to the 20.109 lab!

1. EHS laboratory-specific training
2. Introductions
3. Prelab: Laboratory logistics
4. Orientation exercise – your first protocol
5. Preparations for M1D1

Introductions

- What year are you at MIT?
- Do you have any research experience you want to share?
- Where in the universe would you go if you got the chance?

Where can you find the instructors?

- Noreen Lyell
  - Office: 16-317
  - Email: nllyell@mit.edu
- Becky Meyer
  - Office: 16-469
  - Email: rcmeyer@mit.edu
- Amanda Facklam
  - Email: afacklam@mit.edu
- Leslie McClain
  - Email: mebane@mit.edu

Zoom office hours will be established

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)
  - Integrity (*personal* reflections)
- The faculty are here to help – **come to us with questions!**

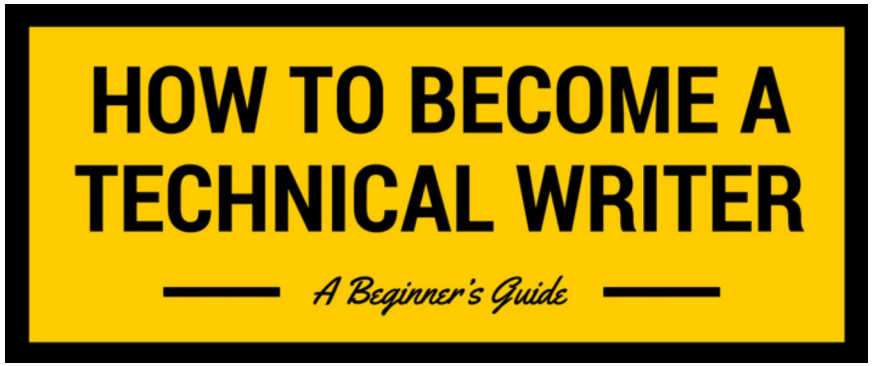
Key deadlines this semester

Assignment	% final grade	Due date
Data summary	15	10/13 (draft), 10/23 (revision)
Research talk	5	10/16
Journal club presentation	15	10/26 & 27 or 10/28 & 29
Research article	20	10/22
Research proposal presentation	20	12/7 or 12/8
Lab notebook	5	at the end of each module
Homework	10	daily
Participation	5	daily for notebooks, 4 blog posts
Quizzes	5	2 per module

individual : 65%

team: 35%

Homework helps!



- 10 percent of your final grade

- A chance to practice technical/ scientific writing

- Homework builds components of major assignments
  - Allows you to get individualized feedback on first draft of work
  - Not gratuitous busywork

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

Class policies to note (also on wiki!)

- **Absences from lecture** will impact participation points accumulated throughout the semester.
  - You are responsible for getting lecture material even if you are absent

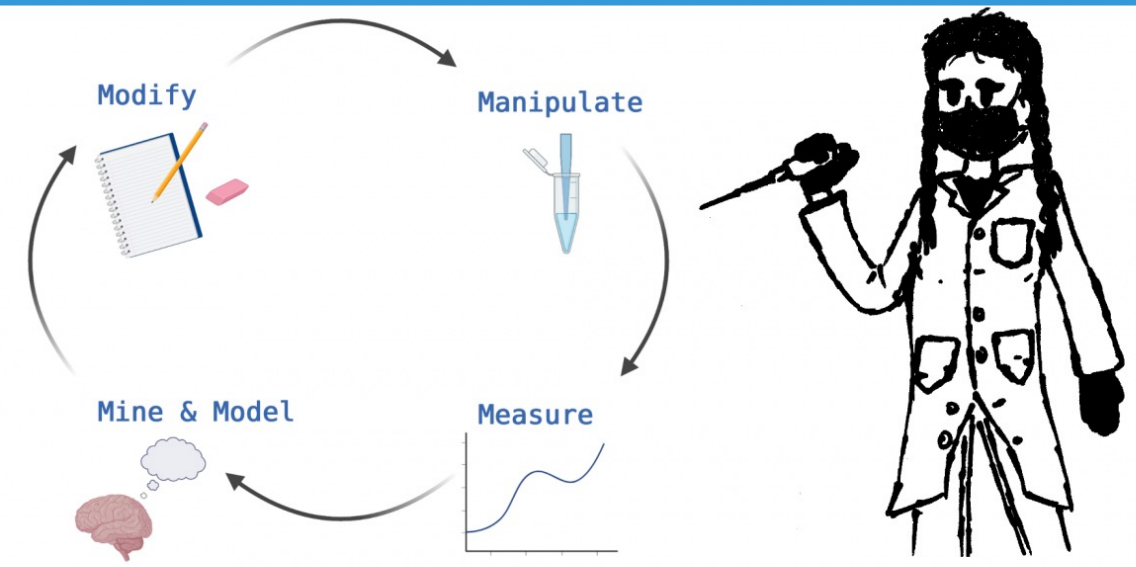
- **Laboratory attendance is mandatory**
  - Excused absences should be discussed with the Instructors as soon as possible.
  - Unexcused absences = 1/3 of a letter grade deduction from the final grade on the major assignment for the module (for example, a B+ would become a B).
    - If absent, you may be required to attend a different laboratory section to complete experiments.

