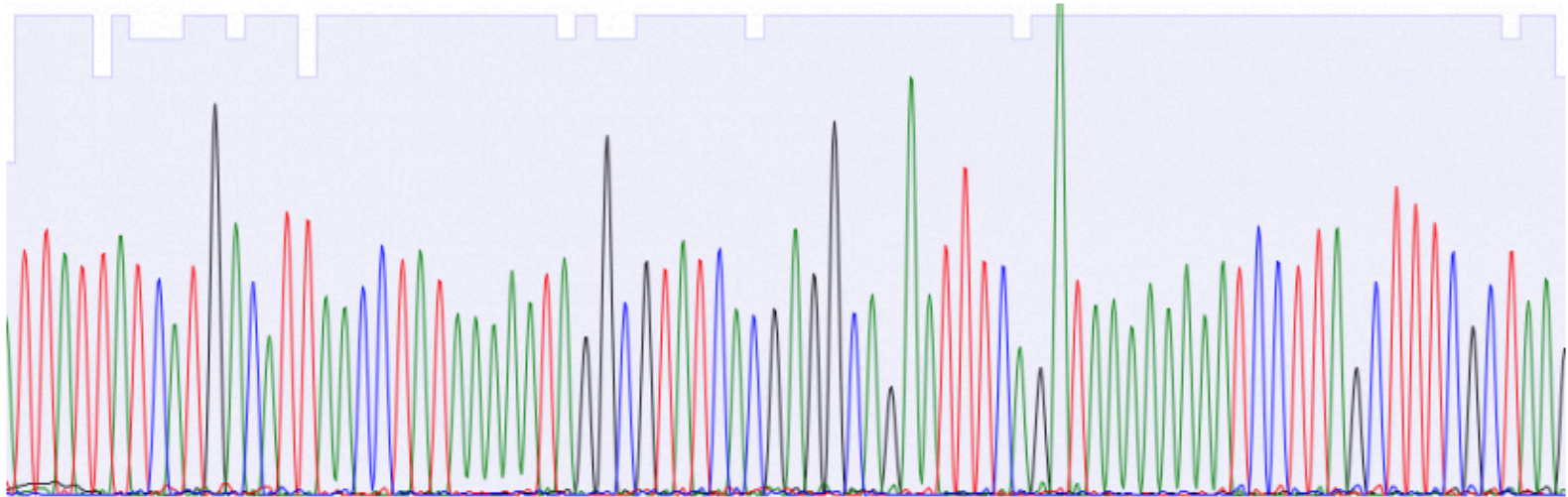
- Collect **authentic** data
 - Elements of design, unknown outcomes
- Practice **communicating** your science
 - Written & oral, in homework and assignments, a lot of feedback
- Working in **collaboration** with colleagues
 - Experiments completed in teams
 - Assignments are completed individually or in teams (as noted)
 - Class-wide collaboration (for data acquisition and analysis)
 - Punctuality
 - Integrity (*personal* reflections)
- The faculty are here to help – **come to us with questions!**

The wiki is your best friend

Link on
Stellar

[http://engineerbiology.org/wiki/20.109\(F19\):_Fall_2019_schedule](http://engineerbiology.org/wiki/20.109(F19):_Fall_2019_schedule)

20.109(F19): Laboratory Fundamentals of Biological Engineering



Fall 2019 schedule	FYI	Assignments	Homework	Class data	Communication
1. Measuring genomic instability		2. Modulating metabolism		3. Testing chemical probes	

Bookmark the Schedule page

SCHEDULE DETAILS:

Lecture times: T/R 11 - 12 pm (16-220)

Laboratory section times: T/R 1 - 5 pm or W/F 1 - 5 pm (56-322)

MODULE	DAY	DATE	LECTURER	LABORATORY EXPERIMENTS	ASSIGNMENTS
		R/F Sept 5/6	NLL	Orientation and laboratory tour	
1	1	T/W Sept 10/11	BE	Practice cell culture and begin gamma-H2AX assay	Laboratory orientation quiz Homework due
1	2	R/F Sept 12/13	BE	Treat cells for gamma-H2AX assay and prepare CometChip for loading experiment	Homework due
1	3	T/W Sept 17/18	BE	Complete gamma-H2AX assay and perform loading experiment	Homework due
		R/F Sept 19/20	BE	Lecture, but no laboratory Career fair student holiday	
1	4	T/W Sept 24/25	Comm Lab	Load cells into CometChip and apply treatments for DNA damage experiment	Laboratory quiz Homework due
1	5	R/F Sept 26/27	BE	Complete DNA damage experiment	Homework due
1	6	T/W Oct 1/2	BE	Image CometChip	Homework due
1	7	R/F Oct 3/4	BE	Practice statistical analysis methods and complete data analysis	Laboratory quiz Homework due
2	1	T/W Oct 8/9	NLL	Complete in silico cloning of pdCas9	Homework due
2	2	R/F Oct 10/11	NLL	Design gRNA sequence for CRISPRi	Homework due
		T/W Oct 15/16		Columbus day holiday	Data Summary draft due Mon, Oct 14 at 10 pm [Blog post due] Tue, Oct 15 at 10 pm

Keep track of assignment due dates

(See Assignments tab on wiki)

