54th Annual Meeting – October, 2010

“Biology 2010 and Beyond”
ACUBE 54\textsuperscript{th} Annual Meeting – Program Overview

\textbf{Thursday October 7\textsuperscript{th}}
4:00-6:00 p.m. Steering Committee Meeting (McAlear Hall)

\textbf{Friday October 8\textsuperscript{th}}
7:00-8:30 a.m. Registration (coffee and Danish)
8:30-10:00 a.m. Opening Session and Invited Speaker Romi Burks
10:10-10:50 a.m. Session 1 (40 minute presentations)
11:00-1:00 p.m. Luncheon and First Business Meeting
1:00-1:40 p.m. Session 2 (40 minute roundtable discussions)
1:40-2:00 p.m. Session 3 (20 minute presentations)
2:10-2:50 p.m. Session 4 (40 minute roundtable discussions)
2:50-3:10 p.m. Session 5 (20 minute presentations)
3:20-4:00 p.m. “BIO 2010” (40 minute roundtable discussions)
4:00-6:00 p.m. Poster Session, Silent Auction, and Social Hour (Cash Bar)
6:00-8:00 p.m. Dinner, Second Business Meeting, and Keynote David Hillis

\textbf{Saturday October 9\textsuperscript{th}}
8:30-9:30 a.m. Bioscene Editorial Meeting
9:30-10:10 a.m. Session 6 (40 minute presentations)
10:20-11:00 a.m. Session 7 (40 minute workshops)
11:00-1:00 p.m. Luncheon and Third Business Meeting
1:00-3:30 p.m. Steering Committee Meeting

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Detailed Conference Schedule..........page 11
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Presenter Contact Information..........page 26
Lourdes College

Lourdes College, rooted in Catholic and Franciscan traditions, provides a values-centered education that enriches lives and advances academic excellence through the integration of the liberal arts and professional studies. Beginning in 1943 as an extension campus of the College of St. Theresa (located in Winona, Minnesota), Lourdes Junior College was founded in 1958. Originally established to educate sisters of the Franciscan community, Lourdes College began to admit lay women in 1969 and lay men in 1975. The College received its certificate of authorization from the Ohio State Board of Education in January, 1958, and was accredited by the North Central Association of Colleges and Schools in 1964. It was independently incorporated as Lourdes College in 1973.

Information retrieved from: http://www.lourdes.edu

A special thank you to Marya Czech, our local arrangements chair at Lourdes College
BIO 2010

In 2003, The National Academies Press published a comprehensive book on reforming biology undergraduate education. With nearly a dozen committee members, the goal of this report was to promote undergraduate learning and to provide recommendations for comprehensive reevaluations of undergraduate science education.


PDF available from: [http://www.nap.edu/catalog/10497.html](http://www.nap.edu/catalog/10497.html)

Recommendations *(taken directly from pages 8 and 9 of the Executive Summary)*

1. Given the profound changes in the nature of biology and how biological research is performed and communicated, each institution of higher education should reexamine its current courses and teaching approaches to see if they meet the needs of today’s undergraduate biology students. Those selecting the new approaches should consider the importance of building a strong foundation in mathematics and the physical and information sciences to prepare students for research that is increasingly interdisciplinary in character. The implementation of new approaches should be accompanied by a parallel process of assessment, to verify that progress is being made toward the institutional goal of student learning.

2. Concepts, examples, and techniques from mathematics, and the physical and information sciences should be included in biology courses, and biological concepts and examples should be included in other science courses. Faculty in biology, mathematics, and physical sciences must work collaboratively to find ways of integrating mathematics and physical sciences into life science courses as well as providing avenues for incorporating life science examples that reflect the emerging nature of the discipline into courses taught in mathematics and physical sciences.

3. Successful interdisciplinary teaching will require new materials and approaches. College and university administrators, as well as funding agencies, should support mathematics and science faculty in the development or adaptation of techniques that improve interdisciplinary education for biologists. These techniques would include courses, modules (on biological problems suitable for study in mathematics and physical science courses and vice versa), and other teaching materials.
These endeavors are time-consuming and difficult and will require serious financial support. In addition, for truly inter-disciplinary education to be achieved, administrative and financial barriers to cross-departmental collaboration between faculty must be eliminated.

4. Laboratory courses should be as interdisciplinary as possible, since laboratory experiments confront students with real-world observations do not separate well into conventional disciplines.

5. All students should be encouraged to pursue independent research as early as is practical in their education. They should be able to receive academic credit for independent research done in collaboration with faculty or with off-campus researchers.

6. Seminar-type courses that highlight cutting-edge developments in biology should be provided on a continual and regular basis throughout the four-year undergraduate education of students. Communicating the excitement of biological research is crucial to attracting, retaining, and sustaining a greater diversity of students to the field. These courses would combine presentations by faculty with student projects on research topics.

7. Medical school admissions requirements and the Medical College Admissions Test (MCAT) are hindering change in the undergraduate biology curriculum and should be reexamined in light of the recommendations in this report.

8. Faculty development is a crucial component to improving undergraduate biology education. Efforts must be made on individual campuses and nationally to provide faculty the time necessary to refine their own understanding of how the integrative relationships of biology, mathematics, and the physical sciences can be best melded into either existing courses or new courses in the particular areas of science in which they teach.”

