ACUBE’s 58th Annual Meeting
University of Portland
Portland, Oregon
October 15-17, 2014
ACUBE’s 58th Annual Meeting Program Overview:

Wednesday October 15th
6:00 -9:00 pm  Steering Committee Meeting  Franz Murphy Room (4th floor)

Thursday October 16th
7:30 am  Registration Opens  Bauccio Commons
8:30-9:50 am  Opening Session and Keynote Speaker  Bauccio Commons
10:00-10:20 am  Concurrent Sessions I  Franz Hall
10:30-11:50 am  Teaching Workshops  Franz Hall
12:00-1:30 pm  Lunch, Business Meeting  Bauccio Commons
1:40-2:20 pm  Concurrent Sessions II  Franz Hall
2:30-4:00 pm  Concurrent Sessions III  Franz Hall
4:00-4:20 pm  Concurrent Sessions IV  Franz Hall
4:30-8:00 pm  Open Bar, Dinner, Awards, Special Guest Speakers  Bauccio Commons

Friday October 17th
8:00-8:40 am  Concurrent Sessions V  Franz Hall
8:50-9:10 am  Concurrent Sessions VI  Franz Hall
9:20-9:40 am  Concurrent Sessions VII  Franz Hall
10:00-10:50 am  Exhibitor Workshops  Franz Hall
11:00-1:30 pm  Lunch, Posters, Exhibitors  Bauccio Commons
1:00-1:30 pm  Bioscene Business Meeting  Franz Murphy Room
1:40-3:00 pm  Faculty Development Workshops  Franz Hall
3:10-3:30 pm  Concluding Session  Bauccio Commons
4:00 pm  Steering Committee Meeting  Franz Murphy Room

Campus Map........................................................................................................... page 10
Detailed Program Schedule........................................................................................ page 11
Abstracts ...................................................................................................................... page 17
Contact Information ................................................................................................... page 38
Wireless internet for portable devices

network: UPGuest

password: ACUBE2014

Login in for classroom computers

username: Acube1-upg or Acube2-upg

password for both: UPfallbreak14
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 nationally, peer-reviewed journal Bioscene

Governance

President, Aggy Vanderpool, Lincoln Memorial University
Past-President, Tara Maginnis, University of Portland
Executive Secretary of Finance, Greg Smith, Lakeland College
Executive Secretary of Membership, Christina Wills, Rockhurst University
Secretary, Paul Pickhardt, Lakeland College
Historian, Conrad Toepfer, Brescia University
Website Editor, Tara Maginnis, The University of Portland

Steering Committee

Danielle Rintala, Bryant & Statton College
Rebecca Burton, Alverno College
Nighat Kokan, Cardinal Stritch University
Jordan Clark, Lincoln Memorial University
Steven Daggett, Avila University
Khadijah (Gigi) Makky, Marquette University
The University of Portland was founded in September 1901 by Portland Archbishop Alexander Christie, who had purchased property atop Waud’s Bluff with financial assistance from the Congregation of Holy Cross in South Bend, Indiana. Archbishop Christie named the school “Columbia University” after the mighty river that flowed nearby, and when it opened its doors, it was staffed with priests from the archdiocese. Columbia University achieved junior college status in 1922, and in 1925 the College of Arts and Sciences was founded. Four years later the first bachelor’s degrees were awarded to a class of seven men. In the 1930s, the University’s name was changed to the University of Portland, the St. Vincent Hospital School of Nursing became part of the University as the College of Nursing, and the School of Business were created. In 1948, the School of Engineering was created. The University established its Graduate School in 1950 and the School of Education in 1962. In 1967 the Congregation of Holy Cross and the University’s Board of Regents transitioned to a shared governance structure.

As of the 2013-2014 academic year, some 3,900 University of Portland students and approximately 320 faculty members are engaged in teaching and research. The University has been ranked 19 years consecutively in the top ten for western regional universities by U.S. News & World Report, and in Barron’s Best Buys as one of the best teaching universities in the West. It also has been ranked by Bloomberg BusinessWeek as the best return on investment for any university in Oregon and for five consecutive years has been on the President’s Higher Education Community Service Honor Roll. In 2012, the University of Portland was named the top producer of Fulbright scholars in the nation, according to the Chronicle of Higher Education. For three consecutive years, Washington Monthly has ranked the University in the top three nationally among peer institutions for its commitment to community service.
A very special

Thank You

to

MACMILLAN
Additional Special Thanks
to ACUBE’s Exhibitors
and Workshop Hosts:

MORTON PUBLISHING

THE UNIVERSITY OF CHICAGO PRESS

NABT
National Association of Biology Teachers
Christopher Price
Keynote Speaker

Chris will be speaking on Thursday October 16th about "Promoting Academic Integrity in the 21st Century", a topic that is of concern to teachers at all higher education institutions.

Christopher Price is the Director of the Center for Excellence in Learning and Teaching (CELT) at The College at Brockport, State University of New York. He has been at Brockport since receiving his PhD in Political Science from the University at Albany in 2004. In addition to his work at CELT, Chris teaches an undergraduate hybrid course in political thought and a graduate online course on democratic philosophies of education. Some of the teaching and learning workshops he has conducted include discussion-based teaching, communicating effectively with students, collaborative learning, academic integrity, and using critical reflection to improve teaching and learning. Chris established and directs the faculty learning community program at Brockport. He lives in Rochester, New York with his wife Jessica and his children Lucy and Henry.
Richard Prestholdt & Roger Wendlick
Guest Speakers

Lewis and Clark experts Dick and Roger will be speaking on Thursday October 16th about “The Biology and Natural History of The Lewis and Clark Expedition”. Specifically, they will speak on the flora and fauna discovered and described by The Corps of Discovery between 1802 and 1806.

