Association of College & University Biology Educators

57th Annual Meeting – October 18-19, 2013

Hosted By
Indiana University Purdue University Indianapolis
ACUBE 57th Annual Meeting – Program Overview

Friday October 18th
9:00-11:00 a.m. Steering Committee Meeting
11:30 a.m.-2:30 p.m. Registration
12:00-2:50 p.m. Pre-Conference Workshop – Pulse: Vision and Change
3:00-3:20 p.m. Welcome
3:30-4:20 p.m. Roundtable Discussion
3:30-3:50 p.m. Session 1 (20 minute presentations)
4:00-4:20 p.m. Session 2 (20 minute presentations)
4:30-6:00 p.m. Student Posters
6:00-8:00 p.m. Dinner and Keynote Address

Saturday October 19th
8:30-9:50 a.m. Session 3 (80 minute workshops)
9:00-9:50 a.m. Roundtable
10:00-10:20 a.m. Session 4 (20 minute presentations)
10:30-11:20 a.m. Session 4 (40 minute presentations/50 min workshops
11:30 a.m.-12:30 p.m. Lunch, Vision and Change report, Bioscene meeting
12:30-3:00 p.m. Field trips
3:00-3:50 p.m. Session 5 (50 minute roundtables/workshops)
4:00-4:30 p.m. Session 6 (20 minute presentations)
4:30-6:00 p.m. Faculty Posters
6:00-8:00 p.m. Dinner and awards

Sunday October 20th
9:00-11:00 a.m. Steering Committee Meeting
Indiana University - Purdue University

Indianapolis, IN

IUPUI is Indiana's premier urban university, with 19 schools and academic units which grant degrees in more than 200 programs from both Indiana University and Purdue University. Its location within blocks of downtown Indianapolis facilitates advancement of research and teaching, and presents unique opportunities for internships, partnerships, community engagement, and more. IUPUI enrolls more than 30,000 students representing all 50 states and 122 countries.
Dee Silverthorn is a Distinguished Senior Lecturer in Integrative Biology at the University of Texas-Austin. Her bench research interest is epithelial transport, and work in her laboratory most recently focused on transport properties of the chick allantoic membrane. Over the years she has taught a wide range of students, from medical and college students to those still preparing for higher education. Currently she teaches physiology in both lecture and laboratory settings, and instructs graduate students on developing teaching skills in the life sciences. She believes that the classroom should be interactive, no matter how large, and her 8 a.m. class with 200+ students is a noisy place with 90% attendance. Dee has received numerous teaching awards and honors, including a 2011 University of Texas Regents’ Outstanding Teaching Award, Outstanding Alumna for Newcomb College, the 2009 Outstanding Undergraduate Science Teacher Award from the Society for College Science Teachers, the American Physiological Society's Claude Bernard Distinguished Lecturer and Arthur C. Guyton Physiology Educator of the Year, and multiple awards from UT-Austin, including the Burnt Orange Apple Award. She has written an award-winning textbook, *Human Physiology: An Integrated Approach*, currently in its sixth edition. Dee is an active member of the American Physiological Society, where she is currently chair of the APS Book Committee. She works with colleagues nationally and internationally to improve physiology education through workshops and conferences.
ACUBE greatly appreciates the donations by:

Acube also wishes to thank PULSE for sponsoring the PULSE Workshop and Friday’s Lunch
ACUBE Governance 2013

President, Tara Maginnis, University of Portland
President-Elect, Aggy Vanderpool, Lincoln Memorial University
Past President, Laura Salem, Rockhurst University
Executive Secretary of Finance, Greg Smith, Lakeland College
Executive Secretary of Membership, Christina Wills, Rockhurst University
Secretary, Aggy Vanderpool, Lincoln Memorial University
Local Arrangements Chair, Jim Clack, Indiana University Purdue University Columbus
Program Chair, Debbie Meuler, Cardinal Stritch University
Editor of Bioscene, Jim Clack, Indiana University-Purdue University
Historian, Conrad Toepfer, Brescia University

Steering Committee Members:

Rebecca Burton, Alverno College
Melissa Daggett, Missouri Western State University
Nighat Kokan, Cardinal Stritch University
Paul Pickhardt, Lakeland College
Danielle Rintala, Bryant & Statton College

ACUBE Mission Statement
The Association of College and University Biology Educators (ACUBE) focuses on undergraduate and graduate biology education. Members of ACUBE share their ideas, concerns, and course innovations; present their work at the annual meeting; publish their work in Bioscene, our peer-reviewed journal; and participate in the friendly collegiality of the organization.

The objectives of ACUBE are to:
1) Further the teaching of the biological sciences at the college and other levels of educational experience.
2) Bring to light common problems involving biological curricula at the college level and by the free interchange of ideas; endeavor to resolve these problems.
3) Encourage active participation in biological research by teachers and students in the belief that such participation is an invaluable adjunct to effective teaching.
4) Create a voice which will be effective in bringing the collective views of the college and university teachers of the biological sciences to the attention of college and civil government administrations.

http://www.acube.org/
## ACUBE 57th Annual Meeting
Indiana University Purdue University Indianapolis, Indianapolis, IN

### Friday, Oct. 18th

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<th>Time</th>
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<td>9:00-11:00</td>
<td>Steering Committee Meeting - UL 0110</td>
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<td>11:30-2:30</td>
<td>Registration – Lilly Auditorium Lobby</td>
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<td><strong>12:00-2:50.</strong></td>
<td>Pre-Conference Workshop UL 1126</td>
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<td><strong>Pulse: Vision and Change</strong></td>
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<td>Hosted by Michael Kelrick and Karen Klyczek</td>
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### 3:00-3:20 OPENING SESSION

Welcome to our 57th Annual Meeting: ACUBE President Tara Maginnis, *University of Portland*
Welcome to IUPUI: Simon Rhodes, Dean, *IUPUI School of Science*
Greetings from Conference Chairpersons:
- Local Arrangements Chair: Jim Clack, *Indiana University-Purdue University*
- Program Chair: Debbie Meuler, *Cardinal Stritch University*

### 3:30-4:20 SESSION 1 (Roundtable)

- **Sharing the Vision and Catalyzing Change: Forging a Midwest and Great Plains Network** (A roundtable discussion led by PULSE Vision and Change Fellows)
  - Michael Kelrick, *Truman State University*
  - Karen Klyczek, *University of Wisconsin – River Falls*

### 3:30-3:50 SESSION 1 (20 min presentations)

- **Captivating the Attention of Cell Biology Students**
  - Anjali Gray, *Lourdes University*
- **Exploring Relationships Between Students’ Misconceptions of the Nature of Science, Evolution and Global Climate Change**
  - B. Elijah Carter and Jason Wiles, *Syracuse University*
- **Undergraduate Ratings of Instructional Behaviors Informs Graduate Teaching Assistant Professional Development**
  - Katharina Denise Kendall, *University of Tennessee*
  - Matthew Niemiller, *Yale University*
  - Dylan Dittrich-Reed, *University of Tennessee*
  - Elisabeth Schussler, *University of Tennessee*

### 4:00-4:20 SESSION 2 (20 min presentations)

- **Improving Learning Outcomes from Introductory Courses Through Semester-long Community Involvement Projects**
  - Barbara Hass-Jacobus and Luke Jacobus, *Indiana University-Purdue University Columbus*
- **Teaching Sensors and Automation to Enhance the Biology Lab Experience**
  - Matthew Kropf, Nicolette Fruehan, and Danielle Erdley, *University of Pittsburg*
- **A Case Study: Biology Research as a Capstone Experience**
  - Stephen Daggett, *Avila University*
- **Introducing Drawing into a Powerpoint Lecture-based Microbiology Course**
  - Laurieann Klockow, *Marquette University*
### POSTER TITLES AND AUTHORS

