Welcome to 20.109!

Laboratory Fundamentals of Biological Engineering

September 6, 2018

Plan for today

1. EHS training
2. Get to know one another
3. Laboratory specifics
4. Orientation exercise – your first protocol!
5. Preparations for M1D1

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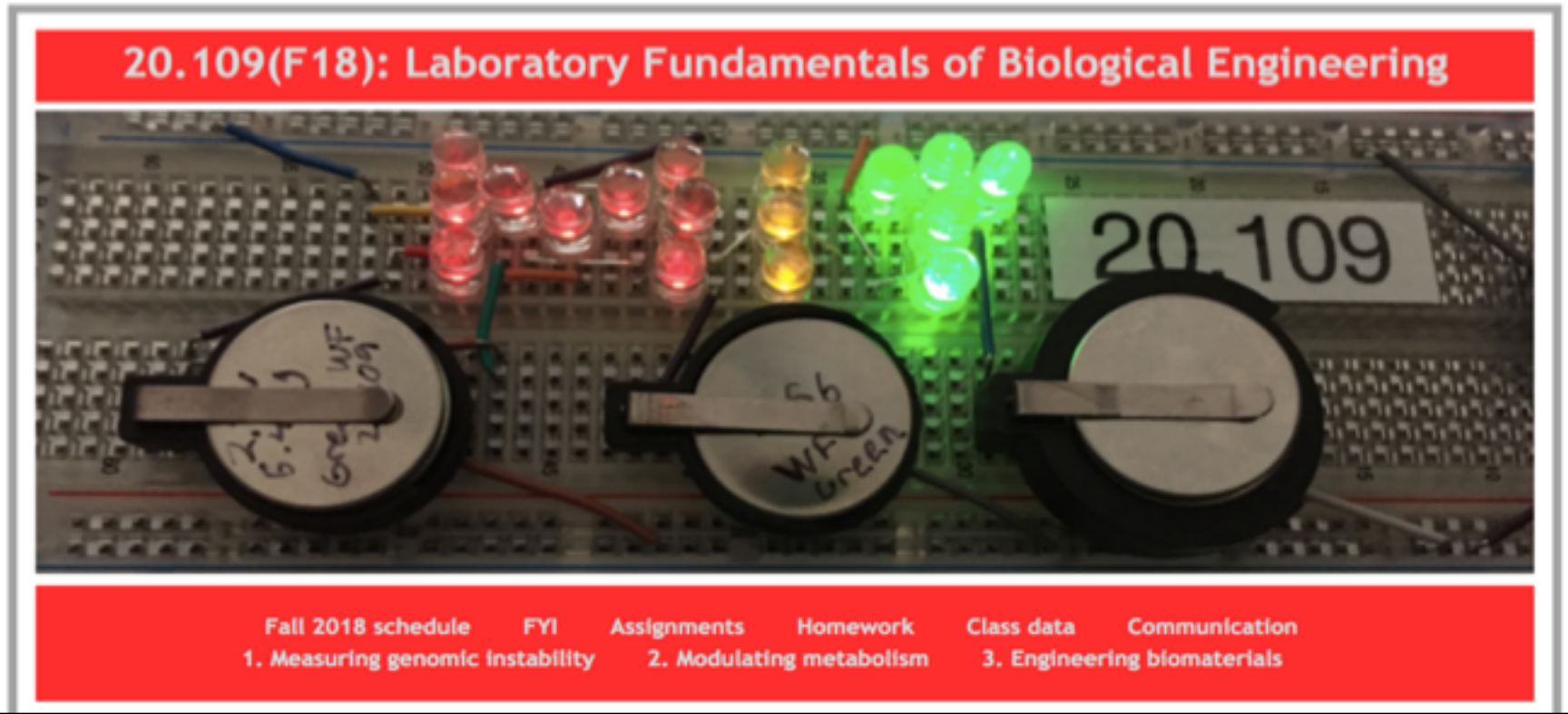
Core missions of 20.109

