

# Orientation:



9/8/17

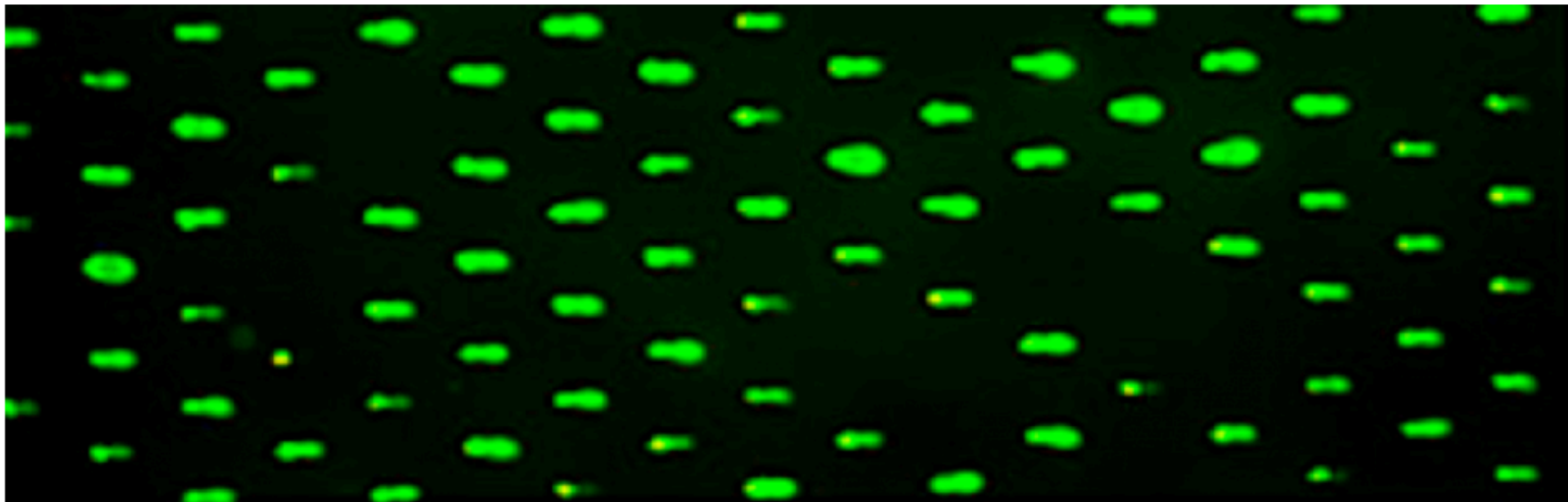
1. EHS training
2. Introductions
3. Laboratory specifics
4. Orientation exercise – your first protocol!
5. Preparations for M1D1

# Core mission 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!**

# Say hello to our wiki!

## 20.109(F17): Laboratory Fundamentals of Biological Engineering



Fa17 Schedule	Announcements	Assignments	Homework	Communication
1. Measuring Genomic Instability	2. Manipulating Metabolism	3. Engineering Biomaterials		

[http://engineerbiology.org/wiki/20.109\(F17\) :\\_Fall\\_2017\\_Schedule](http://engineerbiology.org/wiki/20.109(F17) :_Fall_2017_Schedule)

# The Schedule page is your best friend

MODULE	DAY	DATE	LECTURER	LABORATORY EXPERIMENTS	ASSIGNMENTS
		R/F Sept 7/8	NLL <a href="#">↗</a> Orientation lecture	Orientation Prelab T/R	
1	1	T/W Sept 12/13	BE <a href="#">↗</a>	Prepare microwell array and practice tissue culture	Laboratory orientation quiz Homework due
1	2	R/F Sept 14/15	NLL <a href="#">↗</a>	Develop experiment to optimize cell loading	Homework due
1	3	T/W Sept 19/20	BE <a href="#">↗</a>	Evaluate cell loading results	Homework due
1	4	R/F Sept 21/22	BE <a href="#">↗</a>	Test role of biochemical factors in genomic stability	Homework due
1	5	T/W Sept 26/27	BE <a href="#">↗</a>	Complete biochemical experiment and apply chemical treatments for sub-nuclear foci assay	Laboratory quiz Homework due
		R/F Sept 28/29	BE <a href="#">↗</a>	Lecture, but no laboratory Career fair student holiday	
1	6	T/W Oct 3/4	BE <a href="#">↗</a>	Examine sub-nuclear foci abundance to measure DNA damage	Homework due
1	7	R/F Oct 5/6	BE <a href="#">↗</a>	Visualize and analyze data for sub-nuclear foci assay	Laboratory quiz Homework due
		T/W Oct 10/11		Columbus day holiday	Data Summary draft due Mon, Oct 9 at 10 pm