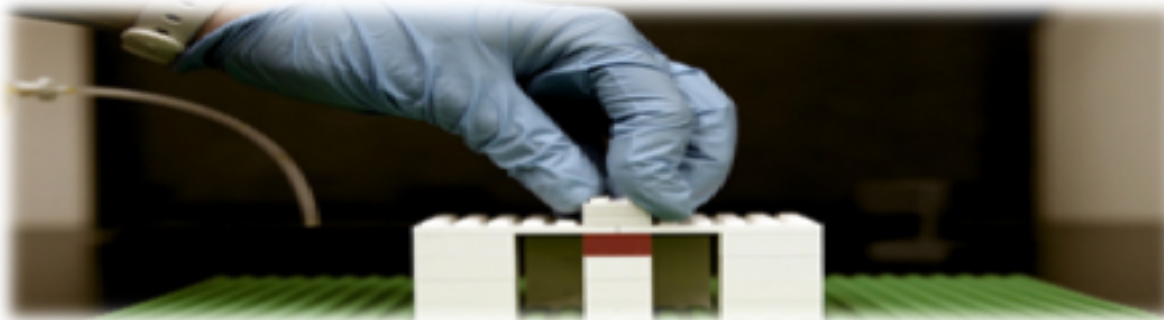
Module	Assignment	% final grade	Due date
1	Data summary	15	10/14 (draft), 10/26 (revision)
1	Mini-presentation	5	10/19
2	Journal club presentation	15	10/22 or 29
2	Research article	20	11/11
3	Research proposal presentation	20	12/5
3	Mini-report	5	12/9
all	Homework and Lab notebook	10	daily
all	Participation and blog	5	after module, see wiki
all	Quizzes	5	2 per module

individual : 60%

team: 40%

Homework builds to major assignments

- Only 10% of final grade?!
- Give it your best:
 - Consider homework a first draft
 - Never gratuitous, building blocks toward final reports and oral presentations
 - We give a lot of feedback (will prove helpful)
 - Great tool to keep ahead of the game and pace your work



A typical day in 20.109

- Lab starts at 1:05pm
 - **You must let us know ahead of time if you will be late or have a conflict with lab hours**
- Quiz (on lectures and labs)
 - M1D1, M1D4, M1D7...keep track on wiki!
- Turn in homework as .doc or .pdf on Stellar by 1:05pm
- Prelab: interactive discussion ~ 15-45 min
- Design and Experiment!
 - Keep notes in electronic lab notebook (Benchling)
 - Q&A throughout the afternoon

unexcused
absence = deduct 1/3
letter grade
for major
assignment
for that
module

Lab notebook in Benchling

- Set up an account: benchling.com
- Entitle your project "20.109(F19)_YourName"
 - Make each module a new folder
 - Make each day a new entry within appropriate folder
- Share with Leslie & Shelbi: lesliemm@mit.edu, shelbi@mit.edu

1) click on gear symbol
2) choose project settings
3) type email next to "add collaborator"

Add Protocol Notes Metadata

Insert H B I U A x₂ x² More

Title: Template for notebook entry




TUESDAY, 9/6

MID2, include the date the experiment was completed here as the automatic timestamp above reflects the day you created this entry (you can also change the automatic timestamp).

Statement of the purpose of the experiments to be completed today.

List of protocols (including experiment 'titles' as written on the wiki):

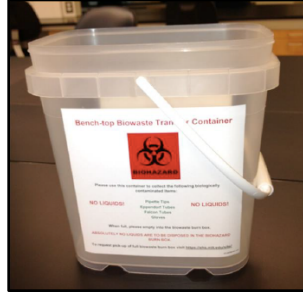
Personal protective equipment (PPE)

Item	Worn (BE guidelines)
<p>Gloves</p> 	<ul style="list-style-type: none">- When working with chemical or biological materials➤ Change when entering tissue culture room! <p>u TC "</p>
<p>Lab coat</p> 	<ul style="list-style-type: none">- When working with chemical or biological materials➤ Change when entering tissue culture room!
<p>Goggles</p> 	<ul style="list-style-type: none">- When handling large quantities of powder or liquid due to chance of splash- When pipetting toxic chemicals (mutagens)- When using ethanol burners- In conjunction with face shield at UV transilluminator

Be sure to dispose of waste correctly



recycling/trash can



benchtop waste



sharps container



liquid waste vacuum flask

NO LIQUIDS!

boxes
paper towels
Scrap paper
(No food trash)

gloves
plastic
tips + bottles
tubes

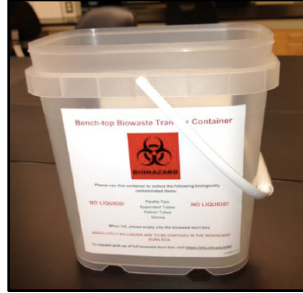
glass pipettes
glass tubes
razor blades
needles

- bacteria
media
- cell culture
media
(no chemical
waste)

Everyone has waste responsibilities



recycling/trash can



benchtop waste



sharps container



liquid waste vacuum flask

Please empty
benchtop
waste daily



biowaste box

Today

- Find partner and bench / team color
 - Record choice at front bench
- Complete lab orientation—there will be a quiz!
 - [http://engineerbiology.org/wiki/20.109\(F19\):Lab_tour](http://engineerbiology.org/wiki/20.109(F19):Lab_tour)
 - No lab notebook entries required today



For Tuesday

- Respond to poll on best office hours times (emailed later today)
- Find homework ([http://engineerbiology.org/wiki/20.109\(F19\):Homework](http://engineerbiology.org/wiki/20.109(F19):Homework)):
 - Lab notebook in Benchling ✓
 - Be ready for orientation quiz
 - Screen capture EHS training certificate(s) to turn in, preferably on Stellar ✓
 - Read Mod1 overview page and M1D1 introduction