

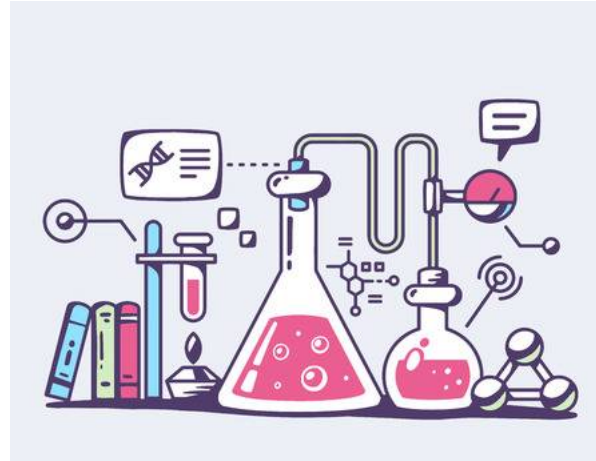


to the 20.109 virtual lab!

1. Introductions
2. Prelab: Laboratory class logistics
3. Orientation exercise – your first protocol
4. Preparations for M1D1

Introductions!

- Your name
- Your year at MIT
- Any research experience?
- Where in the universe are you currently located?



How can you contact the instructors?

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



We have Office Hours via Zoom

We will have 1-on-1s for each student

Core missions of 20.109 (even in a virtual environment)

- Analyze **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
 - Class utilizes lab partners for experiments
 - Assignments are completed individually or in teams (as noted)
 - Class-wide collaboration (for data acquisition)
 - 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\(F20\):_Fall_2020_schedule](http://engineerbiology.org/wiki/20.109(F20):_Fall_2020_schedule)

20.109(F20): Laboratory Fundamentals of Biological Engineering



Fall 2020 schedule FYI Assignments Homework Communication
M1: Genomic instability M2: Drug discovery M3: Metabolic engineering

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

| MODULE | DATE | LECTURER | LABORATORY EXPERIMENTS | ASSIGNMENTS |
|--------|----------|---------------------|--|---|
| | T Sep 1 | NLL | Orientation and laboratory tour | |
| M1D1 | R Sep 3 | BE | Learn best practices for mammalian cell culture | Orientation quiz Homework due |
| M1D2 | T Sep 8 | BE | Prepare and treat cells for repair foci experiment | Homework due |
| M1D3 | R Sep 10 | BE | Use immunofluorescence staining to assess repair foci experiment | Homework due |
| M1D4 | T Sep 15 | BE | Image repair foci experiment and quantify results | Laboratory quiz Homework due |
| M1D5 | R Sep 17 | BE | Treat cells and perform high-throughput genome damage assay | Homework due |
| M1D6 | T Sep 22 | BE | Image and analyze high-throughput genome damage assay | Homework due |
| M1D7 | R Sep 24 | BE | Complete data analysis using statistical methods | Laboratory quiz Homework due |
| M2D1 | T Sep 29 | JN | Complete in silico cloning of protein expression plasmid | Homework due |
| M2D2 | R Oct 1 | JN | Perform protein purification protocol | Homework due Data Summary draft due Sun, Oct 4 at 10 pm [Blog post due] Mon, Oct 5 at 10 pm |

