



## Delivering on the UC Promise: Providing Equitable STEM Education Opportunities for California

November 16, 2018 5:30pm PST to November 17, 2018 6:00pm PST

Third Annual HHMI-UC STEM Faculty Learning Community Meeting

November 16-17, 2018 at Loma Pelona Conference Center

University of California, Santa Barbara

### Meeting Agenda

Friday November 16, 2018		
Time	Speaker / Title	Location
5:30	Social Hour and Light Dinner	Loma Pelona 1100
7:00	<b>Dean Pierre Wiltzius</b> , UC Santa Barbara / Welcome	Loma Pelona 1100
7:10	<b>Linda Adler-Kassner</b> , UC Santa Barbara / Helping Students Access Expertise in STEM Disciplines	Loma Pelona 1100
7:30-8:00	<b>Carl Wieman</b> , Stanford University / Achieving institutional change in science teaching; a large scale experiment	Loma Pelona 1100
Saturday November 17, 2018		
Time	Speaker / Title	Location
8:30	Coffee, Juice, muffins, etc.	Loma Pelona 1108
9:00	<b>Joel Rothman</b> , UC Santa Barbara / Meeting Overview	Loma Pelona 1108
9:05	<b>Morris Maduro</b> , UC Riverside / Improved Outcomes in a Hybrid Intro Bio Course with Optional Lectures	Loma Pelona 1108
9:20	<b>Enrique Hernandez</b> , UC Santa Barbara / The Promise Scholar Program: ensuring academic success for low income, first generation, and underrepresented students at the UCSB	Loma Pelona 1108
9:35	<b>Ira Clark</b> , UC Los Angeles / Beyond the CURE: Leveraging discovery to create opportunities for STEM excellence	Loma Pelona 1108
9:50	<b>Norbert Reich</b> , UC Santa Barbara / Highly effective active learning in a one-year Biochemistry series with limited resources	Loma Pelona 1108
10:05	Coffee Break	Loma Pelona 1108

10:30	<b>Mike Wilton</b> , UC Santa Barbara / Improving academic performance, belonging, and retention through a structured introductory biology course	Loma Pelona 1108
10:50	<b>Natascha Buswell</b> , UC Irvine / Swimming Upstream: Experiences of STEM Faculty Pursuing Non-R1 Positions	Loma Pelona 1108
11:10	<b>Rolf Christoffersen</b> , UC Santa Barbara / Biomentors: a Peer Mentoring Program for Introductory Biology	Loma Pelona 1108
11:30	<b>Michael McKibben</b> , UC Riverside / A Decade of Comprehensive Data on the Outcomes of First-year STEM Learning Communities at UCR	Loma Pelona 1108
12:00	<b>Lunch and Posters</b>	Loma Pelona 1100
1:15	<b>Lalo Gonzalez</b> , UC Santa Barbara / BIOME and RUMBLE: Promoting Self-efficacy, Community and Academic Success of First-year Students from Vulnerable Populations	Loma Pelona 1108
1:35	<b>John Matsui</b> , UC Berkeley / Berkeley Scholars Program	Loma Pelona 1108 & Patio
1:55	<b>Brian Sato</b> , UC Irvine / Building a change ecosystem: Leveraging stakeholders from the institution to the individual to improve STEM education	Loma Pelona 1108
2:15	<b>Laura Beaster-Jones</b> , UC Merced / Using student-authored narratives to explore student values, self-efficacy and sense of belonging in an introductory biology course	Loma Pelona 1108
2:45	<b>Coffee Break</b>	Loma Pelona 1108
3:15	<b>Sara Brownell</b> , Arizona State Univ. / Exploring the experiences of students with covert social identities in active learning classrooms	Loma Pelona 1108
3:45	<b>Timothy A. McKay</b> , Univ. of Michigan / Equity in STEM Education – Using data for multi-institution exploration and experiment	Loma Pelona 1108
4:15	<b>Lark Park</b> , UC Regent, Director, California Education Learning Lab, and former higher education advisor to Governor Edmund G. Brown Jr. / California Education Learning Lab 1.0	Loma Pelona 1108
4:45-5:45	<b>Workshop: Andrew Estrada Phuong</b> , UC Berkeley & <b>Judy Nguyen</b> , Stanford University / Applying Adaptive Equity-Oriented Pedagogies to Improve Equity in Student Outcomes: Lessons from Randomized Controlled Trials /	Loma Pelona 1100
4:45-5:45	<b>Meeting Attendees</b> / Group Discussion on Future of UC STEM Faculty Learning Community	Loma Pelona 1108
5:00-7:00	Social Hour and Appetizers	Loma Pelona 1108 & Patio