Lewis and Clark’s infamous journey west led to a wealth of knowledge about the plants and animals of the Rocky Mountains and Pacific Northwest. Dick and Roger participated in the Lewis & Clark Bicentennial Event - an adventure that took them from Philadelphia to Oregon from 2002-2006 and included traveling by foot, boat, and horseback. Both gentlemen are published Lewis and Clark experts. They will be dressed in period clothing and their show-and-tell items include furs, books, weapons, medicinal plants, and a variety of the equipment Lewis & Clark had on the trail.
### ACUBE’s 58th Annual Meeting
University of Portland
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October 15-17, 2014

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*registration will remain open until 4:00 pm*

- Continental breakfast bar
- Poster set-up (available all day Thursday and Friday)

| 8:30 – 9:50 am        | Opening Session           | Bauccio Commons |

**Welcome to ACUBE’s 58th Annual Meeting**, ACUBE President Aggy Vanderpool

Welcome to University of Portland, Michael Andrews, Dean of College of Arts & Sciences

Greetings from Conference Chairpersons:
- Tara Maginnis, Local Arrangements Chair
- James Clack, Bioscene Editor

Keynote Speaker Christopher Price, **Promoting Academic Integrity in the 21st Century**

| 10:00 – 10:20 am      | Concurrent Sessions I    |
|-----------------------|
| (abstracts on page 17-18) |

**STEM-Sense: Students building and using sensors for data collection in biology laboratories**
- Denise A. Piechnik, Matt Kropf
  - University of Pittsburgh

**Improving Lab Report Writing and Student Confidence Using a Classroom Partner Program and Scaffolding Assignments**
- Marlee B. Marsh, Columbia College

| 10:30 – 11:50 am      | Teaching Workshops       |
|-----------------------|
| (abstracts on page 18-19, 21) |

**Epidemiology of Ebola**
- Stacey Kiser, Lane Community College
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<td>12:00 – 1:30</td>
<td>Lunch</td>
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<td>First call for committee nominations</td>
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<td>Out of This World Teaching Contributions</td>
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<td>1:40 – 2:20</td>
<td>Concurrent Sessions II (abstracts on page 19-20)</td>
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<td>Regional Communities of Practice for implementing Vision and Change Recommendations</td>
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<td>Karen Klyczek, University of Wisconsin-River Falls</td>
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<td>Gary Reiness, Lewis and Clark College</td>
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<td>Enhanced Undergraduate STEM Education Through a University/Community College Collaboration to Provide High Quality Research Experiences to First and Second Year Students</td>
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<td>Presley Martin, Hamline University</td>
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<td>Lori Thrun, Century College</td>
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<td>Assessment of Factors Affecting Learning and Retention in a Two-Semester General Biology Course Sequence</td>
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<td>Elizabeth Evans, Lisa Felzien, Christina Wills</td>
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<td>Rockhurst University</td>
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<td>2:30 – 3:20</td>
<td>Concurrent Sessions III (abstracts on page 22-24)</td>
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<td>2:30 – 3:10</td>
<td>Flippin’ the A&amp;P Classroom: Why Didn’t I Do It Earlier?</td>
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<td>Tom Davis, Loras College</td>
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<td>Using a case study of Viagra and nitroglycerin causing an MI in the first physiology lab of the semester-what issues to consider?</td>
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<td>Mark Milanick, University of Missouri</td>
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<td>3:20 – 4:00</td>
<td><strong>The Pros and Cons of Using Human Models and Examples in General Biology Courses</strong></td>
<td>Christina Wills, Rockhurst University</td>
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<td><strong>Assessing the Impact of Integrated Research in a Molecular Biology Course</strong></td>
<td>Lisa K. Felzien, Rockhurst University</td>
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<td><strong>Skull detective: Teaching students to observe</strong></td>
<td>Lynn Gillie, Elmira College</td>
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<td>4:00 – 4:20</td>
<td>Concurrent Sessions IV (abstracts on page 24-26)</td>
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<td><strong>Hunger U at Syracuse University: Impacts of an Informal Education Experience on Student Attitudes Toward the Science of Food Sourcing</strong></td>
<td>B. Elijah Carter, Jason R. Wiles, Syracuse University</td>
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<td><strong>An approach to STEM education in the biology classroom and lab</strong></td>
<td>Matt Kropf, Denise Piechnik, University of Pittsburg</td>
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<td><strong>Linking undergraduate lab experiences to local campus research</strong></td>
<td>Lori Kayes, Krissi Hewitt, Oregon State University</td>
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<td><strong>Undergraduate research collaboration mapping lethal mutations in Drosophila</strong></td>
<td>Laura Salem, Jamie Dyer, Rockhurst University</td>
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<td>Danny Miller, Scott Hawley, Stowers Institute for Medical Research</td>
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<td>Open Bar and hors d’oeuvres, <strong>Sponsored by MacMillan New Ventures</strong></td>
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<td>7:30-9:00 am</td>
<td><strong>Special Guest Speakers Richard Prestholdt and Roger Wendlick, The Biology and Natural History of the Lewis &amp; Clark Expedition</strong></td>
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<td>Dinner</td>
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<td>8:00 – 8:40 am</td>
<td>Concurrent Sessions V</td>
<td>Using Cystic Fibrosis to illustrate heterozygote advantage</td>
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<td>Question by question analysis of student performance instrument</td>
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<td>Survey of Biology Capstone Courses in American and Canadian Higher Education: Requirement, Content, and Skills</td>
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<td>8:50 – 9:10</td>
<td>Concurrent Sessions VI</td>
<td>Incorporating human subjects research ethics into a biology majors course</td>
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<td>Traxoline Requaselled: The Montillation of Online Homework</td>
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<td>Online and Hybrid Biology Courses: Five Years In</td>
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<td>9:20 – 9:40</td>
<td>Concurrent Sessions VII</td>
<td>Systems Physiology, Active learning in an inquiry based laboratory course</td>
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<td>Dive Right In: Starting Undergraduate Research as a First Year Visiting Faculty Member</td>
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<td>Community engagement in undergraduate biology: opportunities and challenges</td>
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<td>Bridge To The Next Generation: Building Research Interest and Developing Global Engagement With Undergraduates</td>
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<td>10:00 – 10:50 am</td>
<td>Exhibitor Workshops (abstracts on page 31-32)</td>
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<td><strong>Hands-on Science Labs in an Online World</strong></td>
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<td>eScience Labs</td>
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<td><strong>Principles of Biology Workshop and Demo</strong></td>
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<td>Nature Education</td>
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<td><strong>Capturing Student Interest with Digital Interactivity</strong></td>
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<td>Sapling Learning</td>
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<td>11:00 – 1:30 pm</td>
<td>Lunch, Exhibitors, and Posters</td>
<td>Bauccio Commons</td>
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**Exhibitors:**
- Sapling Learning, Macmillan New Ventures
- EScience Labs, Macmillan New Ventures
- Hayden McNeil, Macmillan New Ventures
- Late Night Labs, Macmillan New Ventures
- Nature Learning, Macmillan New Ventures
- Morton Publishing
- University of Chicago Press

**POSTER PRESENTATIONS (abstracts on page 32-36):**

**Gender Bias in Lesson Models for Biology Education**
- Amy Buxton, Jamie Jensen, Brigham Young University

**Encouraging Students to Pursue Careers and Graduate School in Biology and Biochemistry through Administration of an NSF S-STEM Scholarship Program**
- Jennifer Maki, Daniel Westholm, Jennifer Rosato, Luther Qson
- The College of St. Scholastica

