

# Orientation and laboratory tour



1. Introductions
2. Prelab discussion
3. Orientation exercises
4. Preparations for M1D1

# Let's get to know each other!

- Your name?
- Your research experience or interests?
- If you could go anywhere, where would you go?



# How can you reach us?

- Noreen Lyell
  - Email: [nllyell@mit.edu](mailto:nllyell@mit.edu)
- Becky Meyer
  - Email: [rcmeyer@mit.edu](mailto:rcmeyer@mit.edu)
- Jamie Zhan
  - Email: [zhanj@mit.edu](mailto:zhanj@mit.edu)
- Office hours TBD
- One-one-one meetings scheduled by request

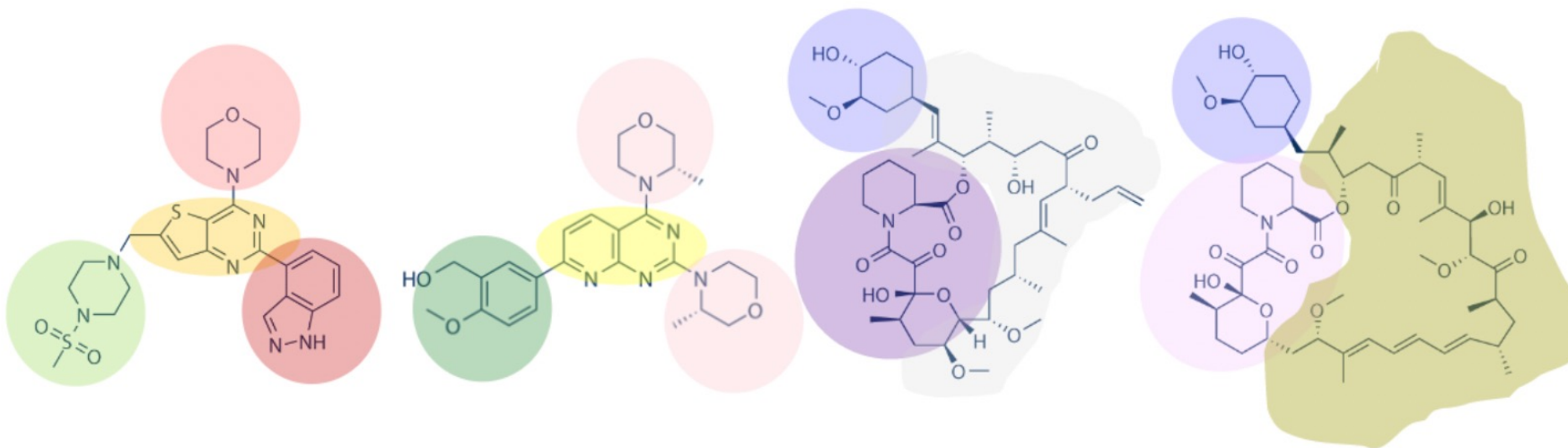


# What will we do this semester?

- 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 20.109 team is here to help – **come to us with questions!**

# The wiki is your new best friend

## 20.109(S22): Laboratory Fundamentals of Biological Engineering



[Spring 2022 schedule](#)

[FYI](#)

[Assignments](#)

[Homework](#)

[Class data](#)

[Communication](#)

[Accessibility](#) 









[M1: Drug discovery](#)

[M2: Metabolic engineering](#)

[M3: Project design](#)

[http://engineerbiology.org/wiki/20.109\(S22\):Spring\\_2022\\_schedule](http://engineerbiology.org/wiki/20.109(S22):Spring_2022_schedule)

“It’s on the wiki...”