Chapter 1: Introduction
Chapter 2: A New Biology Curriculum
Chapter 3: Instructional Materials and Approaches for Interdisciplinary Teaching
Chapter 4: Engaging Students with Interdisciplinary and Project-based Laboratories
Chapter 5: Enabling Undergraduates to Experience the Excitement of Biology
Chapter 6: Implementation
Dr. David Hillis

Dr. Hillis comes to us from The University of Texas at Austin, where he teaches courses in herpetology, systematics, and computational phylogenetics. He is no stranger to the mid-west however; he received his M.A., M.Ph., and Ph.D. at the University of Kansas. He is a MacArthur Foundation Fellow and has been honored with the Presidential Young Investigator Award through the National Science Foundation. In 2000 he was elected in to the American Academy of Arts and Sciences, and in 2008 he was elected to the National Academy of Sciences. He is the Alfred W. Roark Centennial Professor of the Section of Integrative Biology and has nearly 200 peer-reviewed publications in major scientific journals. He continues to do ground breaking research with a suite of undergraduates, graduate students, and post-docs at The University of Texas.

In addition to an enormously successful research program, David is also highly involved in higher-education pedagogy and continues to participate in discussions concerning how educators can help to shape biologists of future generations. Most notably, in 2003, he was one of eleven authors of “BIO 2010: Transforming Undergraduate Education for Research Biologists”. In 2008 he worked with Sinaur to publish a new edition of the innovative introductory biology textbook “Life: The Science of Biology”. He has also published two CD’s as educational resources for teachers – one regarding unique and endangered animals of central Texas, and one dismantling truth from fiction for “Hollywood DNA”. As a testament to his dedication of integrating the physical and applied sciences, David is the Director of The Center for Computational Biology and Bioinformatics at The University of Texas, where they support research and opportunities for using computational approaches to solve biological programs. In his spare time David enjoys spending time at his “Double Helix Ranch” – a ranch in central Texas that specializes in the genetics and breeding of Longhorn Texas cattle.
Dr. Romi Burks

Romi received her Ph.D. from the University of Notre Dame in 2000, B.S. and B.A. from Loyola University Chicago. After two post-doctoral positions (one at The Ohio State University and one at Rhodes College), she made an academic home at Southwestern University in Georgetown, Texas in 2003. She is a Fulbright Scholar and a Paideia professor at Southwestern, which is a “distinctive and holistic program, transcending conventional approaches to teaching and learning through a student-driven, faculty-led experience”. The program promotes connections between academic courses, offers intercultural and diversity experiences, encourages civic engagement, and supports collaborative or guided research and creative works. Her successful research program on invasive invertebrates has allowed her to mentor dozens of undergraduates and has led to international collaborations in Denmark, Belgium, and Uruguay. Romi is also extremely involved with The Texas Academy of Science (an organization dedicated to the training of undergraduate researchers) and she is President-Elect for the 2010-2011 academic year. At Southwestern, she founded SMArT – Science and Math Achiever Teams – a civic engagement project in central Texas.

Three highlighted pedagogical publications demonstrate her commitment to excellence in teaching and involving undergraduates in her research include: her 2007 article demonstrates how to use chocolate to explore phylogenetic relationships within evolutionary biology, a 2009 manuscript regarding how microwave popcorn makes it easier to teach statistics, and her 2009 Science paper entitled “To co-author or not to co-author: how to write, publish, and negotiate issues of authorship with undergraduate research students”.

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ACUBE Governance 2010

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Secretary, Debbie Beuler, Cardinal Stritch University
Local Arrangements Chair, Marya Czech, Lourdes College
Program Chair, Tara Maginnis, University of Portland
Editor of Bioscene, Stephen S. Daggett, Avila University
Editor of Bioscene, Jim Clack, Indiana University-Purdue University
Website Editor, Mindy Walker, Rockhurst University
Website and Media Editor, Christine Bezotte, Elmira College
past-President, Conrad Toepfer, Brescia University

Steering Committee Members:
Neval Erturk, Converse College
Karen Sirum, Bowling Green State University
Greg Smith, Lakeland College
Agy Vanderpool, Lincoln Memorial
Kristen Walton, Missouri Western State University

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 Association of College & University Biology Educators was first established in 1957 as the Association of Midwest College Biology Teachers (AMCBT). In 1997 we changed our name to ACUBE to reflect our growing national membership.

The objectives of ACUBE are: 1) to further the teaching of the biological sciences at the college and other levels of educational experience; 2) to 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) to encourage active participation in biological research by teachers and students in the belief that such participation is an invaluable adjunct to effective teaching; and 4) to 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.
## ACUBE 54th Annual Meeting
Lourdes College – Sylvania, Ohio

### Thursday, Oct. 7th

4:00 – 6:00 Steering Committee meeting *(McAlear Hall – ground level conference room)*

### Friday, Oct. 8th

7:00 – 8:30 a.m.  **Registration – St. Joseph Hall (SJH) Lobby**
- Coffee and Danish
- Poster set-up, Presentation Loading
- Registration will remain open all day

### 8:30 – 10:00 OPENING SESSION – SJH Room 110

Welcome to our 54th Annual Meeting: ACUBE President **Laura Salem**, *Rockhurst University*

Welcome to Lourdes College: Dr. Janet Robinson, Vice President for Academic Affairs

Greetings from Conference Chairpersons:
- Local Arrangements Chair: Marya Czech, *Lourdes College*
- Program Chair: Tara Maginnis, *University of Portland*
- Bioscene Editor: Jim Clack, *Indiana University-Purdue University*

Invited Speaker: **Romi Burks**, *Southwestern University*

“A Snail's Tale: A story of promoting publishable undergraduate research”

