Driving Directions

I-20 W (toward Augusta): Take exit 70 to merge onto US-321/Fairfield Road and go about one mile. You will see the college directly in front of you. Take a right onto North Main Street to reach the main entrance.

I-20 E (toward Florence): Take exit 70 for US-321/Fairfield Road toward Winnsboro. Turn left at Fairfield Rd/US-321 South and go about one mile. You will see the college directly in front of you. Take a right onto North Main Street to reach the main entrance.

I-26: Take exit 107B to merge onto I-20 E toward Florence. Take exit 70 for US-321/Fairfield Road toward Winnsboro. Turn left onto Fairfield Road/US-321 and go about one mile. You will see the college directly in front of you. Take a right onto North Main Street to reach the main entrance.

I-77: Take exit 16 to merge onto I-20 W toward Augusta. Take exit 70 to merge onto Fairfield Road/US-321 and go about one mile. You will see the college directly in front of you. Take a right onto North Main Street to reach the main entrance.
1. Cottingham
   - Division of Arts and Communication Studies
   - Cottingham Theatre
   - Griffin Arena Theatre
   - Box Office

2. Ariail-Peele
   - Division of Education

3. Mirse Hall

4. Wesley Hall

5. Hudson Hall

6. McNair Hall

7. Student Union
   - First Floor: Dining Services
   - Second Floor: Terrace Café, Student Lounge
   - Lower Level: Office of Residence Life and Housing; Office of Student Activities

8. Godbold Center
   - Porter Gymnasium
   - George’s Gym Fitness Center
   - Athletics Department
   - Dance Studios
   - Greer Natatorium

9. Columbia College Police Department

10. Barbara Bush Center for Science and Technology
    - Division of Business, Mathematics, and Sciences

11. Daniel Hall and Humphries Hall

12. J. Drake Edens Library
    - Main Level
      - Library Reference & User Services
    - Lower Level
      - Division of Languages & Literatures
      - Academic Skills Center
      - Information Technology Services
      - Overton Media Center
    - Upper Level
      - Honors Program
      - Collaborative Learning Center

13. Spears Center for the Arts
    - Concert Hall
    - Goodall Gallery

14. The Johnnie Cordell Breed Leadership Center for Women
    - Undergraduate Admissions (second floor)
    - Mary Adams Brown Brown Grand Foyer
    - Gibson-Tucker Board Room

15. Center for Coaching and Professional Development

16. Allison Administration Building
    - First Floor
      - Office of the President
      - Office of the Provost
      - Chaplain/Director of Church Relations
      - VP Enrollment Management
      - VP Finance
    - Second Floor
      - Registrar
      - Office of Marketing and Communications
    - Third Floor
      - Financial Aid
      - Financial Services
      - Human Resources/Benefits Coordinator
      - Payroll and Student Employment

17. College Place United Methodist Church
    - Children’s Garden Daycare
    - Clubhouse Gang Afterschool Program

18. T. J. Harrellson Student Services Center
    - First Floor
      - Bookstore
      - Post Office
    - Second Floor
      - Division of Student Affairs
      - Office of the Dean of Students
      - Office of Counseling Services
      - Office of Multicultural Affairs & Community Resources

19. Wil Lou Gray
    - Division of Behavioral Studies and Human Inquiry

20. Alumnae Hall
    - Advancement
    - Alumnae Relations
    - “The Parlor” (orig. Vera Young Thomas Memorial Library)
    - Alawee Gibson Tucker Conference Room


22. S.C. UMC Credit Union


24. Community Resource Center

25. Fleming House
    - Evening, Graduate and Online Admissions
    - CCPD Substation

26. Ariail House
    - The Institute for Leadership and Professional Excellence

27. Parking for Fleming & Ariail House

28. Parker House
    - The Barclay School

29. Andrew Jackson Statue

30. Athletic Complex
    - Price Pavillion
    - Younts Soccer Stadium
    - Sutton Softball Field

31. S.C. United Methodist Center

32. Maxwell House

34. Facilities Management

35. Knox Hall

36. Kneeece Hall

37. The Green

38. The Mall

39. The Fountain

40. Mitzi’s Garden

Parking: Park in lot A or lot H
Conference location: Breed Leadership Center #14

A-I Parking
A, B, G - Visitor Parking
C, D, E, F, H - Requires Decal

Faculty, staff, and resident student parking is assigned
ACUBE’s 61st Annual Meeting Program Overview

All sessions take place in the Breed Leadership Center

Thursday, October 19th
6:30 -8:00 pm  Steering Committee Meeting, Breed Leadership Center Boardroom

Friday, October 20th (Registration open all day, starting 7:30 am)
7:30-8:30 am  Registration
8:30-9:00 am  Welcoming Remarks and Meeting Orientation
9:00-10:00 am  Keynote Speaker (Dr. Peggy Brickman)
10:15-10:45 am  Concurrent Presentations (20 minute Sessions)
11:00-11:50 am  Concurrent Round Table & Discussions (40 minute sessions)
12:00-1:00 pm  Luncheon and ACUBE members meeting
12:30-1:00 pm  Bioscene Meeting
1:15- 2:45 pm  Concurrent Presentations and Workshops (80 minute sessions)
3:00-3:50 pm  Concurrent Round Table & Discussions (40 minute sessions)
4:00-4:30 pm  Concurrent Presentations (20 minute Sessions)
4:30-5:00  Break
5:00-7:00pm  HHMI Biointeractive Dinner & a Movie

Saturday, October 22nd
8:00-9:00am  Registration and Poster set up
9:00-9:50 am  Concurrent Round Table & Discussions (40 minute sessions)
10:00- 11:30am  Concurrent Presentations and Workshops (80 minute sessions)
11:40- 12:00 pm  Box lunches and Instructions/directions for the field trips
12:00-4:00 pm  Field Trips
4:00-4:30  Break and Poster Set up
4:30- 5:30 pm  Poster and Exhibitor Session and eScience Labs Cocktail Hour
5:30-6:30 pm  Dinner, ACUBE Awards and Remarks by Dr. Alan White, Professor of Biology, University of South Carolina
6:45- 8:00pm   ACUBE Steering Committee Meeting
Our Mission
Members of ACUBE share ideas and address the unique challenges of balancing teaching, research, advising, administration, and service. We are a supporting and mentoring community that provides professional development opportunities to:

- Develop and recognize excellence in teaching
- Incubate new and innovative teaching ideas
- Involve student research in the biology curriculum
- Advise and mentor students in and out of the classroom
- Enhance scholarship through our national, peer-reviewed journal *Bioscene*

Governance
President and Website Editor, Christina Wills, Rockhurst University
Past-President, Aggy Vanderpool, Lincoln Memorial University
Executive Secretary of Finance, Greg Smith, Lakeland University
Executive Secretary of Membership, Rebecca Burton, Alverno College
Secretary, Paul Pickhardt, Lakeland University
Historian, Conrad Toepfer, Brescia University
Editor of Bioscene, Debra Meuler, Cardinal Stritch University
Website Editor, Tara Prestholdt, University of Portland

Steering Committee
Jessica Allen, Rockhurst University
Laurieann Klockow, Marquette University
Khadijah (Gigi) Makky, Marquette University
Marlee Marsh, Columbia College
Jason Wiles, Syracuse University

Local Arrangements Chair, Marlee Marsh, Columbia College
ACUBE gratefully acknowledges the support of the following exhibitors at the 61st Annual Meeting:

Keynote Speaker: Dr. Peggy Brickman

Biography

Peggy Brickman is a Josiah Meigs Distinguished Teaching Professor in Plant Biology in the Division of Biological Sciences at the University of Georgia. Her Ph.D. in Genetics from U.C. Berkeley in 1993 infused her with a love of teaching which has persisted even after instructing 30,000 introductory biology students over the past 20 years, usually in large sections with over 300 students each. The sheer madness of this setting inspired her to develop and assess multiple types of active learning strategies designed to improve large group instruction. She migrated to education research in 2001 receiving NSF funding and gaining recognition as the 2008 Georgia State Regents Award for the Scholarship of Teaching and Learning. She researches (1) gains in achievement and motivation to learn science in general education courses, (2) effectiveness of novel curriculum for teaching these courses, and (3) preparing and mentoring for faculty. Brickman has served as a National Academies Fellow in the Life Sciences since 2004 and continues to mentor graduate students, post-doctoral fellows and faculty as a National Academies Speaker and Facilitator.