**Genomics Education Partnership (GEP): Teaching Biology Using a Bioinformatics Research Project**
- Nighat Kokan, Cardinal Stritch University
- Christopher Shaffer, Wilson Leung, Sarah Elgin, Washington University-St. Louis
- David Lopatto, Grinnell College

**Utilizing a needs assessment analysis to inform the development of a cell/molecular biology laboratory course**
- Jenean O’Brien, University of Colorado Denver
- Fordyce Lux III, Metropolitan State University of Denver
### New York State Parks' FORCES: A Model for Engaging Students and the Community for Stewardship and Education

Caitlin C. Conn, New York Office of Parks, Recreation & Historic Preservation

### Testing the antimicrobial effect of honey in an undergraduate introductory microbiology lab

Daniel Westholm, Jen Maki, The College of Scholastica

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<td>Bioscene Business Meeting</td>
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<td>Faculty Development Workshops (abstracts on page 36)</td>
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<td><strong>Session I</strong>: Teaching Like a Pro Your First Few Years</td>
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<td>Becky Burton, Janice Bonner, and Conrad Toepfer</td>
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<td><strong>Session II</strong>: Pre-Health Care Advising</td>
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<td>Khadijah (Gigi) Makky and Debbie Meuler</td>
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<td><strong>Session III</strong>: Getting an Academic Job</td>
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<td>Aggy Vanderpool, James Clack, and Tara Maginnis</td>
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<td><strong>Session IV</strong>: Promotion and Tenure</td>
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<td>Laura Salem, Greg Smith, and Paul Pickhardt</td>
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<td>3:10 – 3:30</td>
<td>Closing Session</td>
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<td>59th Annual Meeting at Missouri Western, Melissa Daggett</td>
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<td>Financial Report, Greg Smith</td>
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<td><strong>Presidential Address</strong>, Aggy Vanderpool</td>
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<td>4:00 pm</td>
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STEM-Sense: Students building and using sensors for data collection in biology laboratories

Denise Piechnik, Matthew Kropf, University of Pittsburgh

Our workshop will demonstrate the approach of our interdisciplinary pilot-study that introduces biology students to microcontroller sensor systems that they build and then use to collect their own data. By supplementing existing lab exercises, we will show how we use these sensors in two introductory laboratories; respiration in a Cell and Molecular Biology course, and soil moisture in an Ecology and Evolution course. Biology students are instructed on basic electronics, followed by directions for the assembly and the use of the programmable microcontroller system by Arduino. Students perform the classic biology experiment, make observations, formulate their hypotheses, and then use the microcontroller and sensor to collect real-time data. By modifying existing lab exercises, the inexpensive and easy-to-learn Arduino sensor systems provide a tractable approach for exposing biology students to STEM-based skills in the context of research-based lab exercises.

Improving Lab Report Writing and Student Confidence Using a Classroom Partner Program and Scaffolding Assignments

Marlee B. Marsh, Columbia College

Students generally need to work to strengthen their writing skills when they enter college, and writing in science is no different. Science writing is a technical skill and freshmen tend to struggle when composing first lab reports. Originally, a thorough and complete “How to Write a Lab Report for Biology” guide was composed and reviewed with students in small groups in the hopes of turning out polished lab reports at the end of the semester. However, many student products were below average (n= 36, Avg = 74) as students failed to follow guidelines in document. In search of a novel way to enhance student writing and reduce faculty-grading time, scaffolding methodology was employed in order to allow students to focus on how to write one section of the lab report at a time. Additionally, Biology faculty partnered with the college English faculty to assign a classroom partner to the class (CP). The CP was a science student skilled in writing who met with Biology faculty and each member of the class for every writing assignment to provide peer review and guidance. After meeting with the CP and having at least one round of revisions, students turned in scaffolding assignments to professors for another round of feedback. At the end of the semester, student averages on the lab report were high (n=31, Avg = 91) and student feedback about the classroom partner were excellent.
Abstracts – Teaching Workshops
Thursday 10:30-11:50 am

**Epidemiology of Ebola**

Stacey Kiser, Lane Community College

We will build an understanding of the SIR model for a disease outbreak and move to a dynamic model built in Excel to explore the model's parameters. Students can change variables and compare outcomes to learn about modeling and potential limits to viral evolution based on host population biology and rates of transmission and recovery. Resources for the hot topic of Ebola will be shared.

**DIY Animation**

Conrad Toepfer, Brescia University

You spent all morning on YouTube looking for just the right animation for your class. Well ok, part of that was watching dogs scared of cats, but still. Just when you thought you found the perfect video, the narrator tosses in a horrible misconception. Argh, what will you do? Make your own! In this workshop, I will give you an introduction to storyboarding animations and using apps to create your own animations. Come with one or more ideas of concepts you would like to animate and a tablet. If you do not own a tablet, bring a friend who has one. We should have time to do short animations, and hopefully look at some options for post-processing. Fine art skills are not necessary. If you are convinced that you are not artistic enough, come anyway. Your students might like to do this for an assignment.

**Case It update: computer simulations for case-based learning in molecular biology**

Mark Bergland, Karen Klyczek, UW-River Falls

Case It! is an NSF-sponsored project to provide molecular biology computer simulations and associated cases to the educational community. Case It v6.07 is a computer simulation that will perform a variety of laboratory procedures on any DNA or protein sequence. It is used by students to analyze cases based primarily on infectious and genetic diseases, via role-playing and other means, but can also be used as a tool to study original research questions. Both PC and Mac versions of Case It v6.07 can be downloaded from www.caseitproject.org, free of charge for educational use. Case It supports the Vision and Change initiative of NSF by providing a low-cost method for educators to incorporate inquiry-based activities in the classroom. It is also useful as a tool for open-ended undergraduate research. We will demonstrate freshmen research applications involving the HHMI SEA-PHAGES project and also a project based on the study of colony decline in honeybees, both of which are part of our freshmen curriculum at the
University of Wisconsin - River Falls. We will also demonstrate a new qPCR module that accurately displays results of actual qPCR analyses, such as those conducted by freshmen students in the BEE project at UW-River Falls. Case It! won an AAAS Science Prize for Inquiry-based Instruction, and an essay appeared in the July 27, 2012 issue of Science magazine (“Engaging Students in Molecular Biology via Case-Based Learning”). The project has proven to be effective at a variety of educational levels, from high school through advanced undergraduate classes.