| MODULE | DATE          | LECTURER  | LABORATORY EXPERIMENTS   | ASSIGNMENTS   |
|--------|---------------|---|--|---|
|        | T/W Feb 1/2   | NLL <br><a href="#">Lecture slides</a> | Orientation and laboratory tour<br>T/R prelab  |   |
| M1D1   | R/F Feb 3/4   | AK <br><a href="#">Lecture slides</a>  | Review small molecule microarray (SMM) technology  | <b>Orientation quiz</b><br><a href="#">Homework due</a> |
| M1D2   | T/W Feb 8/9   | AK                                     | Examine SMM data collected using TDP43 protein   | <a href="#">Homework due</a>                            |
| M1D3   | R/F Feb 10/11 | AK                                     | Induce and purify TDP43 protein  | <a href="#">Homework due</a>                            |
| M1D4   | T/W Feb 15/16 | AK                                     | Assess purity and concentration of purified TDP43 protein  | <b>Laboratory quiz</b><br><a href="#">Homework due</a>  |
| M1D5   | R/F Feb 17/18 | AK                                     | Perform aggregation assay using TDP43 protein and draft data slide for Data summary                  | <a href="#">Homework due</a>                            |
|        | T/W Feb 22/23 |   | <b>Presidents' day holiday</b>   | <b>Research talk due</b> Wed, Feb 23 at 10 pm           |
| M1D6   | R/F Feb 24/25 | AK                                   | Learn best practices for mammalian cell culture and seed CAD cells for TDP43-localization experiment | <a href="#">Homework due</a>                            |
| M1D7   | T/W Mar 1/2   | AK                                   | Complete staining for TDP43-localization assay   | <a href="#">Homework due</a>                            |
| M1D8   | R/F Mar 3/4   | Comm Lab workshop   | Image TDP43-localization experiment and complete data analysis                                       | <b>Laboratory quiz</b><br><a href="#">Homework due</a>  |

# Mark your calendars

| Module | Assignment                     | % of final grade | Due date                      |
|--------|--------------------------------|------------------|-------------------------------|
| 1      | Data summary                   | 15               | 3/12 (draft), 3/20 (revision) |
| 1      | Mini-presentation              | 5                | 2/23                          |
| 2      | Journal club presentation      | 15               | 3/29 & 3/30 or 3/31 & 4/1     |
| 2      | Research article               | 20               | 4/23                          |
| 3      | Research proposal presentation | 20               | 5/5 or 5/6                    |
| all    | Homework                       | 10               | daily                         |
| all    | Laboratory notebook            | 5                | refer to wiki                 |
| all    | Participation and blog         | 5                | refer to wiki                 |
| all    | Quizzes                        | 5                | refer to wiki                 |

individual : ~65%

team: ~35%

# Homework is the key to success

- Only 10% of final grade?!
- Give it your best:
  - Consider homework to be a first draft
  - Never gratuitous, building blocks for major assignments
  - LOTS of feedback is provided
  - Great tool to stay of track and pace your work
- Submit to Stellar by 1:05p on due date
  - [Name submission according to this format: YourName\\_Assignment \(NoreenL\\_M1D1\)](#)
  - Grades and comments will be returned via Stellar
- Generous late policy used in place of extensions
  - 1/3 of letter grade deduction per 24 hrs late (within 24 hr of due date = -0.3 / 10 pts)



