

# Effective Mentoring of Undergraduates

**PLEASE SIGN IN ON GOOGLE FORM IN CHAT**



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Rutgers University

## Introductions

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- Xenia Morin (PhD in Biochemistry)
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## Effective Mentoring for Undergraduates Learning Goals

Attendees will be able to:

- 1) Define what mentoring is and the different kinds of mentoring
- 2) Discuss practical ways to mentor an undergraduate
- 3) Actively analyze case studies
- 4) Develop follow-up plan of action / sign up for Microbadge



What is the primary reason you choose to mentor an undergraduate in research?

- Someone is assigned to you
- There is a project that needs help
- You want to give back
- You want to gain supervisory experience

Zoom poll



## Mentor Defined

- A mentor is a person, often more experienced, who can serve to offer training, advice, and guidance, through discussions, and through interest in the mentee's goals and experiences.
- An effective mentor builds a two-way relationship with a mentee over the long-term based on trust.
- To an undergraduate, a mentor can play a critical role in shaping the experience.



## How **Research** Mentoring Differs from Other Types

Research mentorship as a construct inherently carries risks of conflicting and competing interests

- training/freedom (altruistic support) vs. research productivity
- different ideas about how to approach a problem

It has very limited similarities to the role of Mentor guiding

Mentoring relationships must navigate all of the challenges of human relationships on top of this

It's well established that mentees who are 'different' from mentors can receive less and lower quality mentorship

Research mentoring relationships range from truly life-defining in a positive way to pathologically debilitating

## Why We Are Optimistic

The proportion of highly positive relationships is really quite high despite all this complexity based on our research

There has been a sea change over 2 decades toward mentorship as a critical skill to teach, learn and apply

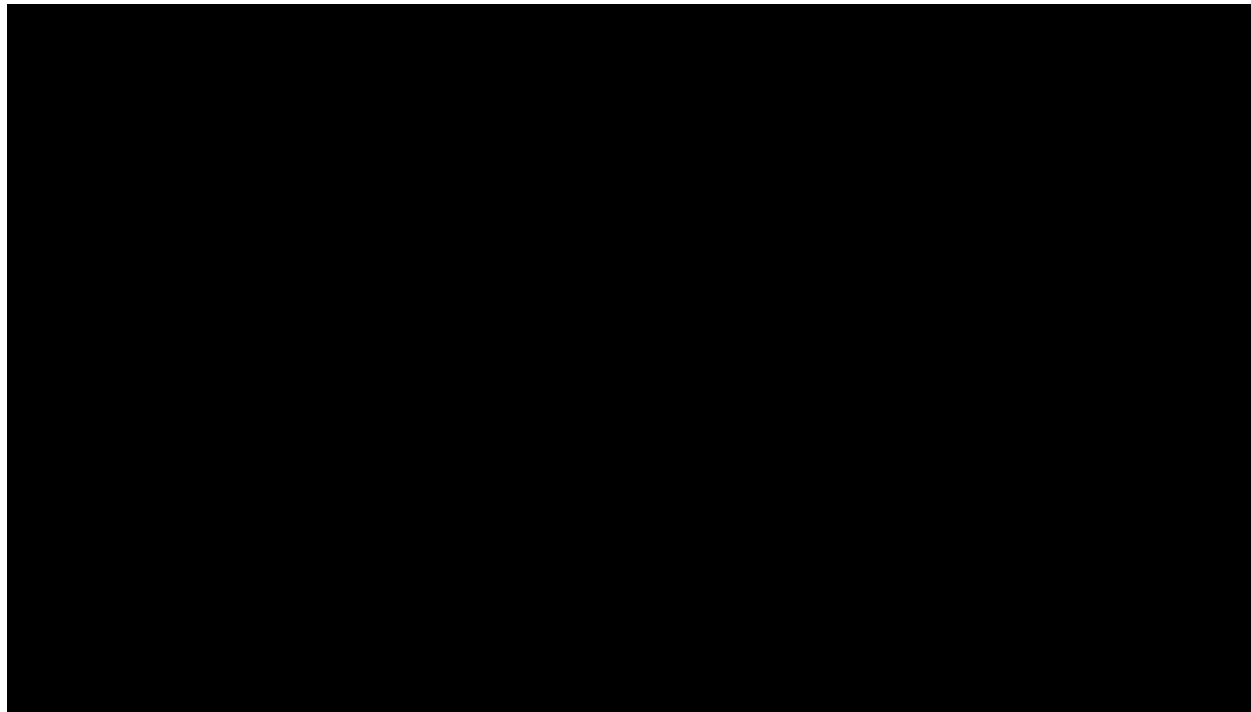
The desire to apply these skills is high from those who engage – even across challenging cultural differences

Evidence-based ways to teach mentorship skills exist

You are all here. You have control as mentors & mentees

A nut still to crack is better ways to detect toxic mentoring and protect trainees who are very vulnerable

Video: <https://vimeo.com/336213022>



## Small Group Discussion in Breakout Room for 8 min

- Introduce yourself
- What challenges and concerns might you face when mentoring undergraduates?
- What principles are important in mentoring relationships?
- Choose a notetaker for the Google Slides and pick a representative to report out your top 2 challenges, concerns, and mentoring principles
- Ground rules for breakout rooms



What challenges, concerns and mentoring principles are important in mentoring relationships?

Share Google slides

## What principles are important in mentoring relationships?

1. Establishing and Aligning Expectations
2. Promoting Professional Development
3. Maintaining Effective Communication
4. Assessing Understanding
5. Mentee Self-Efficacy
6. Addressing Differences
7. Fostering Independence
8. Navigating Mentoring Networks
9. Cultivating Ethical Behavior



# Mentoring Contract



Template pasted in chat

## Undergraduate Mentee Contract\*

\* Adapted from Branchaw, J. L., Pfund, C., and Rediske, R. (2010), *Entering Research: A Facilitator's Manual: Workshops for Students Beginning Research in Science*, Chapter 2 Aligning Expectations, W.H. Freeman & Company

Undergraduate Mentee:

Graduate or Postdoc Mentor:

This contract outlines the parameters of our work together on this research project.

