

# Symposium on k-12 Science Education

Exploring multiple frameworks  
to transform the classroom

**Kendall Hall 207      Friday, April 19th, 2019**

Join us to expand your understanding of Science Education through different research approaches.

The Department of Science education is organizing this open event for people who are interested in K-12 science education or faculty who are interested in learning more about science education research.

We have four invited talks from specialists in STEM education research sharing their latest results. This conference will explore different disciplines and aspects for teaching and learning sciences.

Time	Activity
9:00 am	Coffee service offered
9:10 am	“Engaging Diverse Communities in STEM Education” <i>by Dr. Cid</i>
9:50 am	“Facilitating Perspective Taking in an Environmental Science Course Using a Socioscientific Issues Framework” <i>by Dr. Newton</i>
10:30 am	Coffee break
10:40 am	“Engineering Design in Scientific Inquiry: The EDISIn Project” <i>by Dr. Atkins</i>
11:20 am	“Are all grade-scales equal? Why we need to think carefully about grading practices” <i>by Dr. Paul</i>
12:00 pm	Break for lunch (not provided)
1:00 pm	Panel with invited speakers

If you have any inquiries regarding the event, please don't hesitate to contact the Department of Science Education (Holt 101, 898-4599, [sced@csuchico.edu](mailto:sced@csuchico.edu))



**Dr. Ximena Cid**  
CSU Dominguez Hill



**Dr. Mark Newton**  
CSU Chico



**Dr. Leslie Atkins**  
Boise State University



**Dr. Cassandra Paul**  
San Jose State Univ.

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### “Engaging Diverse Communities in STEM Education”

**by Dr. Ximena Cid, CSU  
Dominguez-Hill  
Talk starts at 9:10 am**

This talk has two components. The first will be discussing ways on how to involve diverse communities in Science, Technology, Engineering, and Mathematics. National discussions over the past few years recognize that some populations have additional challenges that they have to navigate when pursuing higher education, and STEM in particular, compared to other populations. As such, it is my hope that we can have a discussion about the populations that participants work with at their home institution and how they can go about thinking about ways to support those populations.



The second component of this talk will discuss curriculum that has been developed by a collaboration between the American Association of Physics Teachers (AAPT) and NASA's Space Sciences Education Consortium (NASA SSEC). This team of experts has been working for the past few years on curriculum to engage students on topics around space sciences. Curriculum has been developed for high school teachers, introductory college level courses, and upper division college level courses..

**For more information visit [www.csuchico.edu/sced](http://www.csuchico.edu/sced) or email us at [sced@csuchico.edu](mailto:sced@csuchico.edu)**

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## “Facilitating Perspective Taking in an Environmental Science Course Using a Socioscientific Issues Framework”

by **Dr. Mark Newton, CSU Chico**  
**Talk starts at 9:50 am**



Perspective-taking is a necessary skill for the environmentally literate citizen but has proven to be difficult to develop in students. Sadler, Barab, and Scott (2007) identified perspective taking as one of four skills that comprise socioscientific reasoning (SSR), which is integral for SSI resolution and the development of scientifically literate citizens. The authors also point out that promoting perspective taking has proven to be difficult, specifically when those perspectives differ from one's own perspective. In response, Kahn and Zeidler (2016) developed the Humanities, ARTSs, and Social Sciences (HARTSS) model for perspective taking transformation and theorize that utilizing strategies commonly implemented in other disciplines may prove effective when integrated within the SSI framework. One such strategy is perspective reading and writing, where an individual examines and writes about an issue from an assigned perspective.

To this point, there is scant empirical evidence supporting the claim that perspective reading and writing within a SSI framework impacts students' perspective taking abilities. This study examines the effectiveness of perspective reading and writing exercises within a SSI-embedded environmental science course. The results indicate that students gained both a deeper and more nuanced understanding of the wolf management issue and a stronger ability to consider various perspectives. Additionally, the themes that emerged align with aspects of Sadler, Barab, and Scott's (2007) socioscientific reasoning (SSR) construct; namely, recognizing the complexity of the issue and incorporating multiple perspectives. This evidence supports the claim that incorporating practices that promote perspective taking in other disciplines may also be effective in science classes.

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## “Engineering Design in Scientific Inquiry: The EDISIn Project”

**by Dr. Leslie Atkins,  
Boise State University  
Talk starts at 10:40 am**

The Next Generation Science Standards calls for engineering — and particularly engineering design — to be part of students’ science education throughout K-12. However, few prospective teachers have an engineering background, nor are they likely to receive even a cursory training in engineering. That is, while engineering design is central to scientific activity — a critical component of how scientific ideas are constructed — curricular examples of engineering for science are rare.



For preservice programs that hope to prepare science teachers to integrate engineering design into the development of scientific content, in “three-dimensional” ways consistent with NGSS, there are few models to draw from. In this talk I’ll present data from a course that focuses on scientific inquiry while attending to emergent design opportunities, with a focus on the emerging question of how the process of creating designed artifacts in a science class differ from the process of creating designed artifacts in engineering.

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**“Are all grade-scales equal? Why we need to think carefully about grading practices”**

**by Dr. Cassandra Paul,  
San Jose State University  
Talk starts at 11:20 am**



As educators we all need to make decisions about how to assign grades. We make these decisions based on our expectations of what students should be able to accomplish in our class and what we think is fair. However, the choice of what grade-scale to use can influence our grading practices in ways that remain hidden to us.

I compare two numerical scales: the 4-point scale (where each whole number 0-4 corresponds to a letter grade) and the percent scale (where letter grades A through D are uniformly distributed in the top 40% of the scale). I share data collected from over 15,000 students enrolled in an introductory college physics course that clearly indicate that students graded using the percent scale are significantly more likely to fail, and that this effect seems to be consistent across all instructors in this study. I also discuss implications for grading practices.

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