Keynote Address: When Group Work Doesn’t Work: Insights from Students

College faculty are increasingly abandoning the traditional mode of delivering content in lectures to incorporate more active learning that encourages students to work in groups with their peers to solve problems and learn through collaboration and exploration. Group work and collaboration can profoundly increase students’ motivation and achievement, but instructors confess that they rarely adhere to procedures to insure equity and shared contributions required for true collaboration. This seminar will review research recommendations for effective procedures to plan, monitor, and intervene so that students of diverse abilities and backgrounds can all benefit from collaborative group work no matter the class size or discipline.
## Program

### Thursday, October 19th, 2017

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:30-8:00pm</td>
<td>Steering Committee Meeting</td>
<td>BLC Rm 204</td>
</tr>
</tbody>
</table>

### Friday, October 20th, 2017

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30am</td>
<td>Registration Open all Day, Breed Leadership Center (BLC) 2nd Floor Lobby</td>
<td>BLC 2nd Floor Lobby</td>
</tr>
<tr>
<td>8:30 – 9:00 am</td>
<td>Welcoming Remarks and Meeting Orientation</td>
<td>BLC 201/202</td>
</tr>
<tr>
<td>9:00- 10:00 am</td>
<td>Keynote speaker- Dr. Peggy Brickman</td>
<td>BLC 201/202</td>
</tr>
<tr>
<td>10:15 - 10:45 am</td>
<td>Concurrent Presentations (20 minute Sessions)</td>
<td>BLC 103</td>
</tr>
</tbody>
</table>

**Field Ecology with Pokémon GO**
Kirt Moody, *Columbia College*

**The Effect of a Year of Introductory Biology Education on Acceptance of Evolution and Associated Factors**
Ryan D.P. Dunk and Jason R. Wiles, *Syracuse University*

**Using Movies to Demonstrate Topics in Epidemiology and Ethical Challenges**
Janet Cooper, *Rockhurst University*

**A Suite of Metacognition MiniLectures**
Alan R. White, *University of South Carolina*

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:00-11:50 am</td>
<td>Concurrent Round Table &amp; Discussions (40 minute sessions)</td>
<td>BLC 301</td>
</tr>
</tbody>
</table>

**Creating a Reflexive Practice – Applying Your Scientific Skills to Increase Student Engagement**
Melissa M. Haswell, *Davenport University*

**Teaching the ecology of emerging infectious diseases using a case study about the current Lyme Disease epidemic in the U.S**
Laurieann Klockow, *Marquette University*

**Inquiry-based Teaching in the College Classroom: The Nontraditional Student**
Daniel Kiernan and Christine Lotter, *University of South Carolina, Sumter*

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00-1:00 pm</td>
<td>Lunch and ACUBE members meeting</td>
<td>BLC 201/202</td>
</tr>
<tr>
<td>12:30-1:00 pm</td>
<td>Bioscience Meeting</td>
<td>BLC 204</td>
</tr>
<tr>
<td></td>
<td>First call for committee nominations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>First call for Out of this World Teaching Contributions</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Event</td>
<td>Location</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>1:15- 2:45 pm</td>
<td>Concurrent Presentations and Workshops (80 minute sessions)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teaching the Experimental Process with New Labs from SimBio</td>
<td>BLC 304</td>
</tr>
<tr>
<td></td>
<td>Eli Meir, <em>SimBio</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transforming your classroom into an active environment by adding Universal Design for Learning.</td>
<td>BLC 103</td>
</tr>
<tr>
<td></td>
<td>Dawn Tamarkin, <em>Cell Zone, Inc. and Springfield Technical Community College</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teaching Like a Pro in Your First Years</td>
<td>BLC 301</td>
</tr>
<tr>
<td>3:00- 3:50 pm</td>
<td>Concurrent Round Table &amp; Discussions (40 minute sessions)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Genetics for pre-health undergraduate students in the era of advanced genomics and personalized medicine</td>
<td>BLC 301</td>
</tr>
<tr>
<td></td>
<td>Khadijah Makky, <em>Marquette University</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Service Learning in Life Sciences: To Do or Not To Do?</td>
<td>BLC 302</td>
</tr>
<tr>
<td></td>
<td>Judith Maloney and Laurieann Klockow, <em>Marquette University</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Course Predictors of Success versus Performance in STEM</td>
<td>BLC 305</td>
</tr>
<tr>
<td></td>
<td>Melissa Eslinger and Timothy Hill, <em>US Military Academy, West Point</em></td>
<td></td>
</tr>
<tr>
<td>4:00- 4:30 pm</td>
<td>Concurrent Presentations (20 minute sessions)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>An Interdisciplinary Approach to Enhance the Math and Problem-Solving Skills of First-Year Students</td>
<td>BLC 301</td>
</tr>
<tr>
<td></td>
<td>Marlee Marsh, Adrienne Oxley, Madeleine Schep, and Virginia Johnson, <em>Columbia College</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Election Campaign of Cell Organelles to Promote Student Engagement in Introductory Biology course</td>
<td>BLC 302</td>
</tr>
<tr>
<td></td>
<td>Lynn Rumfelt, <em>Gordon State College</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A CEREUS Approach to Investigating Ecological Responses to Global Change in Biology Classrooms</td>
<td>BLC 305</td>
</tr>
<tr>
<td></td>
<td>Alisa Hove, <em>Warren Wilson College</em></td>
<td></td>
</tr>
<tr>
<td>4:30- 5:00 pm</td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>5:00- 7:00 pm</td>
<td>HHMI Biointeractive Dinner &amp; a Movie</td>
<td>BLC 201/202</td>
</tr>
<tr>
<td></td>
<td><strong>Saturday October 21st</strong></td>
<td></td>
</tr>
<tr>
<td>8:00- 9:00 am</td>
<td>Registration and Poster Set up</td>
<td>Breed Lobby 2nd floor</td>
</tr>
<tr>
<td>9:00- 9:50 am</td>
<td>Concurrent Round Table &amp; Discussions (40 minute sessions)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To Infinity and Beyond: Wrestling With Biology Curricula in the Coming Decades.</td>
<td>BLC 301</td>
</tr>
<tr>
<td></td>
<td>James Clack, <em>Indiana University - Purdue University</em></td>
<td></td>
</tr>
</tbody>
</table>
### How to Offer an Online Science Course with an Authentic Hands on Lab Experience
Jan Benedict, *eScience Labs, Inc.*

### Designing formal group work to ensure equity
Peggy Brickman, *University of Georgia*

### 10:00- 11:30 am  Concurrent Presentations and Workshops (80 minute sessions)

- **Pre-Health Student Advising: Successes and Challenges**
  Laura Salem, *Rockhurst University*
  **BLC 301**

- **Natural Selection in the Ebola Outbreak: Integrating Multimedia and Primary Literature into Undergraduate Biology Education**
  Mark Randa, *HHMI BioInteractive and Cumberland County College*
  **BLC 302**

### 11:40 - 12:00 pm  Box lunches available
Instructions/directions for the field trips

### 12:00- 4:00 pm  Field Trips
*note: the bus to Congaree National Park will leave at 12:05pm*

- Field trip 1: South Carolina State Museum and Planetarium Show
- Field trip 2: Riverbanks Zoo and Botanical Gardens
- Field trip 3: Trip to Congaree National Park with interpretive tour

### 4:00 - 4:30 pm  Break and Poster Set up

### 4:30 - 5:30 pm  eScience Labs Cocktail Hour & Poster Session/ Exhibitors  
Breed Lobby 2nd floor

- **Poster Session/Exhibitors**

  - **Gamification of a Nursing Microbiology Course: Design and Initial Impacts on Attitude, Anxiety and Student Performance**
    Wendy A. Dustman and Julie Shearer, and Rolando Marquez, *Georgia Gwinnett College*

  - **Teaching A Non-Majors Biology Online Lab Course**
    Daniel Kiernan and Pearl Fernandez, *University of South Carolina Sumter*

  - **Assessment of Misconceptions and Prior Knowledge in a Microbiology Course Using a Concept Inventory**
    Julie Grainy and Jennifer Walker, *University of Georgia*

