

Course Title: "Seeing Yourself in Science" (IB98)

Credits: 2 credits

Instructors:

Emilie Richards

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Course overview

"Seeing Yourself in Science" (IB98) aims to increase science self-efficacy in undergraduate students. This course will teach students how to use science as a tool to reach a diverse set of personal goals. The course is 15 weeks long and meets every Tuesday from 2-4pm in room VLSB4110. Over the course of the semester, students will conduct scientific studies of their own design investigating any question that interests them and is related to their everyday lives. This is a stark departure from traditional research courses, as many of those classes still require students to perform research in a predetermined field which may not inherently be relatable. In this class you will expand your definition of a scientist to include yourself, gain new skills to use science in your everyday life, and create your own scientific story.

Course Learning Goals and Approaches

At the end of this class you will:

1. Expand your definition of a scientist to include yourself. Science is a tool that anyone can use!
 - a. Investigate a question of personal interest by designing and implementing a study using the scientific method.
 - b. Discussing the current perceptions of a "scientist" and why that is flawed
2. Gain new skills to help you critically analyze, interpret, understand common types of data that you may encounter.
 - a. Learning about open source tools that are commonly used to interpret data
 - b. Discussing the subjective nature of data and data analyses
 - c. Learning the components of a traditional scientific story, and discussing their pros and cons
3. Create your own scientific story to communicate your findings to your friends and family in a relatable way.
 - a. Gain experience communicating your scientific process, progress, and conclusions to your peers, colleagues, family, and friends

Meet the instructors

Emilie Richards: Hey y'all! My name is Emilie Richards and I am a 6th year graduate student in Integrative Biology. I am delighted to be a student instructor of this course because I want to learn and reflect alongside everyone else taking the course about how I can use scientific skills in my everyday life outside of my graduate research studying evolutionary biology. I can't wait to figure out the fastest route from the BART to my office, or how many tummy pokes my cat will tolerate under various conditions before attacking me, or what are some optimal coffee drinking routines given my preferences for drinking large cups of coffee kept at a temperature just slightly below burning my tongue.... So hard to decide!

Michelle St. John: Hello All! My name is Michelle St. John and I am a 5th year graduate student in Integrative Biology here at UCB. I am very excited to be a student instructor of this course because I love using science to answer questions in my everyday life. I also really enjoy data analysis and look forward to working with you all to figure out what your data is "telling" you. This semester I plan to investigate either: 1) how many times my dog chases his tail before he decides that it is the right time to eat or 2) which window in my house is my cats' favorite spot.

Land Acknowledgment

We support the statement co-created by the Muwekma Ohlone Tribe and the UCB Native American Student Development which recognizes that:

'UC Berkeley sits on the territory of xučyun (Huichin), the ancestral and unceded land of the Chochenyo speaking Ohlone people, the successors of the sovereign Verona Band of Alameda County. This land was and continues to be of great importance to the Muwekma Ohlone Tribe and other familial descendants of the Verona Band.

We recognize that every member of the Berkeley community has, and continues to benefit from, the use and occupation of this land, since the institution's founding in 1868.

Consistent with our values of community, inclusion and diversity, we have a responsibility to acknowledge and make visible the university's relationship to Native peoples. As members of the Berkeley community, it is vitally important that we not only recognize the history of the land on which we stand, but also, we recognize that the Muwekma Ohlone people are alive and flourishing members of the Berkeley and broader Bay Area communities today.'

By offering this Land Acknowledgement, we affirm Indigenous sovereignty and pledge to hold UC Berkeley and ourselves more accountable to the needs of American Indian and Indigenous peoples.

Diversity and Equity Statement

Science is commonly viewed as completely objective. In reality, science is subjective and historically built on the viewpoints and perspectives of a small subset of privileged voices. Furthermore, science has explicitly ignored and devalued the contributions of marginalized

groups. We are offering this class in the hopes of expanding the perspective of science as a tool for everyone, however, we would like to acknowledge that most of our scientific training has come from the above perspective. It is possible that there may be overt and/or covert biases in the material or our suggestions. Integrating a diverse set of experiences is important for a more comprehensive understanding of science, and we welcome anyone's feedback regarding the course. If you would like to offer anonymous feedback please fill out this [form](https://forms.gle/QYsXRqjx3Y6oLPYz7) (<https://forms.gle/QYsXRqjx3Y6oLPYz7>).

Our goal is to create a learning environment that supports a diverse set of identities (including race, gender, class, sexuality, religion, ability, etc.) to accomplish this:

- Please let us know your preferred pronouns
- If something outside of the course is impacting your performance in this class please let us know. We are here to support you in any way we can and can help provide resources for a variety of topics.
- If anything is said in class that makes you feel uncomfortable, and you would like to address it, we would appreciate your feedback (anonymous or not).

We really liked the diversity and equity statement from Monica Linden at Brown University (<https://www.brown.edu/heridan/teaching-learning-resources/inclusive-teaching/statements>), and drew a lot of inspiration from her to make the above statement.

UC Berkeley Disabled Students' Program

UC Berkeley is committed to creating a learning environment that meets the needs of its diverse student body including students with disabilities. If you anticipate or experience any barriers to learning in this course, please feel welcome to discuss your concerns with us. If you have a disability, or think you may have a disability, you can work with the Disabled Students' Program (DSP) to request an official accommodation. The Disabled Students' Program (DSP) is the campus office responsible for authorizing disability-related academic accommodations, in cooperation with the students themselves and their instructors. You can find more information about DSP, including contact information and the application process here: dsp.berkeley.edu.