### 10:00 – 10:10 Break

### 10:10 – 10:50 (40 min) SESSION 1  
**MAH (Mother Adelaide Hall)**

<table>
<thead>
<tr>
<th>Presentation</th>
<th>Room</th>
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</table>
| **Emphasizing Scientific Literacy in a Course for Non-Majors**  
Janice Bonner – *College of Notre Dame Maryland*                                                                                                  | 201    |
| **Getting Student Group Work to Work: Characteristics of Individuals that Impact Their Team’s Learning and Attitudes in an Introductory Biology Classroom**  
Alexis Majorczyk and *Karen Sirum – Bowling Green State University*                                                                                | 203    |
| **Science e-Fellows: Induction Program for Beginning Science Teachers** (A Cooperative Professional Development Program)  
Josephine C. Agnew-Tally, Betty Paulsell, Scott McQuerry  
Wakisha Briggs, *Donald L. Williams – Park University*                                                                                       | 119    |

### 10:50 – 11:00 Break
11:00 – 1:00 **LUNCHEON and FIRST BUSINESS MEETING** — SJH Room 110

Call for nominations:
- Two open positions for Steering Committee (serve from October 2010-October 2012)
- Opening for President-Elect

**“Out of This World” Teaching Idea Contributions**

<table>
<thead>
<tr>
<th>1:00 – 1:40 (40 min) <strong>SESSION 2</strong></th>
<th>MAH</th>
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<tbody>
<tr>
<td><strong>Writing Biology</strong></td>
<td>Room 201</td>
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<td>Barbara Hass-Jacobus – <em>Indiana University-Purdue University</em></td>
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**The Science of Sex, Drugs, and Rock’n’Roll-The pluses and minuses of starting with student interest**
- Mark Milanick – *University of Missouri*

**The Senior Biology Major Capstone Experience - What is out there and does it work?**
- Tom Davis – *Loras College*

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<tr>
<th>1:40 – 2:00 (20 min) <strong>SESSION 3</strong></th>
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<tr>
<td><strong>Online and Hybrid Biology Courses: Pedagogy, Progress, Pitfalls, and Pointers</strong></td>
<td>Room 201</td>
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<td>Jim Clack – <em>Indiana University-Purdue University</em></td>
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**Using multiple assessments to examine student perceptions of science and learning**
- *Tim Henkel and Terry Derting – Murray State University*
- Diane Ebert-May – *Michigan State University, East Lansing*

**Development of Web-Base Tools for Organizing Biology Labs**
- *Tim Mulkey and Jessy Robbins – Indiana State University*

**Getting Student Group Work to Work: Characteristics of Individuals that Impact Their Team’s Learning and Attitudes in an Introductory Biology Classroom**
- *Alexis Majorczyk and Karen Sirum – Bowling Green State University*

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<th>2:00 – 2:10 Break</th>
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<tr>
<td>2:10 – 2:50 (40 min) <strong>SESSION 4</strong></td>
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<tr>
<td><strong>Service Learning in Biology: Best Practices and Personal Experiences</strong></td>
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<tr>
<td>Laura Salem – <em>Rockhurst University</em></td>
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**Pre-Health Professions Advising Resources: a roundtable discussion**
- *Lynn Gillie – Elmira College*
- *Steve Daggett – Avila University*
### 2:50 – 3:10 (20 min) SESSION 5

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<th>Topic</th>
<th>Room</th>
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<tr>
<td><strong>Making the Maumee River GLISTEN: Undergraduate Service Learning through Water Quality Monitoring at Defiance College</strong>&lt;br&gt; * Doug Kane, Spiro M. Mavroidis, J. Maxcy – Defiance College&lt;br&gt; Marya Czech – Lourdes College</td>
<td>201</td>
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<tr>
<td><strong>Progressive Assessment of Laboratory Reports Enhances Student Writing Skills In a Biology Majors Botany Course</strong>&lt;br&gt; Don Williams – Park University</td>
<td>203</td>
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<tr>
<td><strong>Creating Inclusive Learning Environments: A Diversity Workshop for Laboratory Teaching Assistants</strong>&lt;br&gt; Cori Fata-Hartley – Michigan State University, Lyman Briggs College</td>
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<tr>
<td><strong>The Use of Service Learning to Teach Non-Science Majors Anatomy and Physiology</strong>&lt;br&gt; Christina Wills – Rockhurst University</td>
<td>204</td>
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### 3:10 – 3:20 Break

### 3:20 – 4:00 (40 min) BIO 2010 Roundtable Discussions – SJH Room 110

As many of you know, ACUBE regularly discusses several of the goals laid out by the BIO 2010 authors; our discussions of these topics are a tribute to our dedication to quality undergraduate education and speak as a testament to our interest in creating competent and well-rounded future scientists. However, there are other goals laid out by the authors of “BIO 2010” that we do not discuss as often. Thus, the aim of this conference-wide roundtable is to discuss some of the other goals of BIO 2010.

**BIO 2010: Addressing Recommendations 2-4**  
Led by Laura Salem and Greg Smith

2: integrating the physical and information sciences  
3: improving interdisciplinary approaches  
4: improving interdisciplinary approaches in laboratories

**BIO 2010: Addressing Recommendations 6 and 8**  
Led by Tara Maginnis and Karen Sirum

6: developing seminar-type courses  
8: support for faculty development
Please visit the silent auction table to bid on the variety of items kindly donated by ACUBE members. All proceeds go to fund future ACUBE events and members.

Silent Auction Ends at 5:30 p.m.