**Contacts:**

Gwendelyn Wensloff  
Travel Coordinator, reimbursements, etc.

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Rolf Christoffersen

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**Hotel:**

Hilton Garden Inn Santa Barbara/Goleta  
6878 Hollister Avenue, Goleta, California, 93117,  
USA TEL: +1-805-562-5996  
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**Meeting Shuttle Service:**

There will be a shuttle available to take folks between the Hilton and UCSB free of charge

Running on Friday, Nov. 16th from 4:30PM-9:30PM

Running on Saturday, Nov. 17th from 7:30AM-8:00PM

**Meeting Venue:**

Loma Pelona Center

Ocean Road behind Parking lot 24 (see campus map)

UCSB

<https://goo.gl/maps/Cf6HrkEFM4H2>

**Internet Access:**

Eduroam access is available in Loma Pelona. If you don't have access to Eduroam, ask Gwendelyn for an access code.

## Meeting Attendees

First Name	Last Name	Institution
Linda	Adler-Kassner	UC Santa Barbara
Ayush	Agarwal	Google
Nicole	Albada	UC Santa Barbara
Nicole	Albada	UC Santa Barbara
Nathan	Altice	UC Santa Cruz
Ramesh	Arasasingham	UC Irvine
Evangeline	Ballerini	UC Santa Barbara
Laura	Beaster-Jones	UC Merced
Nandini	Bhattacharya	UC Santa Cruz
Sara	Brownell	Arizona State University
Jim	Burnette	UC Riverside
Natascha	Buswell	UC Irvine
Alison	Butler	UC Santa Barbara
Silvia	Carrasco Garcia	UC Davis
Penny	Carroll	UC Santa Cruz
Joseph P	Chada	UC Santa Barbara
Rolf	Christoffersen	UC Santa Barbara
Xochitl	Clare	UC Santa Barbara
Ira	Clark	UC Los Angeles
Debra	Conte	UC Merced
Alejandro	Cortez	UC Riverside
Samantha	Davis	UC Santa Barbara
Yasmine	Dominguez-Whitehead	UC Santa Barbara
Catherine	Drake	UC Santa Barbara
Kamal	Dulai	UC Merced
Alegra	Eroy-Reveles	UC Santa Cruz
Thomas	Even	UC Santa Barbara
Ruth	Finkelstein	UC Santa Barbara
Kathy	Foltz	UC Santa Barbara

Eduardo	Gonzalez	UC Santa Barbara
Ozcan	Gulacar	UC Davis
Sathya	Guruswamy	UC Santa Barbara
Sayward	Halling	UC Santa Barbara
Grant	Hartzog	UC Santa Cruz
Enrique	Hernandez	UC Santa Barbara
Susanna	Honig	UC Santa Cruz
Anna	James	UC Santa Barbara
Pradeep	Joshi	UC Santa Barbara
Pavan	Kadandale	UC Irvine
Kalju	Kahn	UC Santa Barbara
Daniel	Katz	UC Santa Barbara
Susan	King	UC Irvine
Paul	Koch	UC Santa Cruz
Georgios	Koutroulakis	UC Santa Barbara
Eryn	LEE	UC Merced
Michelle	Leslie	UC Merced
Marc	Levis-Fitzgerald	UC Los Angeles
Lilly	Lew	UC Santa Barbara
David	Low	UC Santa Barbara
Morris	Maduro	UC Riverside
Jennifer	Manilay	UC Merced
John	Matsui	UC Berkeley
Jasmine	McBeath	UC Santa Barbara
Timothy	McKay	University of Michigan
Michael	McKibben	UC Riverside
Stephanie	Mel	UC San Diego
Raju	Metherate	UC Irvine
Jordan	Moberg Parker	UC Los Angeles
Alice	Nguyen	UC Santa Barbara