- **Scientific Consensus and Social Controversy: Exploring Relationships Between Students' Conceptions of the Nature of Science, Biological Evolution, and Global Climate Change**  
  B. Elijah Carter and Jason Wiles, *Syracuse University*

- **Assessment of Highway Traffic and Rail-Road Impact on Campus Environment: A Case of Martin University, Indianapolis, Indiana**  
  Valerie Collier, Nancy Munson, and Mamta Singh, *Martin University*

- **Design and Implementation of an Automated Plant Growth System**  
  Danielle Erdley, Nicolette Fruehan and Matthew Kropf, *University of Pittsburg at Bradford*

- **“Evo in the News”: A Pedagogical Tool to Enhance Students’ Perceptions of the Relevance of Evolutionary Biology**  
  Lynn M Infanti and Jason R. Wiles, *Syracuse University*

- **Freshwater Ecosystem Health – Why is it Important?**  
  Mauriya Majada, Nancy Munson and Mamta Singh, *Martin University*

- **The Effects of Individual Components of Acid Mine Drainage Remediation on *Elodea densa* Viability**  
  Paige Mundy and Irene M Wolf, *Saint Francis University*

- **Environmental and Socio-Economic Studies of the Impact of Freeway (I-70) and Rail-Road on a University Campus and its Neighborhood in Indianapolis, Indiana.**  
  Sophia Nelson, Mamta Singh, Nancy Munson, Tia-Lyn Gary and LaTosha Williams, *Martin University*

- **Effects of Acid Mine Drainage on Hsp70 Protein Expression of *Elodea densa* at Remediation Ponds**  
  Travis Schofield and Irene M. Wolf, *St. Francis University*

- **Increased HSP70 Expression in *Typha latifolia* in Decreasing Concentrations of Acid Mine Drainage**  
  Matthew Williams and Irene M. Wolf, *St. Francis University*
Invited Speaker: Dr. Dee Silverthorn

“Interactive Lectures: Concepts and Competencies”

Saturday, Oct. 19th

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<th>Time</th>
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<td>8:30-9:50</td>
<td>SESSION 3</td>
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<td>Teaching Evolution</td>
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<td></td>
<td>Kristin Jenkins, University of Wisconsin - Madison</td>
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<td>Teaching Osmolarity, Tonicity, and IV Fluid Therapy</td>
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<td>Dee Silverthorn, University of Texas Austin</td>
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<td>9:00-9:50</td>
<td>(Roundtable)</td>
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<td>The Challenges of Career Advising for Biomedical Students</td>
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<td>Khadijah Makky, Marquette University</td>
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<td>10:00-10:20</td>
<td>SESSION 4</td>
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<td>Student Engagement Through the Use of Biological Fieldwork</td>
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<td>Antonios Pappantoniou, Housatonic Community College</td>
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<td>Tales of a First Year Department Chair</td>
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<td>Paul Pickhardt, Lakeland College</td>
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<td>Lab Activity: Sperm Number Decreases after Vaginal Ejaculation</td>
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<td>Dianne M. Jedlicka, Devry University, School of the Art Institute of Chicago</td>
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<td>Victoria Lu, Columbia College Chicago</td>
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<td>10:30-11:20</td>
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<td>Assessment of a Cell Basis of Anatomy and Physiology Course on the Success of Nursing Students in Microbiology</td>
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<td>Janet L. Cooper, Rockhurst University</td>
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<td>Connecting Genetics, Nutrition and Cellular respiration: A Case study in MCADD</td>
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<td>Kimberly Vogt, Marian University</td>
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<td>How Often Do College Students See You-Tube Videos to Learn Biology and Chemistry Concepts.</td>
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<td>Abour Cherif, Devry University</td>
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<td>Margaret Martyn, Harold Washington College</td>
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<td>Julia Siuda, The Illinois Institute of Art</td>
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<td>Charles Cannon, Columbia College Chicago</td>
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<td>Samar Ayesh, Harold Washington College</td>
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<td>Farahnaz Movahedzadeh, Harold Washington College</td>
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<td>11:30-12:20</td>
<td>LUNCHEON</td>
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<td>Vision and Change Report: Tara Maginnis</td>
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<td>BioScene Meeting: Jim Clack</td>
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### 12:30-3:00 Field Trips

| Medical Museum | Meet on New York Street South of UL |
| Allied Health and Professional School Advisor Information Session | UL 0130 |

### 3:00-3:50 SESSION 6  
(50 minute workshops or roundtables)  

<table>
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<tr>
<th>Topic</th>
<th>Presenter(s)</th>
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| *Addressing Student Misconceptions about Human-Driven Natural Selection in Introductory Biology Courses (Workshop)* | Conrad Toepfer, *Brescia University*  
Carol Maillet, *Brescia University*  
Sibyl Bucheli, *Sam Houston State University*  
Brooke Dubansky, *Tarleton State University* |
| *Teaching and Assessing Higher-Level Thinking in Biology (Workshop)* | Rebecca S. Burton, *Alverno College* |
| *Challenges of Assessment Within and Between Programs (Roundtable)* | Kristine Wills, Laura Salem and Mindy Walker, *Rockhurst University* |

### 4:00-4:20 SESSION 7  
(20 minute presentations)  

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<tr>
<th>Topic</th>
<th>Presenter(s)</th>
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| *Redesigning Sperm and Egg* | Dianne M. Jedlicka, *Devry University, Columbia College of Chicago, The School of the Art Institute of Chicago*  
Abour Cherif, *Devry University*  
Ateeq Al-Arabi, *Devry University*  
Farah Movahedzadeh, *University of Illinois at Chicago*  
Kris Horn, *Devry University* |
| *Survey Results: Addressing Critical Challenges to the Teaching of Anatomy and Physiology* | Abour H. Cherif, Kris M. Horn, and Matthew J. Bruder, *Devry University* |
| *You’re Only in Peru Once: Organizing a Field Trip to the Amazon* | Mindy Walker, *Rockhurst University* |
| *The Science Case Network: Supporting Faculty Implementing Case Studies and Problem-based Learning* | Karen Klyczek, University of Wisconsin – River Falls  
Pat Marsteller, *Emory University* |

### 4:30-6:00 POSTER SESSION B  

<table>
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<tr>
<th>Poster Titles and Authors</th>
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| *Enabling Undergraduates to Comprehend and Analyze Primary Research*  
*Katharyn J. Affeldt, University of Wisconsin-Madison* |
| *A Literature Review on the Possible Uses of Course Web Sites*  
*Andrea M.-K. Bierema and Renee’ S. Schwartz, Western Michigan University* |
| *Facilitating Successful Collaborative Research in Undergraduate Animal Behavior Courses* |
Rebecca Burton, *Alverno College*

- **New Methods for an Interactive Undergraduate Journal Club**  
  Jordan Clark, Adam Rollins, and Philip Smith, *Lincoln Memorial University*

- **Teaching From the Primary Literature: An Overview of a Molecular Cell Biology Course Taught Using the C.R.E.A.T.E Method**  
  Melissa A. F. Daggett, *Missouri Western State University*

- **PULSE: Organizing to Catalyze Change in Undergraduate Biology Education**  
  Karen Klyczek, *University of Wisconsin – River Falls*  
  Michael Kelrick, *Truman State University*

- **Halobacterium Species NRC-1 as a Model for Independent Student Projects**  
  Nighat P Kokan, *Cardinal Stritch University*

- **Weaving a Thread: A Cross-Curricular Approach**  
  Carol M. Maillet and Conrad S. Toepfer, *Brescia University*

- **Blending Lecture and Lab in one Setting to Maximize Learning**  
  Devonna Sue Morra, *Saint Francis University*

- **Can ‘Supplemental Instruction’ Increase the Success of Students in a One Semester Human A & P Course**  
  Thomas Rachow, *Missouri Western State University*

- **Peer Led Team Learning in Introductory Biology: Effects on Critical Thinking Skills and Student Achievement**  
  Julia J. Snyder and Jason Wiles, *Syracuse University*

