



to the 20.109 lab!

Orientation:

✓ 1. EHS laboratory-specific training

2. Introductions

3. Prelab: Laboratory logistics

4. Orientation exercise – your first protocol

5. Preparations for M1D1



Where can you find the instructors?

- Noreen Lyell
 - Office: 16-317
 - Email: nllyell@mit.edu
- Leslie McClain
 - Office: 16-469
 - Email: lesliemm@mit.edu
- Becky Meyer
 - Office: 16-469
 - Email: rcmeyer@mit.edu



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!**

Welcome to the wiki! The wiki is your lifeline...









[http://engineerbiology.org/wiki/20.109\(S20\):_Spring_2020_schedule](http://engineerbiology.org/wiki/20.109(S20):_Spring_2020_schedule)

20.109(S20): Laboratory Fundamentals of Biological Engineering



Spring 2020 schedule FYI Assignments Homework Class data Communication
1. Screening ligand binding 2. Measuring gene expression 3. Engineering antibodies

If the wiki is your lifeline, the Schedule page is your best friend

MODULE	DAY	DATE	LECTURER	LABORATORY EXPERIMENTS	ASSIGNMENTS
		T/W Feb 4/5	NLL 	Orientation and laboratory tour	
1	1	R/F Feb 6/7	AK 	Complete in silico cloning and induce TDP43 protein expression	Orientation quiz Homework due
1	2	T/W Feb 11/12	AK 	Purify TDP43 protein	Homework due
1	3	R/F Feb 13/14	AK 	Assess purity and concentration of TDP43 protein	Homework due
		T/W Feb 18/19		President's day holiday	
1	4	R/F Feb 20/21	AK 	Perform small molecule microarray (SMM) with TDP43 protein	Laboratory quiz Homework due
1	5	T/W Feb 25/26	AK 	Scan SMM slides to identify binders of TDP43 protein	Homework due
1	6	R/F Feb 27/28	AK 	Analyze SMM data	Homework due
1	7	T/W Mar 3/4	AK 	Examine TDP43 binders for chemical features	Laboratory quiz Homework due

Key deadlines this semester

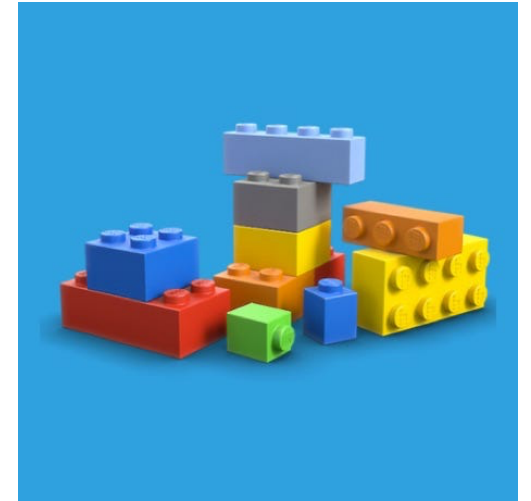
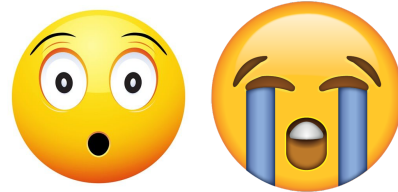
Module	Assignment	% final grade	Due date
1	Data summary	15	3/8 (draft), 3/22 (revision)
1	Mini-presentation	5	3/15
2	Journal club presentation	15	4/17 & 16 or 4/18 & 20
2	Research article	20	4/19
3	Research proposal presentation	20	5/7 or 5/8
3	Mini-report	5	5/11
all	Homework and Lab notebook	10	daily
all	Participation and blog	5	after module, see wiki
all	Quizzes	5	2 per module

individual : 60%

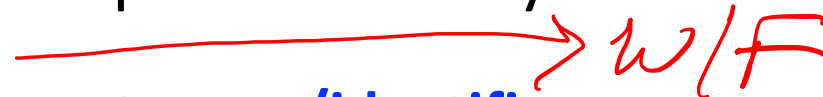
team: 40%

Homework helps!