1. Our major goals are:

A. Research project goals:

B. Mentee's personal and/or professional goals:

C. Mentor's personal and/or professional goals:

2. Our shared vision of success in this research project is:

3. We agree to work together on this project for at least \_\_\_\_\_ semesters.

4. The mentee will work at least \_\_\_\_\_ hours per week on the project during the academic year, and \_\_\_\_\_ hours per week in the summer.

The mentee will propose his/her weekly schedule to the mentor by the \_\_\_\_\_ week of the semester.

If the mentee must deviate from this schedule (e.g., to study for an upcoming exam), he or she will communicate this to the mentor at least \_\_\_\_\_ (weeks / days / hours) before the change occurs.

5. On a daily basis, our primary means of communication will be through (circle):  
face-to-face / phone / email / text

6. We will meet one-on-one to discuss our progress on the project and to reaffirm or revise our goals for at least \_\_\_\_\_ minutes \_\_\_\_\_ time(s) per month.

It will be the (mentee's / mentor's) responsibility to schedule these meetings. (circle)

In preparation for these meetings, the mentee will:

In preparation for these meetings, the mentor will:



## 1. Establishing and Aligning Expectations

- Setting clear relationship expectations
- Goals of project
- Estimating mentee ability
- Enhancing mentee skills



Suggested discussion:

- Ask why they want to do research
- Determine prior background and skill set of undergrad and tailor project accordingly
- Give background reading, explain repeatedly, and be wary of jargon
- Teach how to critically read the literature
- Explain what skills will be learned
- Discuss what success in this research experience look like to each of you
- Explain policy for authorship on posters and papers

## Formula for Successful Accountability Discussions



Create safety



Highlight the gap



Start with the facts



Share your story



Ask what happened



Agree to action



## 2. Promoting Professional Development

- Helping network effectively
- Setting career goals
- Helping establish a work/life balance
- Helping mentees acquire resources

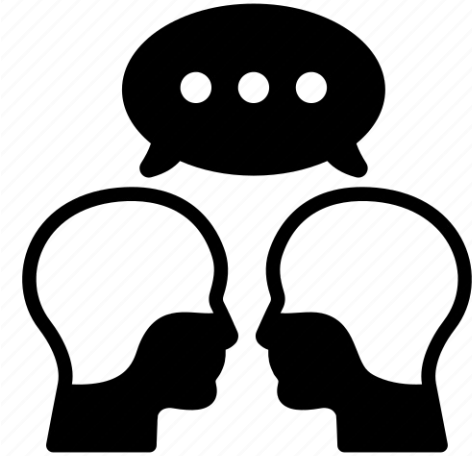
Suggested approaches:

- Bring them to seminars and introduce them to other scientists
- Help them explore career options and create an Individual Development Plan
- Assist with writing recommendation letter
- Understand that exams or personal issues may require time off from lab
- Ensure they have lab safety including CITI training, IRB approval, IACUC training, and access to buildings
- Make sure that all resources and materials etc...are ready and available for their experiments



### 3. Maintaining Effective Communication

- Active listening
- Providing constructive feedback
- Developing a trusting relationship
- Accommodating communication style



Suggested discussion:

- Be a good listener. Ask how they are doing and if they need anything.
- Explain the communication structure between undergrad, grad student, postdocs and PI
- Discuss what is the preferred mode and frequency of communication
- Discuss the expected schedule
- Discuss how the results be documented
- Provide timely feedback on funding proposals, end of semester papers, honor theses, powerpoints etc... and explain your expectation of lead time to receive these items

## Be Aware of Different Communication Styles

<p style="text-align: center;"><b>Thinking/Planning</b></p> <p>ASK FOR:</p> <ul style="list-style-type: none"> <li>• Data</li> <li>• Information</li> <li>• Facts</li> </ul> <p>FOCUSED ON:</p> <ul style="list-style-type: none"> <li>• Process</li> <li>• Task</li> <li>• Goal</li> <li>• Doing things the right way</li> </ul> <p>UNDER STRESS:</p> <ul style="list-style-type: none"> <li>• Avoid</li> </ul> <p>NEED/LIKE:</p> <ul style="list-style-type: none"> <li>• Logical thinking</li> <li>• Documentation</li> <li>• Rational approach</li> <li>• Careful planning</li> </ul>	<p style="text-align: center;"><b>Doing/Directing</b></p> <p>TELL ABOUT:</p> <ul style="list-style-type: none"> <li>• Progress to goals</li> <li>• Actions required</li> <li>• Solutions to problems</li> </ul> <p>FOCUSED ON:</p> <ul style="list-style-type: none"> <li>• Task</li> <li>• Goal</li> <li>• Winning/being successful</li> <li>• Making things happen</li> </ul> <p>UNDER STRESS:</p> <ul style="list-style-type: none"> <li>• Become autocratic and tell</li> </ul> <p>NEED/LIKE:</p> <ul style="list-style-type: none"> <li>• Options</li> <li>• Directness</li> <li>• Flexibility</li> <li>• Conciseness</li> </ul>
<p style="text-align: center;"><b>Supporting/Collaborating</b></p> <p>ASK FOR:</p> <ul style="list-style-type: none"> <li>• Information re: other's skills and interests</li> <li>• Input</li> <li>• Feedback</li> </ul> <p>FOCUSED ON:</p> <ul style="list-style-type: none"> <li>• People</li> <li>• Relationships</li> <li>• Collaborations</li> <li>• How situations "feel"</li> </ul> <p>UNDER STRESS:</p> <ul style="list-style-type: none"> <li>• Acquiesce or yield</li> </ul> <p>NEED/LIKE:</p> <ul style="list-style-type: none"> <li>• Friendliness</li> <li>• Inclusion</li> <li>• Participation</li> <li>• Involvement</li> </ul>	<p style="text-align: center;"><b>Visioning/creating</b></p> <p>TELL:</p> <ul style="list-style-type: none"> <li>• Visions</li> <li>• Ideas</li> <li>• Stories, analogies</li> </ul> <p>FOCUSED ON:</p> <ul style="list-style-type: none"> <li>• Big picture</li> <li>• Models/theories/concepts</li> <li>• Bringing visions into reality</li> </ul> <p>UNDER STRESS:</p> <ul style="list-style-type: none"> <li>• Blame others</li> </ul> <p>NEED/LIKE:</p> <ul style="list-style-type: none"> <li>• To understand how the details fit their picture</li> <li>• Innovation and creativity</li> <li>• Others to handle the details</li> </ul>

## 4. Assessing Understanding

- Setting research goals
- Developing strategies to meet goals
- Assessing mentee knowledge and comprehension

### Suggested approach

- Discuss with PI who will decide project and how much responsibility you have in mentoring
- Ensure undergraduate can
  1. explain rationale (big picture)
  2. state background for project (previous studies)
  3. state hypothesis
  4. explain why chose this technique and how it works
  5. explain steps in protocol
  6. explain how data is analyzed
  7. explain interpretation of data analysis
- Implementation: weekly meetings where one of the above aspects is reported out in in-person meetings or else videotaped and shared
- If problems persist what could be underlying the issue and how would you handle?