- **HungerU at Syracuse University: Impacts of an Informal Education Experience on Student Attitudes Toward the Science of Food Sourcing**  
  Jason R. Wiles and B. Elijah Carter, *Syracuse University*

**6:00-8:00 Dinner and Awards**  
Buggs Temple

- Out of this World Teaching Idea
- Teaching Excellence Award
- Honorary Life Membership Award
- Carlock Awards
- Resolutions

2014 Meeting (Our 58th) University of Portland-Presented by Tara Maginnis 2014 Local Arrangements Chair
ABSTRACTS
(Organized according to session)

KEYNOTE ADDRESS
“Interactive Lectures: Concepts and Competencies”
Dr. Dee Silverthorn

Calls for reform to science education have been issued for decades with little response from the university community until recently. Now, with publication of the Vision and Change report and increasing use of technology for webcasting, podcasting, and lecture capture, instructors are beginning to re-examine how they teach. Can massive open online courses (MOOCs) replace warm bodies in the classroom? How do we convince the tech-savvy Millennials in our courses that coming to class is going to benefit them? In this talk we will examine several strategies for creating interactive lectures that focus on key concepts in biology and that also teach non-content competencies such as teamwork and the ability to recognize gaps in understanding.

SESSION 1

“Captivating the Attention of Cell Biology Students”
Anjali Gray, Lourdes University
In addition to the required textbook for a cell biology course, a recent bestseller was used to show students the importance and application of cell biology in real life.

“Exploring Relationships Between Students’ Conceptions of the Nature of Science, Evolution, and Global Climate Change”
B. Elijah Carter and Jason R. Wiles, Syracuse University
It is overwhelmingly acknowledged by the scientific community that evolution and global climate change (GCC) are undeniably supported by physical evidence. And yet, both topics remain politically contentious in the United States. Students’ conceptions of the nature of science (NOS) may be key factors in determining attitudes towards evolution and GCC. With this hypothesis in mind, we asked: Do changes in NOS understanding correlate with changes in attitudes towards evolution or GCC? Are correlations similar for evolution and GCC? What demographic factors influence these correlations? Are other factors from the literature important? We administered surveys to a large sample of students in a mixed-majors biology course at a medium-sized, private university in the northeastern US. Students were surveyed both at the beginning and end of the course. The surveys included previously validated tools to measure acceptance of evolution and NOS conceptions, questions on GCC opinions from national polls, and items related to demographic factors thought to influence acceptance of evolution or GCC. Correlation tests and ANOVA/ANCOVA were used to look for significant relationships and interaction effects in the data. The data support the hypothesis that NOS conceptions correlate with positive attitudes towards evolution and GCC.

“Undergraduate Ratings of Instructional Behaviors Informs Graduate Teaching Assistant Professional Development”
Katharina Kendall, University of Tennessee
Matthew Niemiller, Yale University
Dylan Dittrich-Reed, University of Tennessee
Elisabeth Schussler, University of Tennessee
Introductory biology courses rely heavily on graduate teaching assistant (GTA) instruction in sub-sections (laboratories and discussions) associated with large lecture sections. These introductory courses are important
gateway courses for student retention, attitude, and learning in the sciences, and the instruction undergraduates receive from GTAs can impact all of these aspects. Therefore, this study explored instructional behaviors of GTAs teaching introductory biology laboratory sections to determine which behaviors are most important for teaching effectiveness. In Spring 2012, 1159 undergraduates in freshman-level biology courses rated their GTA on 21 instructional behaviors previously identified as important for student learning, the GTA’s teaching effectiveness, the amount the student learned, and expected grade in the laboratory course. Using linear mixed models we found that instructional behaviors related to teaching techniques and interpersonal rapport best predict teaching effectiveness of GTAs, from the undergraduate perspective, suggesting these aspects should be the focus of professional development.

SESSION 2

“Improving Learning Outcomes from Introductory Courses through Semester-long Community Involvement Projects”
Barbara Hass-Jacobus and Luke Jacobus, Indiana University-Purdue University Columbus
Teaching and applying knowledge utilizes more integrative thinking than memorization. Community involvement projects that require students to apply classroom knowledge in the real world can improve achievement of course objectives and program-level learning outcomes. We will discuss specific semester-long service learning projects in particular, and methods for assessing long-term learning.

“Teaching Sensors and Automation to Enhance the Biology Lab Experience”
Matthew Kropf, Nicolette Fruehan, and Danielle Erdley, University of Pittsburg
New electronics technologies have enabled sophisticated digital measurement and control automation in biological science. With pervasive growth in open-sourced hardware and software platforms such as Arduino microprocessors, Processing programing language, and Raspberry PI computers, implementing custom automated measurements and control has become an inexpensive and straightforward option for the college laboratory. These technologies have eliminated the need of specialized equipment in order to achieve high accuracy control and measurements in biology experiments. A multi-disciplinary approach to learning integrates engineering technologies with biological education. This results in students with confidence and abilities in the application of supporting technologies. Furthermore, teaching the basic skills involved with open source hardware programming provide students with a greater ability to apply these technologies to field biology, sustainability projects, and their careers. This presentation will review the curriculum, teaching method, and technology tools implemented in a multi-disciplinary course on Sensors and Automation.

“A Case Study: Biology Research as a Capstone Experience”
Stephen Daggett, Avila University
Since 1996, the Department of Biology at Avila University has required undergraduates to complete a minimum two semester research project as part of their senior capstone experience. The course has undergone several modifications since that time. Avila is primarily a teaching institution where twelve contact hours a semester is the minimum required teaching load for faculty. This presents several challenges, including time blocks to work in the laboratory and field, faculty compensation, and student motivation to devote 10-12 hours a week on average for a one-credit hour experience. This presentation will look at the evolution of the course, solutions to previous challenges, and concerns about the future.

“Introducing Drawing Into a Powerpoint Lecture-Based Microbiology Course”
Laurieann Klockow, Marquette University
Students introduced to microbiology often have trouble visualizing complex processes such as the host immune response and genetic drift/shift in the context of viral evolution. Furthermore, actively engaging students in a large lecture course (250+ students) without a team of teaching assistants is a daunting task for the new professor. To address these concerns, I introduced drawing into my Powerpoint lectures in two microbiology courses that I teach. The first course, BISC 3115, is a three credit introductory microbiology
course for undergraduates. The student population consists of ~50% sophomore nursing students and ~50% junior/senior biomedical science majors. The second course, BISC 7410, is a four credit basic microbiology course taught to first year dental students and physician assistant students. I provided students with “bare bones” Powerpoint point lectures slides prior to lecture. During lecture I used a tablet PC to draw out structures and pathways to flesh out the Powerpoint slides. Students then copied these drawings into their notes rather than passively viewing Powerpoint images. I assessed the impact of using the tablet PC in the classroom by asking the students in the professional-level course, BISC 7410, to voluntarily complete an online survey. I also analyzed comments from students on end-of-semester evaluations in the undergraduate course, BISC 3115, to gather qualitative data. The survey consisted of five questions based on a Likert scale to assess the impact of drawing on student learning, retention, and engagement. 70% of the respondents thought that the use of the tablet PC in lecture enhanced their learning of microbiology “ quite a bit” or “a lot”. I will discuss how I incorporated drawing into my Powerpoint lectures, the benefits of this activity to the professor and students, sources of good examples of drawings, and student impressions of this teaching strategy.

