(All times are in Pacific Standard Time; 10am – 2pm)

**Friday, July 10th**

10:00 – 10:55 Keynote Speaker: **Dr. Elizabeth Canning**
- *Instructors as Meaning-Makers: Designing Social-Psychological Interventions to Support Stigmatized Students*
- Dr. Canning is an Assistant Professor of Psychology at Washington State University. Her research focuses on the subtle messages that create and maintain bias and social inequality, both in classrooms and organizational contexts. Her lab also designs and tests psychosocial interventions to try to mitigate these impacts.

10:55 – 11:00 BREAK

11:00 – 12:00 Anti-Racism Action Group Report and Discussion

12:00 – 12:20 BREAK

12:20 – 1:20 Four concurrent sessions of talks (see next page)

1:20 – 1:50 Additional questions and discussion with talk presenters
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<th>Time</th>
<th>Session A: Conceptual Understanding</th>
<th>Session B: Research &amp; Laboratory Experience</th>
<th>Session C: Science &amp; Society and Affect</th>
<th>Session D: Conceptual Understanding</th>
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</table>
| 12:20–12:40 | **156:** A learning progression characterizing how students use mass balance reasoning to understand biology  
Emily Scott*, Mary Pat Wenderoth, Jennifer H Doherty (University of Washington) | **101:** Investigating Students’ Statistics Attitudes and Knowledge in CUREs  
Anita Schuchardt (University of Minnesota); Melissa L Aikens* (University of New Hampshire); Jeffrey T. Olimpo (The University of Texas at El Paso); Catherine Kirkpatrick (University of Minnesota) | **106:** Talking Science: undergraduates bridging the gap between scientific and non-scientific communities  
Josue Simeon, Sarah L Eddy*, Hana Shah (Florida International University) | **237:** Observing Growth in Students’ Recognition of DNA-Associated Concepts with a Card Sorting Task  
Dina L. Newman*, Hannah Spector, Lauren Trumpore, Anna Neuenschwander, L. Kate Wright (Rochester Institute of Technology) |
| 12:40–1:00 | **167:** Teaching metabolism as a dynamic system improves student learning in biochemistry  
Christine S Booth* (University of Nebraska-Lincoln) | **228:** Integrated Lab-Lecture Courses Boost Non-Major’s Experiences in Introductory Biology  
Jessica Merricks*, Dave Gammon, Kathy Gallucci (Elon University) | **200:** Students’ perspectives on their acceptance of evolution  
Ryan Dunk*, Jason Wiles (Syracuse University) | **94:** Students’ Mechanistic Explanations of Protein Function Cluster around Core Ideas from Chemistry or Biology Courses, but Rarely Both  
Caleb M Trujillo (University Of Washington Bothell); Jenna Kesh, Melanie Cooper, Joelyn de Lima, Tammy M Long, Keenan Noyes, Christina Schwarz, Jon Stoltzfus* (Michigan State University) |
| 1:00–1:20 | **85:** Perceptual Grouping Affects Students’ Propensity to Make Inferences Consistent With Their Misconceptions  
Laura R Novick*, Jingyi Liu (Vanderbilt University) | **149:** Longitudinal tracking of instructors shows that a short-duration CURE can catalyze expansion to longer CURE experiences  
Elizabeth A Genne-Bacon (Tufts University School of Medicine)*; Michal Fux (Northeastern University); Jessica Wilks (Tufts University School of Medicine); John Coley (Northeastern University); Carol Bascom-Slack (Tufts University School of Medicine) | **10:** Context matters: variation in psychosocial factors across three institution types  
Sara Berk (Auburn University)*; Shima Salehi (Stanford University); Catherine Creech (Mt Hood Community College); Sheritta Fagbudun (Tuskegee University); Michele Shuster (New Mexico State University); Rebecca Brunelli (California State University, Chico); Abby Drake (Cornell University); Carrie Hall (University of New Hampshire); Sadie Hebert (University of Minnesota); Justin St. Juliana (Cornell University); Daniel Stovall (Winthorp University); Min Zhong (Auburn University); Sehoya Cotner (University of Minnesota); Cissy Ballen (Auburn University) | **148:** A student who understands evolution, accepts evolution: evidence from a systems view of evolution acceptance  
Rachel L Salter*, Kurt R Williams, Jennifer Momsen (North Dakota State University) |
Friday, July 17th