**Abstracts – Concurrent Sessions II**

**Regional Communities of Practice for implementing Vision and Change Recommendations**

Karen Klyczek, University of Wisconsin-River Falls
Gary Reiness, Lewis and Clark College

To inspire, encourage, and sustain evidence-based teaching, we also need to effect changes in our departments, programs, and institutions. The Report "Vision and Change in Undergraduate Biology Education: A call to action" (AAAS 2011) recommends organizing undergraduate life sciences education around five core concepts and six core competencies, using student-centered best pedagogical practices. As we seek solutions at our own institutions, networks of like-minded individuals can be powerful allies. The Partnership for Undergraduate Life Science Education (PULSE) was established to develop strategies for department-level transformation and implementation of Vision and Change recommendations. One of the approaches to achieve these goals is the development of regional networks of faculty and institutions dedicated to the formation of local communities of practice that can exchange knowledge, ideas, and resources. PULSE Leadership Fellows representing networks in the Pacific Northwest and the Midwest/Great Plains regions will describe the ongoing activities in these networks, as well as plans for expanding their outreach and impact. Participants will interact with PULSE resources and learn how they can connect to network activities.

**Enhanced Undergraduate STEM Education Through a University/Community College Collaboration to Provide High Quality Research Experiences to First and Second Year Students**

Presley Martin, Hamline University
Lori Thrun, Century College

Hamline University is collaborating with Century College and North Hennepin Community College in an HHMI funded project to provide first and second year students with research
opportunities, both in their introductory courses and as 10 week summer research internships. The goal of the grant is to increase the number of student who major in a STEM field, and increase the diversity of students pursuing a STEM degree. The summer research program pairs students from Hamline with a community college student who work together on a research project with a Hamline faculty member in the Biology, Chemistry, or Physics Department. All students in this program have finished one or two years of college coursework. The grant provides stipends and funds for research supplies for 22 research students each summer. We are also developing a series of ‘Distributed Research Projects’ (DRPs) which will be incorporated into the curriculum of all three collaborating institutions. The DRPs are ongoing research projects that are designed in a way that allows students in introductory courses to engage in a portion of the research and contribute data to the project. In this presentation we will provide an overview of the first DRP to be implemented, which is focused on analysis of the distribution and identification of antibiotic resistance genes found in the environment. We have just completed the first year of this DRP and will discuss preliminary assessment results and our experience with collaborating across institutions on a complex pedagogical project.

**Assessment of Factors Affecting Learning and Retention in a Two-Semester General Biology Course Sequence**

Elizabeth Evans, Lisa Felzien, Christina Wills, Rockhurst University

Successful introductory biology courses are essential for providing foundational knowledge, exposure to scientific thinking, opportunities to challenge high-performing students, and opportunities to cultivate learners with inadequate preparation. Assessing both learning and retention is critical for determining student success and persistence in science. At Rockhurst University, freshmen students considering a major in biology or related discipline are typically enrolled in a 2 semester course sequence, General Biology I and II. Since 2009, we have used a pre-test/post-test strategy to assess learning in general content areas and track whether students retain material learned in General Biology I through General Biology II. For this presentation, we have examined several implications of our assessment: 1) long-term trends between final grades and overall scores on pre and post-tests in General Biology I and II; 2) effects of minor changes in instruction on learning in General Biology I and retention through General Biology II; and 3) whether our assessment may be used to predict student success and determine new ways to support underprepared students.
Flippin' the A&P Classroom: Why Didn't I Do It Earlier?

Tom Davis, Loras College

The author used his own version of flipping the A&P classroom in an attempt to get 1) more students talking to each other in lecture, 2) more students better prepared for class before class, 3) less “telling” of info by the instructor and 4) more student engagement and active learning during lecture. Daily quizzes were appreciated by most students and helped them prepare for class each day. Student teams in lecture were used regularly to answer questions, ask questions to other groups and present their versions of drawings of structure and function. Each day each group had a different spokesperson who spoke for the group when answering questions. Groups often presented drawings or answers simultaneously on the blackboard and then the class evaluated each answer from each group. Examples of student lecture activities and extensive discussion with session attendees will be the main components of this session.

Using a case study of Viagra and nitroglycerin causing an MI in the first physiology lab of the semester—what issues to consider?

Mark Milanick, University of Missouri

Consider this real case, published in the New England Journal of Medicine. Henry gave George (70 y/o) some of his Viagra™. Soon George began to feel chest pain. Instead of going to the hospital, he told his mother. Mom gave George some of her nitroglycerin. Eight hours later he went to see his physician and was diagnosed as having a heart attack. This is the opening scenario for the first laboratory in a course aimed at pre-health professional students. In this discussion, I will briefly present the lab exercises that I use to answer the questions:

* Why might the combination of Viagra™ and nitroglycerin lead to a heart attack?
* Why should one exhale when lifting weights? Could this relate to why some people think strokes are more common when straining to poop?
* When they use a stethoscope to measure blood pressure, how do they get the blood pressure? Then I will lead a discussion on the following issues as I would like suggestions about this approach and how to improve it.
* What are the trade-offs of using how-easy-it-is-to-flow for conductance and how-hard-it-is-to-flow for resistance? In general, it is better to use easy to understand terms (high blood pressure) or to stress mastery of the clinical terms (hypertension)?
* How important is it, for these types of students, to have open inquiry labs vs. labs that connect physiology to potential clinical applications?
* Is the fact that flow requires a pressure difference and a pathway a general concept for most facets of physiology?
The Pros and Cons of Using Human Models and Examples in General Biology Courses

Christina Wills, Rockhurst University

This roundtable discussion will focus on the pros and cons of using human models and examples in freshmen general biology courses. Many universities and colleges require a two semester sequence of general biology courses. This sequence often includes sections on genetics, molecular structures and processes, mitosis and meiosis, evolution, ecology, and a brief tour and animal, plant and fungal phyla. There are numerous references that can be made to humans in most if not all of these sections. Are these references beneficial or detrimental to freshmen? Do they encourage students to view humans as a part of ecosystem or do they foster an egocentric view of biology? Should instructors use a large number of human examples to increase student interest in the subject? Should instructors exclude human models to increase students’ understanding of the biology? Does the use of human models and examples improve or impede student performance in upper level biology courses? Is it important for students interested in human health care careers to focus on other species? I will pose these questions and provide anecdotal evidence from the Rockhurst general biology sequence.