Key deadlines this semester

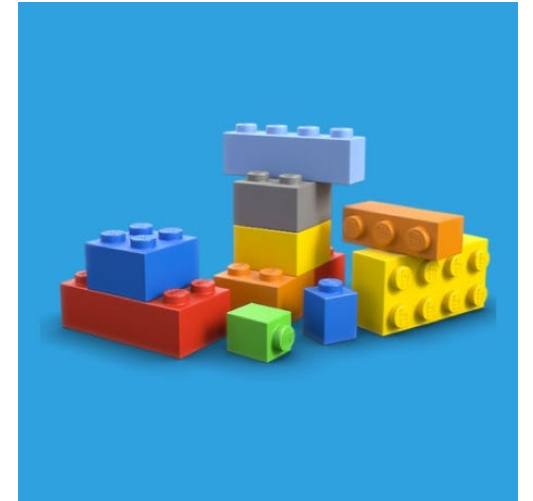
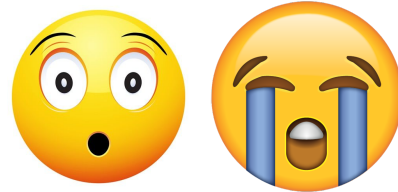
| Module | Assignment | % final grade | Due date |
|--------|--------------------------------|---------------|--------------------------------|
| 1 | Data summary | 15 | 10/4 (draft), 10/14 (revision) |
| 1 | Mini-presentation | 5 | 10/11 |
| 2 | Journal club presentation | 15 | 10/20 & 22 |
| 2 | Research article | 15 | 11/11 |
| 3 | Research proposal presentation | 20 | 12/3 |
| 3 | Mini-report | 5 | 12/7 |
| all | Homework and Lab notebook | 15 | daily |
| all | Participation and blog | 5 | after module, see wiki |
| all | Quizzes | 5 | 2 per module |

individual : 60%

team: 40%

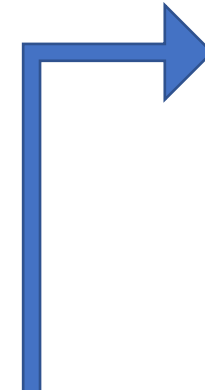
Homework helps!

- 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 3:05pm on the day of lab
 - Submit as .doc or .pdf to Stellar
 - Document name: Your name_assignment name/identifier (i.e. BeckyM_M2D3)



Record your science in Benchling

- Set up your account: benchling.com
- Title your project “20.109(F20)_YourName”
 - Make each module a new folder
 - Make each day a new entry within the appropriate module folder
- Share with your Instructors and graduate TA



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The screenshot shows the Benchling notebook entry editor. At the top, there are tabs for 'Add Protocol', 'Notes', and 'Metadata'. Below the tabs is a rich text editor toolbar with icons for undo, insert, heading (H), bold (B), italic (I), underline (U), link, text color (A), subscript (x₂), superscript (x²), bulleted list, numbered list, and a 'More' dropdown. The main content area has a title field with the text 'Title: Template for notebook entry' and a horizontal line below it. Below the title is a date field showing 'TUESDAY, 9/6'. The main body of the notebook contains several sections: a paragraph starting with 'M1D2, 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).', a section for 'Statement of the purpose of the experiments to be completed today.', a section for 'List of protocols (including experiment 'titles' as written on the wiki):', an '(OPTIONAL) Part 1: BE Communication Lab workshop' section with a bullet point 'If you would like to keep everything in one place, you can use this space to take notes.', and a 'Part 2: Design experiment to optimize CometChip loading' section with a bullet point 'Include notes on the conversation you have with your laboratory partner concerning the experimental conditions you will test.'

A laboratory day in the life of a 109er

- Lab starts at 3:05pm
 - **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 3:05pm
- Participate in interactive prelab discussion
 - Typically 15-45 minutes with focus on experimental details
- Design and Analyze!
 - Keep notes in electronic laboratory notebook (Benchling)
 - Q & A throughout the afternoon/ in office hours/ in 1-on-1s/ via email or Piazza

For today:

- Complete lab orientation
 - [http://engineerbiology.org/wiki/20.109\(F20\):Laboratory_tour](http://engineerbiology.org/wiki/20.109(F20):Laboratory_tour)
 - I will demo Station 1
 - Orientation quiz on M1D1!
- Fill out questionnaire for lab partners (on wiki)
 - Lab partners will be assigned based on time zone with considerations
 - If you already have a bestie in your lab section, you both must email me to request to be partners

For M1D1:

- Complete homework assignments (see 'Homework' tab on wiki)
[http://engineerbiology.org/wiki/20.109\(F20\):Homework](http://engineerbiology.org/wiki/20.109(F20):Homework)
 - Create laboratory notebook in Benchling
 - Prepare for orientation quiz
 - Complete, screen capture EHS training certificate(s)
 - Read Mod1 overview page and M1D1 introduction