10:00 – 10:45 Two concurrent long talks

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<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
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<td>A</td>
<td>8: A scientist like me: demographic analysis of biology textbooks reveals both progress and long-term lags</td>
<td>Cissy Ballen (Auburn University)*; Jeremiah Henning (University of South Alabama); Michael Smith (University of Konstanz); Sara Wood (Auburn University); Taylor McKibben (Auburn University); Luoying Chen (Auburn University); Marjorie Weber (Michigan State University); Ash Zemenick (Michigan State University)</td>
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<td>B</td>
<td>56: Exploration of the transition between high school and college STEM courses: Characterization of students’ perspectives and faculty’s instructional approaches</td>
<td>Clara Meaders (Cornell University)*; A. Kelly Lane (University of Nebraska-Lincoln); Brian Couch (University of Nebraska-Lincoln); Anya Morozov (University of Nebraska-Lincoln); Justin Shuman (University of Nebraska-Lincoln); Marilyne Stains (University of Virginia); MacKenzie Stetzer (University of Maine); Emma Toth (University of Maine); Erin Vinson (University of Maine); Michelle Smith (Cornell University)</td>
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10:45 – 11:00 BREAK

11:00 – 12:00 Four concurrent sessions of talks (see next page)

12:00 – 12:30 BREAK/Presenters stay in room for additional questions and discussion

12:30 – 2:00 Poster Session
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<td>11:00–11:20</td>
<td>196: Exploring Laboratory TAs’ Ambitious Teaching &amp; Tensions in an Online PD Course</td>
<td>24: “It Comes from Within”: Characterizing the Internal Strengths Black Undergraduates Use to Succeed in Science Majors</td>
<td>138: Integrating motivation theories to measure students’ motivational profile in a modeling-based introductory biology course</td>
<td>191: Beyond office hours: what happens when students and professors engage in scientific discourse</td>
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<td>Ryan C Coker*, Miray Tekkumru-Kisa (Florida State University)</td>
<td>Julie Dangremond Stanton* (University of Georgia)</td>
<td>Bethany J Gettings*, Tammy M Long (Michigan State University)</td>
<td>Melissa McCartney* (Florida International University)</td>
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<td>11:20–11:40</td>
<td>38: Content-focused professional development and higher cognitive demand of curricular tasks elevate teaching assistants’ teaching practices</td>
<td>25: Students Speaking Up: What supports and hinders self-advocacy for STEM undergraduates with ADHD and/or specific learning disabilities?</td>
<td>211: Mode of Responses Influences Content of Student Responses</td>
<td>86: A Multi-Institution Curriculum Mapping Project to Investigate Teaching of Core Competencies</td>
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<td>Jenna Hicks*, Jessica Dewey, Michael Abebe, Maxwell Kramer, Anita Schuchardt (University of Minnesota)</td>
<td>Mariel Pfeifer*, Julie Dangremond Stanton (University of Georgia)</td>
<td>Joelyn de Lima*, Tammy M Long (Michigan State University)</td>
<td>Alexa Clemmons* (University of Washington); Deborah Donovan (Western Washington University); Jerry Timbrook (University of Nebraska-Lincoln); Alison Crowe (University of Washington)</td>
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<td>Zhigang Jia*, Grant E Gardner (Middle Tennessee State University)</td>
<td>Jeffrey Maloy* (UCLA); Bryce Hughes (Montana State University)</td>
<td>Matthew R Fisher* (Oregon Coast Community College)</td>
<td>P. Citlally Jimenez*, Jenny M Dauer (University of Nebraska-Lincoln)</td>
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Thursday, July 23rd (For DBER Trainees/Scholars-in-Training)