All presenters will be at their posters from 4:45-5:15

POSTER TITLES & AUTHORS:

1. Teaching socialization and graduate student preparation for the biomedical professoriate: divergent graduate student paths and perspectives of teaching during PhD training.
   Catharine Clark – University of Missouri
2. Application of a pedagogical method for using non-scientific literature to increase interest in the content taught in an undergraduate animal physiology course.
   Melissa Daggett – Missouri Western State University
3. Using Program-Level Review as the Spark to Initiate Explicit Use of Learning Progression
   Chiron Graves – Eastern Michigan University
4. Macroinvertebrates in Leaf Packs in White Aloe Creek, Parkville, MO.
   Miki Katuwal, Carol Sanders, Don Williams – Park University
5. Genomic Research in the Undergraduate Classroom: Challenges and Solutions
   Nighet P Kokan – Cardinal Stritch University
6. Integrating Physics & Biology in Ethology & Evolution Courses
   Tara Maginnis – University of Portland
7. Use of primary literature in a human disease project in a pathophysiology course for allied health majors
   Kristen Walton – Missouri Western State University
8. Using Democracy to Teach a Freshmen Science Survey Course
   Christina Wills – Rockhurst University
9. Students’ Acceptance of Evolution and Their Understanding of The Central Dogma and Protein Structure/Function: Is There a Connection?
   Jill Jaketic – Bowling Green State University
10. An Open-Ended, Learner-Driven Approach to a Content-Heavy Diversity Course
    Conrad Toepfer – Brescia University

6:00 DINNER & SECOND BUSINESS MEETING (SJH Room 110)

Keynote Speaker: David Hillis, The University of Texas at Austin

“Engaging Biology Students in Evolution”

Saturday, Oct. 9th

8:30 – 9:30 Bioscience Editorial Board Meeting (MAH Room 119)
   Coffee and Danish provided
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
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<tr>
<td>9:30 – 10:10</td>
<td><strong>SESSION 6</strong></td>
<td>MAH</td>
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<td><strong>Educational applications of Web 2.0: An introduction to WordPress</strong></td>
<td>Room 120</td>
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<td>Neval Erturk – <em>Converse College</em></td>
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<td><strong>Medically relevant enzyme laboratory using grocery store materials</strong></td>
<td>Room 119</td>
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<td>Mark Milanick – <em>University of Missouri</em></td>
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<td>10:10 – 10:20</td>
<td><strong>Break</strong></td>
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<td>10:20 – 11:00</td>
<td><strong>SESSION 7</strong></td>
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<td><strong>Integration of Undergraduate Research in a Tropical Biology Travel Course</strong></td>
<td>Room 119</td>
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<td>*Paul Pickhardt and *Greg Smith – <em>Lakeland College</em></td>
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<td><strong>Transforming a First-Year General Biology Course Into an Honors Course at</strong></td>
<td>Room 201</td>
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<td><em>Lincoln Memorial University</em></td>
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<td>Aggy Vanderpool – <em>Lincoln Memorial University</em></td>
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<td>11:00 – 12:30</td>
<td><strong>LUNCHEON &amp; THIRD BUSINESS MEETING (SJH Room 110)</strong></td>
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<td>Winner: “Out of this World” Teaching Idea</td>
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<td>Resolutions: TBD</td>
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<td>Executive Secretary Report: Tom Davis – <em>Loras College</em></td>
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<td>* Bioscene Steve Daggett, <em>Avila University</em></td>
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<td>Jim Clack – <em>Indiana University-Purdue University</em></td>
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<td><strong>Presidential Address: Laura Salem – <em>Rockhurst University</em></strong></td>
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<td>2011 Meeting (Our 55th) <em>Lincoln Memorial University</em> – Harrogate, TN</td>
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<td>2011 Local Arrangements Chair: Aggy Vanderpool</td>
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<td></td>
<td>“Introduction to Lincoln Memorial University“</td>
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<td>Concluding Remarks &amp; Adjournment: Tara Maginnis</td>
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<tr>
<td>12:30 – 1:00</td>
<td><strong>Break</strong></td>
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<td><strong>Steering Committee Meeting 1:00 – 3:30 (SJH)</strong></td>
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<td><em>Includes newly elected members</em></td>
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ABSTRACTS
(organized according to session)

SESSION 1

“Emphasizing Scientific Literacy in a Course for Non-Majors”

Janice Bonner – College of Notre Dame of Maryland

One of the challenges of teaching biology to non-majors is integrating activities that encourage the development of biological literacy and that make the course practical. This presentation will explain how we have accomplished this in Human Biology, a non-majors course at College of Notre Dame of Maryland. The course is designed as a “User’s Guide” to the human body and units are organized around topics, each of which incorporates various types of reading and at least one laboratory exercise. Nutrition is studied by analyzing the food available to a family of farm workers in Guatemala. The role of exercise is studied by comparing variables such as heart rate, CO2 output, and blood pressure for two individuals while they run on a treadmill. Epidemiology is initially presented using a game adapted from Nutrition Action and information from the Population Reference Bureau; it is then illustrated with articles from the newspaper. An extended activity helps students understand the relationship between malaria and sickle cell anemia. Scaffolded reading activities are designed to help students read journal articles from Science and Nature. Books written for non-specialists and information from on-line sources are analyzed for scientific accuracy.

“Getting Student Group Work to Work: Characteristics of Individuals that Impact Their Team’s Learning and Attitudes in an Introductory Biology Classroom”

Alexis Majorczyk and Karen Sirum – Bowling Green State University

The fundamental way to improve student learning is to create an environment where students are using course material to solve problems working with each other. The guidelines for implementing group work in the college and university classroom setting have been described in detail in terms of such considerations as the type of assignments, grading, peer feedback, and the importance of forming diverse teams for maximum team effectiveness. However, there are many considerations that are not well understood and may be situation dependent when it comes to team dynamics. For example, what exactly constitutes a diverse team? What factors should be considered when assigning students to work together? How do these factors impact student satisfaction with their group, student learning, and student attitudes towards science? We will share what we learned from a semester-long implementation of the Team-Based Learning strategy, where students are assigned to permanent teams in the large enrollment introductory biology classroom, lecture is minimized, and assignments include graded group quizzes and problem solving activities. We will consider the significance of the cognitive development stage of a student on team dynamics and performance and we will explore the impact of the team composition on individual student learning and attitudes.