Judy	Nguyen	Stanford University
Narges	Norouzi	UC Santa Cruz
Melinda	Owens	UC San Diego
Alessandra	Pantano	UC Irvine
Lark	Park	Governor's Office of Planning and Research and University of California
Oscar	Perez	UC Santa Barbara
Katherine	Petrie	UC San Diego
Christine	Pham	UC Riverside
Malaphone	Phommasa	UC Santa Barbara
Andrew	Phuong	UC Berkeley
Jessica	Pratt	UC Irvine
Javier	Pulgar	UC Santa Barbara
Norbert	Reich	UC Santa Barbara
Joel	Rothman	UC Santa Barbara
Maggie	Safronova	UC Santa Barbara
Brian	Sato	UC Irvine
Julie	Simpson	UC Santa Barbara
Laurie	Smith	UC San Diego
Adam	Smith	UC Santa Cruz
Tanja	Stoyan	UC Santa Barbara
Kelly	Thomasson	UC Santa Barbara
Anna	To	UC Davis
Guillermo	Vazquez- Anaya	UC Merced
David	Weisblat	UC Berkeley
Sue	Wessler	UC Riverside
Carl	Wieman	Stanford University
Lizzy	Wilbanks	UC Santa Barbara
Mike	Wilton	UC Santa Barbara
Pierre	Wiltzius	UC Santa Barbara
Vanessa	Woods	UC Santa Barbara

## Meeting Posters:

1. **Laura Beaster-Jones**  
University of California, Merced  
More than course content: student values, attitudes, and beliefs in an introductory biology course
2. **Jim Burnette**  
University of California, Riverside  
A mixed-methods assessment of a CURE for first-year students reveals benefits in grades and attitudes.
3. **Silvia Carrasco Garcia**  
University of California, Davis  
TBA
4. **Alejandro Cortez**  
University of California, Riverside  
Sequencing to Success: Using DNA Barcoding Research Projects to Engage Community College Students.
5. **Kamal Dulai**  
University of California, Merced  
Comparison of actively taught cell biology class verses traditional format.
6. **Ozcan Gulacar,**  
University of California, Davis  
Adding Missing Flavors to Chemistry Curriculum: Increasing Joy and Motivation Through Socio-scientific Issues
7. **Kalju Kahn,** Department of Chemistry and Biochemistry  
UC Santa Barbara  
Going On-line with Chemistry and Biochemistry: Where Are We After 7 Years?

Department of Chemistry and Biochemistry at UC Santa Barbara has been regularly offering on-line Biochemistry (CHEM W 142A) and Organic Chemistry (CHEM W 109C) courses in recent years. These courses were designed to offer a rich on-line learning environment while maintaining a close student-instructor interaction via regular synchronous on-line discussions. One of the unique features of CHEM W 142A and CHEM W 109C is the use of extensive quiz question banks in which most questions utilize a variety of interactive features (e.g. drawing of molecular structures, labeling of diagrams, writing short free-response answers, constructing informational passages, and analyzing 3D models of biological molecules). Grading and feedback algorithms have been developed that recognize a variety of partially correct and incorrect answers in open-ended questions, and provide meaningful feedback for each answer. Academic integrity in these on-line courses is ensured by (i) course design that minimizes

incentives for cheating, (ii) the use of randomized versions of similar-looking questions, (iii) close monitoring of student course access patterns, (iv) video-proctoring open-book midterm exams, and (v) the use of a comprehensive closed-book final exam. Statistical analysis of student's work during the on-line class reveals a strong and consistent correlation between the points student earn in open book assignments, such as on-line quizzes and real-time discussions, and the score on the closed-book final exam. Follow-up studies of the academic success of students who have taken on-line classes suggests that their future performance is well aligned with their grade in on-line classes. A significant fraction of students who have successfully completed on-line CHEM W 142A and CHEM W 109C at UCSB are currently in graduate schools.