## 5. Mentee Self-Efficacy

- Motivating mentees
- Building confidence

Suggested approaches:

- Be aware of imposter syndrome
- The goal is to give them confidence that they can do some or all of the work by themselves
- Help them see the joys of research but understand that not everybody wants to get a PhD. How to motivate pre-meds is that cure could help hundreds of patients
- Teach them to accept that failure is OK and that we learn from these mistakes. If you screw up, speak up
- Don't put undue pressure to get positive results and enforce that negative results are still valuable



## 6. Addressing Differences

- Considering differences may impact expectations
- Accounting for biases and prejudices
- Accounting for different backgrounds of mentors and mentees



Suggested approach:

- Be aware of unconscious bias - Refers to a bias that we are *unaware of*, and which happens outside of our control. It is a bias that happens automatically and is triggered by our brain making quick judgments and assessments of people and situations, influenced by our differences
- Be culturally sensitive
- Be aware of microaggressions
- Be aware of educational background
- Be aware of ageism
- Be aware of people who are differently able
- Send to CAPS if anxiety is high

## 7. Fostering Independence

- Simulating creativity
- Acknowledging mentees' professional contributions
- Negotiating path to independence

### Suggested approaches

- Discuss what level of independence is expected
- Encourage them to formulate questions and try to answer them themselves before asking you
- Teach excellent note taking and lab book maintenance
- Agree on how much practice they will need
- Have them watch you several times, then you watch them, and finally they do on their own while you are available for questions
- Have them teach someone else
- Analyze outcomes and have them do it in parallel to see if get same outcomes
- Create a reasonable timeline – make daily task list until they can do it for themselves
- Encourage creating check lists for protocols and locations
- Require “what did you learn this week and how” reports
- Some situations involving undergraduates require mentoring up from grad student to PI



## 8. Navigating Mentoring Networks

- Coordinating with other mentors

Suggested approach:

- Encourage trainee to find other mentors
- Be aware of other mentors that the trainee may have
- Discuss with those mentors if they have differences in approaches
- No single approach is correct and trainees may benefit from various perspectives



## Case Scenario – Frustrated Grad Student Mentor

- Sofia, a grad student, had just begun mentoring Jordan, an undergrad student who was participating in the lab for exposure to research. Sofia was anticipating mentoring Jordan in learning and development in the lab, but soon discovered some problems. Jordan was always late, occasionally missing the start of an experiment, and this caused delays and incomplete data. Secondly, Jordan never took notes during experiments. When Sofia asked for progress later during the week, Jordan would either forget something or be forced to rework it since there were missing records.
- Sofia raised these issues several times, reminding Jordan of being punctual, keeping records, and frequent feedback. Jordan agreed to these concepts in the conversations, but the attitude did not change. Sofia is frustrated now, questioning why she should keep putting time into mentoring Jordan when the lack of responsibility holds back research progress.

## Discussion Questions for Case - Frustrated Grad Student Mentor

This case raises the issues of how graduate student mentors can set expectations, hold the mentee accountable, and balance being supportive with productivity and professionalism in the lab.

1. How can Sofia set clear expectations and boundaries for Jordan's duties?
2. What are some strategies that Sofia can employ to encourage accountability without being overly harsh?
3. How might Jordan's behavior influence the mentor–mentee relationship and lab productivity?
4. What is the appropriate place for documentation and communication practices in early research training?



## Summary Points about Case - Frustrated Grad Student Mentor

- This case study highlights matching expectations, building independence, communication, and professional development. A key practice is to set clear expectations early, especially for undergraduate researcher. Basic competencies like punctuality, lab note-taking, and frequent communication, these need to be well communicated, perhaps in a mentoring agreement or written checklist.
- The other important practice is building accountability structures. Practices such as weekly progress reports, shared electronic lab notebooks with the mentor, or even brief check-ins can potentially create habits without causing frustration to the mentor.
- Equally important is giving constructive feedback. Rather than repeating reminders, Sofia can frame the expectations as part of Jordan's long-term career development, so that he sees these skills as being central to success and not just arbitrary rules.
- Finally, mentors must balance patience and consequences. If issues persist, consultation with a faculty supervisor on the mentee's role may be necessary.



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**Preventing 'small' but potentially catastrophic mistakes when  
working with trainees with little research experience**

OR

**How I learned to stop worrying and  
love working with undergraduates**

Benton Purnell 5/6/26

## What can you trust undergraduates with and when?

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On the one hand: Getting undergraduates **meaningfully involved** with research is essential to training the next generation of scientists.

On the other hand: Getting undergraduates meaningfully involved with research necessitates some degree of **responsibility and autonomy** and opens the door to **catastrophic mistakes**.

Undergraduate help can advance your research program **quickly** in a way that is **cost effective**.

Undergraduates have the capacity to make mistakes that are **enormously costly** in both time and money.

You can **check your students work** later for any mistakes.

Some of the most troubling mistakes are **difficult to recognize**.

Your students may be able to provide **diverse perspectives** within your research program.

Each student is different and will do things slightly differently. **Many hands make variable work**.

# Can you trust undergraduates with preparing buffers and solutions?

There are few lab tasks simpler than this and having students prepare reagents like this can **save a lot of time**.

Preparing a reagent incorrectly can **ruin** an entire set of experiments.  
Bad reagents can be a difficult to recognize if they ever are...

aCSF

**REAGENTS AND SOLUTIONS**  
Use deionized, distilled water in all recipes and protocol steps. For common stock solutions, see APPENDIX 2A; for suppliers, see SUPPLIERS APPENDIX.