If you have already been approved for accommodations through DSP, please meet with us so we can develop an implementation plan together. If you haven't been approved, but feel like this class is in some way inaccessible, please come talk to us so we can improve your experience.

Students who need academic accommodations or have questions about their accommodations should contact DSP, located at 260 César Chávez Student Center. Students may call 642-0518 (voice), 642-6376 (TTY), or e-mail dsp@berkeley.edu

Course details

Grades

60% Participation

Refined Question	10pts
Finished data collection protocol	10pts
Result powerpoint	10pts

15% Discussion

Share and participate in-class discussions	10pts
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15% Final Presentation

Attend finals presentation and present your work	10pts
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Class management

We will establish a set of community rules together during the first week of class. This may include (but is not limited to): what attendance, engagement, and participation look like to our class, and deadline flexibility. We consider this a collaborative learning course, meaning that we (Emilie and Michelle) expect to lecture on certain topics some weeks, other weeks will primarily be discussion with other students, and still other weeks may be actively working on your given research project. However, in general our expectation is that you attend class and participate in a compassionate way.

Class schedule & activities

Week	Date	Learning Goals and activities
1	August 31, 2021	LG: At the end of this week you will start seeing that people are doing science and that science can be used to answer a variety of questions. • Emilie and Michelle will introduce themselves their paths to science, and how they see themselves as scientist • Discuss class policies/goals/activities/etc. • Give examples of potential projects • Introduction to the scientific method Activity: Brainstorm ∞ ideas for questions that you could research with the scientific method
2	September 7, 2021	LG: At the end of this week you will be able to critically assess the feasibility of a scientific question. • Share your brainstormed questions from the week before with a partner

		• List pro's and con's for the feasibility of answering that question with a partner • Pick a question • Talk about methods Activity: Brainstorm potential ways to investigate your question.
3	September 14, 2021	LG: At the end of this week you will be able to give and receive constructive feedback on scientific ideas, and will be able to incorporate community ideas into your final question. • Share your ideas for investigating your question with the class. • Provide classmates with constructive feedback on their projects. • Incorporate the feedback you receive into your final question and design. Activity: Take your refined questions and design and test it out! You will report back next week.
4	September 21, 2021	LG: At the end of this week you will be able to troubleshoot scientific designs. • Share: what worked, what didn't work, and what could be improved from your experience • Talk about data organization- How will you keep track of all of your data? Activity: Troubleshoot your current design with the feedback you received and try it again
5	September 28, 2021	LG: At the end of this week you will be familiar with some common ways to interpret data. • Experiment check-in: How is it going? Is your design working well? Do you need to change anything? • Discuss how scientists tell what their data is saying about their question? • Explore tools for investigating what your data says. (Hint: stats!) Activity: Data collection
6	October 5, 2021	LG: At the end of this week you will be able to read a scientific paper, which is the major communication style used in science, and be able to critic it

		• Discuss the components of a scientific paper • Discuss the pro's and con's of scientific publication-what happens behind the scenes • Tips and tricks for how to read a paper • Citation managers Activity: Data collection & Read assigned scientific paper
7	October 12, 2021	LG: At the end of this week you will be able to think critically about the common communication strategies currently used in scientific fields • Discuss how effective scientific papers are at communicating science. What do they do well, what could they improve? • Discuss who the audiences for such papers are and why. • Brainstorm ways to make the current paper more accessible to other audiences. Activity: Data collection & Read pop science article
8	October 19, 2021	LG: At the end of this week you will learn how to use open source software designed to analyze data. • Download R/Rstudio • Learn to input your dataframe into the program • Learn how to visualize your data Activity: Data collection
9	October 26, 2021	LG: At the end of this week you will learn how to use open source software designed to run statistical tests on data. • Learn how to visualize your data • Overview of common statistical test • Brainstorm/discuss which test your data would best fit with Activity: Data collection
10	November 2, 2021	LG: at the end of this week you will gain experience running statistical analyses on your own data sets and visualizing your results. • Open lab time to run and troubleshoot statistical tests • Produce graphs to accompany your stats. Activity: Data analysis + run statistics, make figures for your own data
11	November 9, 2021	LG: At the end of this week you will learn how to interpret and talk about the results from your statistical analyses • Discuss the language used to talk about

		statistical results. • Discuss how to make statistical results more digestible. Activity: Data analysis + summarize your results in a powerpoint to share in class next week
12	November 16, 2021	LG: At the end of this week you will learn how to communicate your results • Share results from your experiment • Share and discuss interpretations of your results in light of your original question • Offering critical feedback to other students Activity: Data analysis including incorporating any suggestions from class
13	November 23, 2021	LG: At the end of this week you will be able to think critically about how to communicate your scientific results to others • Discuss who your preferred audience is • Discuss different communication strategies to best reach your audience Activity: Work on presentation
14	November 30, 2021	LG: At the end of this week you will be able to think critically about how to communicate your scientific results to others • Work on presentation Activity: (Buffer) Work on presentation
15	December 7, 2021	LG: At the end of this week you will be able to think critically about how to communicate your scientific results to others • Troubleshoot any remaining issues for your presentation • Practice Presentation with a partner Activity: Work on presentation
Final Exam	December XXX, 2021	Presentations

Reading List: There will be two main readings for this class: first we will choose a scientific research article to read as a class (primary literature). Second, we will read an accompanying popular science article on the same topic. We will choose the exact articles together as a class and will make sure everyone has access to them.

Required Materials: You will need access to a computer. If you don't currently have access to one we can work with you to find a solution. Just let us know.