  - **Career Exploration Assignments increase Student Confidence in Career Path Planning**
    Latanya Hammonds-Odie, *Georgia Gwinnett College*

  - **An Investigation of Potential Trends in Anatomy and Physiology I & II Final Grades Between Male versus Female Students**
    Kara Cashwell, Nicole Faison, Ashley Higgenbothem, and Virginia Baker Haynes, *Charleston Southern University*
Two-Course Collaboration for Understanding Conservation Genetics
Alissa Hulstrand and Erik Olson, Northland College

The Genomics Education Partnership: An Opportunity for a Bioinformatics Course-based Undergraduate Research Experience for all Biology Students
Nighat P Kokan, Cardinal Stritch University, Vida Mingo, Columbia College, Christopher Shaffer, Washington University in St. Louis, Wilson Leung, Washington University in St. Louis, David Lopatto, Grinnell College, Sarah C.R. Elgin, Washington University in St. Louis

The importance of outreach science: Turning the tide on ocean conservation
Holly Nance, College of Coastal Georgia

Effect of Active Learning Exercises on Cognitive Skill Level and Student Performance in Exams
Scott M. Shreve, Lindenwood University-Belleville

Teaching the Current Trends in Immunology: A Layered Learning Approach
Denise L. Slayback-Barry, Indiana University – Purdue University

Formal involvement of students in new course development provides a unique educational experience and valuable perspective for students and the instructor
Matthew M. Stern, Winthrop University

The Strategic Undergraduate STEM Talent Acceleration INitiative (SUSTAIN)
Jason Wiles, Syracuse University

Exhibitor information - Please visit our ACUBE Sponsors:
- eScience Labs
- HHMI Biointeractive
- Associated Microscope, Inc.
- CellZone, Inc.
- SimBio

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>5:30-6:30 pm</td>
<td>Dinner</td>
</tr>
<tr>
<td>Remarks by Dr. Alan White, Professor of Biology, University of South Carolina</td>
<td></td>
</tr>
<tr>
<td>Presentation of ACUBE Awards</td>
<td></td>
</tr>
<tr>
<td>Preview of ACUBE 2018</td>
<td></td>
</tr>
<tr>
<td>6:45-8:00 pm</td>
<td>Steering Committee Meeting</td>
</tr>
</tbody>
</table>
ABSTRACTS BY CATEGORY

20 minute Presentations

Field Ecology with Pokémon Go
Kirt Moody, Columbia College

The “augmented reality” function of the Pokémon GO AP provides an opportunity for students to spend actual time outside in the real environment, sampling for virtual organisms, and then using appropriate mathematics to describe their abundance, distribution, and population characteristics. This session will introduce and demonstrate the AP and provide instructions for collecting data and testing hypotheses involving population density, species diversity, and demography.

The Effect of a Year of Introductory Biology Education on Acceptance of Evolution and Associated Factors
Ryan D.P. Dunk and Jason R. Wiles, Syracuse University

The ubiquity of evolutionary theory in biology makes it nearly impossible to fully understand or engage in biological investigation without a thorough understanding of evolution. Thus, full participation in biology is hindered by a failure to accept evolutionary biology. Previous work of ours was among the first studies to combine a number of educational, psychological, and sociodemographic variables into a single working model of the factors that influence acceptance of evolution. Previous work of ours has shown that in undergraduate students, a knowledge of the nature of science, religiosity, and openness to experience all have a stronger independent effect on acceptance of evolution than knowledge of evolution. Here, we sought to further investigate the role of such factors in a longitudinal time frame. Pre and post surveys were compared using normalized change to determine which variables have the most significant relationship with changes in evolution acceptance. In addition, multivariate ANCOVA models were generated for the pre-course and post-course data. Interestingly, many of the variables that lost significance over the year were demographic factors and were replaced by variables that are tied to education. Religiosity, understanding the nature of science, and evolutionary knowledge were significant predictors of evolution acceptance in both models. This study will form a baseline that will allow further research to explore the similarities and differences between different groups in acceptance of evolution. Additionally, this research has direct potential applications to curriculum development.

Using Movies to Demonstrate Topics in Epidemiology and Ethical Challenges
Janet Cooper, Rockhurst University

Movies, such as And the Band Played On and Contagion have been helpful in highlighting the steps in an outbreak investigation discussed in the Principles of Epidemiology in Public Health Practice (US Health and Human Services Self-Study Course SS1978). These movies also prove useful in discussing ethical challenges and issues confronting work in Microbiology today. After viewing these videos, students are asked to write a reflection on the steps in an outbreak investigation as presented in the movie and are also prompted with various questions related to identifying issues dramatized in the movies or to identify the most memorable scene in the movie or their most favorite and least favorite characters. The answers to these questions have been coded for specific issues and tallied over the years. Four issues have emerged consistently in the student reflections, 1) lack of funding (19%), 2) conflict between the French scientists and Dr. Gallo (18%), 3) failure of blood banks to acknowledge the potential that AIDS could be a blood-borne disease (16.9%) and 4) failure to close bathhouses (16.5%). When asked which movie would be better to show in a Microbiology course, the class is split although many students confess to having a difficult time choosing between the two movies. Fifty-
four percent of students chose And the Band Played On while 46% would rather watch Contagion. Reasons cited for preferring And the Band Played On include: it is more historical and more relevant and showed the impact of AIDS on society while those who favor Contagion believe it is more engaging and fast-paced and does a better job of demonstrating the transmission of the virus. They also can relate more with the actors since they are more familiar to them than those in And the Band Played On. Using these reflections have allowed discussion of the issues or challenges students raise as well as highlighting student misconceptions relating to the history of the AIDS outbreak and the study of epidemics.

**A Suite of Metacognition MiniLectures**

Alan R. White, University of South Carolina

Don’t study harder; Study smarter. This session will present a series of Metacognition Mini-Lecture learning modules that introduce principles of brain science and how human memory works. The mini-lectures can be incorporated into courses in any discipline. They present evidence-based learning strategies and explain why those learning strategies work in light of the brain’s design. We know a lot about how the human brain works to store and recall memories during the process of learning. These principles of brain science can be applied to teaching, learning, note-taking, studying and test-taking. This process of “thinking about thinking” is known as metacognition. Both instructors and students need to be familiar with metacognition, which can help us align learning activities and practices with how our brains work. Metacognition can encourage us to use evidence-based practices that are more effective because they are based on the science of learning and take advantage of how the brain learns. This doesn’t make studying and learning easier, learning is always hard, but it can make the time spent studying more effective so that the same amount of time spent learning can lead to better learning results.


**An Interdisciplinary Approach to Enhance the Math and Problem-Solving Skills of First-Year Students**

Marlee Marsh, Adrienne Oxley, Madeleine Schep, and Virginia Johnson, Columbia College

Columbia College science and math faculty have designed, developed, and begun evaluating a first-year enhancement program titled Interdisciplinary Math and Problem-Solving (IMAPS) seminar. Our hypothesis is that IMAPS will improve mathematics and quantitative problem-solving skills in first-year women and underrepresented minorities (URM) who are underprepared in mathematics and will provide them with a foundation to succeed in college-level STEM courses. Science faculty will implement and test the innovative IMAPS model to assess its ability to improve mathematics and quantitative problem-solving skills; increase students' self-efficacy, resilience, and persistence in STEM; and provide contextual and active learning experiences in alignment with the learning styles of women and URM. The objectives are to demonstrate improvements in first-year students' mathematics achievement, problem-solving skills, and academic persistence, as assessed by academic performance, retention, engagement, and commitment to a STEM career. An interdisciplinary team of biology, chemistry, math and computer-information science faculty will give an overview of the project and the results thus far.
Election Campaign of Cell Organelles to Promote Student Engagement in Introductory Biology course
Lynn Rumfelt, Gordon State College

First semester Introductory Biology courses for non-science majors are designed to cover organization and structures of prokaryotic and eukaryotic cells. This requires the students to know a fair amount of detailed information. It has been challenging to teach this material in a way they find fun, interesting, and are able to learn on their own. To accomplish the goal of making learning this material fun and interesting, I used a class activity based on a modification of published work that was given before any instruction on the content was given by the instructor. (1, 2). A double-section of students self-organized into groups of four then randomly chose a cell organelle/structure provided by the instructor. The student’s researched, wrote, and presented a two minute campaign speech arguing for election of their organelle and arguing against five other organelles so theirs may be elected the most important organelle/structure in the cell in 2017. An art component was included by requiring creation of a campaign poster showing the greatness of their organelle candidate. A rubric was used to grade the poster and presentations. Results: all students were engaged with the process and analyses of the formative and summative assessments will be discussed.