SESSION 3

“Teaching Evolution”
Kristin Jenkins, University of Wisconsin-Madison
Evolution is one of the Five Big Ideas in biology as identified in the Vision and Change report but it is also a challenging topic to teach. Not only are many important aspects of evolution cognitively difficult for students to grasp, but a plethora of misconceptions have been identified around key evolutionary concepts. On top of this, creationists have made evolution a social issue which can cause tension in the classroom for many students. This session will focus on identifying some key misconceptions and approaches to address them, as well as sharing a variety of freely available, high quality resources for teaching evolution at a variety of levels from Understanding Evolution, HHMI’s BioInteractive and other groups. Specifically, we will use tree thinking as a valuable way to understand common ancestry and explore the “genotype to phenotype” approach to help students build a complete picture of evolutionary processes. In addition, we will touch on ways to defuse classroom tension. Kristin Jenkins is the director of BioQUEST and the director of Future Faculty Programs at the University of Wisconsin, Madison. She works with the UW Crow Institute for the Study of Evolution to provide quality evolution education resources to high school and college faculty.

“Teaching Osmolarity, Tonicity, and IV Fluid”
Dee Silverthorn, University of Texas Austin
Understanding osmolarity and tonicity is essential for health professionals faced with decisions about administering appropriate IV solutions. Student confusion is compounded by erroneous or misleading information that is widely disseminated on the web, in introductory biology textbooks, and even in continuing education material for nurses. In this workshop we will review the two concepts and show how they can be taught to students using clinical scenarios. Some of the problems we will discuss require students to use quantitative skills and apply the principle of mass balance. Other problems, though seemingly simpler, require conceptual understanding to answer correctly.

“The Challenges of Career Advising for Biomedical Students”
Khadijah Makky, Marquette University
Science students who are planning to attend professional schools (Medical, Dental schools) after graduation are well served in Biomedical Sciences or Biology departments. The requirements are clear, the curriculum is planned and they are provided with a plethora of informational sessions for competitive and successful applications. In contradistinction to these professional school bound students, there is a growing number of students who are looking for careers in alternative healthcare fields. Helping these students to set up a plan for after graduation is more challenging! Some of the difficulties include a lack of well---known career paths, difficulty in finding training opportunities and
internships, and the novelty of some of these alternative health related specialties in general. What can be done to help these scholars navigate the current climate of healthcare related specialties? How can we help guide them in pursuing a career in genetic counseling for example, or how to become a healthcare administrator after graduation? What are the ways we can help them enter this job market as strong candidates?

SESSION 4

“Student Engagement Through the Use of Biological Fieldwork”
Antonios Pappantoniou, Housatonic Community College

One measure of student engagement is the willingness of students to become involved in extracurricular activities. In a collaborative effort between Housatonic Community College and the Connecticut Audubon Society, an extracurricular summer fieldwork experience has been underway since summer 2010. This experience has a dual purpose: 1. Introduce a group of community college students to fieldwork and 2. Have students collect and analyze data from aquatic organisms. This presentation will discuss components of this research experience. Opportunities such as this offer students an experience collecting biological data with real world applications. Since summer 2010 a total of 11 students have volunteered for this program with 7 of these students going on to four-year institutions to major in biology. Three of these students have graduated with degrees in biology.

“Tales of a First Year Department Chair”
Paul Pickhardt, Lakeland College

For most tenure track biology professors at smaller or more teaching focused institutions their primary responsibilities are classroom and laboratory teaching. So what happens to that primary responsibility when they find themselves taking on the position of department or division chairperson? In this presentation, issues associated with teaching while taking on administrative tasks will be presented and reflected upon. Ideally, the presentation will stimulate discussion on how the author could improve upon areas of concern and aid future biological administrators if and when they take on the role of departmental chairperson.

“Lab Activity: Sperm number decreases after vaginal ejaculation”
Dianne M. Jedlicka, Devry University, School of the Art Institute of Chicago
Victoria Lu, Columbia College Chicago

For decades, Biology and Health instructors have told students that the majority of sperm are made nonviable by the rigorous acidic environment of the vagina. By modifying a population life table lab tabulation, we now have a good illustrative data collecting lab that can successfully show what happens to a sperm cohort (an ejaculate) along its journey. Included in this presentation will be the procedure for the lab, explanation of a one hundred di (dice) cohort, and what happens on each roll of the di. Data sheets and calculations are needed to complete this exercise and examples will be presented at this ACUBE meeting.

SESSION 5

“Assessment of a Cell Basis of Anatomy and Physiology Course on the Success of Nursing Students in Microbiology”
Janet L. Cooper, Rockhurst University

Initial assessment work showed that in general, nursing students do not score as high as Biology majors in a Microbiology course. This is especially true when examining units related to cellular structure and metabolism. One potential reason for this poorer performance may be the lack of preparation in cellular biochemistry. To address this issue, the department redesigned the existing course series for nursing students to include a 1 credit course in the Cell Basis of Anatomy and Physiology, taken concurrently with the Anatomy and Physiology I course. This course included an introduction to topics in cellular biochemistry. The redesigned course structure did not add any additional hours to the nursing curriculum. To determine if this course helped
nursing students perform better in subsequent courses, student performance was evaluated in Microbiology classes before and after the implementation of the Cell Basis course. Students were evaluated based on their performance in individual units and in their overall performance (final grade average) in the course. Nursing students overall did better in the course after the implementation of the Cell Basis course, based on their final grades in the course. When examining units in Microbiology, it was also found that nursing students did better in areas related to cellular structure and biochemistry following the implementation of the Cell Basis course. While only the unit on prokaryotic structure showed a statistical difference, better scores were observed in the areas of growth and metabolism.

“Connecting Genetics, Nutrition and Cellular respiration: A Case study in MCADD”
Kimberly Vogt, Marian University

Cellular respiration is one of the topics introductory students struggle with most frequently. Students are introduced to medium chain fatty acid oxidation disorder by ways of a newspaper article. By examining this genetic disorder, students begin to understand the steps involved in respiration and the consequences if these are steps do not proceed as usual. An additional component of this case study asks students to explore how key players in the health field balance costs and benefits of diagnostic tests.

“How Often Do College Students Use YouTube Videos to Learn Biology and Chemistry Concepts?”
Abour Cherif, Devry University
Margaret Martyn, Harold Washington College
Julia Siuda, The Illinois Institute of Art
Charles Cannon, Columbia College Chicago
Samar Ayesh, Harold Washington College
Farahnaz Movahedzadeh, Harold Washington College

In this presentation we describe a study we conducted with 385 (144 + 241) students from two and four year colleges. We asked them to provide their own perspectives on how often they use YouTube videos in learning biology and chemistry at the undergraduate level, and how they see their usefulness in helping them understand learned topics. In this study we will share the results and discuss the implications of the findings on students, instructors, curriculum, and academic leaders. In short, being aware of how students themselves use and perceive the effectiveness of YouTube videos in learning the subject matter is a necessary first step. It can help instructors decide how to integrate YouTube videos into the curriculum when designing their courses, selecting learning materials, and selecting teaching strategies to achieve higher rates of success of the intended learning objectives and outcomes in their classes. The goal is to find workable pedagogical options that can lead to an increased rate of student success measured in terms of higher student satisfaction, and better academic performance and long term retention of their comprehension of learned concepts. After all, understanding the knowledge and the value of science, technology, and engineering is not only important, but also a necessity for every American citizen (National Research Council, 2012) to live and be a productive part of this highly technological world.

