

## Pathways to Scientific Teaching Winter Quarter 2017

Instructor:

Dr. Diane Ebert-May  
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Course Meetings: Tuesday afternoons 12 – 2 PM. Course meetings from January 10 – February 28, 2017.

Location: See agenda for Building and room number.

**Registration required:** [Pathways to Scientific Teaching](#)\*

Individuals will earn a Certificate in Scientific Teaching from the UC San Diego Vice Chancellor of Research Affairs (citable)

\*Only those in UC San Diego [postdoctoral scholar title codes](#) are eligible to register for this course through UC Learning. If you are interested in participating and not in a postdoc title code, please contact Ginger Hazen ([vhazen@ucsd.edu](mailto:vhazen@ucsd.edu)) to register, room permitting.

Questions about course, please contact [ebertmay@msu.edu](mailto:ebertmay@msu.edu)

Course Overview: I invite postdoctoral scholars to learn to develop and implement state-of-the-art learner-centered instructional materials and teaching strategies for both large and small enrollment undergraduate biology courses. During this course, we will use scientific teaching to actively engage participants in evidence-based instructional methods shown to be effective in helping students learn core disciplinary ideas by using science practices -- so it is not only what students learn, but how they use that knowledge. Importantly, the pathway to scientific teaching integrates the biological research model into a teaching approach by using science practices desired for all students, such as working with data, creating and using models, reasoning analytically, developing arguments, and working cooperatively. Participants will gain experience in developing materials, instructional methods, and assessments directed at improving and assessing students' understanding of biology. Participants will identify one or two core scientific concepts established by the faculty in the discipline, and develop an instructional module that is suitable for implementation in an introductory biology course taught at the freshman or sophomore level), and/or in a job interview that requests a demonstration of teaching.

Course Format: The course meets two hours weekly (see dates above). I encourage you to enroll with a colleague from your lab, although that is not required. The topics in the course are intended to promote and build learner-centered student instruction in undergraduate science courses. Participants will practice inquiry-based, active learning throughout the training.

Readings: TBD

Evaluation: Instructional modules are assessed using criteria developed for edition 2 of Pathways to Scientific Teaching (Ebert-May and Hodder eds 2008). Revision of the new edition in progress.

Goals and Impact of Course: Participants will

- Demonstrate how and why to create learner-centered classrooms.
- Practice how to actively engage students in cooperative work and inquiry-based activities in all types of learning environments.
- Construct a unit/module in which objectives, assessments and instruction are aligned and that promote learner-centered instruction by engaging all students in science practices during each class meeting.
- Create learning goals and assessments for the course that enable students to demonstrate deep understanding of core ideas and concepts by using science practices (e.g., modeling, arguments).
- Use and evaluate instructional resources, technology and literature.
- Create, analyze and use assessment data to inform and improve instruction.
- Develop a pathway for integrating teaching and research into your profession.

**Pathways to Scientific Teaching Seminar  
Weekly agenda**

<b>Seminar Number When?</b>	<b>Location</b>	<b>Topics</b>	<b>Driving questions</b>	<b>Readings</b>
1 January 10	<a href="#">Medical Education and Telemedicine Building (MET)</a> , Room 215	Establishing a learning community	Who are we? Who are your students? What are your teaching and mentoring philosophies? How do people learn? What does a learner-centered classroom look like and sound like?	Scientific Teaching Chapter: 1 How People Learn (Ch2)
2 January 17	<a href="#">Medical Education and Telemedicine Building (MET)</a> , Room 215	Effective classroom pedagogy -- evidence-based practices.	What should we teach? What do students need to learn? Big ideas – in biology? How do we use the literature?	Scientific Teaching Chapter 2, 3 Tanner 2010 Brewer and Smith 2011
3 January 24	<a href="#">Skaggs Pharmaceutical Sciences Building (PSB)</a> , Room 1170	Course frameworks to – individual lesson/unit	Designing course goals and learning outcomes - what are the core ideas/concepts? Using scientific practices to learn concepts.	Scientific Teaching Chapter 4 Long et al 2014
4 January 31	<a href="#">Medical Education and Telemedicine Building (MET)</a> , Room 215 (class to begin just after 12 pm)	Assessment of learning	How will you know that students have learned? What evidence will you and your peers accept?	Freeman et al 2014
5 February 7	<a href="#">Skaggs Pharmaceutical Sciences Building (PSB)</a> , Room 1186	Use science practices for assessment	How do we teach and assess with modeling and arguments?	Laverty et al 2015
6 February 14	<a href="#">Teaching and Learning Commons</a> , Big Room (west wing of Geisel Library)	Diversity and inclusive learning environments	How do <u>all</u> students learn? What about motivation? How can you incorporate diversity into your teaching? Into your teaching philosophy?	Smith et al. 2005
7 February 21	<a href="#">Medical Education and Telemedicine Building (MET)</a> , Room 141	Review of lesson/unit	Group peer-review on learning module. Feedback – revise unit.	
8 February 28	<a href="#">Medical Education and Telemedicine Building (MET)</a> , Room 120.27	Let's teach	How do we evaluate teaching? What are the criteria? Peer review and feedback.	

Instructor:

Diane Ebert-May provides international leadership for discipline-based biology education research that integrates life sciences and cognitive science. She promotes professional development, assessment and improvement of faculty, postdoctoral scholars, and graduate students who actively participate in creative research about teaching and learning in the context of their scientific discipline. She teaches plant biology, introductory biology to majors in a large enrollment course, and a graduate /postdoctoral seminar on scientific teaching. Her plant ecology research continues on Niwot Ridge, Colorado, where she has conducted long-term ecological research on alpine tundra plant communities since 1971. She is an AAAS Fellow in the Biological Sciences. Her recent awards include the US Professor of the Year Award for Michigan from the Carnegie Foundation/CASE (2011) and the Education Award from the American Association for Biological Science (2012). She earned her BS from University of Wisconsin, Madison (Botany), MA and PhD University of Colorado (Ecology and Evolutionary Biology). ([Learn more](#))