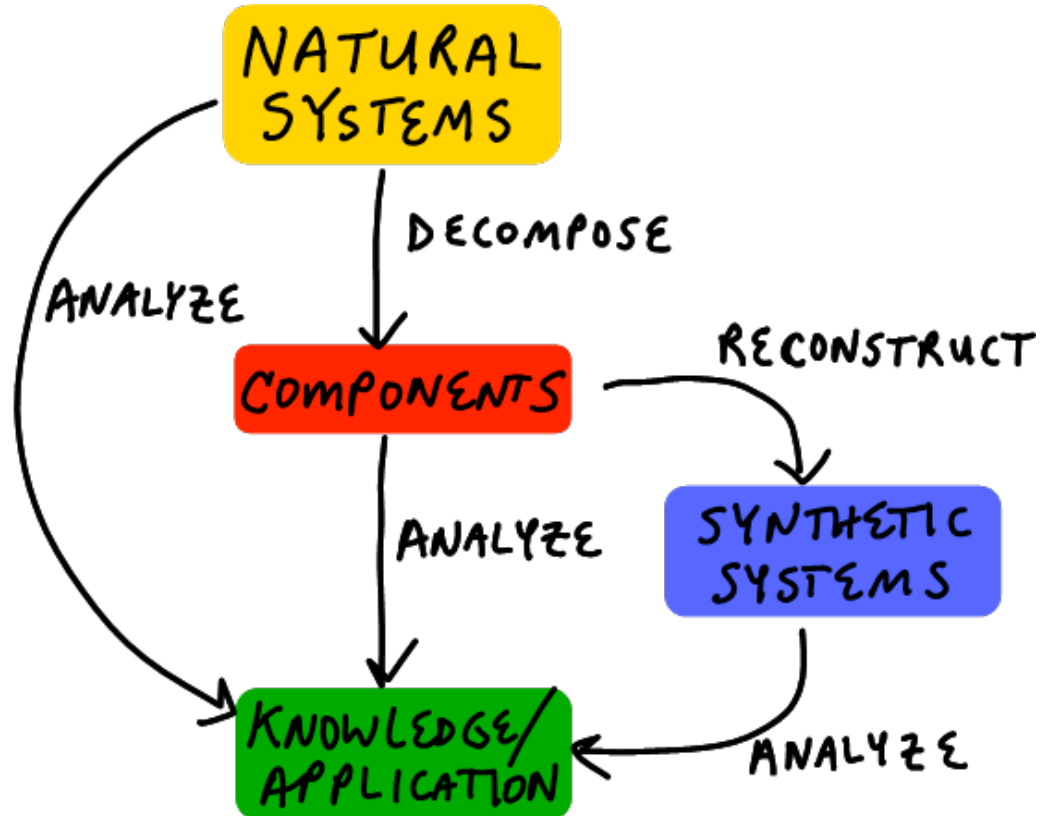


# Orientation: Welcome to 20.109!!

9/10/15

# What is biological engineering?

- Repurposing biology to solve problems
  - DNA
  - Protein
  - Biomaterials



# Lab business

1. Introductions and 20.109 mission
2. Semester overview (introduction to our wiki)
3. Daily operations
4. Laboratory notebook
5. Lab safety specifics
6. Lab tour (introduction to our space)

# 20.109 mission

- Aim 1: Novel investigations
- Aim 2: Authentic communication
- Aim 3: Integrity-based collaboration
  - Contributions to team assignments
  - Independent completion of individual assignments

# Semester overview: hello, wiki

20.109(F15): Laboratory Fundamentals of Biological Engineering



[Home](#)   [People](#)   [Schedule Fall 2015](#)   [Assignments](#)   [Homework](#)   [Lab Basics](#)   [Wiki Basics](#)  
[DNA Engineering](#)   [Protein Engineering](#)   [Biomaterials Engineering](#)

Welcome and details for fall 2015

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**Lecture:** T/R 11-12 (16-220)

**Lab:** T/R 1-5 or W/F 1-5 (56-322)

**People:** Instructor and student web pages may be found at the linked [People](#) page.

<http://engineerbiology.org/wiki/20.109%28F15%29>

# Semester overview: schedule

MODULE	DAY	DATE	LECTURER	LABORATORY EXPERIMENTS	ASSIGNMENTS
		R/F Sept 10/11	NLL <a href="#">↗</a>	Orientation	
1	1	T/W Sept 15/16	BE <a href="#">↗</a>	DNA engineering using PCR	Lab orientation quiz Homework due
1	2	R/F Sept 17/18	BE <a href="#">↗</a>	Clean and cut DNA	
1	3	T/W Sept 22/23	BE <a href="#">↗</a>	Agarose gel electrophoresis	Homework due
1	4	R/F Sept 24/25	BE <a href="#">↗</a>	Ligation & transformation	Lab quiz Homework due
1	5	T/W Sept 29/30	NLL <a href="#">↗</a>	Examine candidate clones and tissue culture	Homework due
1	6	R/F Oct 1/2	BE <a href="#">↗</a>	Lipofection	Homework due
1	7	T/W Oct 6/7	BE <a href="#">↗</a>	Data analysis	Lab quiz Homework due
2	1	R/F Oct 8/9	NLL <a href="#">↗</a>	Evaluate mutations and site-directed mutagenesis	Homework due
		T/W Oct 13/14		Columbus day holiday	DNA engineering summary draft due Tue, Oct 13 at 5 pm