- **Late policy for homework and major assignments** is very generous!
  - In lieu of extensions
  - Each day late for homework = -0.3pts /10
  - Each day late for major assignment = -3pts /100
  - Work will not be accepted 1 week past the due date

Welcome to the wiki! The wiki is your lifeline…

http://engineerbiology.org/wiki/20.109(F21):Fall_2021_schedule

20.109(F21): Laboratory Fundamentals of Biological Engineering



Drawing provided by Marissa A., 20.109 student in Sp21 term! Schematic generated using BioRender.

Fall 2021 schedule | FYI | Assignments | Homework | Class data | Communication | Accessibility

Module 1: Genomic instability | Module 2: Drug discovery

Welcome to 20.109! It is our goal to make this class a useful and fun introduction to the experiments and techniques used in biological engineering. Though there is not enough time to show you everything needed to do research, after this class you will feel confident and familiar

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

MODULE	DATE	LECTURER	LABORATORY EXPERIMENTS	ASSIGNMENTS
	R/F Sep 9/10	NLL [[ISlides]]	Orientation and laboratory tour	
M1D1	T/W Sep 14/15	BE	Learn best practices for mammalian cell culture	**Orientation quiz** Homework due
M1D2	R/F Sep 16/17	BE	Prepare and treat cells for repair foci experiment	Homework due
M1D3	T/W Sep 21/22	BE	Use immunoflourescence staining to assess repair foci experiment	Homework due
M1D4	R/F Sep 23/24	BE	Treat cells and perform high-throughput genome damage assay	**Laboratory quiz** Homework due
M1D5	T/W Sep 28/29	BE	Draft data slide for major assignment	Homework due
M1D6	R/F Sep/Oct 30/1	BE	Image and analyze high-throughput genome damage assay	Homework due
M1D7	T/W Oct 5/6	BE	Analyze data using statistical methods	**Laboratory quiz** Homework due
M2D1	R/F Oct 7/8	JN	Complete in silico cloning of protein expression plasmid	Homework due
	T/W Oct 12/13		**Indigenous People's holiday**	**Data Summary draft due** Wed, Oct 13 at 10 pm

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 starts immediately at 1:05pm (on lectures and laboratory material)
  - M1D4, M1D7, M2D4, M2D7…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