- Only 10 percent of your final grade
- Homework builds components of major assignments
- Give it your best:
 - Consider homework a first draft
 - Not gratuitous busywork, helps build final reports and oral presentations
 - Feedback is provided (will prove helpful)
 - Great tool to keep ahead of the game and pace your work



- Homework must be submitted by 1:05pm on the day of lab
 - Submit as .doc or .pdf to Stellar
 - Document name: Your name_assignment name/identifier



TJR =
Print
homework

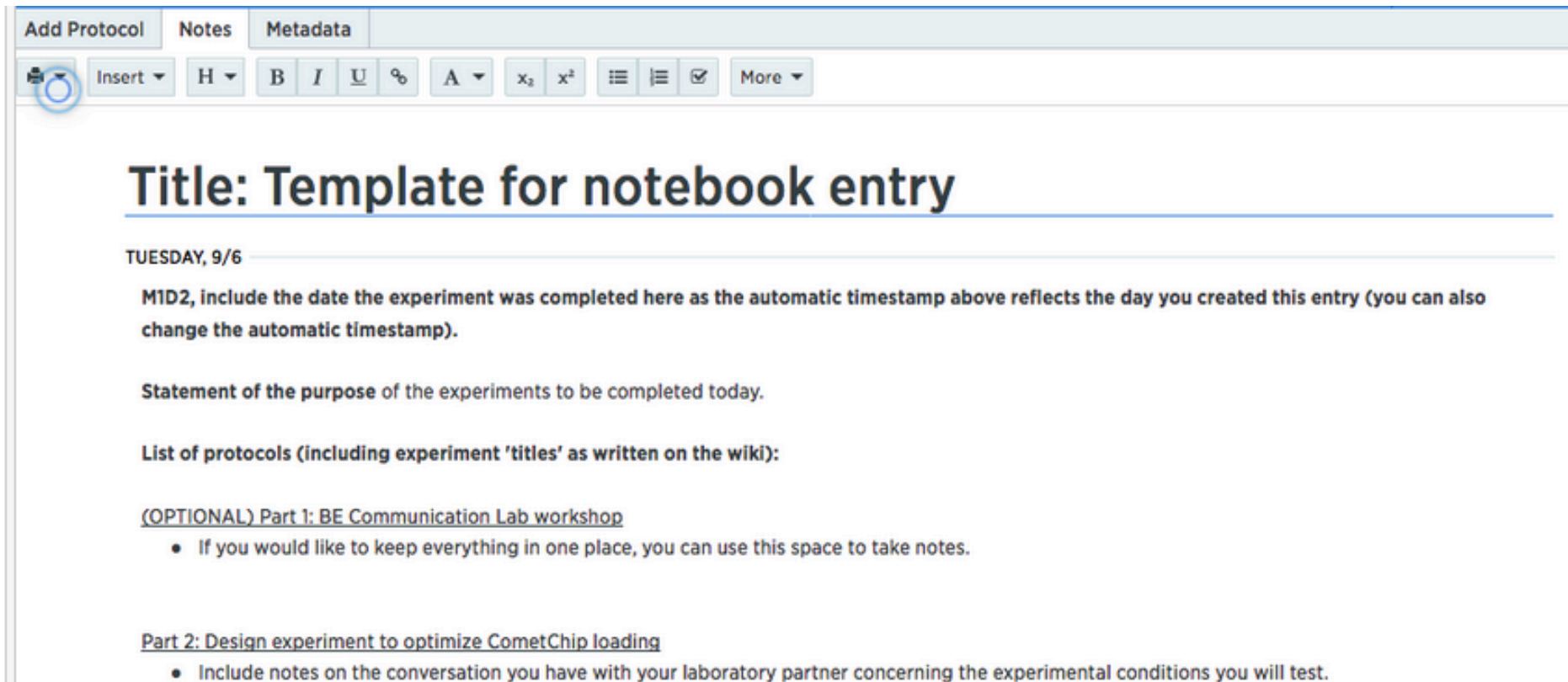
A laboratory day in the life of a 109er

- Lab starts at 1:05pm
 - **You must alert me in advance if you will be late or have a conflict**
- Quiz (on lectures and laboratory material)
 - M1D1, M1D4, M1D7...as noted on the wiki!
- Submit homework to Stellar by 1:05pm
- Participate in interactive prelab discussion
 - Typically 15-45 minutes with focus on experimental details
- Design and Experiment!
 - Keep notes in electronic laboratory notebook (Benchling)
 - Q & A throughout the afternoon

Record your science in Benchling

- Set up your account: benchling.com
- Title your project “20.109(S20)_YourName”
 - Make each module a new folder
 - Make each day a new entry within the appropriate module folder
- Share with your Instructor and TA

WF: Becky and Joe (jkreitz@mit.edu)
TR: Noreen, Leslie, and Kevin (skchung@mit.edu)



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):

(OPTIONAL) Part 1: BE Communication Lab workshop




- If you would like to keep everything in one place, you can use this space to take notes.

Part 2: Design experiment to optimize CometChip loading

- Include notes on the conversation you have with your laboratory partner concerning the experimental conditions you will test.

Project
Name →
Gear →
Project
Settings →
Add
Collaborator

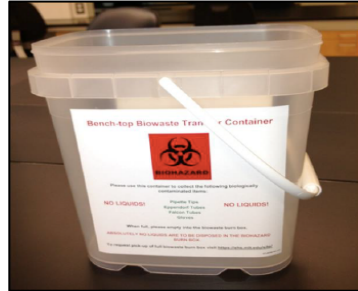