- 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!**

The wiki is your best friend

http://engineerbiology.org/wiki/20.109(F18):_Fall_2018_schedule



Bookmark the Schedule page

MODULE	DAY	DATE	LECTURER	LABORATORY EXPERIMENTS	ASSIGNMENTS
		R/F Sept 6/7	NLL	Orientation	
1	1	T/W Sept 11/12	BE	Practice tissue culture and prepare microwell array	**Laboratory orientation quiz** Homework due
1	2	R/F Sept 13/14	BE	Design cell loading optimization experiment and research cell lines	Homework due
1	3	T/W Sept 18/19	BE	Prepare and treat cells for genomic instability experiment	Homework due
		R/F Sept 20/21	Comm Lab	**Lecture, but no laboratory** Career fair student holiday	
1	4	T/W Sept 25/26	BE	Complete genomic instability experiment and load cells for sub-nuclear foci assay	**Laboratory quiz** Homework due
1	5	R/F Sept 27/28	BE	Analyze instability experiment data and treat cells for sub-nuclear foci assay	Homework due
1	6	T/W Oct 2/3	BE	Complete sub-nuclear foci assay	Homework due
1	7	R/F Oct 4/5	BE	Practice statistical analysis methods and complete data analysis	**Laboratory quiz** Homework due

Keep track of assignment due dates
(See Assignments tab on wiki)

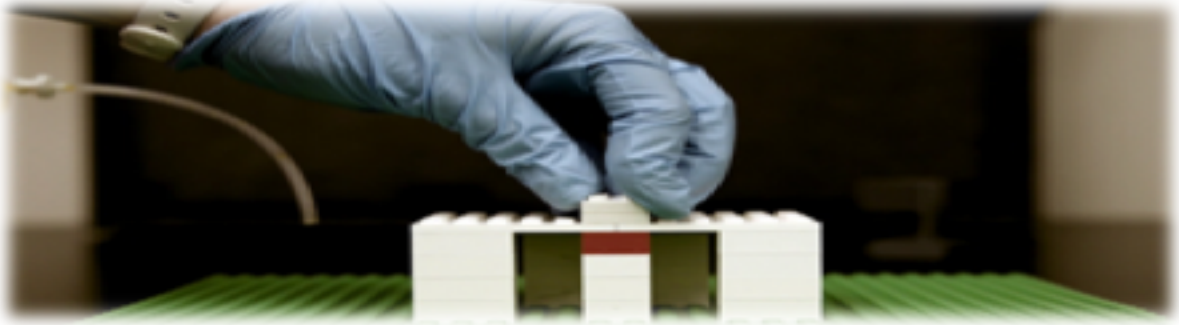
Module	Assignment	% final grade	Due date
1	Data summary	15	10/8 (draft), 10/20 (revision)
1	Mini-presentation	5	10/13
2	Journal club presentation	15	10/23 or 25
2	Research article	20	11/12
3	Research proposal presentation	20	12/6
3	Mini-report	5	12/10
all	Homework and Lab notebook	10	daily
all	Participation and blog	5	after module, see wiki
all	Quizzes	5	2 per module

individual : 60%

team: 40%

Homework builds to major assignments

- Only 10% of final grade?!
- Give it your best:
  - Consider homework a first draft
  - Never gratuitous, building blocks toward final reports and oral presentations
  - We give a lot of feedback (will prove helpful)
  - Great tool to keep ahead of the game and pace your work