A CEREUS Approach to Investigating Ecological Responses to Global Change in Biology Classrooms
Alisa Hove, Warren Wilson College

The CEREUS (Consortium Exchanging Research Experiences among Undergraduate Students) Project addresses a recognized area of STEM need by creating inquiry-driven curricular modules, implementing new instructional strategies, and assessing student achievement and attitudes across multiple types of higher education institutions. This project establishes a place-based educational network utilizing regional environmental issues to impart botanical knowledge while encouraging high-order cognitive processes, advancing quantitative literacy, teaching analytical techniques, honing scientific communication skills, cultivating more positive student attitudes towards plants and STEM, and improving persistence in STEM majors. Our four-institution group utilizes the expertise of project P.I.s and research students to create classroom-based research modules, focused on investigating responses of Southern Appalachian ecosystems to global change. To date, over 300 students in upper- and lower-division biology courses from the four partner institutions have participated in CEREUS modules. All students participating in the project have shown significant decreases in plant blindness and many of the courses have significantly increased students’ views about their ability to conduct scientific investigations. These measures of student success indicate the CEREUS course modules produce students who are more likely to persist in botanical fields and are better prepared for the STEM workforce.

40 minute Presentation & Round Table Discussions

Creating a Reflexive Practice – Applying Your Scientific Skills to Increase Student Engagement
Melissa M. Haswell, Davenport University

There has been a push in higher education for students to make meaningful connections with the material they are learning instead of merely submitting to a knowledge transmission-based learning environment. One way to accomplish meaningful learning is to encourage a dialogue between instructors and students, described as
praxis (Vella, 2002). Praxis is the active application of knowledge or skills that evolve from reflection on previous actions, which is essential for creating a learning atmosphere inclusive to all students. Praxis aligns with the current reform initiatives in science education, such as the use of the scientific teaching method, because it allows faculty members to record and reflect their approach to teaching, much like maintaining a laboratory notebook in scientific research. The method of scientific teaching is based on the “making teaching more scientific” by using the core essence behind scientific discovery in order to help students identify the interconnectedness of the various biological concepts (Handelsman et al., 2007, p. 1). However, if instructors are not able to engage in regular self-reflection regarding their teaching practice are they able to provide students with the ability to identify the nuances of interconnected concepts on their own? This session will share the results of a preliminary qualitative study regarding work on instructor self-reflection in the classroom and create a platform for a round-table discussion regarding this topic.

**Teaching the ecology of emerging infectious diseases using a case study about the current Lyme Disease epidemic in the U.S**

Laurieann Klockow, Marquette University

In a typical microbiology course designed for pre-med or allied health students, students learn about pathogens that infect and cause human disease. This approach to teaching infectious diseases neglects to recognize how these diseases emerge and spread throughout communities. Taught in this way, students fail to recognize how physical and social environments impact the emergence and spread of infections and consequently do not connect what they learn in class to outbreaks they may hear about in the news. In this workshop, I will demonstrate the case study about Lyme disease that I designed and implemented to engage students in learning about the ecology of infectious disease. Lyme disease has been in the news lately as its incidence has tripled in the last 15 years according to the CDC and is estimated to affect 300,000 Americans annually. This lesson uses as its case study, an NPR news story containing interviews with two disease ecologists, Rick Ostfeld and Felicia Kessing, who describe their novel way of predicting Lyme disease incidence by measuring mice populations. The activities in this lesson follow the experiments performed by these ecologists to explore the factors that have led to the recent surge in Lyme disease. In small collaborative groups, students analyze data figures from publications by the Ostfeld and Kessing labs (along with others) to construct an understanding of the ecology of Lyme disease and predict how changes to the ecosystem would affect Lyme disease incidence. As more and more instructors try to enhance their lecture-based classes with active learning, interactive case studies like the one you will experience in this workshop can be an effective way to engage students in collaborative problem solving and in connecting course content to the “real world”. This case study lesson could be relevant to those teaching microbiology, ecology, public health or biology for non-majors.

**Inquiry-based Teaching in the College Classroom: The Nontraditional Student**

Daniel Kiernan and Christine Lotter, University of South Carolina, Sumter

Decline in the economic realm often bolsters an increase of nontraditional student enrollments in colleges and universities (Windolf, 1992). This trend is especially positive for states such as South Carolina that have a lower number of bachelor’s degree holders compared to most other states (State Rankings). Many of these nontraditional students, who do not desire to major in some scientific area, find themselves struggling in required science courses. Over the last decade, science departments of higher education have been adjusting their curriculum to include inquiry in the college science classroom. Although inquiry-based teaching has been shown to be very academically positive in science classrooms from K-12 and up, “at the college level the data are mixed as to whether increasing inquiry instruction can significantly change students learning or attitude toward science” (Brickman, 2009, p. 3). To help delineate this controversy, more data is needed regarding the effectiveness of inquiry on student conceptual understanding and attitude toward science. Further, little
research has addressed student academic and attitude changes when entire college science courses are transformed from traditional approaches to more inquiry-based approaches. Finally, research on how to improve the learning of nontraditional, non-science major students taking science courses is absent from the literature. The proposed investigation intends to begin to address this gap in the literature. The overarching question of the following research project is: Does a science curriculum that is inquiry-based versus a science curriculum that is more traditionally-based, produce more positive academic results in nontraditional, non-science major, college students?

**Genetics for pre-health undergraduate students in the era of advanced genomics and personalized medicine**

Khadijah Makky, Marquette University

In modern medicine and patient centered treatment, clinical applications of genetics have evolved beyond just understanding the cause of rare inherited diseases. With advancements in the field of genomic and genetic testing, many believe that future healthcare providers should have the ability to understand and analyze personalized information based on a patient’s genetic profile in addition to physical symptoms they may present with. This transformation has prompted a shift in medical education, with genetics coursework being central to this shift. What can biology educators do to prepare undergraduate students for their future careers as health care providers? What educational practices will best help our pre-health undergraduate students? Do we have to reform genetics classes at the college level in order to better prepare our pre-health students? In the Department of Biomedical Sciences at Marquette University, we offer a human medical genetics course that follows the medical knowledge competencies proposed by the Association of Professors of Human and Medical Genetics (APHMG). In this round table discussion, the curriculum offered by Marquette will be shared, and feedback and information from other institutes will be solicited.

**Service Learning in Life Sciences: To Do or Not To Do?**

Judith Maloney and Laurieann Klockow, Marquette University

Service learning is a pedagogy that can have a positive impact on both academic and civic learning. It enables students to connect course content to real life situations, engage in experiential learning, and reflect on their own personal values. While it is widely used in the humanities, its use in life sciences classes is not prevalent. Perceived difficulties of incorporating service learning into life science courses include time constraints, assessment of service learning, identification of relevant community service experiences, and integration of service learning with course content. To explore these issues, we will describe our development and implementation of a service learning component into two different upper level biology classes, a physiology class, which used a presentation service learning model, and an infectious disease class which used a placement service learning model. At the completion of each course, students were surveyed on the impact of service learning on their understanding of course content, personal development and civic engagement. Survey results, along with analysis of reflection papers indicate that the service learning experience, whether it was the presentation or placement model, had a positive effect on these learning goals. In this workshop, we will describe our experiences, as well as discuss the benefits and challenges of implementing service learning in a life science course.