Assessing the Impact of Integrated Research in a Molecular Biology Course

Lisa K. Felzien, Rockhurst University

Engaging undergraduates in research is essential for teaching them to think like scientists. Mentoring large numbers of students, however, is a challenge for faculty and has resulted in the use of inquiry based laboratories in courses to achieve research goals. While these labs have been successful, many instructors wish to expose students to a greater variety of concepts and techniques, necessitating the integration of larger research projects that are relevant for both. Projects that require both conceptual and technical learning allow students to use experiments to learn molecular principles, understand why specific techniques are applicable for certain biological questions, critically analyze varied data, and examine how techniques relate to acquiring new information. To provide an authentic research experience for undergraduates, a semester long research project was developed in the course, Molecular Biology. The goals for the project were: 1) to support the content goals of this integrated lecture/laboratory course, 2) to provide opportunities for students to develop critical thinking skills required for conducting research, and 3) to instill an appreciation for molecular biology research in students. To examine whether these goals were met, student performance on related pre-test and post-test questions were compared, surveys to determine student perceptions about the project were administered, and student comments about the project on final exams were summarized.
Skull detective: Teaching students to observe

Lynn Gillie, Elmira College

The first step in the scientific method is observation. Many students will look at an object, but not truly observe it. This is true of observations using a microscope, examining lab specimens, and ecological observations in the field. Skulls are an inexpensive resource used to examine biological variation qualitatively and quantitatively and create hypotheses. We will examine skulls and discuss ways to use data to get students thinking. This exercise has been used successfully with students at all levels.

Hunger U at Syracuse University: Impacts of an Informal Education Experience on Student Attitudes Toward the Science of Food Sourcing

B. Elijah Carter Jason R. Wiles, Syracuse University

The HungerU Tour is dedicated to connecting with college students and sharing the story of the role of modern agriculture in tackling world hunger. A mobile, interactive display, HungerU is an informal education exhibit that shows how hunger affects people around the world. Along with the mobile exhibit, a “Food Forum” was organized, which involved a panel of faculty experts in food security and related science and technology in dialogue with students about the challenges of feeding a growing human population. In this study, we sought to evaluate the impacts the HungerU mobile exhibit and Food Forum on our students at Syracuse University who attended one or both of the events. The population within which we can measure impacts of the program are the students in our General Biology course. For this population, we were able to employ a quasi-experimental, controlled, pre/post approach along with qualitative exit surveys to ascertain student awareness about hunger issues, whether students engage in hunger-prevention efforts following HungerU, and whether they perceive the display to have influenced their decision to do so. We found that students became more aware of hunger as the primary source of human mortality, more accepting of the use of genetically modified organisms and other advanced agricultural techniques in dealing with the challenges of hunger, and more interested in small-scale farming in developing countries. Students report that they are more likely to get involved with hunger-related activities than they did prior to HungerU and the Food Forum.
An approach to STEM education in the biology classroom and lab

Matthew Kropf, Denise Piechnik, University of Pittsburgh

The integration of Science Technology Engineering and Mathematics (STEM) learning across disciplines in higher education is a major focus of educators, funding agencies, and academic institutions such as the National Academy of Sciences and the National Science Foundation. However, teaching tools and curriculum to implement the multi-disciplinary approach needed are not well established; particularly in Biology. Building on the success of a few Biology students who transferred skills from an elective course in Sensors and Automation to a Biology research experiment, faculty collaborators in Biology and Engineering applied for and were awarded a grant to develop a strategy to integrate learning about microcontroller sensor systems into the biology classroom and lab. This presentation outlines the process of developing and implementing technology teaching tools for introductory biology classes at the University of Pittsburgh Bradford.

Linking undergraduate lab experiences to local campus research

Lori Kayes, Krissi Hewitt, Oregon State University

Many of our undergraduate’s students lack an understanding of the mission of the university. Students do not understand that faculty have multiple facets to their jobs or they do not appreciate the caliber of the research being done by their instructors. We have created several new laboratory modules to modernize our introductory biology curriculum. In doing so, we have made a concerted effort to tie modules to research being done by our faculty on campus. This gives us the opportunity to increase our students scientific literacy, introduce them to local issues, and provide an avenue for exploring potential research opportunities of interest. By explicitly linking our laboratory activities to the research activities on campus we have also forged connections with the research faculty that have improved the quality of our laboratory modules. I will discuss several examples of these links in my talk. For example, we have a lab on invasive plant species removal efforts. This is linked to research being done by one of my graduate teaching assistant on control of invasive plant species. The pre-lab introduces the students to the species and the issue fo invasive species control. We use a video of the researcher to discuss her questions and methods. For the actual laboratory activity students go out to the field, actively remove the invasive species, and collect data on the plant community. As their summative assessment, they write a scientific paper on their data collection and develop an invasive species removal protocol for the plant species.

Undergraduate research collaboration mapping lethal mutations in Drosophila

Jamie Dyer, Laura Salem: Rockhurst University
Danny Miller, Scott Hawley: Stowers Institute for Medical Research
Students at Rockhurst University have begun an ongoing research project mapping unknown lethal mutations stored in the Bloomington Drosophila Stock Center. The experiments involve analyzing whole genome sequences, selecting candidate genes, and performing a series of crosses. We will discuss the benefits of establishing a collaboration with a neighboring institution as well as the long term goals for the project.

Abstracts – Concurrent Sessions V

Using Cystic Fibrosis to illustrate heterozygote advantage

Janice Bonner, Notre Dame of Maryland University

The relationship between malaria and sickle cell disease (SCD) is frequently used as a model of heterozygote advantage. Students often tend to absorb this connection as a biological fait accompli, however, and don’t contemplate the thinking that led to a recognition of the connection. In this session, participants will be introduced to another possible example of heterozygote advantage, cystic fibrosis (CF). CF, like sickle cell disease, is a genetic disease that persists in a particular portion of the human population; 2% of people of European descent are carriers. Like the connection between SCD and malaria, a plausible selective agent for CF must provide evidence along three lines: a molecular explanation of how heterozygosity protects from the disease, a clinical connection between heterozygosity and morbidity and mortality, and a match between CF and the historical and geographical distribution of the selective agent. Three infectious diseases have been proposed as selective agents: cholera, typhoid fever, and tuberculosis. In this session, participants will be shown how students can be led to use the available literature to explore the CF heterozygote advantage.