“Science e-Fellows: Induction Program for Beginning Science Teachers (A Cooperative Professional Development Program)”

Josephine C. Agnew-Tally, Former Dean, School for Education, Park University

(New title: Department Head, Childhood Education and Family Studies; Hill Hall, College of Education, Missouri State U., Springfield, MO and Promoter and Grant
Writer for the Sprint Science E-Fellows Induction Program

Betty Pulsell, Program Director / Fair Director, Science Pioneers, and Adjunct Instructor for Park University School for Education and Course Developer for the Sprint Science E-Fellows Induction Program

Scott McQuerry, Independence, MO Public Schools and Adjunct Instructor for Park University School for Education, Elementary Science Methods and Instructor for Sprint Science E-Fellows Induction Program

Ms. Wakisha Briggs, Director of Continuing Education, Park University

Donald L. Williams, Ed. D., Associate Professor of Biology and Sprint Science E-Fellows Induction Program on-line Faculty Mentor.

This presentation will highlight the Science e-Fellows high intensity professional development opportunities program that is in its second year of operation in the greater Kansas City metropolitan community. It has been funded by a grant from the Sprint Corporation and facilitated by the Park University School for Education administration in conjunction with the Science Pioneers, a non-profit organization established to foster, develop, and encourage youth in the study of science in the greater Kansas City metropolitan community. On-line mentors, outstanding secondary education science faculty and college and university science faculty participate in the program both contributing their expertise but also gaining new insights into their own teaching. This program has targeted beginning science teachers and special education teachers from Missouri and Kansas to help them improve their science knowledge and pedagogy. This program can be a model for the development of similar programs that can promote and enhance the teaching of science by providing professional development for science faculty in middle and high school classrooms.

SESSION 2

“Writing Biology”  Barbara Hass-Jacobus – Indiana University-Purdue University

Most biology courses incorporate writing in the form of lab reports, and all biology programs require students to take writing courses as part of their general education requirements. In the current global and multidisciplinary research climate, however, it becomes increasingly important for scientists to be able to communicate scientific information not just to other scientists, but also in a way that is accessible to all audiences. Topics for discussion may include: the role of undergraduate biology educators play in training students to communicate technical information to other audiences; strategies for collaboration between biology and humanities; ideas for successful activities and assignments beyond the traditional lab report.

“The Science of Sex, Drugs, and Rock’n’Roll-The pluses and minuses of starting with student interest”

Mark Milanick – University of Missouri

My objection to many traditional science courses is that the best is saved for last. So I tried to teach a course where I started out with topics of immediate interest to the students and then used this as a carrot to motivate them to learn the science. Certainly, the students were interested in sex, drugs and rock’n’roll, but I found it harder than I expected to identify the major scientific concepts for non-majors in this course and to keep the students (and myself) focused on the science and not the societal aspects of these topics. The presentation will include having the audience participate in a discussion along the lines of what I tried to do in class.
“The Senior Biology Major Capstone Experience - What is out there and does it work?”  
**Tom Davis – Loras College**

Abstract: This session will show what Loras College, Dubuque, IA, does for its Biology major senior capstone but will ask others to bring and discuss what they require from their senior majors before they graduate. Discussion will focus on critiquing and examining these requirements to, maybe, rethink and adjust what each of us have going at our institutions. Prizes (like left over mugs, pens, posters) for the best capstone experience will be given to the best capstone experience!

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**SESSION 3**

“Online and Hybrid Biology Courses: Pedagogy, Progress, Pitfalls, and Pointers”  
**Jim Clack – Indiana University-Purdue University**

We have deployed several online and hybrid courses recently, culminating with our first "hybrid" laboratory class. I will discuss our experiences, good and bad, involving the following topics: 1) Creating an online course: software issues, syllabus alterations 2) Maintaining a non-personal online persona 3) Administering and evaluating online courses: from peer review to grading 4) Exams/quizzes/papers/tests: avoiding the big mess 5) Philosophical issues, such as intellectual property rights, that concern online courses.

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“Using multiple assessments to examine student perceptions of science and learning”  
**Tim Henkey** and **Terry Derting – Murray State University**  
**Diane Ebert-May – Michigan State University, East Lansing**

Although a variety of assessments are used by faculty to ‘preview’ their students, few individual assessments provide a comprehensive view of students’ understanding of the discipline and their approaches to learning. We administered two validated assessments, the Views About Biology Survey (VABS) and the Learning and Studying Questionnaire (LSQ), to undergraduate biology students nationwide. The VABS characterizes students’ perception of biology as a process of discovery, while the LSQ assesses students’ approach to studying, which provides an indicator of students’ agreement with a deep and surface approach to learning. We examined the results of each assessment individually and then looked at inter-relationships between the two sets of data. We found that students with a more realistic understanding of the discipline used a more deep approach to learning than their peers, while students with an inaccurate understanding of the discipline are less able to differentiate between surface and deep approaches. The relationships support previous work that correlates VABS profiles with achievement in biology courses and may provide a framework for faculty to better understand student preconceptions and adjust the structure of the course at the outset of the semester.