**Course Predictors of Success versus Performance in STEM**

Melissa Eslinger and Timothy Hill, United States Military Academy, West Point

Teaching Introduction to Biology to non-STEM majors at the United States Military Academy is an interesting opportunity to engage humanities majors in the process of science. While the students elect to take biology, they are face with challenges when drawing conceptual applications of previous coursework in chemistry, math,
and physics. Instructors are the key “tour guides” for mapping these concepts across the liberal arts curriculum. We initially began exploring the target audience of cadets choosing biology as their final science course based on their predictors of academic success, the West Point college entrance examination rank (CEER) score. This composite predictor includes multiple areas such as standardized exams, high school endeavors, and overall candidate scores. CEER facilitated categorization of the enrolled cadets into at-risk, average, and scholar populations. We further examined their performance across the core requirements of chemistry, math, and physics based on final course averages and see a direct correlation between the course predictors and actual performance. We also compared the CEER scores to individual events and cumulative performance in biology to determine educational gains. These events included a Biology Concept Assessment Tool (BCAT), final exam percentage by course focal areas, and individual demographics. To ensure standardization across the course, we also compared faculty education and teaching experience to analyze differences in performance by cadets as well as gender and athlete status. Interestingly, the CEER score is most predictive of performance in STEM coursework at the at-risk population and extreme ends of the scholars. Taken together, our data supports that pre-admission assessments are useful predictors for STEM performance. These predictors can identify students who may benefit from additional intervention and remediation opportunities to ensure successful academic progress towards graduation as well as provide quantitative evidence for deliberate curriculum adjustments.

To Infinity and Beyond: Wrestling With Biology Curricula in the Coming Decades.
James Clack, Indiana University - Purdue University

Most biology curricula are somewhat archaic course structures that may be decades old. Given the rapid rate at which higher education is evolving, what strategies might we use to better structure course offerings in order to meet the needs of today's (and tomorrow's) students as well as their future employers? Several examples of innovations at various levels of the curriculum will be presented for critique and comparison with participants' current curricula. It is the aim of this round table discussion to facilitate discovery of innovative means of restructuring current curricula and to do so in a manner that will also allow more seamless future reorganization.

How to Offer an Online Science Course with an Authentic Hands on Lab Experience
Jan Benedict, eScience Labs, Inc.

Join eScience Labs for an information session on designing and implementing your online lab course. Four Steps: syllabus alignment, reviewing content, customizing the lab kit to meet course objectives and student budget, and learning management system integration.

Designing formal group work to ensure equity.
Peggy Brickman, University of Georgia

Future employers are clamoring for colleges to help students gain group work skills. Instructors hope group work will encourage students to share and exchange reasoning and tackle assignments with real world complexity and relevance. Student achievement can improve through peer collaboration, but the process is not guaranteed. Many instructors have no idea how to support effective collaboration, organize student groups, deal with conflicts that arise, and a host of other practical issues that can turn group work into an ineffective and frustrating exercise for all. This interactive, practice-oriented session will focus on how to avoid the common pitfalls that derail group work and methods for structuring groups to ensure equity even in large enrollment classes. Participants will get an opportunity to view software that can help set up groups and also provide a mechanism for peer evaluation and notification of the instructor if there are problems within the group. Time
will also be set aside for participants to modify group activities so that they adhere to best practices for ensuring true collaboration.

**80 minute Workshops**

**Teaching the Experimental Process with New Labs from SimBio**
Eli Meir, SimBio

Dr. Eli Meir (SimBio's founder) will demonstrate two new labs from SimBio that both help students with their ability to describe and carry out well designed experiments. Understanding Experimental Design, the culmination of a multi-institution NSF cyberlearning grant, provides students individualized feedback as they design and construct experiments to solve an engaging biological mystery. A new version of our Keystone Predator lab uses a simulated intertidal system to offer helpful feedback as students generate and test hypotheses about how direct and indirect effects impact community structure. Bring your laptops - Eli will have USB drives with evaluation software so you can play along.

**Transforming your classroom into an active environment by adding Universal Design for Learning.**
Dawn Tamarkin, Cell Zone, Inc. and Springfield Technical Community College

Active learning has been shown to improve learning in biology classes. Yet, there are those who question whether active learning excludes some learners. In this presentation we will learn how to develop active learning approaches using an inclusive methodology to improve the potential for active learning to increase learning for more students. Universal Design for Learning (UDL) is a method for developing classroom approaches to include more learners, regardless of background, disability, or primary language. The UDL approach often leads to active classrooms, since more students learn that way.

In this workshop you will be given the opportunity to learn about UDL to find an approach that could help you transform your classroom. In particular, you will get to try to work through the most challenging topics that you teach to come up with better, more inclusive, approaches. The goal of this exercise is that you will leave this workshop with new ideas tailored to your own classroom to improve your students’ success. While you are working on new approaches for your own classroom we will also try out some UDL classroom activities which have been very successful in my classes. You will have an opportunity to select activities from among the following topics depending upon how much time we have: biological molecules, cells, microscopy, membrane structure, membrane transport, mitosis, the genetic code, and genetic engineering. Some of those classroom activities are available through Cell Zone, Inc., but others are simply classroom activities that I will share with you.

**Teaching Like a Pro in Your First Years**
Rebecca Burton, Alverno College, Conrad Toepfer, Brescia University, and Jason Wiles, Syracuse University

Join a conversation exploring topics such as effective pedagogy, classroom management, excellent resources, authentic assessment, and the road to tenure and promotion. The conversation is led by past winners of the ACUBE Excellence in Teaching Award.
Pre-Health Student Advising: Successes and Challenges
Laura Salem, Rockhurst University

At Rockhurst University in Kansas City we have a large population of students interested in health care careers. During this session we will share information about 1) communication strategies with students, 2) establishing partnerships with local and regional health professional programs, and 3) advocating for support for Pre-Health advising within the University.

Natural Selection in the Ebola Outbreak: Integrating Multimedia and Primary Literature into Undergraduate Biology Education
Mark Randa, HHMI BioInteractive

In this workshop, participants will see how to scaffold learning by pairing multimedia, a hands-on classroom activity, and primary literature to improve student understanding and engagement. In HHMI's, “Think Like a Scientist: Natural Selection in an Outbreak,” computational geneticist Pardis Sabeti and disease ecologist Lina Moses bring us to the front line of the Ebola epidemic and explain the science behind how this event became the largest Ebola outbreak in history. The short film reveals the invisible world of viruses and portrays some of the most dramatic moments of the recent Ebola crisis. Participants in the workshop will watch a segment of the film and then actively work through a classroom activity in small groups where they will analyze and interpret DNA sequence data and follow the Ebola virus transmission in a small set of patients in Sierra Leone. The session will conclude with a primary literature tie-in using resources from Science in the Classroom.

Posters:

Gamification of a Nursing Microbiology Course: Design and Initial Impacts on Attitude, Anxiety and Student Performance
Wendy A. Dustman and Julie Shearer, and Rolando Marquez, Georgia Gwinnett College

Gamification of curriculum isn’t just about using games in the classroom – it integrates game elements and game-thinking in course design to engage students, promote learning, motivate their actions as learners, and develop problem-solving skills. Using elements of game play (earning of experience points [XP], completion of quests, PvP battles, etc.), students’ educational journey was transformed to make the learning experience more compelling while encouraging development of problem-solving skills, classroom engagement, and a drive to exceed minimum goals. In a “gamified” course, rewards and incentives, rather than fear of poor grades, are anticipated to motivate student-players to continually improve, or “level-up”, as well as add to the sense of enjoyment of participating. The course structure of “gamified” Nursing Microbiology sections was modeled after a multiplayer role-playing game (like World of Warcraft) where fighting “monsters”, performing “quests”, “farming to level up”, and working in “guilds” were regular events. Game terminology (e.g., quests, raids, etc.) was substituted for standard terms (e.g. assignments, exams, etc.) in the course syllabus. Challenges (individual and/or cooperative), were related to course goals which reflected real-world applications of the content as often as possible. An overall team competition was implemented to enhance cooperative learning and teamwork skills. While the actual content coverage, as well as many of the learning activities and assessments, remained unchanged from previous traditional section offerings, the manner in which the course was delivered and the ways in which the students reacted was different. The instructional design of the experimental (“gamified”) section compared to a traditional section will be presented along with an initial summary of data collected to examine the effects of participating in the “gamified” vs. traditional design on student motivation, anxiety level, and academic performance itself. Assessment of impacts of the alternate course design include
free response learner satisfaction surveys (free response), the Colorado Learning About Science Survey (CLASS) – Biology (Likert scale response), and a comparison of pre-/post- performance on key content questions (multiple choice).

Teaching A Non-Majors Biology Online Lab Course
Daniel Kiernan and Pearl Fernandez

We designed an online Human Biology laboratory course as a companion course for the Human Biology lecture course for non-majors. The aim was to have the same learning outcomes in the online course as in a face-face laboratory course. The labs were a mixture of dry, wet and virtual labs. End of the course student evaluations revealed that the students were able to relate the online labs to their day-day lives, and the learning outcomes of the course were achieved.