Question by question analysis of student performance on a general biology assessment instrument

Chad Scholes, Jamie Dyer, Ryan Elsenpeter, Rockhurst University

The Rockhurst University Biology Department began an assessment of learning and retention of knowledge through our General Biology sequence in Fall 2009. Nine questions considered to be fundamental to the cellular and molecular content of General Biology I were answered by students on the first day of class (pre-test) and at the final exam (post-test). Students continuing on in General Biology II the next semester were given the same pre- and post-tests. This 9 question assessment was administered each semester until Spring 2013, during which our instrument was expanded to 20 questions, allowing for the inclusion of some General Biology II
content. Analysis of student performance for each question allowed us to determine concepts where large increases in knowledge and retention were observed, as well as certain areas that need more emphasis or a change in teaching strategies to improve student understanding and retention. In-depth analysis of individual questions in our instrument led to possible explanations for some of the variability in student performance. Finally, in an attempt to further understand student retention of biological information, the same test was administered in Genetics, a course populated with sophomores and juniors. Results were compared to students’ previous performance on this test in General Biology I and II to determine trends suggesting retention, or lack thereof, for students progressing through the biology program at Rockhurst University.

Survey of Biology Capstone Courses in American and Canadian Higher Education: Requirement, Content, and Skills

Neil Haave, University of Alberta, Augustana Campus

Capstone courses and experiences have been shown to have high educational impact (AAC&U 2013 Peer Review 15(4); Kuh 2008 High-impact educational practices) with various approaches available for biology majors (Davis 2011 Bioscene 37(1)). However, no information exists regarding the degree to which capstone courses are offered in biology degree programs. This paper presents surveyed data, which determined both the prevalence and character of biology capstone courses in the USA and Canada. The survey sampled approximately 450 institutions with a 36% response rate. The sample included a vast majority of public institutions (94-96%) in the USA and Canada (88%). The vast majority (>88%) were either 4-year degree or research institutions. More than 2/3 of American biology degree programs required a capstone course. This increased to >80% for schools associated with the liberal arts or a biology association. In contrast, only 25-50% of Canadian schools required capstones. Most American (>53%) capstones were seminars, whereas 1/3 of Canadian institutions were seminars. 36-44% of American biology capstone courses included a research experience. This increased to >62% for Canadian institutions, and those associated with ACUBE. Most respondents indicated their course provided some review of the conceptual foundations of biology, though this was not a focus of the course. Most biology capstones do not devote a significant amount of time toward a consideration of the history or philosophy of biology. Most schools included the development of writing (>75%), speaking (>80%), critical thinking (>80%), and research (>60%) skills as learning objectives.
Incorporating human subjects research ethics into a biology majors course

Kristen LW Walton, Missouri Western State University

Students in the biology department at Missouri Western State University are exposed to bioethics issues informally, but are not required to take a separate bioethics course. “The Immortal Life of Henrietta Lacks” by Rebecca Skloot is the story of the woman whose cervical cancer biopsy gave rise to the HeLa cell line, as well as the historical context for relevant medical, social, and ethical issues. This book is assigned reading in an upper division Molecular Basis of Disease course with the aim of using the Lacks family story as a springboard for learning about the guidelines for ethical treatment of human research subjects and human tissues. Students had weekly reading assignments with questions about the relevant science and/or ethical issues. After finishing the book, students were assigned to write a brief paper on the events that led to the current federal regulations for human subjects research. Students were also surveyed about their knowledge of these guidelines and for their qualitative feedback to the usefulness of including this book as part of the course. Overall, this book has been a successful platform for increasing student knowledge of human subjects research ethics and empathy for the humans who have contributed tissues to medical research.

Traxoline Requaselled: The Montillation of Online Homework

Jason R. Wiles, Christina Giovinazzo, Syracuse University

Attributed to Judy Lanier, the story of Traxoline has been used to illustrate how teaching can go wrong even when we think it is going just fine. The traxoline example is fairly famous with regard to lecture-style “teaching”. Herein, we report on an experiment whereby we explored the classic traxoline example in the context of an online homework assignment. Results reveal some interesting and enlightening insights into student interactions with the internet while completing online homework. Implications for critical thinking and plagiarism are considered.

Online and Hybrid Biology Courses: Five Years In

James W. Clack, Indiana University - Purdue University

I have now been teaching and administering online courses for five years. My resulting experience has allowed me to gain certain insights on the development and administration of online courses empirically and as they compare with face-to-face instruction. I will provide an expanded analysis of the state of online course development tools and an appraisal of different approaches to online instruction. I will also review several different course management
environments such as Canvas, Blackboard, Angel, and Oncourse. I will include a brief discussion about how each of these interacts with online modules created with different online development software packages. I will also include a brief discussion of my personal experiences relating to student success and/or issues in online versus face-to-face instruction. Finally, I will discuss effectiveness and security of online assessment tools, specifically, how best to minimize cheating during exams and quizzes that are not taken on-site or proctored.

Abstracts – Concurrent Sessions VII
9:40 am  
Friday 9:20-

**Systems Physiology, Active learning in an inquiry based laboratory course.**

Adam Rich, The College at Brockport

The ability to solve new problems is a desirable skill but many undergraduate courses do not present opportunities for students to practice and develop these skills. An inquiry-based course was designed to address this problem. The course, called Systems Physiology, mimics basic medical research as much as is reasonably possible. The primary goal was for students to develop an understanding of the research process while focusing on physiological control mechanisms. Success was defined as acquiring technical skills with the hands and developing the intellectual skills with the head to formulate a good research question, plan and execute experiments, interpret data, and to think critically. The course focuses on the research process while participating in an authentic research project. Students work in teams and present weekly progress reports. Research challenges are discussed and solutions are developed in collaboration with the entire class. A final presentation and summary report are required. In this way students learn the challenges and rewards of scientific research. Developing an active inquiry based laboratory course mimicking authentic research is difficult, particularly with assessment of student learning, and also in motivating students that are most familiar with cookbook labs and unambiguous solutions, or with multiple choice format exams. The approach to teaching important problem solving skills and to assessing student learning outcomes developed in Systems Physiology will be described, as well as student perceptions of this course.

**Dive Right In: Starting Undergraduate Research as a First Year Visiting Faculty Member**

Ryan Elsencode, Rockhurst University

Starting a position as a visiting faculty member with a focus primarily on teaching brings excitement and challenge. As a new instructor at a smaller teaching-centric university, I decided it was as good a time as any to undertake an ongoing research project with undergraduate
students. Experiences I have had with starting undergraduate research will hopefully spur discussion for the benefit of all attendees. Beyond ubiquitous issues like limited funding and lab space, my presentation will also focus on both the good and bad of starting research at the beginning of a visiting faculty position, challenges faced when entering into such a task, and a summary of my overall experience thus far.

**Community engagement in undergraduate biology: opportunities and challenges**

Amy E. Boyd, Warren Wilson College

Community engagement comes naturally to social scientists, but the benefits of engaging students in work that enhances community while strengthening course learning can be reaped in biology courses as well. I will discuss challenges of using service learning in biology courses and present examples of fruitful opportunities for addressing these challenges and harnessing the power of community engagement at all levels.