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“Development of Web-Base Tools for Organizing Biology Labs”  
**Tim Mulkey and Jessy Robbins – Indiana State University**

Restructuring of curriculum and renovation of labs provide opportunities for reorganizing and rethinking laboratory management. Tools that have been developed for cataloging and organizing the departmental microscope slide collection and providing a “shopping cart” for delivery of slides to the labs will be demonstrated. The system includes a catalog of digital images to expand the utility of the collection beyond the laboratory environment. Additional tools for organizing, cataloging, and managing laboratory materials will be demonstrated.
“Getting Student Group Work to Work: Characteristics of Individuals that Impact Their Team’s Learning and Attitudes in an Introductory Biology Classroom”

Alexis Majorczyk and Karen Sirum – Bowling Green State University

The fundamental way to improve student learning is to create an environment where students are using course material to solve problems working with each other. The guidelines for implementing group work in the college and university classroom setting have been described in detail in terms of such considerations as the type of assignments, grading, peer feedback, and the importance of forming diverse teams for maximum team effectiveness. However, there are many considerations that are not well understood and may be situation dependent when it comes to team dynamics. For example, what exactly constitutes a diverse team? What factors should be considered when assigning students to work together? How do these factors impact student satisfaction with their group, student learning, and student attitudes towards science? We will share what we learned from a semester-long implementation of the Team-Based Learning strategy, where students are assigned to permanent teams in the large enrollment introductory biology classroom, lecture is minimized, and assignments include graded group quizzes and problem solving activities. We will consider the significance of the cognitive development stage of a student on team dynamics and performance and we will explore the impact of the team composition on individual student learning and attitudes.

SESSION 4

“Service Learning in Biology: Best Practices and Personal Experiences”

Laura Salem – Rockhurst University

I have utilized service learning using different courses, community partners, and assessment strategies. I will share my experiences and examples of best practices for service learning in both upper and lower division biology courses. Discussion will be centered around design, implementation, and assessment of service learning.

“Pre-Health Professions Advising Resources: a roundtable discussion”

Lynn Gillie – Elmira College

Steve Daggett – Avila University

As biology faculty, part of our service load is often related to pre-health professions advising. Advising for graduate work in biology has different challenges than advising for professional programs. How similar are these tracks when considering the recommendations in the BIO2010 report? During this roundtable discussion, we hope we can all share strategies we use to advise pre-health students, write letters, stay current with the ever-changing requirements and navigate the acronyms (AAMC, MCAT, AACOM, etc.). The extremely helpful resources of the NAAHP (National Association of Advisors for the Health Professions) will be highlighted.
“Making the Maumee River GLISTEN: Undergraduate Service Learning through Water Quality Monitoring at Defiance College”  
**Doug Kane, Spiro M. Mavroidis, J. Maxcy – Defiance College**  
**Marya Czech – Lourdes College**  
As part of the GLISTEN (Great Lakes Innovative Stewardship through Education Network) initiative, students and faculty at Defiance College have been conducting water quality monitoring in the Maumee River and its tributaries. This has been a very student-centered initiative, as an undergraduate student has served as a GLISTEN liaison and performed the water quality sampling, analysis, conducted outreach with middle school and high school students, served as a teaching assistant in an upper-level ecology laboratory where students performed water quality monitoring, and served as an intern to a local watershed group, the Upper Maumee Watershed Partnership. We present GLISTEN at Defiance College as a model of successful service learning focusing on water quality and as being applicable to other watersheds within the Laurentian Great Lakes and beyond.

“Progressive Assessment of Laboratory Reports Enhances Student Writing Skills In a Biology Majors Botany Course”  
**Don Williams – Park University**  
In a biology major’s botany course, a series of three formal written laboratory reports are assigned both to give students practice using the scientific method of experimentation and practice developing their scientific literacy writing skills. The three laboratory reports are graded using a stylized rubric which is shown herein. In addition, the laboratory reports are assessed in a progressive manner, i.e., the first report is graded rather rigorously but assigned a minimal point value. The second report and the final report are graded with the same rigor with double and quadruple points assigned, respectively. Data will show that students scoring low on the first report score appreciably better on the second and third reports. Writing skills improve appreciably, as well.

“Creating Inclusive Learning Environments: A Diversity Workshop for Laboratory Teaching Assistants”  
**Cori Fata-Hartley – Michigan State University, Lyman Briggs College**  
Recruitment and retention of underrepresented minority students in science remains a challenge. Several efforts to create an inclusive learning environment that appeals to and promotes the success of underrepresented students have been initiated at Lyman Briggs College, a residential college for science students within Michigan State University. Among these efforts was a diversity workshop for biology undergraduate and graduate laboratory teaching assistants. The workshop included presentations, discussions, case studies, and group activities. Participants were expected to be able to define diversity, understand the value of diversity in educational and scientific settings, explain how diversity affects teaching and learning, and develop tools, strategies, and resources that contribute to an inclusive learning environment. The effectiveness of the workshop was assessed through pre- and post-workshop surveys. A majority of participants indicated the workshop objectives were met and they intended to change the way they conduct themselves as a teaching assistant. The following semester, participants also wrote narratives about specific teaching experiences affected by diversity. Qualitative evaluation of the narratives revealed most participants had an intermediate understanding of diversity, while a small percentage demonstrated either sophisticated or deficient comprehension. In summary, the diversity workshop improved participant understanding of and appreciation for the role of diversity and likely improved the laboratory learning environment.
“The Use of Service Learning to Teach Non-Science Majors Anatomy and Physiology”

Christina Wills – Rockhurst University

Science and technology pervade every aspect of modern living, particularly health care. In the future, students will be making health care decisions for themselves or family members and will be voting on health care policy and funding for biomedical research. To adequately prepare students for this eventuality, the goal for Biology 1150 (biology for non-majors) was to educate students about the functioning of their bodies (anatomy and physiology “light”) and for students to develop an understanding and ability to reflect on the myriad of medical issues that they, their family, community, country and world may or do face. Students were required to complete a semester long research project tying together their academic major, an organ system, social implications, a literature review of relevant biomedical research and 15 hours of service at Truman Medical Center, a level 1 trauma center. At the end of the semester, a survey was administered to assess the students’ experiences and attitudes towards service, the application of material learned in class, the effect of service on students’ social opinions and the effectiveness of the research project. I will be presenting the results (data from the journals and survey) of this service learning project on student learning.