Remember your personal protective equipment (PPE)

Item	Worn (BE guidelines)
<p data-bbox="384 496 504 532">Gloves</p> 	<ul data-bbox="848 565 1842 665" style="list-style-type: none">- When working with chemical or biological materials➤ Change when entering tissue culture room!
<p data-bbox="384 758 529 793">Lab coat</p> 	<ul data-bbox="848 826 1842 926" style="list-style-type: none">- When working with chemical or biological materials➤ Change when entering tissue culture room!
<p data-bbox="384 1019 524 1055">Goggles</p> 	<ul data-bbox="848 1068 2201 1258" 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 correctly dispose of your waste



recycling!
regular trash can



benchtow waste



sharps container



liquid waste vacuum flask

NO LIQUIDS!

- paper towels
- packaging
- ~~scrap~~ scrap

- gloves
- plastic pipette tips
- plastic tubes

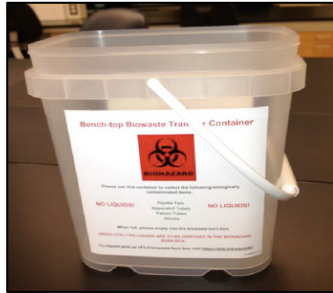
- glass slides
- glass pipette
- needles / razors

- media
- buffers
- NO Qiagen
- No chemical waste

Everyone has waste responsibilities



regular trash can



benchtop waste



sharps container



liquid waste vacuum flask

Please empty
benchtop waste
every lab



biowaste box

For today:

- Complete lab orientation with a partner
 - You will choose your “Forever” lab partner during your assigned lab section

[http://engineerbiology.org/wiki/20.109\(S20\):Laboratory_tour](http://engineerbiology.org/wiki/20.109(S20):Laboratory_tour)

- Orientation quiz on M1D1!

For M1D1:

- Complete homework assignments (see ‘Homework’ tab on wiki)

[http://engineerbiology.org/wiki/20.109\(S20\):Homework](http://engineerbiology.org/wiki/20.109(S20):Homework)

- Create laboratory notebook in Benchling
- Prepare for orientation quiz
- Complete, screen capture EHS training certificate(s)
- Read Mod1 overview page and M1D1 introduction