# Semester overview: assignments

- Major assignments (80%)

MODULE	TOPIC	ASSIGNMENT	GRADING
1	DNA Engineering	Summary	15%
		Mini-presentation	5%
2	Protein Engineering	Research report	25%
		Journal club presentation	10%
3	Biomaterials Engineering	Research proposal presentation	20%
		Mini-report	5%

- Daily work (20%)
  - Notebook, quizzes, homework, participation and blog posts

# Daily operations

- Hand in homework, receive graded homework
- Lab treats...
  - 15 points
  - ~15 minutes
- Pre-lab and discussion
- Fun stuff
- The wiki is your friend!!





# Laboratory notebooks

The screenshot displays the Evernote Premium desktop application interface. At the top, the title bar reads 'Evernote Premium' and includes window control buttons. Below the title bar, the user's email 'NLLYELL@GMAIL.COM' is visible, along with navigation and search controls. The main interface is divided into three vertical sections:

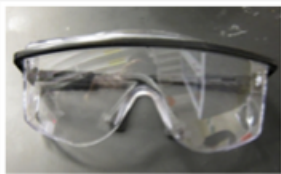


- Left Sidebar:** Contains 'Work Chat', 'Shortcuts' (Fa15 20.109, 20.109(F15), Weekly menus, Grocery Lists), and 'Recent Notes' (Week of 9/7..., Untitled, Week of 9/7..., Week of 8/3..., Week of 8/2...).
- Center Panel:** Shows the selected note '20.109(F15)'. It includes a calendar view for 'SEPTEMBER 2015' with a count of '2' and 'AUGUST 2015' with a count of '3'. The note content includes:
  - F15 order list:** 'Today BioRad Login: 20.109, password: BE56322! 4-15% Mini-PROTEAN® TGX™ Precast Protein Gels, Cat#4561084DC Pur...'
  - 20.109(F15) ToDo (Wiki & Lab):** 'Today Noreen Finish Fa15 homework descriptions M2D7 peer review assignmen...'. This section is highlighted with a blue border.
  - 20.109 enzymes in -20C (# of tu...):** '8/19/15 1 kb Ladder (2) AatII Acc65I Accl Accl AfIII AfLIII (2) AgeI AlwNI Apal Apol BamHI BamHI-HF BclI BglI BglII BglIII BplI...'
- Right Panel:** Shows the note's metadata ('Created: Jul 28, 2015 Updated: Sep 9, 2015') and a checklist for 'Noreen':
  - Finish Fa15 homework descriptions
    - M2D7 peer review assignment
    - M2D8 post data
    - M3D3 design in-class peer review exercise
    - M3D5 peer review assignment and mini-report
  - Update M1 summary assignment
  - Update M2 report assignment
  - Update M3 mini-report assignment
  - update suggested figures

# Evernote

- See wiki page concerning your laboratory notebooks (Assignment tab)
- Register for an Evernote account (Homework assignment due M1D1)
- Create a 20.109 notebook
  - Use your name in the title - 20.109(S15)\_Noreen
  - Share your notebook with me ([nllyell@mit.edu](mailto:nllyell@mit.edu)), Leslie ([lesliemm@mit.edu](mailto:lesliemm@mit.edu)), and Djenet ([djenetb@mit.edu](mailto:djenetb@mit.edu)).

# Lab safety specifics: PPE

## Personal Protective Equipment (PPE)

Item	Required	Recommended
Safety glasses 	<ul style="list-style-type: none"><li>• At hood.</li><li>• When using ethanol burners.</li><li>• Add face shield at UV transilluminator.</li></ul>	<ul style="list-style-type: none"><li>• Large quantities of liquid or powder (even if not strictly hazardous) due to chance of irritation by splash, dust, etc.</li></ul>
Lab coat 	<ul style="list-style-type: none"><li>• At hood.</li><li>• In TC room.</li></ul>	<ul style="list-style-type: none"><li>• See above.</li></ul>
Gloves 	<ul style="list-style-type: none"><li>• Working with hazardous materials (w/r/t chem or bio).</li><li>• Nitrile for greater hazards (e.g., EtBr).</li></ul>	<ul style="list-style-type: none"><li>• Working with any material.</li><li>• Touching gloves-on equipment.</li></ul>

# Lab safety specifics: waste

## Managing Biological Waste

**Benchtop biowaste:**

- 
- 
- 



**Sharps jar:**

- 
- 

**NO LIQUIDS!!!**

**Step-can:**

- 



**Burn box:**

-

# Today

1. Make a friend, choose a bench, sign-up on the lab map up front!
2. Complete lab orientation
  - Lab treat on M1D1
3. Read through Homework assignments
  - See 'Homework' tab for assignments due M1D1
4. Watch for Office Hours poll
  - Will be sent via email tonight
  - Please respond as soon as possible