The rationale for conducting this study involves the high failure rates in introductory college chemistry courses seen for many years (e.g., Rowe 1983; WagnerSasser & DiBiase, 2002; Zeegers & Martin, 2001). And it is even higher in “large lecture introductory chemistry courses, as seen for STEM majors for many years” (Popejoy and Asala, 2012, p. 18). Most likely, adding to the high failure rate, is the issue of seeing the inherent link of chemistry to biology. It is fundamental to understanding biology, and is integrated in most biology courses. And many students in these introductory biology courses are struggling with the biology-based chemistry topics. These concepts require understanding pertinent knowledge of chemistry, as it is linked to biology specifically. And again, class size comes into place, as large, lecture hall-based biology courses are a norm in much educational settings. Even with this, though, the fact is many students could succeed in the early days of their undergraduate experience, if they were given enough support and guidance (National Research Council, 2007).
“Galápagos Mystery: A Scientific Process Case Study”
Conrad Toepler, Brescia University
Participants of this workshop will have a chance to work through an extensive case study (over 100 pages of data and notes) used to illustrate the scientific process. I use the case study in 2-3 class periods after discussing the nature of science with freshmen biology majors. Students are given preliminary data showing a dramatic decline in marine iguana populations concurrent with a population explosion in Galápagos finches. Students, working in groups, are required to develop reasonable hypotheses which may result in the receipt of data to interpret (if that study had been done in reality). As students progress through the case study, they typically eliminate multiple hypotheses and begin to build an explanation for the observed data. Their use of deductive and inductive reasoning is emphasized through the entire case. The case is open-ended so is slightly different each time it is used. It does, however, usually allow discussions of how experimental methods and data presentation may alter interpretation of results, how scientists piece together data from disparate sources and compensate for missing information, and how the elimination of alternative hypotheses is just as important as the “right” answer. After we work through the case study, I will point out where specific issues can be addressed and discuss how students respond to the case. My intent is to make the case study and teaching notes freely available on the members-only section of the ACUBE website.

SESSION 6

“Addressing Student Misconceptions about Human-Driven Natural Selection in Introductory Biology Courses”
Conrad Toepler, Brescia University
Carol Mailliet, Brescia University
Sibyl Bucheli, Sam Houston State University
Brooke Dubansky, Tarleton State University
As a mechanism of evolution, natural selection is a core concept in introductory biology courses, as well as evolution courses. Students at all levels of study, however, tend to carry the misconception that humans are isolated from the effects of natural selection, and do not often recognize anthropogenic influences on the environment as natural; rather they categorize these interactions as components of artificial selection. In this workshop, we will be presenting a “teachable tidbit” we developed at a National Academies Summer Institute. This teachable unit and its correlated assessments are designed to address these misconceptions at the introductory biology level. Following a short lecture that uses anthropogenic examples of natural selection (i.e., Warfarin resistance in rodent populations and/or antibiotic resistance in MRSA), students (or you, as a workshop participant) will utilize a strip-sequence activity designed to reinforce the logical framework and prerequisite conditions for natural selection to occur (e.g., pre-existing variation in natural populations, selection pressures, differential reproductive fitness, etc.), which were covered in a previous class session. Formative assessments such as clicker questions and think-pair-share activities will encourage student reflection and discussion about how pesticide resistance and/or antibiotic resistance meet the requirements of natural selection. The use of anthropogenic examples of natural selection emphasizes that natural selection can be human-driven, and illustrates that natural selection can impact human health. Additional class discussions should emphasize the differences between natural and artificial selection.

“Teaching and Assessing Higher-Level Thinking in Biology”
Rebecca S. Burton, Alverno College
We will be discussing outcomes, criteria, assessment, rubrics and feedback as part of an integrated system to help students analyze, evaluate, and predict—skills that they can transfer to other disciplines. Approaching biology as a framework for learning beyond content allows us to identify thinking skills that are critical across the curriculum. Departmental outcomes focus efforts on the most important aspects of learning. Authentic assessment puts the student in the role of a biologist. Criteria define the key aspects of effective performance.
Well-designed rubrics allow for efficient feedback on complex higher-level tasks. Share your ideas and get concrete examples.

“Challenges of Assessment Within and Between Programs”
Christina Wills, Laura Salem, and Mindy Walker, Rockhurst University
We will be on leading a roundtable about the challenges of assessment (within and between programs). This will include a list of challenges that have been faced at Rockhurst assessing the Biology Program, the Honors Program, and the General Education – Science requirement (across biology, chemistry, geology, and physics), and some of the solutions that we have developed. Participants will be asked to discuss the formulation and assessment of learning objectives at the program level. We hope to foster an open discussion about the difficulties other faculty have faced and the unique approaches they have developed to solve assessment issues.

SESSION 7
“Redesigning sperm and egg”
Dianne M. Jedlicka, Devry University, Columbia College of Chicago, The School of the Art Institute of Chicago
Abour Cherif, Devry University
Ateegh Al-Arabi, Devry University
Kris Horn, DeVry University
Farah Movahedzadeh, University of Illinois at Chicago
After employing our idea of “Redesigning the Human Body Systems” for a few years, an interesting twist at the synthesis level of knowledge “jumped out”. What if, after studying the Human Reproductive System, the students were asked to redesign only the egg and the sperm?! We gave the “design role” to the students and allowed their creativity, still using basic physical laws, to start up. This question allowed for additional thought by the student and initiates higher cognitive and creative thought processes. Three different Biology classes were presented with this assignment. Creative and scientifically based answers illustrate how the students’ interpret the instructor’s lectures, text reading, and figures from the text. There was one student who was hesitant in this project due to possible religious conflicts. This presentation will highlight student ideas and possible instructor applications.

“Survey Results: Addressing Critical Challenges to the Teaching of Anatomy and Physiology”
Abour H. Cherif, Kris M. Horn, and Matthew J. Bruder, Devry University
This survey of anatomy and physiology professors examines some of the most critical challenges in teaching anatomy and physiology to college students. This survey looks at some of the best ways to overcome these critical challenges. In addition, this survey examines some of the most critical challenges in learning anatomy and physiology for college students and some of the best ways to help students overcome these critical challenges. This survey also examines the relevance of other disciples that are routinely taught with anatomy and physiology.

“You’re Only in Peru Once: Organizing a Field Trip to the Amazon”
Mindy Walker, Rockhurst University
Providing students the chance to participate in field work in turn provides them with an invaluable opportunity to explore biology and learn about themselves and their strengths and limitations. Further, field trips abroad can provide not only lessons in ecology and biodiversity, but also in language, research, ethics, socioeconomics, and service. It is difficult to envision an experience that better educates and engages students than the opportunity afforded by field trips abroad to approach complex, real-life problems through experiential-, and service-learning. Herein I will present our experiences with planning and implementing a field trip abroad, as well as provide information about the field station at our field trip destination in the Peruvian Amazon.
“The Science Case Network: Supporting Faculty Implementing Case Studies and Problem-based Learning”

Karen Klyczek, University of Wisconsin – River Falls
Pat Marsteller, Emory University

This session will provide a brief update on the activities of the Science Case Network (SCN), an NSF-funded project to support an active community of science educators, learners, researchers and developers interested in furthering the use of case studies and problem-based learning (PBL) in undergraduate biology education. The web site, www.sciencecasenet.org, connects users to the case studies and PBL projects in the network, groups of educators focused on particular issues in biology education, collaborators for research and development projects around cases, and ideas for classroom implementation.

FRIDAY POSTER SESSION

“Scientific Consensus and Social Controversy: Exploring Relationships Between Students’ Conceptions of the Nature of Science, Biological Evolution, and Global Climate Change”

B. Elijah Carter and Jason Wiles, Syracuse University

It is overwhelmingly acknowledged by the scientific community that evolution and global climate change (GCC) are undeniable supported by physical evidence. And yet, both topics remain very politically contentious in the United States. Efforts to mitigate the disconnects between the scientific community and the general public on these issues are imperative to science education. Such undertakings need to examine students’ conceptions of the nature of science (NOS), including how evidence is treated, how theories are constructed, and how scientific consensus is reached, as these may be key factors in attitudes towards evolution and GCC. If students have a more thorough understanding of the processes of science, how consensus is built, and better tools to discern scientific versus nonscientific arguments, they may become more likely to accept strongly supported scientific ideas. This study explored this hypothesis guided by the following questions: Do changes in NOS understanding correlate with changes in views on evolution or GCC? If there are correlations, are they similar for evolution and GCC? What demographic factors affect these correlations? To what extent do the proposed factors affecting evolution and GCC acceptance actually affect respondents views in a large sample size?