9:00 – 12:00  Virtual Career Panel Workshop

- PARTICIPANT OUTCOMES
  - Gain a better understanding of career options available to those with a graduate degree or other training in BER
  - Obtain insight on the “do’s and don’ts” of the BER job market
  - Gain ideas about how to obtain a job in their desired field
  - Gain a better understanding of how to maintain a healthy work/life balance

12:00 – 12:15  BREAK

12:15 – 1:15  Meeting with Dr. Elizabeth Canning (Keynote Speaker from Friday, July 10th)
**Friday, July 24th**

10:00 – 12:00 Four concurrent sessions (see below)

12:00 – 12:30 BREAK/Presenters stay in room for additional questions and discussion

12:30 – 2:00 Poster Session

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<th>Time</th>
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<th>Session B: Diversity, Equity, &amp; Inclusion</th>
<th>Session C: Instructor Practices</th>
<th>Session D: Research &amp; Laboratory Experience</th>
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| 10:00–10:20 | **3: Demystifying the Meaning of Active Learning in Undergraduate Biology Education**  
Emily P Driessen* (Auburn University); Jenny Knight (University of Colorado, Boulder); Michelle Smith (Cornell University); Cissy Ballen (Auburn University)  
**2: Mind the Gap: Narrowing STEM achievement gaps with active learning**  
Elli J Theobald*, Scott Freeman (University of Washington)  
**13: Low-level Learning: Leaving behind most students-- the non-science majors**  
Cara Gormally* (Gallaudet University); Peggy Brickman, Austin Heil (University of Georgia) | | | |
| 10:20–10:40 | **17: How Introductory Biology Students Prepare for Class: Resources and Actions Under Two Conditions**  
Sabah Sattar, Tina Ballard, Heather E Bergan-Roller* (Northern Illinois University)  
**33: Accessible active learning: To what extent is active learning inclusive for science undergraduates with disabilities?**  
Logan E Gin* (Arizona State University); Frank Guerrero (Arizona State University); Katelyn Cooper (University of Central Florida); Sara E Brownell (Arizona State University)  
**153: What types of groups facilitate the best active learning?**  
Kristine L Callis-Duehl*, Emma Wester, Sandra Arango-Caro (Donald Danforth Plant Science Center); Rebekka Darner (Illinois State University) | | | |
| 10:40–11:00 | **182: Effective application of team-based learning in the online classroom**  
Lina M Arcila Hernandez* (Cornell University)  
**201: Christianity as a Concealable Stigmatized Identity (CSI) in graduate biology programs**  
Elizabeth Barnes*, Taya Misheva, Sara E Brownell (Arizona State University)  
**130: Student perceptions of supportive and non-supportive instructors: What characteristics make a difference?**  
Beth Schussler*, Maryrose Weatherton, Miranda Chen (University of Tennessee, Knoxville); Jennifer Brigati (Maryville College); Benjamin England (Saint Louis University) | | | |
|          | **132: Identifying the Impact of the Tigriopus CURE at Multiple Institutions with Diverse Student Populations**  
Ginger R Fisher* (University of Northern Colorado)  
**186: Exploring student science identity in a place-based, experiential marine science research program**  
Christine Ambrosino* (Hawai‘i Institute of Marine Biology); Mackenzie M Manning (Kapiolani Community College); Malia Rivera (Hawai‘i Institute of Marine Biology) | | | |
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| 11:00–11:20| 116: Advancing the Guidance Debate: Lessons from Educational Psychology and Implications for Biochemistry Learning  
Stephanie Halmo*, Sasha Stogniy, Cheryl Sensibaugh (University of Georgia); Peter Reinhart (Kenyon College); Vanessa Alele, Grace Snuggs, Logan Fiorella, Paula P. Lemons (University of Georgia) | 222: Using Latent Variable Path Modeling to reveal the causal links of evolution acceptance in biology undergraduates  
Gena C Sbeglia*, Ross Nehm (Stony Brook University) | 179: Service learning positively impacts classroom climate and empowers students for environmental action  
Heather D. Vance-Chalcraft*, Carol Goodwillie (East Carolina University) | 199: Exploring student depression in undergraduate research experiences  
Sara E Brownell* (Arizona State University); Katelyn Cooper (University of Central Florida); Logan Gin (Arizona State University) |
| 11:20–11:40| 215: Faculty Adoption of Evidence-based Teaching Practices: The Role of Observation Sampling Intensity on Measures of Change  
Justin A Goodridge*, Lucy Gordon, Ross Nehm, Gena C Sbeglia (Stony Brook University) | 139: Culturally Responsive Teaching in Undergraduate Science Labs  
Hillary Barron* (University of Minnesota); Julie Brown (University of Florida); Sehoya Cotner (University of Minnesota) | 219: Random Call In Class Discussions Facilitates Peer Interaction and Can Reduce Communication Apprehension  
Stacy M Alvares* (Edmonds Community College); Elli Theobold (University of Washington); Gwen Shlichta (Edmonds Community College); Jenny McFarland (Edmonds Community College) | 54: Establishing a Framework for the Culture of Scientific Research and Application to Course-based Undergraduate Research  
Jessica Dewey*, Anita Schuchardt (University of Minnesota) |
| 11:40–12:00| 6: Using Learning Assistants to Systematically Gather and Analyse Formative Assessment Data in Large STEM Classes  
Young Ae Kim* (University of Arizona) | 225: Religious Students' Perceptions in Biology  
Ryan Dunk*, Mia Pepi, Jason Wiles (Syracuse University) | 77: Exploring the Impacts of Graduate Teaching Assistants on Student Experiences in a Course-Based Undergraduate Research Experience  
Emma C Goodwin*, Jessica Cary, Erin E Shortlidge (Portland State University) | 18: The Darkside of Development: A systems approach for characterizing the negative mentoring experiences of doctoral students  
Trevor T Tuma*, Benjamin Hultquist, John David Adams, Erin Dolan (University of Georgia) |
**Friday, July 31st**