SESSION 6

“Educational applications of Web 2.0: An introduction to WordPress”

Neval Erturk – Converse College

Utilization of computer based social technologies, in particular Web 2.0 tools, by the educators is the basis of computer-supported collaborative learning (CSCL). Web 2.0 is the second generation Web that enables those with no technical knowledge to actively participate in the digital world and interact with other users (Silva, Rahman, & El Saddik, 2008). Popularity of Web 2.0 is mostly due to highly utilized services such as blogging and social networking sites. Today’s students, referred to as the Digital Natives, are already engaged with the online community through their involvement with blogging and social networking sites. CSCL involves the academic learning community with this ongoing engagement. The concept of delivering educational activities using Web 2.0 tools is called Learning 2.0 (Murray, 2008). However, not all educators are skilled to deliver educational activities via Web 2.0. This workshop is to introduce participants to WordPress, a popular blogging site. The presenter will assume that the participants will have little computer literacy and no prior knowledge of blogging. Participants will have the opportunity to create an educational blog, and learn to add documents, presentations and pictures to the blog they created. A detailed handout will be available for interested educators.

“Medically relevant enzyme laboratory using grocery store materials”

Mark Milanick – University of Missouri

For many students, medical problems capture their interest. I will do a laboratory exercise with the audience studying the enzyme acetylcholinesterase. This enzyme is blocked by many pesticides and neurotoxins and is the target for many medical drugs-to induce paralysis, to treat myasthenia gravis, parkinson’s, and alzheimer’s. A related enzyme, butylcholinesterase, found in plasma, is thought to be important for metabolizing cocaine. Polymorphisms in butylcholinesterase explain one of the original pharmacogenetic findings-about 1 in 3000 people have low activity of the enzyme, but are completely normal, unless given a drug (succinylcholine) designed for 30 minute paralysis-but without the enzyme paralysis lasts for days. One hypothesis is that people that die from an initial dose of cocaine are the rare
individuals that completely lack butyrylcholinesterase. In this experiment all the consumable materials can be purchased at the grocery store except for acetylcholine (or acetylthiocholine and DTNB). This lab can be designed to illustrate drug dose response curves, as a puzzle to identify the problem with a patient or animal suspected of pesticide poisoning, or as an inquiry based lab.

SESSION 7

“Integration of Undergraduate Research in a Tropical Biology Travel Course”

Paul Pickhardt and Greg Smith – Lakeland College

Involving students in scientific research experiences continues to be a focus of many undergraduate institutions. Each type of science course presents its own challenges in integration of research into the course material. Here we describe how small group research projects were integrated into a 15 day travel course in Belize. Working within a lowland tropical rainforest system, students were required to conceive, develop, conduct, troubleshoot, analyze and present original research projects in groups of 2 or 3. We will discuss how the course is structured to accommodate these research projects and the methods used to guide students throughout the process.

“Transforming a First-Year General Biology Course Into an Honors Course at Lincoln Memorial University”

Aggy Vanderpool – Lincoln Memorial University

During the fall of 2009, ENVS 100 Introduction to Environmental Science, was restructured to incorporate pedagogies of student engagement including think-pair-share, group exercises, peer instruction, problem-based inquiry, concept tests, and just-in-time-teaching techniques. Pedagogical strategies also included extensive use of web-based resources in the classroom including animations, video clips and interactive quizzes as well as exercises on educational and organizational web sites. Major assessment tools for the course included four in-class examinations and paired peer-instruction presentations. Examinations were administered using a basic exam format that included multiple choice and short answer questions. Preliminary findings suggest that the above mentioned strategies for student engagement can be used very effectively in order to deliver course content in science-based courses. To further test this concept, pedagogies of student engagement will be used in the development of a new honors section of Biology 111, General Biology I, to be offered at LMU during the fall of 2010. The general biology I honors section will use active learning strategies and will be compared to previously taught sections. The performance of these populations of students (i.e. those taught the same content material using pedagogies of student engagement versus those taught using more traditional lecture techniques will be examined.

POSTER SESSION

1. Teaching socialization and graduate student preparation for the biomedical professoriate: divergent graduate student paths and perspectives of teaching during PhD training.

   Catharine Clark – University of Missouri

   The socialization (SC) process of doctoral students for the professoriate (PF) ideally should reflect the career they aspire to enter. However university needs for research dollars often supersede graduate student educational demands. Higher educational research suggests rethinking of the academy’s values and
structural organization is needed to address the issue of insufficient departmental graduate student PF SC. Even so, many research intensive departments at major land grant universities do not require graduate students to teach, creating a gap in necessary training tools. To bridge this gap, graduates students become responsible for seeking out teaching opportunities, independent of their graduate program or department. Two different testimonies are presented here of biomedical graduate students’ self-SC for the PF and illustrate a divergent track of choices and options that ultimately lead to a common goal of gaining valuable teaching experience. These testimonies expand on the variety of opportunities available (ranging from formal training in a Minor in College Teaching Program to practical experience gained from part-time teaching at the university and at other surrounding private colleges), the experiences gained, and the lessons learned.