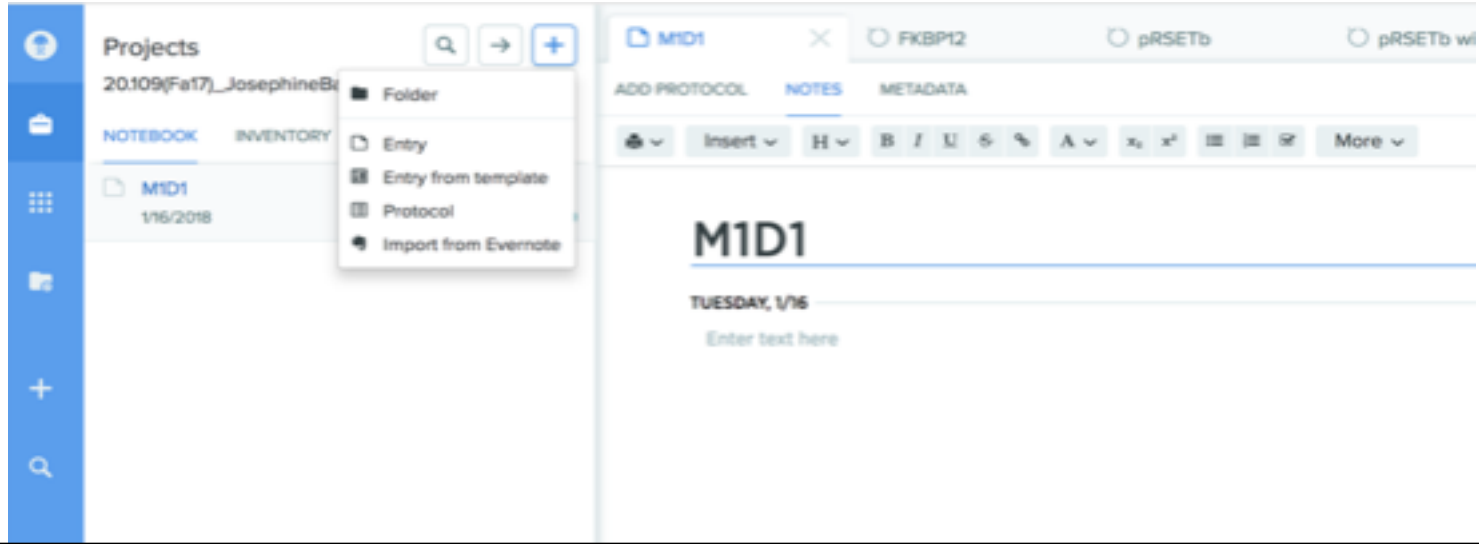
Owens and Hart, Lab on a LEGO
Image by Melanie Gonick, MIT News

A typical day in 20.109

- Lab starts at 1:05pm
  - Let us know ahead of time if you will be late or have a conflict
- Quiz (on lectures and labs)
  - M1D1, M1D4, M1D7…keep track on wiki!
- Turn in homework as pdf on Stellar by 1:05pm
- Prelab: interactive discussion ~ 15-45 min
- Design and Experiment!
  - Keep notes in Electronic lab notebook (Benchling)
  - Q&A throughout the afternoon

Lab notebook in Benchling

- Set up an account: benchling.com
- Entitle your project “20.109(F18)_YourName”
  - Make each module a new folder
  - Make each day a new entry within appropriate folder
- Share with Josephine & Corban: joshaw@mit.edu, c_swain@mit.edu



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 dispose of waste correctly

regular trash can

benchtop waste

sharps container

liquid waste vacuum flask

NO LIQUIDS!

- paper towels
- non-bio or chem waste.
- gloves
- plastic pipet tips
- plastic tubes
- glass
- razor blades
- pasteur pipets
- needles
- cell cultures
- spent media

Everyone has waste responsibilities

regular trash can

benchtop waste

sharps container

liquid waste vacuum flask

Please empty benchtop waste daily

biowaste box

Today

- Find partner and bench / team color
  - Record choice at front bench
- Complete lab orientation—there will be a quiz!
  - http://engineerbiology.org/wiki/20.109(F18):Lab_tour
  - No lab notebook entries required today

For Tuesday

- Respond to poll on best office hours times (emailed later today)
- Find homework (http://engineerbiology.org/wiki/20.109(F18):Homework):
  - Lab notebook in Benchling
  - Be ready for orientation quiz
  - Screen capture (or print) EHS training certificate(s) to turn in
  - Read Mod1 overview page and M1D1 introduction