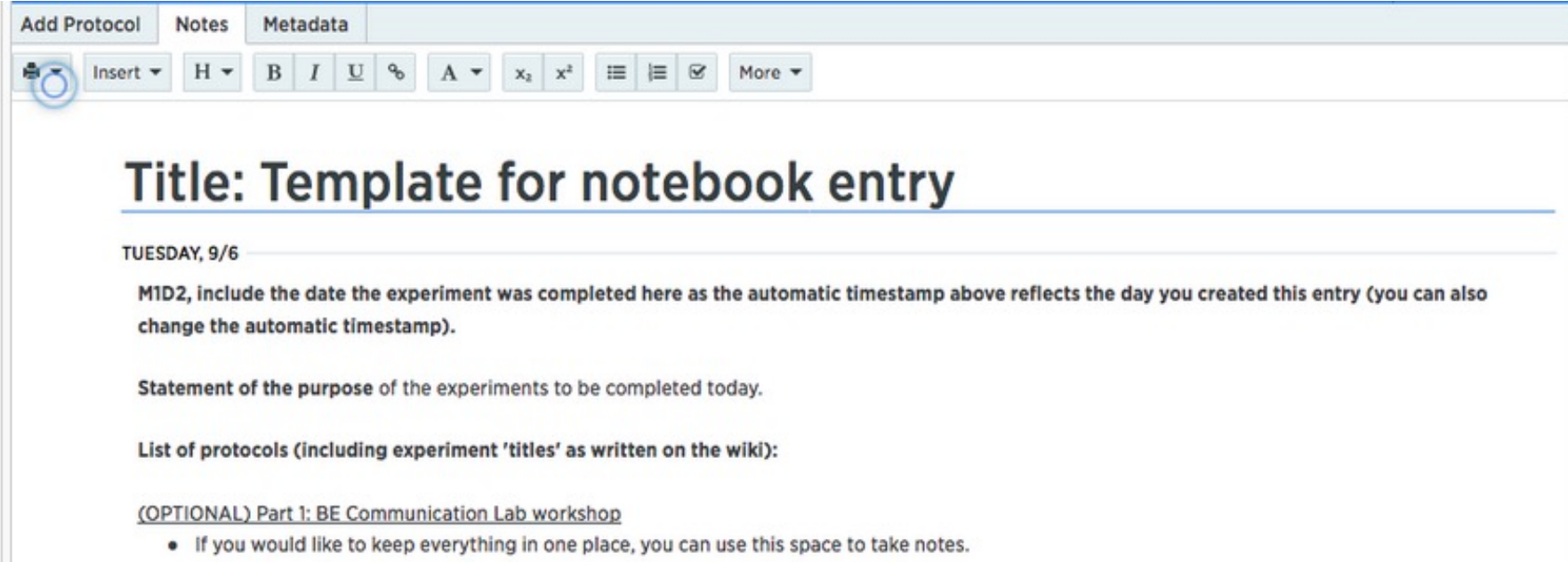


# A typical laboratory day

- Prelab discussion starts at 1:05pm
  - Alert me in advance if you will be absent / late when possible
- Submit homework to Stellar by 1:05pm
- Participate in interactive prelab discussion
  - Typically 15-60 minutes with focus on experimental details
- Design and Analyze!
  - Keep notes in electronic laboratory notebook
  - Q & A throughout the afternoon
- Quiz (see dates on wiki!)
  - Questions from lecture and prelab material

# How will you record your work?

- Set up your account: benchling.com
- Title your project “20.109(S22)\_YourName”
  - Make each module a new folder
  - Make each day a new entry within the appropriate module folder
- Share with Jamie (zhanj@mit.edu) and Tyler (tylerdao@mit.edu)



The screenshot shows the Benchling interface for creating a new notebook entry. At the top, there are tabs for 'Add Protocol', 'Notes', and 'Metadata'. Below these is a rich text editor toolbar with icons for bold, italic, underline, link, text color, background color, bulleted list, numbered list, and a 'More' dropdown. The main content area has a title field with the placeholder text 'Title: Template for notebook entry'. Below the title is a date field showing 'TUESDAY, 9/6'. The body of the entry contains several sections: a note about the timestamp, a section for the 'Statement of the purpose', a section for the 'List of protocols', and an 'OPTIONAL' section for 'Part 1: BE Communication Lab workshop' which includes a bullet point about taking notes.

Add Protocol Notes Metadata

Insert H B I U % A x<sub>2</sub> x<sup>2</sup> ☰ ☷ ☑ More

**Title: Template for notebook entry**

TUESDAY, 9/6

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).

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.

# Important class policies

- **Absences from lecture** will result in loss of participation points
  - You are responsible for getting lecture material even if you are absent
- **Laboratory attendance is mandatory**
  - Excused absences must 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 possible, you should 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 = -0.3 pts /10 or -3 pts /100
  - Work will not be accepted 1 week past the due date

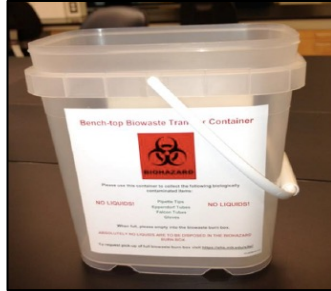
# Remember your PPE!

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

# Be sure to correctly dispose of waste!



regular trash can



benchtop waste



sharps container



liquid waste vacuum flask

**Please empty  
benchtop waste  
after every lab!**



biowaste box

# For today...

- Watch demonstration for Station 1 of laboratory tour
- Work through remaining Stations of laboratory tour with classmate
- Complete and submit laboratory partner questionnaire
  - Specific partner assignments can be requested
- [http://engineerbiology.org/wiki/20.109\(S22\):Spring\\_2022\\_schedule](http://engineerbiology.org/wiki/20.109(S22):Spring_2022_schedule)

# For M1D1...

- Complete homework assignments described on wiki
- Study for Laboratory orientation quiz
- Prepare for M1D1!