Assessment of Misconceptions and Prior Knowledge in a Microbiology Course Using a Concept Inventory
Julie Grainy and Jennifer Walker, University of Georgia

Microbiology courses are often taught by diverse faculty with varying teaching styles. Our objective was to create an assessment tool to evaluate student understanding of important concepts across all introductory microbiology courses at a doctoral university. Concept inventories are tools to identify misconceptions at the start of a course and measure learning gains at the end of a course. Several inventories have been developed for STEM subjects, but there is a need for a microbiology concept inventory. In this study, a microbiology concept inventory was developed, refined, and validated. The ASM Curriculum Guidelines were utilized to develop a list of fundamental concepts students should learn in an introductory microbiology course. A multiple-choice inventory was developed and tested with a novice group of students at the beginning of a course, as well as with a group of microbiology experts for comparison. The novice group was predicted to earn concept inventory scores indicative of a lack of knowledge in the majority of the concepts and reveal any misconceptions. Students were prompted to explain why they chose a certain answer, and common incorrect responses were recorded. As expected, the results of the inventory identified incomplete understanding of certain concepts. Furthermore, there was a significant increase between the scores of the novice and expert groups, supporting the inventory validity. These preliminary results provide evidence for this inventory as a valuable assessment tool. The data from the first version of the concept inventory, including information from experts, influenced the improvement of a refined version that was implemented this summer and fall. Once fully refined and validated, the concept inventory can be used to identify gaps in understanding at the start of a course, which can be addressed with targeted active learning strategies. The effectiveness of interventions can be assessed with a concept inventory at the end of the course. This study provides the foundation for further development of the concept inventory into a useful tool for faculty as they improve their curriculum to enhance student learning.

Career Exploration Assignments increase Student Confidence in Career Path Planning
Latanya Hammonds-Odie, Georgia Gwinnett College

At Georgia Gwinnett College (GGC), an open access, 4-year public college in the University System of Georgia, many senior Biology majors are unable to answer fundamental questions about the next steps that they will take to attain their stated career goals. These students entered college professing a career goal, but many have done little to investigate their next steps post-graduation. In this individual, practical action research project, I have incorporated targeted assignments to encourage students to assert some personal agency and to engage in the process of career exploration to be able to articulate a strategic career plan. Twenty Biology majors were enrolled in the Research Methods in Biology course at GGC in spring 2016. All of the students enrolled in the course were invited and agreed to participate in this study. Over the course of the semester, students
completed assignments (five written) and activities (two workshops) designed to bolster student confidence in their ability to complete specific career exploration tasks. Students recorded their level of confidence or comfort with these specific tasks on the end-of-semester questionnaire using a modified five-point Likert Scale for thirteen items. The questionnaire was designed to allow students to reflect on their confidence/comfort level at the beginning of the semester. Data was collected from students enrolled in two upper-level courses for Biology majors was analyzed using Chi-squared tests as the statistical tool. The demographics of these students paralleled the demographics of the overall diversity of the GGC student population in terms of gender, race and ethnicity with the exception of percentage employed full time and age. Overall, the general trend in the data from the thirteen students revealed that student confidence/comfort in their ability to complete each of the tasks increased from the beginning of the semester to the end when the means and the ranges are compared. This makes sense as the intervention included specific assignments related to these tasks. We should consider including these types of tasks in the Biology major curriculum at GGC.

An Investigation of Potential Trends in Anatomy and Physiology I & II Final Grades Between Male versus Female Students
Kara Cashwell, Nicole Faison, Ashley Higgenbothem, and Virginia Baker Haynes, Charleston Southern University

The ratio of female to male students has been growing for decades with the current statistics suggesting that nearly 60% of college students are female while 40% are male. Additionally, the female students on campus are outperforming their male peers academically. We wondered if this trend was reflected in the courses Dr. Baker has primarily taught since 2011 (Anatomy & Physiology I and II). Therefore, we posed the following question: Have female students academically outperformed their male classmates in Dr. Baker’s A & P I and/or II courses from 2011-2016, as the current research suggests they would? Interestingly, the data shows that while female students have, on average, earned a higher A & P I final grade than male students by approximately 5.2 points (p<1), this difference is no longer see in A & P II final grades. This study lays the groundwork for further analysis of A & P performance comparison amongst male and female students which provides valuable insight for both the larger discussion on academic performance but also the trends on CSU’s campus where the steady growth of the Nursing, Kinesiology, Athletic Training, and Biology programs has led to an increase in the number of A & P students taught each year.

Two-Course Collaboration for Understanding Conservation Genetics
Alissa Hulstrand and Erik Olson, Northland College

In our experience we have found that students often have a hard time applying the skills and knowledge from one course to another, even if these skills are tightly woven in the professional field. A specific dearth is in understanding the role of genetics and molecular biology to making and implementing conservation and management decisions. We proposed a collaboration between two courses in different majors—Wildlife Ecology and Management, a Natural Resources course, and Methods in Molecular biology, a Biology course—for student-led projects to bring together an understanding of both wildlife conservation strategies and applications of molecular techniques. Students in Methods in Molecular Biology became the “experts” in fundamental molecular biology skills and served as leaders for small groups of students from the other course. Students in Wildlife Ecology and Management became “experts” in studying populations and making conservation decisions and brought those skills to the group. The group project used non-invasive genetic sampling of scat opportunistically found on Oak Island in the Apostle Islands of Northern Wisconsin. The students were asked to identify the species and sex of the organism belonging to each scat using a series of molecular techniques, as well as describe the uses of the data and the advantages of non-invasive genetic sampling. Based on qualitative responses by the students, we have identified strengths and weaknesses of the project. The major learning gains came from students in the Methods in Molecular Biology course, who were able to practice their skills.
independently and teach/lead a small group in performing molecular methods. Students in both courses found the activity interesting, and would have preferred earlier and more frequent interaction with their groups to establish a defined purpose prior to beginning the project. We plan to use this project in the future, with this feedback taken into account, as well as assess learning gains in other areas through both qualitative and quantitative means.

**The Genomics Education Partnership: An Opportunity for a Bioinformatics Course-based Undergraduate Research Experience for all Biology Students**

Nighat P Kokan, Cardinal Stritch University, Vida Mingo, Columbia College, Christopher Shaffer, Washington University in St. Louis, Wilson Leung, Washington University in St. Louis, David Lopatto, Grinnell College, Sarah C.R. Elgin, Washington University in St. Louis

The Genomics Education Partnership (GEP) is a consortium of faculty from more than 100 colleges and universities across the United States and overseas who are including bioinformatics tools and techniques in Course-based Undergraduate Research Experiences (CUREs). The greater biological question being addressed is a comparative study of the evolution and function of the Drosophila Muller F element (dot chromosome), an unusual domain which is packaged as heterochromatin but has a normal gene density. GEP students contribute through the sequence improvement and manual gene annotation of several Drosophila species using bioinformatics tools and databases that are freely available on the Internet. Every project is undertaken by two or more different students in the consortium, working independently, and the results reconciled, allowing for quality control. Students submit their completed projects to the GEP infrastructure at Washington University where their data is pooled and compiled for final analysis. Our most recent paper on the expansion of *Drosophila ananassae* F element has 31 faculty and several hundred undergraduate student co-authors who worked on sequence improvement and gene annotation for this species, which has an expanded F element. We are extending our curriculum to include teaching eukaryotic gene structure to beginning students using the genome browser, and hands-on investigations of Hidden Markov Models and Dynamic Programming. Assessment data from faculty and students taking part, using surveys, quizzes and focus groups, seems to indicate that CUREs are most effective when faculty and students work in a collaborative effort toward the common goal. Both groups assert the importance of using human judgment when the computer output is “wrong” or needs to be further explored. Students’ comments seem to indicate that they find this open-ended, independent research learning challenging but worthwhile. Nonetheless, students do not demonstrate a change in “grit” in light of this experience. In a joint effort with Galaxy, we are creating G-OnRamp, a Galaxy workflow that enables biologists with little IT know-how to create Genome Browsers with appropriate tracks (e.g., sequence similarity, gene predictions, RNA-Seq) for annotation of new and novel eukaryotic genome projects. Faculty and educators who are interested in participating in a beta-users workshop for G-OnRamp, should contact S. Elgin (selgin@wustl.edu).