**Artificial cerebrospinal fluid (aCSF, rat)**

10× stock solution

- 0.284 g  $\text{Na}_2\text{HPO}_4$  (20 mM final)
- 0.952 g  $\text{MgCl}_2$  (10 mM final)
- 0.133 g  $\text{CaCl}_2$  (12 mM final)
- 0.201 g  $\text{KCl}$  (27 mM final)
- 8.470 g  $\text{NaCl}$  (1.45 M final)

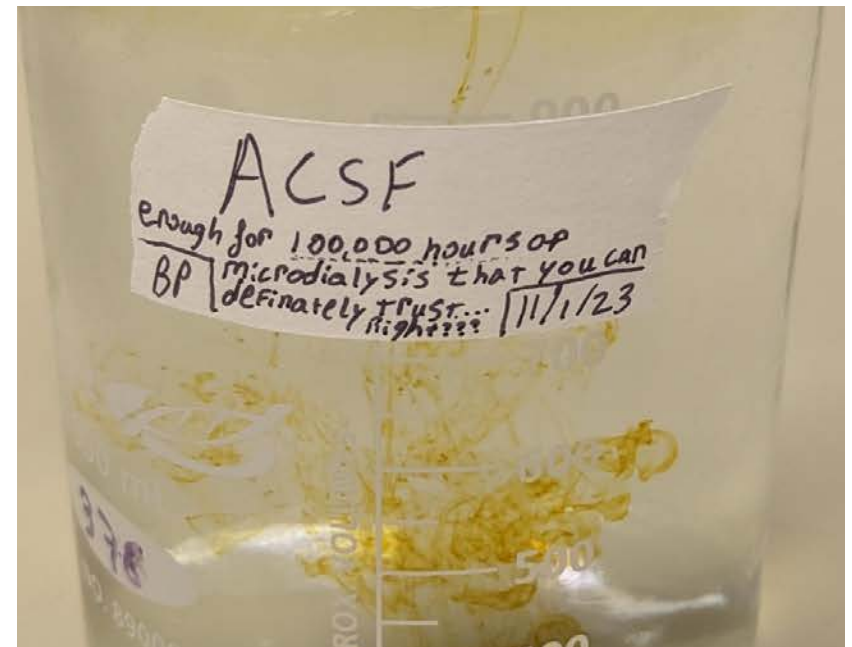
*Incorrect, this is 0.145 M final*

$\text{H}_2\text{O}$  to 100 ml

Filter sterilize, adjust to pH 7.4 if necessary with 1 N NaOH or phosphoric acid, and store up to 1 month at 4°C.

**Working solution**

Dilute the stock solution 1:10, filter sterilize, and adjust to pH 7.4 prior to the start of an experiment.



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What is a scientist who is serious about rigor, reproducibility, and mentoring undergraduates to do about this issue?

Involving undergraduates in research is a huge **opportunity** and an **obligation** to the continuation of our craft.

However, **serious precautions** need to be taken to prevent the unnecessary waste of your time, your lab's resources, and taxpayer dollars.

Learning Objective: Pick up some general strategies and specific approaches to ensure undergraduate research endeavors in your lab are edifying, enjoyable, rigorous, and safe.

# General strategy: Encourage precise and punctilious notetaking

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Specific approach: Do not allow undergraduates to simply follow along with a printed protocol. Insist they write down what they are doing as they go.

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**aCSF**  
Artificial cerebrospinal fluid (aCSF, rat)

10x stock solution  
 0.284 g Na<sub>2</sub>HPO<sub>4</sub> (1 mM final)  
 0.952 g MgCl<sub>2</sub> (10 mM final)  
 0.135 g CaCl<sub>2</sub> (2 mM final)  
 0.201 g KCl (2 mM final)  
 8.470 g NaCl (125 mM final) *Incorporate, this is 0.145M final*  
 H<sub>2</sub>O to 100 ml

Filter sterilize, adjust to pH 7.4 if necessary with 1 N NaOH or phosphoric acid, and store up to 1 month at 4°C.

Working solution  
 Dilute the stock solution 1:10, filter sterilize, and adjust to pH 7.4 prior to the start of an experiment.

aCSF w/ analytes for M.S. Calibration 1/27/23

	500 mL	Concentration	Mol. weight
2.578mg GABA		50 μM	103.12
36.78mg Glutamate		500 μM	147.13
187.68mg Glycine		5mM	75.07
267.24 μg Adenosine		2 μM	267.24

Part 2: Master mix (0.27 mg) 267.24 μg Adenosine

Master mix 2nd attempt 2/1/23 (250 ml)

Component	Amount	Concentration
GABA	1.3 mg	5.2 mg/ml
Glutamate	18.39 mg	73.56 mg/ml
Glycine	93.8 mg	375.2 mg/ml
ADP	133.62 μg	534.48 μg/ml

ADP Stock: 3.4 mg in 5 mL  
 0.68 mg/mL  
 680 μg/mL  
 0.68 μg/mL  
 1.97 μL

Stock Solution  
 5 mL DI H<sub>2</sub>O  
 5.6 mg 1.3 mg  
 267.24 / 0.26 (μg/μL) = 1028 μL

Dilutions 2/1/23

- 1 mL aCSF + 1 μL MM
- 1 mL aCSF + 3 μL MM
- 1 mL aCSF + 10 μL MM
- 1 mL aCSF + 20 μL MM
- 1 mL aCSF + 50 μL MM

Part 1: Stock solution aCSF 1 liter

0.284g	Na <sub>2</sub> HPO <sub>4</sub>
0.952g	Mg Cl <sub>2</sub>
0.135g	Ca Cl <sub>2</sub>
0.201g	KCl
8.470g	Na Cl

# General strategy: Encourage precise and punctilious notetaking



School of Graduate Studies

Specific approach: Do not allow undergraduates to simply follow along with a printed protocol. Insist they write down what they are doing as they go.

Specific approach: Have specific expectations for how lab notebook entries are structured and review lab notebook entries with their authors retrospectively.

Entry title at the top, 2 lines wide with a 'carrot' symbol

Date of initial entry in the c

Column  
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Date/tim  
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tions

A handwritten lab notebook page titled "AlcAdo EEG - 48 Acclim/EEG Trials" with a date of "10/30/23". The page is organized into columns for "Date/time" and "Actions/observations". The entries include acclimation periods, drug administration (S.Oil and Alc), and EEG recording. Animal demographic information is noted on the right side.