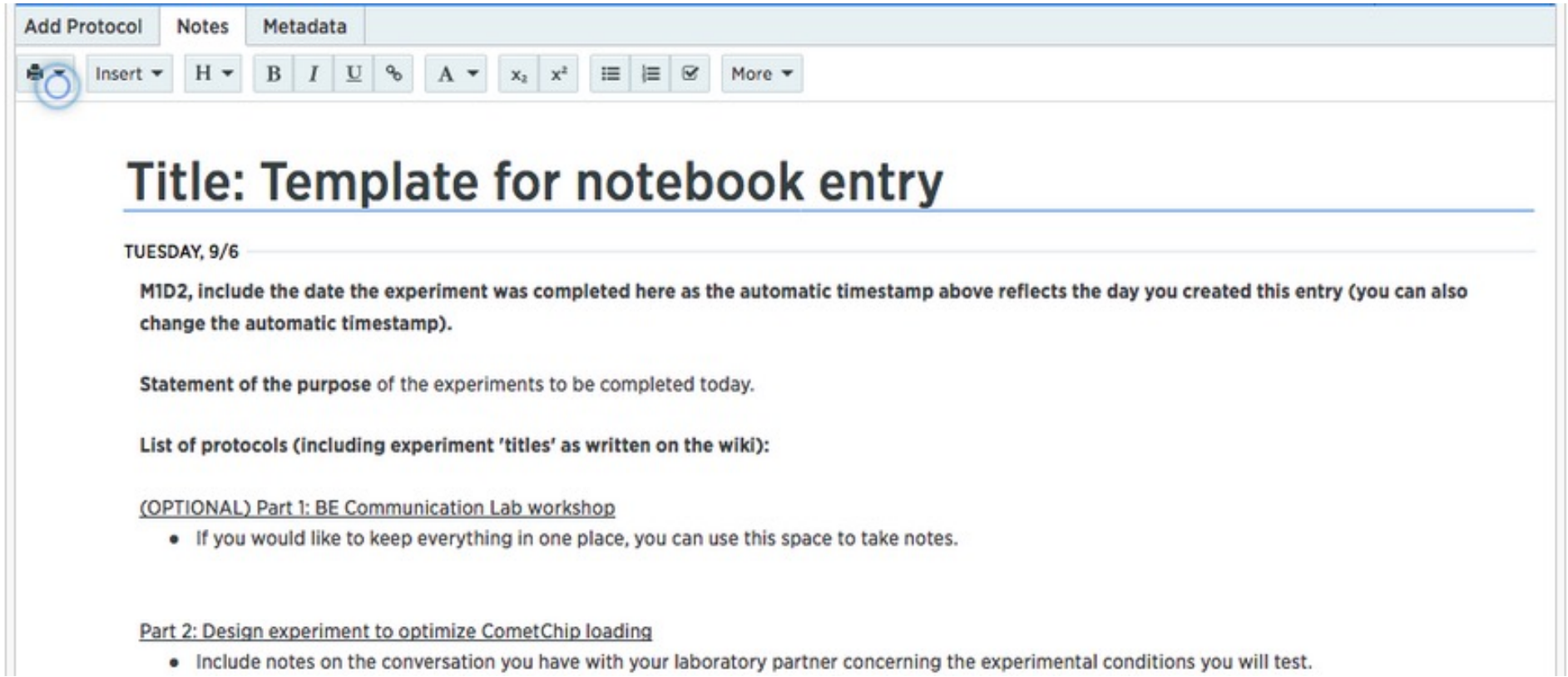
- Design and Experiment!
  - Keep notes in electronic laboratory notebook (Benchling)
  - Q & A throughout the afternoon

Record your science in Benchling

- Set up your account: benchling.com
- Title your project “20.109(F21)_YourName”
  - Make each module a new folder
  - Make each day a new entry within the appropriate module folder
- Share with your Instructor and TA

T/R: Becky (rcmeyer@mit.edu) and Ben (allsup@mit.edu)

W/F: Amanda (afacklam@mit.edu) and Thomas (tjcosta@mit.edu)



Remember your personal protective equipment (PPE)

Item	Worn (BE guidelines)
Gloves 	- When working with chemical or biological materials ➢ Change when entering tissue culture room!
Lab coat 	- When working with chemical or biological materials ➢ Change when entering tissue culture room!
Goggles 	- 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

regular trash can

benchtop waste

sharps container

liquid waste vacuum flask

NO LIQUIDS!

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
  - Your ”forever” lab partner will be assigned prior to the next lab session based on questionnaire responses or by request

http://engineerbiology.org/wiki/20.109(F21):Laboratory_tour

  - Orientation quiz on M1D1!

For M1D1:

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

  http://engineerbiology.org/wiki/20.109(F21):Homework

  – Prepare for orientation quiz
  – Complete, screen capture EHS training certificate(s)
  – Read Mod1 overview page and M1D1 introduction