“Assessment of Highway Traffic and Rail-Road Impact on Campus Environment: A Case of Martin University, Indianapolis, Indiana”

Valerie Collier, Nancy Munson, and Mamta Singh, Martin University

People in the United States have been exposed to unhealthy levels of noise level, and it has become greater since 1974 (Williams & Wilkins, 2007). The studies have shown that noise pollution can be harmful, which can cause hearing interferences, not able to communicate with other people or have to speak louder because of the trains or highway, activates the nervous hormonal response, mental health, and not able to perform task. According to Stansfeld & Matheson (2001), noise is a feature of the environment which includes noise from transportation. Noise tends to disturb people’s sleep while in the lab, however; it generally does not interfere with field studies which adaptation occurs. Road traffic exposures are associated with psychological symptoms. The rationale of this study is to reach out to health officials, local government, and federal legislation to support the issue of noise pollution, and the laws that can be change to make it better; especially in low income areas.

“Design and Implementation of an Automated Plant Growth System”

Danielle Erdley, Nicolette Fruehan and Matthew Kropf, University of Pittsburgh at Bradford

New electronics technologies have enabled sophisticated digital measurement and control automation in biological science. With pervasive growth in open-sourced hardware and software platforms such as Arduino
microprocessors, Processing programing language, and Raspberry PI computers, implementing custom automated measurements and control has become an inexpensive and straightforward option for the college laboratory. These technologies have eliminated the need of specialized equipment in order to achieve high accuracy control and measurements in biology experiments. A multi-disciplinary approach to learning integrates engineering technologies with biological education. This results in students with confidence and abilities in the application of supporting technologies. Furthermore, teaching the basic skills involved with open source hardware programming provide students with a greater ability to apply these technologies to field biology, sustainability projects, and their careers.

“Evo in the News': A Pedagogical Tool to Enhance Students’ Perceptions of the Relevance of Evolutionary Biology”

Lynn M Infanti and Jason R. Wiles, Syracuse University
This investigation evaluated the effects of the use of “Evo in the News” on attitudes toward biological evolution among undergraduate students in a mixed-majors introductory biology course at a medium-sized, private research university in the American Northeast. In addition, this study looked at the initial attitudes of the students and their knowledge of evolution before beginning an introductory biology course. Initial attitudes and the gains in positive attitudes and knowledge were measured using the Evolutionary Attitudes and Literacy Survey (EALS). We used a quasi-experimental design with pre-test/post-test comparison between a control group and an experimental group. The control and experimental groups differed in that throughout the course of the semester, the treatment group was assigned pre-laboratory work using “Evo in the News” while the control group was assigned similar, traditional pre-lab activities. Post-course, the experimental group showed significant gains in their attitudes regarding the relevance of evolution. Additional findings included a significant correlation between positive attitudes toward evolution and knowledge of evolution. Also, significant correlations were found between both positive attitudes toward and knowledge of evolution and the students’ level of achievement in the course.

“Freshwater Ecosystem Health – Why is it Important?”

Mauriya Majada, Nancy Munson and Mamta Singh, Martin University
Pogue’s Run Greenway is located south rural street to Brookside Park in Indianapolis, Indiana. Pogue’s Run is made of 14.34 acres of wetlands and 8.11 acres of open water systems. It is designed to create varied wetland plant community types and promote sheet flow of water as it passes through the site. Structure and function of a wetland depends on its ecosystem health. Ecosystem health can measure in terms of both physical and chemical parameters. They play an important role in survival of aquatic life and balancing the ecosystem. Three sampling locations were selected based on landscape differences (shade, sunny, low flow and high flow) along the sampling stretch of Pogue’s Run wetland. Three samples were collected from each site. The objective was to compare the difference in water quality parameters of the three sites. Methods: Vernier, LabQuest®2 was used to collect field data. Parameters measured were specific conductivity (mS/cm), air temperature (°C), water temperature (°C), pH, and dissolved oxygen (mg/L). Latitude and longitude using a portable GPS system connected to the calibration meter was used. Results: On average, dissolved oxygen was 5.5 mg/L, and specific conductivity was 505 mS/cm indicate this area is moderately impacted. Conclusions: The above results are based on the preliminary filed data collection. Additional monthly and sessional data collections are recommended for the comparison of upstream and downstream sites.

“The Effects of Individual Components of Acid Mine Drainage Remediation on Elodea densa Viability”

Paige Mundy and Irene M Wolf, Saint Francis University
Acid mine drainage (AMD) is a known source of abiotic stress. After a mine has closed the water tables rise allowing contaminated ground waters to discharge into the environment. These contaminated waters are often acidic and contain elevated concentrations of metals and metalloids. The goal of the experiment is to study the effects of individual components of AMD on plant viability, determining which component is the most harmful, and which stress pathway is affected most in the plant. This information may be useful in
determining new remediation methods catered to aquatic plant viability. The harmful components being focused on are acidity and arsenic exposure. To achieve this, Elodea densa plants were submerged in water adjusted to varying levels of pH (2-7) or arsenic (0, 0.05mM, 0.5mM and 1.0mM). DNA degradation was observed by PCR amplification of the gene RuBisCo, and quantified using densitometry analysis. Degradation appeared in all samples subjected to pH 6 or lower after two days. Currently we are quantifying protein expression of HSP70 in the elodea exposed to acidic environments and arsenic, as well as measuring all viability utilizing a fluorescent assay.

Methods & Equipment: Vernier/LabQuest 2 with GPS locations, Sound Level Meters (dB), Logger’s Lite software, Lab Top computers, USB cords, and Tape Measure were used for data collection. Three Martin University students along with three professors agreed upon selection of data collection points. Three data collection sites were selected using Google Earth and the sites were: Front of Martin University light pole-Martin University Aerospace Education (AEL) lab; between the doors and parking lot of school; and the back of the school. The sites were selected so that both highway and rail road data were captured. Data were collected from 9:00 a.m. to 4:00 p.m. on Monday, Wednesday, and Friday from July 3, 2013-July 19th 2013 from three locations. The data were collected every 30 min., in increments of 10 minutes and were imported to spreadsheet which reflected time, sound reading in decibel (db).

Results: The result from the present study suggests that on average sound level is below 80 db which is below the required standard recommended for building a sound barrier. However, the present study is based on limited resources and time, therefore, the continuous data collection during the extended hours is recommended for future research.

“Environmental and Socio-Economic Studies of the Impact of Freeway (I-70) and Rail-Road on a University Campus and its Neighborhood in Indianapolis, Indiana.”

Sophia Nelson, Mamta Singh, Nancy Munson, Tia-Lyn Gary and LaTosha Williams, Martin University

Air pollution has both acute and chronic effects on human health affecting a number of different systems and organs. Short- and long-term exposures have also been linked with premature mortality and reduced life expectancy (Kampa & Castanas, 2008). Pope 3rd’s (2000) study on chronic exposure suggests relatively broad susceptibility to cumulative effects of long-term repeated exposure to fine particulate pollution, resulting in substantive estimates of population average loss of life expectancy in highly polluted environments. Kampa and Castanas (2008) state hazardous chemicals escape to the environment by a number of natural and/or anthropogenic activities and may cause adverse effects on human health and the environment. Increased combustion of fossil fuels in the last century is responsible for the progressive change in the atmospheric composition (Kampa & Castanas, 2008). Kunzli, Kaiser, & Medina et al. (2000) and Samoli, Peng, & Ramsay et al. (2008) also clearly state a strong relationship between air quality and human health impact.