Date/time	Actions/observations	Animal demographic information
10/30/23 5:24p	Acclim #1 (5:24p-6:50p)	DOB: 8/30/23
10/31/23 10:49a	Acclim #2 (10:49a-11:20a)	Surgery: 10/23/23
11/2/23	(28.3g) S. Oil + Alc trial day	(57B165)
11/2/23 10:36a	0.50 mL S. oil (100 mg/kg 5.62 mg/mL)	Male
11/2/23 1:26p	0.90 mL Alc EEG Rec started	(D. SulFron)
" " 2:36:20p	0.90 mL Alc (20%)	

Animal demogra  
information on tr

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Entry title at the top, 2 lines wide with a 'carrot' symbol

Date of initial entry in the c

Column  
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Date/tim  
e &  
Actions/  
observa  
tions

The image shows a handwritten lab notebook page on grid paper. The page is titled 'Alc ADO-38 Acc lim/Trials' and contains a table with columns for 'Date/time' and 'Actions/observations'. The entries are as follows:

Date/time	Actions/observations
9:40a 11/2/22	Acc lim #1 (9:40a - 10:20a)
9:23a 11/8/22	Acc lim #2 (9:23a - 9:53a)
11/9/22 9:34a	(23.5g) calibrating Pleth
11/9/22 9:37a	Start Pleth Rec.
11/9/22 10:37a	Alcohol (5g/kg) + Saline i.p. ↑ 0.12 ml Saline ↓ 0.74 ml 20% Alcohol
11/9/22 12:37p	5% CO <sub>2</sub> Switch
11/9/22 1:37p	End trial

Animal demographic information is written on the right side of the page: C57Bl65, Male, DJB: 8/1/22, 2 tail marks, DOB: 9/7/22.

Animal demogra  
information on tr

# General strategy: Encourage precise and punctilious notetaking



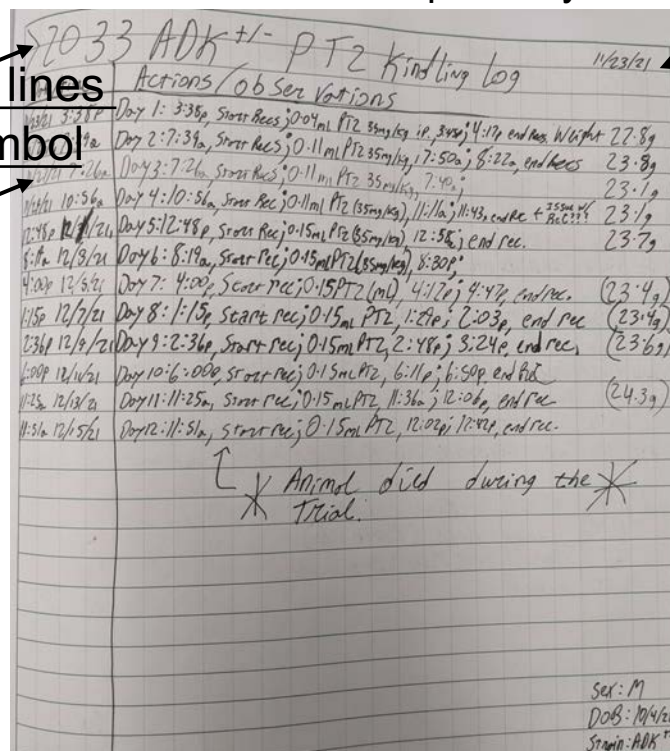
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Entry title at the top, 2 lines wide with a 'carrot' symbol

Column for Date/time & Actions/observations



Date of initial entry in the corner

Animal demographic information on the side

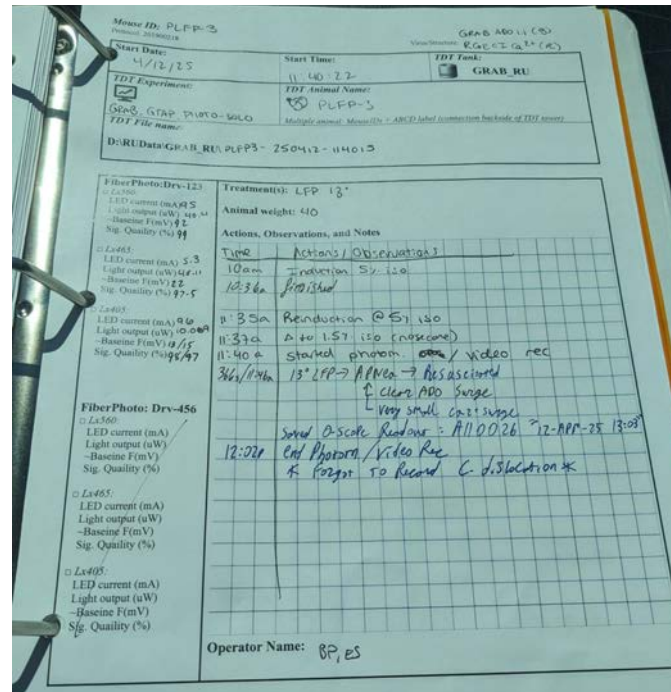
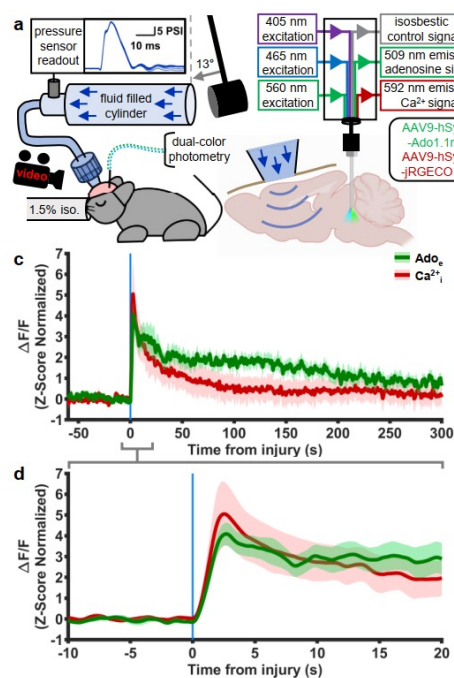
Sex: M  
DOB: 10/4/21  
Strain: ADK<sup>TR</sup>