**10:00 – 12:00** Four concurrent sessions (see below)

**12:00 – 12:30** BREAK/Presenters stay in room for additional questions and discussion

**12:30 – 2:00** Poster Session

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<th>Session C: Affect: Interest/Motivation/etc. &amp; Professional Development</th>
<th>Session D: Metacognition, Conceptual Understanding, &amp; Institutional Change</th>
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| **10:00-10:20** | 11: Exploring How Cultural Backgrounds Influence Attitudes Towards Scientific Teaching  
Seth Thompson*, Sehoya Cotner (University of Minnesota); Ivar Rønnestad (University of Bergen) | 123: Development of a virtual classroom teaching effectiveness observation rubric  
Abha Ahuja* (Minerva Schools at KGI) | 108: Promoting Intrinsic Motivation to Learn Biology through Explicit Attention to Students’ Everyday Ideas  
Ruth B MacNeill*, Miranda Kuns, Anna Grinath (Idaho State University) | 171: Designing a Questionnaire for Undergraduate Biology Student Epistemologies for Science  
Kyriaki Chazikyriakidou*, Melissa R McCartney (Florida International University) |
| **10:20-10:40** | 12: Hidden identities shape student perceptions of active learning environments  
Jeremiah Henning* (University of South Alabama); Cissy Ballen (Auburn University); Sehoya Cotner (University of Minnesota) | 136: Validating Science Interest and Identity Items for Use with Diverse Community College Students  
Heather Perkins* (Purdue University); Sara Cooper (Foothill College); Jennifer D Kurushima (Evergreen Valley College); Jeffrey N Schinske (Foothill College) | 28: I gave my best effort: Measuring test-taking motivation on the GenBio-MAPS programmatic assessment  
Crystal Uminski*, Brian Couch (University of Nebraska-Lincoln) | 102: A survey of study strategies of first-year university students: how strategy choice relates to student demographics and student performance  
Adrienne E Williams* (UC Irvine) |
| **10:40-11:00** | 185: Comparing the Effects of Repetition, Observation of Active Learning, and Kinesthetic Learning on Non-Major General Biology Students  
Kim-Leiloni Nguyen* (Mt San Antonio College) | 154: Defining and Modeling Student Success as a Latent Construct in Learning Assistant Supported Biology Courses  
Hannah Huvard*, Robert Talbot, Courtney Donovan (University of Colorado Denver) | 21: Mixed effects of a belongingness intervention on student performance, confidence, and instructor empathy in two introductory STEM courses  
Sarah P Hammamrlund*, Cheryl Scott, Sadie Hebert, Alyssa Olson, Margaret Sleeth, Sehoya Cotner (University of Minnesota) | 146: Evaluating Representations of Scientific Process and Ethics and Responsible Conduct of Research in Common Introductory Collegiate Biology Textbooks  
Thomas McCabe (The University of Texas at El Paso)*; Kristy J Wilson (Marian University); Jeffrey T. Olimpo (The University of Texas at El Paso) |
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<th>Session D: Metacognition, Conceptual Understanding, &amp; Institutional Change</th>
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| 11:00–11:20| 230: Problem based learning in a computer stimulated collaborative environment can be an effective active learning approach for large medical classrooms
Revati Masilamani* (Tufts University) | 83: Scientific civic engagement survey validation