**Bridge To The Next Generation: Building Research Interest and Developing Global Engagement With Undergraduates**

Aggy Vanderpool, Lincoln Memorial University
Kimberly Gwinn, University of Tennessee

The Bridge To The Next Generation program profiles a plan for developing a research experience for undergraduate students majoring in biology, agricultural sciences or natural resources-related fields of study. The purpose of this program is to generate increased student interest and engagement in biological sciences and natural resources-related careers. Over the next decade, the numbers of graduates from agricultural and life sciences, food and natural resources (ASFNR) programs is expected to decline by more than 10%. An additional factor contributing to the declining numbers of ASFNR graduates is the high attrition rate (more than 50%) of all science, technology, engineering and mathematics (STEM) majors from U.S. universities. Employment opportunities exist now and will continue to grow for ASFNR graduates with advanced degrees as the world meets new challenges for ensuring global food supply and sustainable water supplies. The goals of the program include: increased student interest in ASFNR disciplines, increased student persistence, enhanced career preparation, provide information, clarification and exposure to career paths in ASFNR including graduate school programs, increased undergraduate student skills in field and lab research techniques, promote an increased understanding of the research process in terms of how scientists think and how they work on real problems, and to promote increased self-confidence in ability to do research.
Hands-on Science Labs in an Online World

Casey Schaffer, eScience Labs

eScience Labs will demonstrate how to implement online science laboratory courses while maintaining a physical materials laboratory component. With the use of technology and engaging lab experiments, science instruction online can extend the student experience beyond that of a traditional classroom. Come explore the future of science education and learn how to successfully offer online science laboratory courses.

Principles of Biology Workshop and Demo

Nature Education
Lydia LeStar, lydia.lestar@macmillan.com

Have you ever wondered how much longer traditional textbooks will be relevant? If there are more effective ways to get students involved in course material outside of class, or a solution to the ever-increasing price (and weight!) of those textbooks? Join your peers along with a representative from Nature Education from 10:00-10:50 to discuss these questions and learn about Principles of Biology—a universally-accessible, resource-saving, fully-digital course solution for university level introductory biology courses.

Capturing Student Interest with Digital Interactivity

Sapling Learning
Diana Balakirov, diana.balakirov@saplinglearning.com

Exciting students about biology and engaging them in the process of learning is a challenge faced by many biology educators. With the wide variety of digital resources available, it can be difficult to determine not only which resources to incorporate, but how to use those resources most effectively while teaching. This workshop explores the theory behind the creation and the application of one particular type of resource; an open-ended digital interactive activity referred to from here on as an Interactive. These interactives provide environments that allow students to manipulate variables, environmental conditions, and/or objects to explore challenging topics in biology. They are designed as inquiry-based activities with many possible applications including lecture demonstrations, small group student work, homework assignments, and pre-lab
activities. Participants will learn about the theory behind the design and creation of these interactives as well as how they can be used in the classroom or lecture hall. Several interactives written by biology educators will be shown as examples before splitting up into teams. Each team will be tasked with outlining and designing the basic form of their own interactive on a common topic. It is the goal of the presenters to challenge participants to discover the power of learning through exploration and how it can be incorporated into many forms of instruction as they experience the process of designing their own interactive. Group creations will be shared and discussed prior to a brief conclusion. Take-aways from this session will arm participants with understanding of how to incorporate digital activities and student exploration into their course in order to increase student engagement.

**Abstracts – Posters**

Friday 11:00-1:30 pm

**Gender Bias in Lesson Models for Biology Education**

Amy Buxton, Jamie Jensen, Brigham Young University

While extensive research has been conducted examining gender stereotypes and the gender gap within education, past research has not focused on how to improve student interest and learning within biology by the specific lesson models teachers employ (“models” being the specific lesson content used to teach a broader biology concept, e.g. bird plumage is a model to teach sexual selection). We have developed an instrument to measure if, when, and what lesson models exhibit gender bias in biology. We selected eight broad topics within biology, and created three sets of flashcards within each topic. Within each set, one flashcard depicts a stereotypically male model (e.g. a shark) that could be used to teach the topic, while the other depicts a stereotypically female model (e.g. a dolphin). We gave this survey to 25 male and 25 female students in each grade, k-6, as a way of collecting preliminary data. We found several models that display significant gender bias. Our long-term goal is to create curricular materials based upon these biased models to test if they affect male and female interest and learning in biology.

**Encouraging Students to Pursue Careers and Graduate School in Biology and Biochemistry through Administration of an NSF S-STEM Scholarship Program**

Jennifer Maki, Daniel Westholm, Jennifer Rosato, Luther Qson, The College of St. Scholastica

Historically, most entering biology and biochemistry majors at The College of St. Scholastica (CSS) have intended to pursue a career in medicine, due to the prominence of medical professions and a general lack of awareness of other scientific career options. CSS is located in a
small city (with a population of 86,000) and serves a large proportion of low-income (30% are Pell recipients) and first-generation (40%) college students. In an attempt to increase awareness of careers in the basic sciences, CSS has sought and received S-STEM grants from the National Science Foundation for more than ten years. This presentation will focus on the effects that this funding has had on our biology and biochemistry students’ education and outcomes. The S-STEM program offers scholarships and provides a variety of extracurricular offerings, including: mentoring, field trips, career and graduate school preparation as well as research and presentation opportunities for scholars who major in STEM fields. In the current grant cycle, biology and biochemistry majors on average annually comprise 43% of all majors represented among the S-STEM scholars. During the last decade at CSS, there has been a steady increase in the number of students participating in undergraduate STEM research, the biology curriculum is being updated to include more active learning strategies, and laboratories have been renovated. S-STEM funds have played a crucial role in this transformation, enhancing our ability to attract and retain qualified students in biology and biochemistry, and supporting these students as they explore diverse career paths.