# General strategy: Encourage precise and punctilious notetaking

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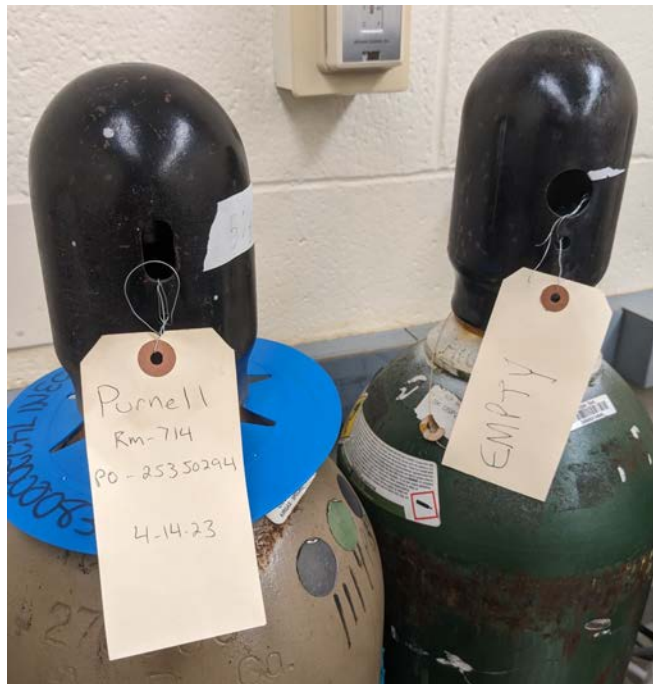
Specific approach: Have specific expectations for how lab notebook entries are structured and review lab notebook entries with their authors retrospectively.



General strategy: Encourage precise and punctilious notetaking

**R**UTGERS UNIVERSITY  
General strategy: Prevent ambiguous diffusion of responsibility

Specific approach: Make sure the transfer of responsibilities is stated explicitly and verbally acknowledged by the person receiving the responsibility.

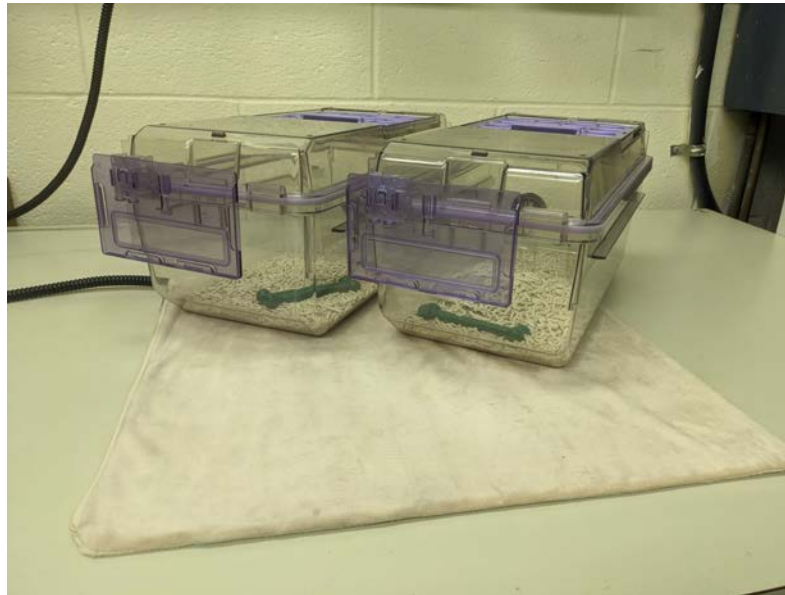


General strategy: Encourage precise and punctilious notetaking

## **R** | RUTGERS UNIVERSITY | **General strategy: Prevent ambiguous diffusion of responsibility**

Specific approach: Make sure the transfer of responsibilities is stated explicitly and verbally acknowledged by the person receiving the responsibility.

Specific approach: Be clear with your students that if they expect you or someone else in the lab to do something, they must be totally disinhibited about asking explicitly that it be done.



General strategy: Encourage precise and punctilious notetaking

General strategy: Prevent ambiguous diffusion of responsibility



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General strategy: Create a work culture that emphasizes the adverse results of mistakes and the benefits of recognizing that a mistake has

happened

Approach: Positively reinforce people coming to you immediately when they suspect they have made a mistake.

General strategy: Encourage precise and punctilious notetaking

General strategy: Prevent ambiguous diffusion of responsibility



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**General strategy: Create a work culture that emphasizes the adverse results of mistakes and the benefits of recognizing that a mistake has happened**

Specific approach: Positively reinforce people coming to you immediately when they suspect they have made a mistake.

Specific approach: When a mistake happens, emphasize prospective action plans for avoiding future mistakes and deemphasize explanations or excuses.



General strategy: Encourage precise and punctilious notetaking

General strategy: Prevent ambiguous diffusion of responsibility

General strategy: Create a culture that emphasizes adverse results of mistakes and the benefits of recognizing them

**General strategy: Use a level of detail in your instructions that is contextually appropriate to the situation.**



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General strategy: Encourage precise and punctilious notetaking

General strategy: Prevent ambiguous diffusion of responsibility

General strategy: Create a culture that emphasizes adverse results of mistakes and the benefits of recognizing them

**General strategy: Use a level of detail in your instructions that is contextually appropriate to the situation.**

Specific approach: Use an outline structure when you make your protocols. An outline structure allows you to put in as much clarifying detail as you would like while making it easy to skip potentially unnecessary details.

General strategy: Encourage precise and punctilious notetaking

General strategy: Prevent ambiguous diffusion of responsibility

General strategy: Create a culture that emphasizes adverse results of mistakes and the benefits of recognizing them

**General strategy: Use a level of detail in your instructions that is contextually appropriate to the situation**

Specific approach: Use an outline structure when you make your protocols. An outline structure allows you to put in as much clarifying detail as you would like while making it easy to skip potentially unnecessary details.