Irfanul Alam*, Lisa A Corwin (University of Colorado Boulder) | 75: The Impact of Group Work on Student Self-Efficacy Towards
Quantitative Biology
Alexander Kulacki*, Melissa L Aikens (University of New Hampshire) | 233: Limited diffusion: How, why, and to whom does knowledge of teaching innovations spread?
A. Kelly Lane (University of Minnesota – Twin Cities), Jacob D. McAlpin (University of South Florida), Luanna B. Prevost (University of South Florida), Marilyne Stains (University of Virginia), Brittnee Earl (Boise State University), Stephanie Feola (University of South Florida), Jennifer E. Lewis (University of South Florida), Susan E. Shadle (Boise State University), John Skvoretz (University of South Florida), John P. Ziker (Boise State University), Brian A. Couch (University of Nebraska-Lincoln) |
|            | 11:00–11:20                                                                             | 11:20–11:40                                              | 11:40–12:00                                                           |
|            | 187: Does a personalized and long-term teaching mentoring program actually work?        | 60: Exam Wrappers in Introductory Biology
Joel Ledford*, Geoffrey Benn, Kara Moloney, Young-A Son, Kem Saichaie, Susan Keen (UC Davis) | 55: Improving life science students’ attitudes toward mathematics: Insights from implementation of two biocalculus courses
Melissa L Aikens* (University of New Hampshire); Carrie Diaz Eaton (Bates College/QUBES); Hannah Highlander (University of Portland) | 217: The Social Networks of Lecturers with Security of Employment
Daniel Grunspan* (University of Guelph); Brian Sato (UC Irvine); Stanley M Lo (University of California San Diego) |
|            | Susan Wick* (University of Minnesota); Michael Moore (University of Nebraska - Lincoln); Uma Swamy (Florida International University); Carlos Goller (North Carolina State University); Anjali Misra (Allan Hancock College); Anusha Naganathan (University of Rochester); Margaret Shain Stieben (The American Physiological Society); Kathryn Johnson (Trail Build LLC) | | | |
|            | 11:40–12:00                                                                             | 175: Moving Towards Authentic Assessment in Traditional Classrooms: Identifying How and Where to Make Changes
Justine Hobbins*, Kerry Ritchie, Bronte Kerrigan (University of Guelph) | 194: The work environment and personal characteristics that affect learner-centered teaching practices
Diane Ebert-May* (Michigan State University) | |
|            | 39: CURE as a supplement to the traditional biology lab: How does actively researching cutting edge science topics influence scientific literacy, performance, and identity of science majors?
Erika C Martin*, Joseph LaForge (Emporia State University) | | | |
|            | 11:40–12:00                                                                             | | | |
|            | 194: The work environment and personal characteristics that affect learner-centered teaching practices
Diane Ebert-May* (Michigan State University) | | | |
|            | 35: Learning to be a scholar: How professional networks shape biology graduate students’ perceptions of the research-teaching nexus
Joshua W Reid*, Grant E Gardner (Middle Tennessee State University) | | | |