**Genomics Education Partnership (GEP): Teaching Biology Using a Bioinformatics Research Project**

Nighet P Kokan¹, Christopher Shaffer², Wilson Leung², David Lopatto³, Sarah C R Elgin²
1) Cardinal Stritch University, Milwaukee WI, 2) Washington University-St. Louis, MO, 3) Grinnell College, IA

The Genomics Education Partnership (GEP, http://gep.wustl.edu), a growing consortium of undergraduate institutions across the US, provides students at primarily undergraduate institutions (PUI) with a genomics research experience. The flexible GEP curriculum can be implemented in a variety of ways: from a two-week module, to a larger fraction of an existing course, to a full semester course or independent study devoted to genome annotation and sequence improvement. The consortium has steadily grown from its inception in 2006 with seventeen institutions to over a hundred affiliates; in 2013-2014, 62 schools and over 1100 students participated. The research question under investigation uses comparative genomics in Drosophilae species: how do the sequence organization and gene characteristics differ between heterochromatic and euchromatic domains? What are the unique properties of the transcription start sites of Muller F element genes that enable them to be expressed in a heterochromatic environment? Utilizing survey and quiz results, we demonstrate that undergraduate students benefit by taking part in a national level genomics research project. Benefits are possible at a wide variety of institutions using a variety of course formats. However, faculty must devote a substantial amount of instructional time (avg. 45 hrs.) to this research project in order for students to show knowledge gains similar to those gained from a summer research experience. Sources of support: HHMI Professors grant #52007051 and NSF IUSE #1431407 to SCRE, and Washington University in St. Louis.
Utilizing a needs assessment analysis to inform the development of a cell/molecular biology laboratory course

Jenean H. O’Brien, University of Colorado Denver
Fordyce G. Lux, III, Metropolitan State University of Denver

When given the opportunity to develop a new upper division laboratory course, there are several potential topics and curriculum design options. Therefore, a two-tiered needs assessment analysis involving student surveys, faculty interviews, and literature review was performed. The purpose of the initial analysis was to determine which topics and techniques within the field of cellular and molecular biology were both of interest to students and considered important by faculty for inclusion in this laboratory class. Specifically, students and faculty were asked to indicate which subject areas already covered in the associated lecture course could be enhanced, which would aid in preparing students for future careers and which may increase interest in the field. The results of these surveys and interviews led to the development of a research-focused cell/molecular biology laboratory course. The second tier of needs assessment focused on determining an appropriate course design. Based on publicly-available course syllabi and published curriculum evaluations, a multi-modal approach was developed. The beginning of the course focuses on how to perform specific cell/molecular biology research techniques and why. The laboratory course then culminates with a project to design-your-own experiment based on these techniques, which will then be performed. This combination is designed to allow for building a factual foundation from which students can expand into inquiry-based learning.

New York State Parks’ FORCES: A Model for Engaging Students and the Community for Stewardship and Education

Caitlin C. Conn, New York Office of Parks, Recreation & Historic Preservation

Through FORCES (Friends of Recreation, Conservation, & Environmental Stewardship), New York State Park staff are working to establish relationships with academic institutions through which students participate in a variety of projects within State Parks. Student involvement ranges from one-day events, semester/summer long internships, to long-term projects suitable for capstone or thesis level work that include improvements to recreation facilities and historic sites, trail rehabilitation, protection and restoration of natural resources, and environmental education. These Natural Resource Stewardship projects support and enhance park visitors’ experiences, strengthen college academic programs, and forge personal life-long connections with these students to NYS Parks. FORCES students learn organizational, leadership, and communication skills that they are able to apply in their personal and professional lives. The FORCES program provides students with opportunities for personal growth and involvement in their community through service projects.
and outreach. In addition, students assist State Parks staff to recruit and collaborate with other interested colleges, volunteers, organizations, and community groups.

By formalizing relationships with academic institutions, agencies, organizations and individuals, the FORCES Program creates successful, long-term, mutually beneficial partnerships that seek to enhance college curriculum, provide hands on experience for students and facilitate the way New York State Parks can maintain, enhance, preserve, and protect its rich natural and cultural resources.

**Testing the antimicrobial effect of honey in an undergraduate introductory microbiology lab**

Daniel Westholm, Jen Maki, The College of Scholastica

Traditional introductory microbiology labs are often comprised largely of technique based exercises, a tendency borne out of the necessity to teach students to safely handle potentially infectious microorganisms. Recently, however, many undergraduate labs have transitioned to more inquiry and research based lab experiences shown to improve student learning and retention. We have developed a lab experiment in which students determine the antimicrobial activity of honey samples on a variety of bacteria in an effort to incorporate both of these important outcomes into one experience. Students are encouraged to select honey from local beekeepers or from other sources of personal interest. The selection process requires student consideration of variables including the geography of the bee colony, nectar sources, bee stock, harvest time, and plant and bee phenology. Students then test the honey for antimicrobial properties on various liquid bacterial cultures. In this single experiment, students gain ownership of original data, while developing fluency in basic microbiological techniques such as aseptic technique, dilution and plating, spectrophotometry, and graphical representation of data. We recently piloted this lab in two sections of an introductory microbiology lab course (50 students) and found it to be accessible to students, inexpensive and easy to expand upon. Students expressed enthusiasm for the experiment and many were willing to put extensive effort into securing a novel honey source. The results, methods, and future ideas will be presented in this poster.
Abstracts – Faculty Development Workshops  

**Session I: Teaching Like a Pro in Your First Few Years**
How can you maximize the cooperation of students, peers, and administrators as you implement the best in innovative pedagogy? Where can you find excellent “turn-key” activities? Master teachers will guide you through:
- Educational Outcomes and Criteria
- Effective Assessments
- Flipping your Class
- Resources

Experienced educators will share their most effective and efficient strategies so that you can focus your time and attention on what matters most.
- Syllabi that work
- Efficient Feedback
- Managing your time

Becky Burton, Janice Bonner, and Conrad Toepfer

**Session II: Pre-Health Care Advising**
Do most of the undergraduates at your institution want to be doctors, dentists, or other related health professionals? This workshop will provide attendees with up-to-date information on
- Statistics on who IS getting accepted into medical school
- How to best prepare students for medical school
- How to guide students that may not be ready for the health professions

Gigi Makky and Debbie Meuler

**Session III: Getting an Academic Job**
Teaching-intensive institutions (TII) have hiring criteria that are probably very different from those of the institution where you received (or will receive) your PhD. This workshop will be led by faculty who serve on hiring committees for TII. Topics will include:
- What sets successful TII candidates apart
- How to get the experience that TII expect
- How to market yourself effectively to TII search committees
- Pitfalls to avoid

Aggy Vanderpool, James Clack, and Tara Maginnis

**Session IV: Promotion and Tenure**
Members and past members of T&P committees share their expertise on navigating the process successfully from your first day on campus until you order those new business cards. Topics include:
- Identifying the written and unwritten expectations
- Optimizing service commitments
- Documentation and presentation
- Letters of support

Laura Salem, Greg Smith, and Paul Pickhardt
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See you next year for ACUBE’s 59th Annual Meeting at Missouri Western University
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