#### **Instructions for running an alcohol + Flumazenil or Vehicle Plethysmography Trial**

##### Part 1: Getting the animals and starting the baseline pleth recording

1. Turn on the laptop (power button).
2. Log into the laptop (the pin is "2600").
3. Determine what kind of trial needs to be run.
  - a. Navigate to Desktop>Boison Lab> HCVR Projects > Alc-Flumaz-HCVR Experiment.
  - b. Open the document titled "Trial Checklist\_Alc-Flumaz\_2023 03 10".
  - c. Look for two animals that have not had a trial in at least 72 hours (3 days)
4. Get those animals from the RT vivarium and bring them to our room on the 7<sup>th</sup> floor.
  - a. These animals will have their tails marked so we can identify them.
5. Weigh the animals and make a note of their weight on a new line in their lab notebook page (see pages 156-164 of lab notebook #8 [VIII]).
6. Make sure the plethysmography boxes are clean-- clean and dry them if they are dirty.
7. Take the cap off of the plethysmography temperature/humidity sensor.
8. Turn the plethysmograph on (on button on the front).
9. Start the recording
  - a. Start the "Finepointe" plethysmography software (blue ball icon on the desktop).
  - b. Log in, (Login Name: "Bpurnell", no password).
  - c. Click the "laboratory home" button (it looks like a house).
  - d. Double click the "Alc/ADO trials (Push HCVR)" folder.
  - e. Click "launch station" and launch the data acquisition software.
  - f. Type in the ID numbers of the animals "AlcADO-..."
  - g. Click Finish.
  - h. Put the mice in the correct plethysmography chambers.
  - i. Check the signal, see if it looks good. Troubleshoot for problems if it does not.
    - i. The box flow signal should be between -5 and -15 ml/min
  - j. Press F12 once to begin the recording. After you do so, it should say 'acclimation period'
10. Write down the time you started the recordings in the lab notebook for each animal.
11. Make sure that animals that are still in their home cage have water bottles.

##### Part 2: Preparing the injections

12. Determine which injections need to be given-- each animal will be receiving two injections: (1) Alcohol or saline and (2) Flumazenil (20 mg/kg) or Vehicle (60%saline, 20% alcohol, 20% DMSO). Check the "Trial Checklist\_Alc-Flumaz" document to determine what injections the animal will need (go in

General strategy: Encourage precise and punctilious notetaking

General strategy: Prevent ambiguous diffusion of responsibility

General strategy: Create a culture that emphasizes adverse results of mistakes and the benefits of recognizing them

**General strategy: Use a level of detail in your instructions that is contextually appropriate to the situation.**

Specific approach: Use an outline structure when you make your protocols. An outline structure allows you to put in as much clarifying detail as you would like while making it easy to skip potentially unnecessary details.

Specific approach: Make sure your efforts to give ancillary insights or to reinforce the 'big picture' do not prevent you from giving direct and unambiguous answers to your students questions.

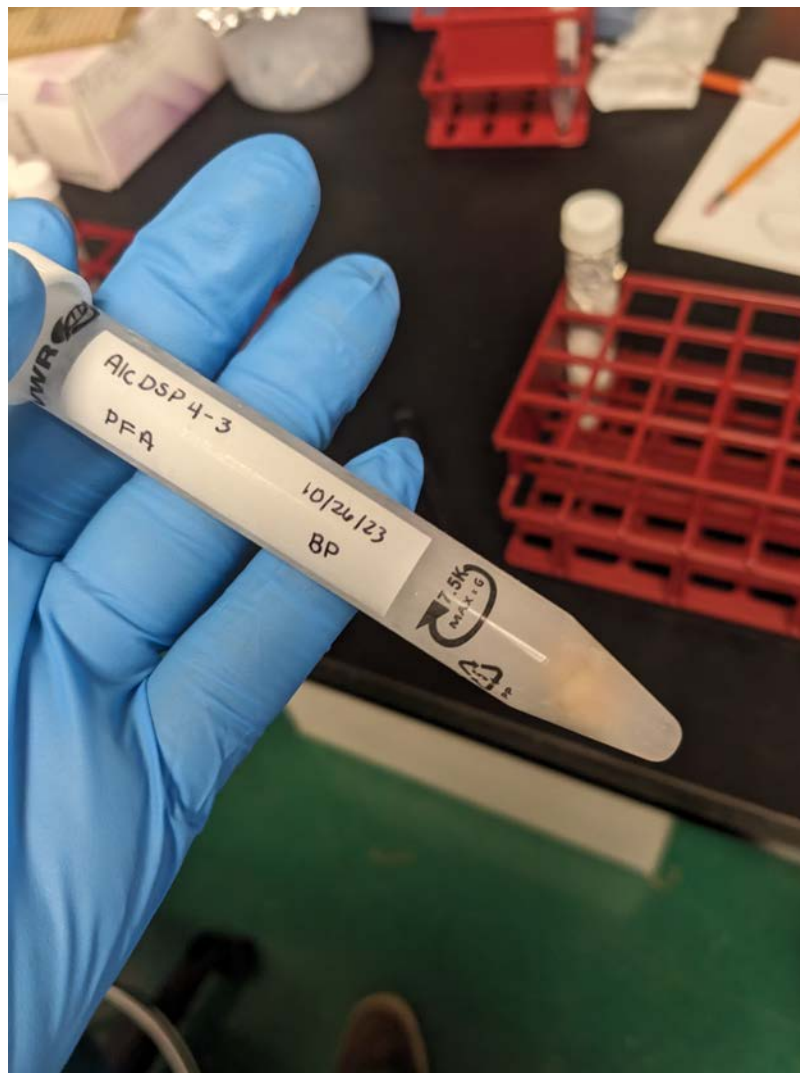
Benton: "Hey, Student, could you take the brains from the DSP-4 study over to SPH for me?"

Student: "Sure! They are in the **fridge** now, but we need to **freeze** them soon, right?"

Should I put them in the **fridge** or the **freezer** when I get to SPH?"

What Benton should have said: "The **fridge**, please."