# Keep track of due dates

Module	Assignment	% final grade	Due date
1	Data summary	15	10/09 (draft) and 10/22
1	Mini-presentation	5	10/14
2	Journal club presentation	15	10/24 or 10/31
2	Research article	20	11/20
3	Research proposal presentation	20	12/7
3	Mini-report	5	12/11
all	Homework and Lab notebook	10	daily
all	Participation and blog	5	Before last day of module
all	Quizzes	5	2 per module

individual : 60%

team: 40%

# Homework builds to major assignments

- Only 10% of final grade?!
- Should be your best effort:
  - consider homework a first draft
  - never gratuitous, building blocks toward final reports and oral presentations
  - feedback is provided (will prove helpful)
  - great tool to keep ahead of the game and pace your work



# A laboratory day in the life of a 109er

- Lab starts at 1:05pm
- Quiz (on lecture and laboratory material)
  - M1D1, M1D5, M1D7...
- Submit printed homework assignment to front bench
- Participate in interactive prelab discussion
  - Typically ~15-45 min with focus on experimental details
- Design and Experiment!
  - Record notes in electronic laboratory notebook (benchling)
  - Q&A throughout the afternoon


# Record your science in Benchling

- Set up your account: [benchling.com](https://benchling.com)
- Title your project: “20.109(F17)\_YourName”
- Share with Josephine & Eric: [joshaw@mit.edu](mailto:joshaw@mit.edu) & [elehnhar@mit.edu](mailto:elehnhar@mit.edu)

Add Protocol

Notes

Metadata



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## Title: Template for notebook entry

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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.

Part 2: Design experiment to optimize CometChip loading

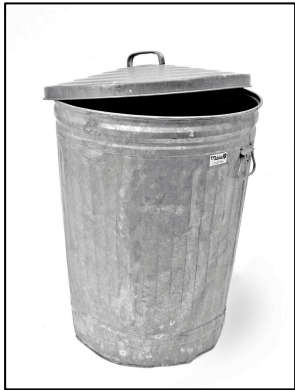
- Include notes on the conversation you have with your laboratory partner concerning the experimental conditions you will test.



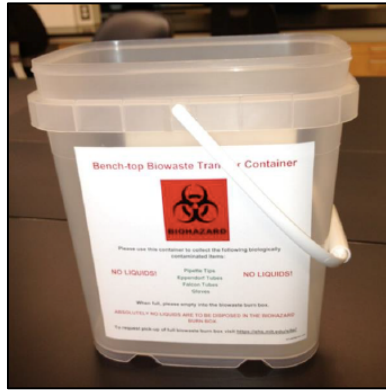
# We do our science safely

PPE item	When to wear?
<p>Gloves</p> 	<ul style="list-style-type: none"><li>- when working with chemical or biological materials</li><li>➤ change when entering tissue culture room!</li></ul>
<p>Lab coat</p> 	<ul style="list-style-type: none"><li>- when working with chemical or biological materials</li><li>➤ change when entering tissue culture room!</li></ul>
<p>Goggles</p> 	<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 dispose of waste correctly



trash can



benchtop waste



sharps jar



aspirator

**NO LIQUIDS!!!**

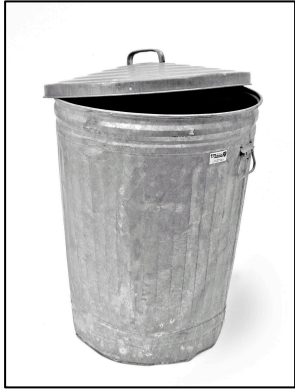
packaging  
paper towels  
(hand drying)

pipet tips  
gloves  
plastic tubes  
paper towels (lab bench)

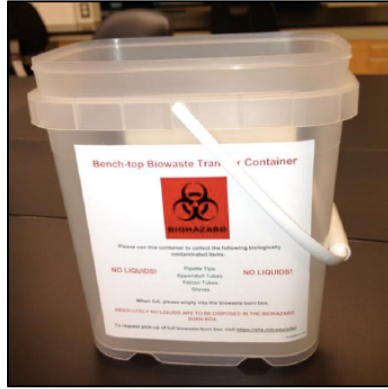
needles  
razors  
glass tubes  
pasteur pipets

cell culture waste

# Everyone has waste responsibilities



trash can



benchtop waste



sharps jar



aspirator



# Lab business...

- For today:
  - Make a friend, choose a bench, sign-up on the lab map up front!
  - Complete laboratory orientation exercise
    - Quiz on M1D1
- For M1D1:
  - Read through Homework assignments
    - See 'Homework' tab on wiki
  - Watch for email concerning Office Hours poll