8. **King, Susan**; Fischer, Christian; Zhou, Ninger; Rodriguez, Fernando  
University of California, Irvine  
Enhancing Student Learning and Retention in Organic Chemistry: Benefits of an Online Organic Chemistry Preparatory Course

Organic chemistry has a reputation as a difficult subject, and undergraduates often approach their first quarter of organic chemistry with significant anxiety about their level of preparation for the course. The content is broad, detailed, and heavily conceptual, and many students are unprepared for the difficulty level of this rigorous course. With an atoms-first general chemistry series, the first quarter of general chemistry covers most of the prerequisite topics for entry into organic chemistry, but at UCI, anyone with a chemistry AP test score of 4 or 5 is excluded from the first quarter of general chemistry. As a result, inadequate preparation is widespread. The transition from general to organic chemistry is not only a problem for students: it is an administrative problem, as underprepared students who take the sophomore organic chemistry series and earn failing grades create bottlenecks in the year-long sequence. To address these problems, an online 3-week Preparation for Organic Chemistry class was developed to prepare students for organic chemistry and allow them to begin the year-long sequence with confidence. The design, implementation, and assessment of this three-week online will be presented.

9. **McBeath, Jasmine**; Duran, Richard; Sanosa, David  
University of California, Santa Barbara  
University Community Partnerships and Equity in Making: St. George Youth Center

We describe a multi-year social action project that developed in collaboration with a youth-oriented makerspace as part of an initiative to strengthen university-community ties. We examine two multimedia design and implementation projects as an expression of Latinx youth experiences and an exploration of what their community means to them and the larger surrounding community.

10. **Tim McKay**, for the Foundational Course Initiative Team  
University of Michigan  
The Foundational Course Initiative: 21st Century Support for Teaching at Scale

In May 2018, the University of Michigan launched a campus-wide Foundational Course Initiative to establish a new, 21st century collaborative approach to the creation and instruction of these courses. Faculty, staff, and students from departments are joining together with instructional consultants from the Center for Research on Learning and Teaching to form Collaborative Course Design teams. These teams will work together over a multi-year period to design, develop, and deliver next generation versions of foundational courses. They will combine the best evidence-based approaches to engaged, inclusive learning, the most appropriate and effective technology solutions, and an assessment toolkit focused on measuring and improving student learning

11. **Jordan Moberg Parker**<sup>1</sup>, Amanda C. Freise<sup>1</sup>, Gaurav Kandlikar<sup>2</sup>, Emily Curd<sup>2,3</sup>, Nathan Kraft<sup>2</sup>, Rachel Meyer<sup>2,3</sup>

<sup>1</sup>Department of Microbiology, Immunology, and Molecular Genetics; <sup>2</sup>Department of Ecology and Evolutionary Biology, <sup>3</sup>University of California Conservation Genomics Consortium  
University of California, Los Angeles

Collaborative Course-Based Undergrad Research Experiences (co-CUREs) Benefit Students and Faculty

Curriculum-based undergraduate research experiences (CUREs) hold tremendous potential to offer authentic STEM research experiences to undergraduate students. However, implementing CUREs can be challenging: they require a great deal of logistical planning, increased time investment from faculty, and a research program that is amenable to be conducted by a large body of undergraduate students. Here we outline our ongoing partnerships for two different CUREs. The first is between three units at the University of California, Los Angeles (UCLA): a soil microbiome-themed CURE, a plant community ecology research lab, and an environmental DNA citizen science program. The second is between 2 units at UCLA and a national CURE program: a bacteriophage biology-themed CURE, a dermatology research lab, and the HHMI SEA-PHAGES program. We highlight the reciprocal benefits through intellectual integration around a CURE. Benefits arise for not just the instructors and students of the CURE, but to all three collaborating groups. Specifically, our collaboration has produced data that all three groups have benefited from, reduced materials-related costs, increased exposure of students to active faculty research, and enhanced the development of the course as a result of shared expertise. We propose that institutions and departments encourage and support the development of such collaborations, given the widespread benefits all participants stand to gain.