What Benton actually said: "The **fridge**, but we will put them in the **freezer** soon. Keep it mind, that will be the **-80 freezer** not the **-20 freezer**. After they are **frozen** we will be able to section them and then do the histology. Frankly I am not sure why they need to be **frozen** in the **-80 freezer** and not the **-20 freezer**. Perhaps the tissue is more stable in the **-80 freezer** long term; however, the **-20 freezer** would probably be sufficient to





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## Mentoring Committee

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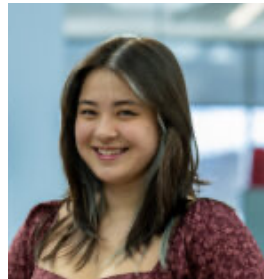


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## Case Scenario – The Quiet Undergraduate

- Petros, a first-year graduate student, was assigned to mentor Marialejandra, a sophomore undergraduate in a summer research program. At first, Marialejandra seemed enthusiastic, but over time, she became quiet and withdrawn. Petros noticed that Marialejandra rarely asked questions and gave short, vague responses during their daily check-ins. Her lab notebook lacked detail, and her experiments were not progressing as expected.
- Petros assumed Marialejandra was just shy and preferred to work independently. However, during a casual lunch, another undergraduate mentioned that Marialejandra was feeling overwhelmed, unsure if she belonged in the lab, and intimidated by Petros's fast-paced explanations. Petros was surprised, having believed they were being approachable and supportive. Now unsure how to proceed, Petros wonders how to reestablish trust and help Marialejandra feel more engaged and confident.

## Discussion Questions for Case – The Quiet Undergraduate

1. How might Petros have evaluated Marialejandra's comprehension and comfort level sooner?
2. In what ways can a mentor foster an environment that is inclusive and friendly to all mentees?
3. What action should Petros take right now to get Marialejandra back into the picture?
4. What symptoms of self-doubt or imposter syndrome are evident in this instance?
5. How might different mentees benefit from varied communication styles?

## Summary Points about Case – The Quiet Undergraduate

This case focuses on mentee self-efficacy, diversity, and comprehension assessment. It emphasizes the significance of:

- Utilizing open-ended questions to assess learning on a frequent basis rather than relying solely on silence.
- By promoting inquiries and normalizing misunderstanding, mentorship relationships can be made psychologically secure.
- Identifying impostor syndrome symptoms and understanding that some students may be reluctant to share their difficulties, particularly those from marginalized backgrounds.
- Mentors who are aware of different communication styles may need to slow down, employ analogies, or check in in a variety of ways (written, verbal, informal).
- Creating a welcoming atmosphere right away by requesting feedback and making it clear that asking questions is valued and anticipated.
- If issues are brought up indirectly (for example, by a peer), follow up in a supportive, non-confrontational manner.

This case ultimately advises mentors to help diverse learners, particularly those who might be reluctant to speak up or who feel uncomfortable in a research setting, by being proactive, sympathetic, and flexible.



## What to Do If a Student Shows Signs of Depression or Anxiety

There are professionals who can help our students in the case of more serious concerns.

Be direct with your concerns. Tell them what you are seeing that has you worried.

Helpful responses:

- Listening
- Conveying an understanding
- Expressing that you care
- Normalizing what they are feeling
- Validate the student's experiences and talk to them about helpful resources such as Counseling, Alcohol and Other Drug Assistance Program & Psychiatric Services (CAPS) <http://health.rutgers.edu/medical-counseling-services/counseling/>  
"Share-A-Concern" <http://health.rutgers.edu/do-something-to-help/>  
"Everyone needs help sometimes."  
"It sounds like you are dealing with a lot, it might be helpful to have someone to talk with."  
Suicide and Crisis Lifeline 988

Unhelpful responses:

- Judging
- Minimizing
- Implying what they are feeling is their fault



## Optional follow up activities to earn Microbadge in Mentoring Undergraduates

You will be invited to Canvas site

1. Write a reflection on your mentoring style
2. Take Communication Style assessment
3. Take an implicit association test
4. Modify and personalize undergraduate contract
5. Plan your first meeting with a new undergraduate considering how you may adapt your style if they come from a different background than you
6. Evaluate another case study provided to you
7. Compose an original case study using a situation that you have encountered with an undergraduate
8. Write a reflection of your mentoring experience. How has your approach to mentoring changed?

Steps 1-4 should be completed prior to your mentee starting in the lab

Steps 5-7 should be completed by August 31 (flexibility for Fall mentoring)



## What do you plan to do? Self reflection

- Write down a few approaches you will now use when mentoring undergraduates that you have not used before.
- Share your reflection and plan with your PI to establish clear communication pathways.



## Foundational Premises

Openly acknowledge the elephants in the room.

Openly acknowledge that relationships are complicated, we all make mistakes, wish for do-overs.

Mentorship skills are complex, and nobody is magically born with them. But they can be learned!

The invisible must become visible – conversations are forgotten as soon as they end – we forget to say things and think we do – write things down.

Mentors must embrace and value mentees' needs.

Mentees must figure out their needs and convey them to mentors. More onus on mentees to “Mentor Up”

## Summary of principles important in mentoring relationships?

1. **Aligning Expectations**
  - Setting clear relationship expectations
  - Goals of project
  - Estimating mentee ability
  - Enhancing mentee skills
2. **Promoting Professional Development**
  - Helping network effectively
  - Setting career goals
  - Helping establish a work/life balance
  - Helping mentees acquire resources
3. **Maintaining Effective Communication**
  - Active listening
  - Providing constructive feedback
  - Developing a trusting relationship
  - Accommodating communication style
4. **Assessing understanding**
  - Setting research goals
  - Developing strategies to meet goals
  - Assessing mentee knowledge and comprehension
5. **Mentee Self-Efficacy**
  - Motivating mentees
  - Building confidence
6. **Addressing Differences**
  - Considering differences may impact expectations
  - Accounting for biases and prejudices
  - Accounting for different backgrounds of mentors and mentees
7. **Fostering Independence**
  - Simulating creativity
  - Acknowledging mentees' professional contributions
  - Negotiating path to independence
8. **Navigating Mentoring Networks**
  - Coordinating with other mentors



## Material for this workshop

- Pfund, et al. *Entering Mentoring*, revised edition.
- NRMN-CAN workshops
- Lee, Steve "Mentoring Up: Pro-actively managing your mentoring relationship by assessing and applying your strengths". Graduate Diversity Office, UC Davis, University of California. PDF Presentation ABRCMS, November 12-15, 2014.
- Hyun, S.H. et al. Re-validation of the mentoring competency assessment to evaluate skills of research mentors: the MCA-2, *Journal of Clinical and Translational Science*. 10.1017/cts.2022.381 (2022)
- Rick McGee, PhD Associate Dean for Professional Development, Professor of Medical Education, Feinberg School of Medicine, Northwestern University

## Q & A