The present study will assess a level of highway traffic noise and railroad noise impact on Martin University and its surrounding neighborhood using both primary and secondary data sources. Martin University is located right across highway I-70. Everyone on and near campus are aware of how I-70 is impacting the campus. If you are in the campus garden performing some activity with university students or K-12 students, you can experience that the campus environment is affected by highway traffic flow on the adjacent freeway, I-70. The situation gets worse when the highway traffic noise is combined with rail road traffic. In this research paper, the two questions are addressed: What are the impacts of I-70 and railroad traffic on Martin University campus? How are traffic noise and air quality affecting Martindale-Brightwood community and Martin University campus? Seventeen questions survey were administered. Participants were Martin University students, staff, and faculty. Responses were anonymous and fifty responses were analyzed. Excel Spread sheet was used for data analysis. The results indicated that 90% respondents were African American, 88% respondents were the age of 25 plus, 38% indicated that they use a car as one of the means of transportation to school, 98% indicated that they do not have any kind of employment and 98% indicated that they have good
health condition. The results suggested that traffic and I-70 do not have any impact on health of Martin university community. However, in-depth research in combination with a mixed method research design will be conducted to get more reliable data regarding the environmental studies of Marti University Campus and Martindale-Brightwood area.

This project utilized resources from the open source software community to enhance control capabilities in the biology lab facilitating undergraduate research. Using inexpensive Arduino microprocessors and readily available open source software, automated environmental controls for plant growth systems were implemented. The design utilizes sensors for automated lighting and watering controls, allowing consistent treatment of the plant specimens under study. The technology is also capable of integrating humidity, temperature, and light intensity measurements to provide quantitative data throughout the period of study. This project demonstrates the ability to measure and control biological experiment variables through innovative integration of technologies.

“Effects of Acid Mine Drainage on Hsp70 Protein Expression of Elodea densa at Remediation Ponds”
Travis Schofield and Irene M. Wolf, St. Francis University
This experiment investigates plants’ response to ecosystems affected by acid mine drainage (AMD). Acid mine drainage increases acidity and adds numerous other factors that serve as stressors to organisms inhabiting freshwater systems, such as increasing iron levels. *Elodea densa* was used as a model in these experiments and was placed in the ponds of a remediation site. In order to explore the effects of such stressors, protein analyses were undergone (specifically targeting Hsp70 and actin) on samples of *Elodea densa* that were cast into organized environments that simulated the toxicity of acid mine drainage in aquatic ecosystems to varying degrees. It was hypothesized that the levels of Hsp70 would increase in correlation with the level of toxicity of the waters in which the samples of *Elodea densa* were cast. A trend would potentially be applicable to indigenous species.

“Increased HSP70 Expression in Typha latifolia in Decreasing Concentrations of Acid Mine Drainage”
Matthew Williams, and Irene M. Wolf, St. Francis University
Acid Mine Drainage (AMD) is a major concern for many freshwater ecosystems. Due to high levels of iron deposits and other factors, many species of organisms are adversely affected. In order to combat the adverse effects of AMD, a process of remediation is commonly used (1997). In this experiment, a comparison of heat shock protein 70 (HSP70) in four ponds at a remediation site and a control pond on Saint Francis University’s campus is examined. We hypothesized that the expression of HSP 70 will decrease as the level of contamination decreases. Previous research performed by Thomas McWilliams showed that the opposite happened, and the purpose of this research was to see if this trend continued after a year. Protein samples were extracted and were analyzed using a western blot. Our results indicate that the trend from last year remains; as the level of contamination decreases, HSP70 expression increases.

“Enabling Undergraduates to Comprehend and Analyze Primary Research”
Katharyn J. Affeldt, University of Wisconsin-Madison
Reading, and more importantly, understanding, primary research articles can be difficult and frustrating for undergraduates due to field-specific jargon, unfamiliar techniques, and extremely condensed information. Multiple strategies were employed in the course “Critical Analyses in Microbiology” to provide students with the skills to understand and analyze primary literature. Among these were pre-class assignments designed to focus students’ reading on key areas of the papers. In addition, students were given the option to add corrections to their assignments during class to increase engagement and understanding. A brief mini-lecture provided background information, but the majority of the class time was spent on activities and discussions that dug deeper into the paper and reinforced major concepts. Through active learning and a low—pressure environment, students reported increased facility in several specific skills related to understanding primary research literature.
“A Literature Review on the Possible Uses of Course Web Sites”
Andrea Bierema and Renee' S. Schwartz, Western Michigan University
The possible uses of course web sites extend far beyond just a place to post PowerPoint lecture notes, but what are some examples on how to make better use of a course web site? Several college biology educators have found creative ways to use their course web sites and have provided these examples in the primary literature. These include providing several different types of supplemental material, sometimes to the extent that they replaced the textbook. Supplemental material may include graphics, glossaries and readings that are more directed toward course objectives than general resources, interactive modules that may include animations, simulations and quizzes, and brief podcasts that are focused on common misconceptions. Course web sites can also be a location for discussion among students. Many of the articles provided details on what they did, what worked and what students enjoyed or suggested for improvement. We examined these articles and summarized their insights on how to make better use of the course web site.

“Facilitating Successful Collaborative Research in Undergraduate Animal Behavior Courses”
Rebecca Burton, Alverno College
This poster addresses benefits and challenges of having students test their own hypotheses in independent groups. It offers ideas and resources for facilitating efficient, effective, and legal projects. A web site connected to the poster supplies several templates for resources such as research proposals, group work contracts, and report criteria.

“New Methods for an Interactive Undergraduate Journal Club”
Jordan Clark, Adam Rollins, and Philip Smith, Lincoln Memorial University
Journal clubs have long been utilized to advance student’s scientific skills beyond basic knowledge and comprehension by engaging them in the process of critically evaluating and discussing research literature. In order to encourage consistent participation, many institutions offer journal clubs for elective credit or as specific course requirements. However, creating a well-attended extracurricular journal club for which no additional academic credit is offered requires a delicate and creative approach. Undergraduate students (already facing a demanding course load) often view the traditional format of analyzing reported data and experiment design as too laborious and intimidating with little perceived benefit. As such the traditional approach can diminish overall student engagement and enthusiasm for the wonders of scientific research. To overcome this perception we have been developing a new journal club format that engages students in discussions of research literature while fostering attitudes of excitement and enthusiasm toward science. To these means the group spends the semester exploring the literature related to a provocative, even controversial topic that encourages both scientific and philosophical debate. The semester begins with a broad discussion of the topic (perceptions, media coverage) and with each progressive session advances from general readings to reports and ultimately the primary literature. An interactive website is utilized that allows students to upload and link articles, videos, comments and/or questions related to the topic. This new format has received positive student reception, but low attendance. The poster will present the details of this new journal club format including (a) an example topic, (b) student feedback, (c) our observations and (d) how we are using this crucial insight with respect to student expectations to further refine our methods to produce a successful and engaging extracurricular undergraduate journal club.

“Teaching From the Primary Literature: An Overview of a Molecular Cell Biology Course Taught Using the C.R.E.A.T.E Method”
Melissa A. F. Daggett, Missouri Western State University
The extensive use of primary literature in undergraduate courses can be an excellent mechanism to demonstrate and reinforce the style and format of scientific communication and process skills to students. This poster presents an overview of materials developed and used to teach BIO 410 Molecular Cell Biology using the C.R.E.A.T.E Method. The C.R.E.A.T.E (Consider, Read, Elucidate hypotheses, Analyze and interpret data, Think of the next Experiment) method uses intensive analysis primary literature in the undergraduate
classroom (http://www.teachcreate.org/). Examples of the papers, assignments, assessments and corresponding laboratory activities used in the course will be presented and discussed.

“PULSE: Organizing to Catalyze Change in Undergraduate Biology Education”
Karen Klyczek, University of Wisconsin – River Falls
Michael Kelrick, Truman State University
The Partnership for Undergraduate Life Sciences Education (PULSE) is a collaborative effort of the HHMI, NIGMS, and NSF to help catalyze institutional change in undergraduate STEM education. Through a national call of departmental leaders, PULSE selected 40 Vision and Change Leadership Fellows from a pool of 350 applicants. The Vision and Change Leadership Fellows, which include departmental leaders from all institution types, were given an eleven-month charge to develop strategies that had the potential to catalyze national implementation of the recommendations from the Vision and Change report (2009) across the full spectrum of post-secondary educational institutions. The Fellows originally formed four working groups, which then rearranged and coalesced around emerging products during the course of their work over the 10 months. In this poster we highlight the challenges, goals, and broad activities of the Vision & Change Fellows.