Supported by NSF IUSE #1431407, NIH R25GM119157, and Washington University in St. Louis.

**The importance of outreach science: Turning the tide on ocean conservation**

Holly Nance, College of Coastal Georgia

Outreach education and the ability to speak scientifically to a non-academic audience are important skills which Biology majors need to develop as they prepare to enter their fields as scientists. Given the College of Coastal Georgia’s proximity to the coast, and a local economy based on fisheries, shipping, and ecotourism, ocean conservation is an issue demanding not only community awareness, but also community activism. To that end, my BIOL 4001 Special Topics class has focused on various environmental threats to our coast as a topic to discuss with 7th graders at Glynn Middle School and students at Brunswick High, emphasizing the underlying causes of these threats to our oceans, and providing examples of how students can be active participants in ocean
conservation. To assess the efficacy of their outreach education, the BIOL 4001 class has prepared pre- and post-presentation questionnaires intended to demonstrate how local students’ knowledge base, opinions, and perceptions regarding specific conservation issues may have changed as a result of their outreach science efforts. These questionnaire results will provide valuable feedback on how they may improve their science communication skills.

**Effect of Active Learning Exercises on Cognitive Skill Level and Student Performance in Exams**
Scott M. Shreve, Lindenwood University-Belleville

The efficacy of the traditional lecture, the predominant mode of teaching in colleges and universities for hundreds of years, has been increasingly challenged. Active learning, as an alternative to traditional lectures, has been shown to increase student performance (Freeman et al, 2007) and decrease failure rate (Freeman et al, 2011; 2014) in introductory biology courses. I compared performance on exam questions covering the three main parts of the first biology course majors take at Lindenwood University: evolution, biodiversity, and ecology. In the fall semester, all three parts where primarily taught using a traditional lecture format. In the spring semester, I used weekly case studies during the evolution unit, weekly IF-AT review quizzes during the biodiversity unit, and both case studies and IF-AT quizzes during the ecology unit. Students in the spring semester were significantly more likely to have lower scores on exam questions from the ecology unit ($P^*=0.22$, $p=0.0016$); there was no significant effect in the evolution and biodiversity units. Use of active learning in the classroom significantly increased the average Bloom level of exam questions in biodiversity unit ($p=0.034$). Overall, active learning did not increase student learning as assessed by exam questions. The disparity between these results versus the predicted effect of active learning may be due to the quality of delivery and differences in student ability between semesters.

**Teaching the Current Trends in Immunology: A Layered Learning Approach**
Denise L. Slayback-Barry, Indiana University – Purdue University

Immune intricacies are unearthed every day: identifying new mechanisms or new details about well-studied processes; demonstrating novel manipulations of immune components to treat diseases; and investigating new drugs to treat immune dysfunction. While these discoveries advance our understanding of the immune system, they also result in a minutia of detail to assess and integrate, as appropriate, into immunology education. It is imperative, as educators, to build a solid framework of understanding core concepts and basic mechanisms, and then to layer upon this framework the appropriate details for the target student audience. This concept of layered learning can be applied to any level of immunology education; within undergraduate, graduate or courses within the health professions. For example, cancer immunotherapy is an exciting field with new treatment strategies at the forefront of research and drug discovery. However, discussing the anti-PD-1 monoclonal antibody clinical trials with students who do not understand anti-tumor immunity, tumor escape mechanisms and manipulations of immune effector mechanisms, would be confusing and lead to memorization rather than understanding. It is essential that the educator first builds a functional immune system, layer-by-layer, allowing students to understand the various mechanisms involved with overall immunity. The next layer of learning would direct students to scrutinize these effector mechanisms with respect to tumor immunity. Most importantly, the instructor must filter the emerging science and determine the most essential details to include as the final layer for that student population. The need-to-know details will depend upon the established course objectives.
Formal involvement of students in new course development provides a unique educational experience and valuable perspective for students and the instructor
Matthew M. Stern, Winthrop University

A common model for developing a new course is for a department or faculty member to identify the desire and/or need for a new course, develop a plan for the structure and content of course, and then implement the course. While student input may inform the decision to offer a new course, students are typically not formally involved in the actual development of a course. When I was allowed to create a new upper-level course on stem cell biology at Winthrop University, I decided to formally involve two senior undergraduate students in the development of the course. My motivation for this approach to course design was to 1) provide a unique and challenging educational experience for two advanced students, 2) better understand student perspective on the different options for course structure and content that are considered when developing a course, and 3) gain assistance with the large workload associated with developing a new course. To formalize this plan, I was able to enroll the students in a flexible three-credit-hour “special topics” course in the semester prior to the initial offering of the new stem cell biology course. Here, I describe the structure of my approach to student-assisted course design, the benefits and challenges of this approach, the feedback provided by the students who participated in the course’s design, and the feedback of the students who took the initial iteration of the course. My experience was overwhelmingly positive, and the students involved stated that they benefited in many ways from their involvement in developing the course. This approach can be used in any discipline and is a way of offering students a unique educational experience while providing faculty with valuable assistance and perspective.

The Strategic Undergraduate STEM Talent Acceleration Initiative (SUSTAIN)
Jason Wiles, Syracuse University

The "Strategic Undergraduate STEM Talent Acceleration Initiative" (SUSTAIN) project at Syracuse University will address the challenges of recruiting and retaining high-achieving, low-income students from diverse backgrounds into undergraduate STEM programs. The SUSTAIN program will award thirty $10,000 scholarships for up to two years, and will provide a coherent system of academic, social, and career support services strategically designed to enhance the success of biology and chemistry students during their first and second years of undergraduate study. Program goals include retaining at least 90% of the initial cohort of 30 scholars as intended or declared STEM majors following their freshman year, and to retain at least 80% of these students as declared STEM majors following their second year of participation in the SUSTAIN program. The program will establish a STEM faculty professional development workshop designed to foster the implementation of cutting-edge instructional practices that support dynamic, active learning approaches in introductory STEM courses. Scholars will be provided 360 degree wrap-around support programming that is responsive to their evolving academic, social, and career development needs as they move through the freshman and sophomore years. Research efforts will investigate the socialization experiences of scholars throughout the program to examine the efficacy of the multi-faceted series of intervention supports to assess their impact on the future STEM trajectories of students. Findings from this project will promote the identification of promising approaches, identify areas for program refinement, and result in the development of a sustainable model for providing wraparound academic and social support services to STEM majors that can be replicated on other campuses.
ACUBE 2017 ATTENDEE CONTACT INFORMATION

Molly Algya  
eScience Labs  
1500 West Hampden Ave  
Sheridan, CO 80110  
malgya@esciencelabs.com

Jessica Allen  
Rockhurst University  
1100 Rockhurst Rd  
Kansas City, MO 64110  
jessica.allen@rockhurst.edu

Jessica Allen  
Columbia College  
1301 Columbia College Dr BSC 239  
Columbia, SC 29203  
jallen@columbiasc.edu

Melissa Anderson  
Lindenwood University – Belleville  
1301 Columbia College Dr BSC 239  
Belleville, IL 62226  
manderson1@lindenwood.edu

Stephen Bauer  
Belmont Abbey College  
100 Belmont-Mt. Holly Rd  
Belmon, NC 28012  
stephenbauer@bac.edu

Jan Benedict  
eScience Labs  
1500 West Hampden Ave  
Sheridan, CO 80110  
jbenedict@esciencelabs.com

Peggy Brickman  
University of Georgia  
3510 Miller Plant Sciences  
Athens, GA 30606  
brickman@uga.edu

Rebecca Burton  
Alverno College  
2209 S. 34th  
Milwaukee, WI 53215  
rebecca.burton@alverno.edu

Jessica Allen  
Columbia College  
1301 Columbia College Dr  
BSC 239  
Columbia, SC 20203  
jallen@co.lumbiasc.edu

Lisa Cantwell  
Wofford College  
429 North Church Street  
Spartanburg, SC 29303  
cantwellr@wofford.edu

Jan Benedict  
eScience Labs  
1500 West Hampden Ave  
Sheridan, CO 80110  
jbenedict@esciencelabs.com