“Halobacterium Species NRC-1 as a Model for Independent Student Projects”
Nighet P Kokan, Cardinal Stritch University
Halobacterium species NRC-1 is an archaean that is an extreme halophile, facultative anaerobe, and a phototroph that can be easily grown in lab without strict safety protocols. Our students have utilized this organism as a model for independent projects in a regular microbiology laboratory course (BL203) at Cardinal Stritch University, Milwaukee, Wisconsin. Groups of students investigate a biological question and carry out the project over a period of 7-8 weeks. Being part of an independent project gives the students a sense of excitement and compels them to learn more than they would in a standard laboratory. The projects culminate in the form of a poster relating to the biological question under investigation. I will provide details of the implementation and examples of student projects carried out using this microbe.

“Weaving a Thread: A Cross-Curricular Approach”
Carol M. Maillet and Conrad S. Toepfer, Brescia University
Responding to national initiatives for changes in undergraduate science education, as well as our own observations, we have implemented a project that: 1) provides students with a multi-faceted exposure to complex biological systems, 2) gives student additional practice in evaluating and synthesizing information from multiple sources, 3) gives students opportunities to collaborate in intradisciplinary teams, and 4) provides students with addition exposure to quantitative analysis and practice with large data sets. The thread topic (for example, cancer) with a focus question, is identified and is woven through classes both semesters. Each semester culminates in a symposium in which synopses of information from all classes are presented, followed by small group discussion led by upper-division biology students. Each biology student then writes a short paper in which he/she synthesizes and reflects on the information (fall semester) or applies the information to a novel, but related, problem (spring semester). Assessments are done at multiple points and include analyses of the papers, pre-post analyses and self-assessment of learning. Activities within each class vary, but include case studies, concept mapping, team-based learning, etc. Preliminary results after the second year of completion indicate an increased sophistication of responses and fewer misconceptions in spring compared to fall. We also established a baseline that both shows higher scores from upper division students (3-4.5 on a 5-point scale) compared to lower division students (1-2 on the same scale) and accommodates improvement among the higher scoring groups. Students’ self-assessments report an increased understanding of both the focus topic and the value of multiple points of view. However, when surveyed after exposure to the thread, students noted deficiencies in their own capacities of logical thinking and expression. We anticipate that exposure to the thread over four years of undergraduate education will enable students to make connections
“among disparate pieces of information, concepts and questions” (V&C document). Overall, our procedures and assessment tools appear to be appropriate for the project and we look forward to extending participation in the thread project to other areas of the Natural Sciences as well as Mathematics and Behavioral Sciences.

“Blending Lecture and Lab in one Setting to Maximize Learning”
Devonna Sue Morra, Saint Francis University
Having taught marine biology for the last 17 years at Saint Francis University and frequently getting frustrated during lectures about my inability to “draw” pictures into my students’ minds about animal physiology or ocean cycles, I have convinced administration to allow me to teach lecture and lab in the same room starting this fall semester. The administration finally agreed to this idea when they studied the number of lecture halls and laboratory rooms needed to meet the needs of all members of the science faculty. A new science complex was build from 2012-2013 with my lab room integrated with a lecture room. I have committed to teaching my classes, both lecture and labs, in this single room. Science faculty moved into the new building August, 2013. I will be teaching not only marine biology in this lab/lecture room, but also animal care, animal nutrition, and freshwater aquatic biology. Other professors will utilize the room for animal behavior and invertebrate zoology. While designing the new facility, all faculty members were involved in the discussions of what we needed to effectively teach. For students to really understand how sea urchin tube feet allow an urchin to climb the aquarium wall, they need to watch a live sea urchin climb. By integrating the space, students can now do exactly that. We can discuss sea urchin anatomy and physiology utilizing textbook materials on a smart board at the front of the room and then move to the aquarium section and observe live sea urchins. I frequently allow students to hold the live urchins so that they can actually feel the tube feet moving. The tables in the front of the room will serve as both note taking space and exploration of animals, etc. The aquarium spaces will serve for animal care along with research space. Both safety and IACUC requirements can be accommodated by the room. During my poster session, I will share how my space was developed and also the sessions that I’m developing to deliver my spring marine biology class as a combined unit utilizing students exploring marine concepts throughout the class.

“Can ‘Supplemental Instruction’ Increase the Success of Students in a One Semester Human A & P Course”
Thomas Rachow, Missouri Western State University
Supplemental Instruction was developed by Dr. Deanna Martin at the University of Missouri-Kansas City in 1973. It is an academic support program that targets historically challenging courses. It is open to all students. It consists of non-remedial sessions led by trained student leaders who help participants review notes, discuss readings, develop organizational tools and prepare for examinations. S.I. has been used in BIO250, a one semester human anatomy and physiology course primarily for aspiring nursing and physical therapy assistant students at Missouri Western Sate University for two semesters. Data comparing the performance on lecture exams of S.I. participants and non-participants typically showed a +0.5-0.9 grade point difference between students who attended S.I. sessions and those that didn’t. End of S.I. surveys generally found that students felt they benefitted from the sessions. About 69% of the students (102 of 148) attended at least one session during the fall 2012 semester; 25 students attended 3-5 sessions; 19 students attended 5-10 sessions.

“Peer Led Team Learning in Introductory Biology: Effects on Critical Thinking Skills and Student Achievement”
Julia J. Snyder and Jason Wiles, Syracuse University
Peer-Led Team Learning (PLTL) is a pedagogical approach to small group instruction which can supplement other traditional components of undergraduate courses. In the PLTL model, students work in small groups of six to eight students led by an undergraduate peer who has previously taken and been successful in the course. Peer leaders are trained in learning theory, pedagogical methods, and the conceptual content of the course in preparation for working collaboratively with the course instructor to facilitate small group problem-solving sessions.
Many studies have documented the effectiveness of the PLTL model. Research has focused primarily on the academic benefits to the students who have participated in the PLTL workshops. Studies have shown improvement in students’ performance, attitudes, retention in the course, conceptual reasoning, and critical thinking skills, yet little attention has been given to the academic benefits for the peer leaders.

This study evaluated the effects of the Peer-Led Team Learning (PLTL) instructional model on undergraduate, biology peer leaders’ critical thinking skills. As the role of the peer leader involves several factors associated with various aspects of higher-level critical thinking, we hypothesized that participating as a PLTL peer leader should promote gains in critical thinking skills.

Critical thinking was assessed using the California Critical Thinking Skills Test (CCTST) Herein, we present results and statistical analyses of data obtained via a controlled, quasi-experimental pretest/posttest protocol designed to measure critical thinking gains in PLTL/non-PLTL groups of undergraduates who were qualified and interested in such experiences. Potential implications of this study are also discussed.

“HungerU at Syracuse University: Impacts of an Informal Education Experience on Student Attitudes Toward the Science of Food Sourcing”

Jason R. Wiles and B. Elijah Carter, Syracuse University

HungerU is a mobile exhibit that travels to college campuses across the United States with the aim of “educating college students, academia and anyone who eats about the role advanced agriculture plays in putting food on our tables.” Using a controlled, quasi-experimental, pre/post approach, we surveyed students enrolled in an introductory biology course regarding their attitudes and understandings of agriculture and related science concepts before and after the HungerU exhibit and used both quantitative and qualitative methods to measure and describe the impacts this informal education experience had on their knowledge and perspectives on food sourcing as well as their intentions for getting involved with hunger prevention efforts.

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Thanks for a great conference! We will see you next year at University of Portland for our 58th Annual Meeting

Sincerely,

Your ACUBE Governance