Rebecca Burton  
Alverno College  
2209 S. 34th  
Milwaukee, WI 53215  
rebecca.burton@alverno.edu

Jessica Allen  
Columbia College  
1301 Columbia College Dr BSC 239  
Columbia, SC 20203  
jallen@columbiasc.edu

Melissa Anderson  
Lindenwood University – Belleville  
1301 Columbia College Dr BSC 239  
Belleville, IL 62226  
manderson1@lindenwood.edu

Stephen Bauer  
Belmont Abbey College  
100 Belmont-Mt. Holly Rd  
Belmon, NC 28012  
stephenbauer@bac.edu

Jan Benedict  
eScience Labs  
1500 West Hampden Ave  
Sheridan, CO 80110  
jbenedict@esciencelabs.com

Peggy Brickman  
University of Georgia  
3510 Miller Plant Sciences  
Athens, GA 30606  
brickman@uga.edu

James Clack  
Indiana University - Purdue University  
4601 Central Ave.  
Columbus, IN 47203  
jclack@iupui.edu

Janet Cooper  
Rockhurst University  
1100 Rockhurst Rd  
Kansas City, MO  64110  
janet.cooper@rockhurst.edu

Melissa Csikari  
Howard Hughes Medical Institute  
4000 Jones Bridge Rd.  
Chevy Chase, MD 20815  
Csikarim@hhmi.org

Ryan Dunk  
Syracuse University  
107 College Place 110 Life Sciences Complex  
Syracuse, NY 13210  
rddunk@syr.edu

Wendy Dustman  
Georgia Gwinnett College  
1000 University Center Lane  
Lawrence, GA 30043  
w dustman@ggc.edu
Melissa Eslinger  
US Military Academy, West Point  
PO Box 850  
Fort Montgomery, NY 10922  
melissa.eslinger@usma.edu

Pearl Fernandes  
University of South Carolina  
200 Miller Rd  
Sumter, SC 29150  
pefernan@mailbox.sc.edu

Julie Grainy  
University of Georgia  
527 Biological Science Bldg  
Athens, GA 30602  
jgrainy@uga.edu

Latanya Hammonds-Odie  
Georgia Gwinnett College  
1000 University Center Lane C2235  
Lawrence, SC 30043  
lhammond@ggc.edu

Elizabeth Harrison  
Georgia Gwinnett College  
1000 University Center Lane I3108  
Lawrence, SC 30043  
eharrison1@ggc.edu

Melissa Haswell  
Davenport University  
3555 E. Patrick Rd.  
Midland MI 48642  
melissamhaswell@gmail.com

Virginia Haynes  
Charleston Southern University  
9200 University Boulevard  
Charleston, SC 29406  
vbaker@csuniv.edu

Anna Hiatt  
University of Nebraska Lincoln  
213 Manter Hall  
Lincoln, NE 68588  
hiattannac@gmail.com

Alisa Hove  
Warren Wilson College  
PO Box 9000, Biology CPO 6217  
Asheville, NC 28815  
ahove@warren-wilson.edu

Alissa Hulstrand  
Northland College  
1411 Ellis Ave  
Ashland, WI 54806  
ahulstrand@northland.edu

Clara Jones  
Benedict College  
1600 Harden Street  
Columbia, SC 29204  
Clara.Jones@benedict.edu

Daniel Kiernan  
University of South Carolina Sumter  
200 Miller Rd  
Sumter, SC 29154  
kiernand@uscsumter.edu

Katherine Kleber  
Brunswick Community College  
50 College Road  
Bolivia, NC 28422  
kleberk@brunswickcc.edu

Laurieann Klockow  
Marquette University  
561 N. 15th St.  
Milwaukee, WI 53233  
laurieann.klockow@mu.edu

Nighat P Kokan  
Cardinal Stritch University  
6801 N Yates Road  
Milwaukee, WI 53217  
npkkan@stritch.edu

Gigi (Khadijah) Makky  
Marquette University  
561 N. 15th St.  
Milwaukee, WI 53233  
khadijah.makky@marquette.edu
Judith Maloney  
Marquette University  
561 N. 15th St.  
Milwaukee, WI  53233  
judith.maloney@marquette.edu

Lynnsay Marsan  
University of Texas at El Paso  
500 West University Dr.  
El Paso, TX 79968  
lmarsan@utep.edu

Marlee Marsh  
Columbia College  
1301 Columbia College Dr.  
Columbia, SC  29203  
mmarsh@columbiasc.edu

Selinda Martinez  
Laredo Community College  
1 West End Washington Street  
Laredo, TX 78040  
selinda.martinez@laredo.edu

Tanya McGhee  
BioNetwork  
PO Box 7007  
Greenville, NC 27835  
tmcghee@ncbionetwork.org

Eli Meir  
SimBio  
1280 S 3rd St W  
Missoula, MT 59801  
eli@simbio.com

Debbie Meuler  
Cardinal Stritch University  
6801 N. Yates Rd  
Milwaukee, WI  53217  
dameuler@stritch.edu

Vida Mingo  
Columbia College  
1301 Columbia College Dr.  
Columbia, SC  29203  
vmingo@columbiasc.edu

Kirt Moody  
Columbia College  
1301 Columbia College Dr.  
Columbia, SC  29203  
mmoody@columbiasc.edu

Holly Nance  
College of Coastal Georgia  
One College Drive  
Brunswick, GA 31520  
holly.nance@gmail.com

Alexandra Olvido  
University of North Georgia  
1201 Bishop Farms, Parkway  
Watkinsonville, GA 30677  
alex.olvido@ung.edu

Adrienne Oxley  
Columbia College  
1301 Columbia College Dr.  
Columbia, SC  29203  
ayoxley@columbiasc.edu

Paul Pickhardt  
Lakeland University  
W3718 South Drive  
Plymouth, WI  53082  
pickhardtp@lakeland.edu

Sarah Powell  
Grantham University  
16025 113th St  
Lenexa, KS 66219  
spowell6@grantham.edu

Mark Randa  
Cumberland County College  
3322 College Dr.  
Vineland, NY  08360  
mranda@cccnj.edu

Lynn Rumfelt  
Gordon State College  
419 College Drive  
Barnesville, GA 30204  
lrumfelt@gordonstate.edu
Laura Salem  
Rockhurst University  
1100 Rockhurst Road  
Kansas City, MO  64110  
laura.salem@rockhurst.edu

Scott Shreve  
Lindenwood University- Belleville  
2600 W. Main St.  
Belleville, IL  62226  
sshreve@lindenwood.edu

Denise Slayback-Barry  
Indiana University-Purdue University Indianapolis  
723 W. Michigan St. SL #306  
Indianapolis, IN  46202  
dlslayba@iupui.edu

Greg Smith  
Lakeland University  
W3718 South Drive  
Plymouth, WI  53073  
smithgr@lakeland.edu

Matthew Stern  
Winthrop University  
701 Oakland Ave.  
Rock Hill, SC 29733  
 sternm@winthrop.edu

Cynthia Syverson-Mercer  
Cell Zone, Inc.  
P.O. Box 2424  
Springfield, MA 01101  
sales@cellzone.org

Dawn Tamarkin  
Springfield Technical Community College  
Cell Zone, Inc.  
P.O. Box 2424  
Springfield, MA 01101  
dawn@cellzone.org

Landon Thompson  
Associated Microscope Inc  
PO Box 1076  
Elon, NC 27244  
info@associatedmicroscope.com

George Todd  
Coastal Pines Technical College  
517 Crescent Street, #5  
Waycross, GA 31501  
gtodd@coastalpines.edu

Conrad Toepfer  
Brescia University  
717 Frederica Street  
Owensboro, KY  42301  
conrad.toepfer@brescia.edu

Alan White  
University of South Carolina  
715 Sumter Street  
Columbia, SC 29208  
arwhite@mailbox.sc.edu

Jason Wiles  
Syracuse University  
107 College Place  
Syracuse, NY  13244  
jwiles01@syr.edu

Robert Yost  
Indiana University-Purdue University Indianapolis  
723 W. Michigan St., SL378  
Indianapolis, IN  46202  
ryost@iupui.edu

Julie Youngblood  
University of South Carolina  
715 Sumter Street  
Columbia, SC 29208  
juliey@email.sc.edu