2. Application of a pedagogical method for using non-scientific literature to increase interest in the content taught in an undergraduate animal physiology course.
   
   **Melissa Daggett – Missouri Western State University**

Animal Physiology at Missouri Western State University is a 4 credit lecture/laboratory undergraduate biology course. In addition to fulfilling the physiology requirement for multiple B.S. degrees within the Biology department, this course is critical for post-graduate work in several fields. Because the range of students taking the course varies from Wildlife Conservation and Management majors to those applying to professional health programs, the level of rigor and the presentation of selected materials for students to find both academically useful and personally interesting, can be a challenge. For the past two years, this course has included the adaptation and implementation of a pedagogical method that incorporates non-scientific literature as a mechanism for introducing societal, cultural and ethical issues related to the study of physiology into this difficult and content heavy undergraduate biology course. An overview of the method, its implementation and its effect on overall student performance in the animal physiology course will be presented.

3. Using Program-Level Review as the Spark to Initiate Explicit Use of Learning Progression
   
   **Chiron Graves – Eastern Michigan University**

Most college and university science departments intuitively employ a learning progression approach in developing core curriculum and evaluating the effectiveness of existing programs. However, the learning progressions in these core courses are not often explicitly evaluated, and the data and discussions generated from these evaluations are rarely shared with department outsiders. The Biology Department at Eastern Michigan University has seized an institution-mandated program-level review process as an opportunity to explicitly identify and evaluate learning progressions in biological knowledge. We intend to use these progressions and assessment tools to inform and improve our core curriculum to best help students progress from novice to expert understanding of major biological concepts and inquiry skills. This poster presents the process our department has used to identify learning progressions and evaluate our students’ achievement in two major areas: 1) content knowledge and 2) scientific communication skills. We have developed assessment tools for learning progressions in three of our core courses and report preliminary data from our initial use of these assessment tools. We have also developed a universal scoring rubric that will be used in our writing-intensive courses during the Fall 2010 semester.

4. Macroinvertebrates in Leaf Packs in White Aloe Creek, Parkville, MO.
   
   **Miki Katuwal, Carol Sanders, Don Williams – Park University**
Chemical analysis of shallow water indicates the water quality for an instant only. Whereas, studying the aquatic macroscopic invertebrates can determine the actual water quality over a longer period of time. These aquatic invertebrates living in the body of water have adapted to the longer-term water quality. Therefore, a standardized qualitative sampling technique was formulated in order to determine the water quality of White Aloe Creek by identifying the biomonitoring leaf packs. The biomonitoring leaf packs are the macroinvertebrates of different taxa. By studying their sensitivity and tolerance to water pollution, the stream quality can be inferred.

5. Genomic Research in the Undergraduate Classroom: Challenges and Solutions
   **Nighat P Kokan**, Department of Natural Sciences, Cardinal Stritch University,
   The Genomic Education Partnership (GEP), a growing consortium of almost 70 participating undergraduate institutions across the United States, has provided opportunities for students to take part in a collaborative genomics research project. The genome sequencing of 12 Drosophilae species provides a resource for understanding the functional organization of genes and genomes. Genome annotation, which involves identifying features in the DNA sequence, is a labor intensive procedure where undergraduates can provide the time and effort needed to annotate genes. This was the second year of implementing genome annotations in a laboratory section as part of Genetics (BL 308) course at Cardinal Stritch University, Milwaukee, Wisconsin. I will share the insights, challenges and solutions as well as student responses to implementing these types of projects. Funding: HHMI grant to Dr. Sarah Elgin, GEP Program Director, Washington University St. Louis, Missouri.

6. Integrating Physics & Biology in Ethology & Evolution Courses
   **Tara Maginnis** – **University of Portland**
   Integrating physics into biology courses can be particularly challenging for organismal courses such as animal behavior. One interesting topic to incorporate is polarized light; a variety of animals can not only see polarized light, but use it for important aspects of fitness such as migration, feeding, communication, and camouflage. In this poster I summarize a suite of possible topics (and their associated papers) that can be used to augment basic concepts in ethology and evolution.

7. Use of primary literature in a human disease project in a pathophysiology course for allied health majors
   **Kristen Walton** – **Missouri Western State University**
   Primary literature is an excellent tool for students to explore research in biology and engage in the process of science. However, using primary literature in non-majors courses presents several challenges; it is often students’ first exposure to primary literature, and their background in technical reading and research methods is limited. Students in an upper-division pre-nursing pathophysiology course were required to write a paper including 1) a summary of the etiology, pathophysiology, and treatment of a human disease, and 2) analysis of a current primary article related to the disease. Reference lists were turned in 1 month prior to the project due date for feedback on appropriate reference selection. Students were surveyed for their prior experience reading primary literature and for self-evaluation of learning gains. Only 12% reported moderate or extensive prior experience finding and reading primary research articles. The most commonly observed problem was identifying whether an article was a primary research article. Although they found the primary literature challenging, the majority (average = 88% across two semesters) of students reported that the project was a useful learning experience. These results suggest that this type of project is a successful mode of incorporating primary literature into a non-majors biology course.
8. Using Democracy to Teach a Freshmen Science Survey Course
   **Christina Wills – Rockhurst University**
   In General Biology II, I created a democratically structured classroom in which I chose instruction methods
   and assignments and allowed students to vote on classroom activities and assignments. I asked the
   following question: Does allowing students to pick and design their own assessment methods and choose
   how classroom time is spent improve their grades on exams and improve student perception of the
   effectiveness of their study habits? To answer this question, I divided the class into four sections. In
   section I, I had 100% control of classroom activities and assignment points. In this section I presented the
   students with a wide variety of classroom activities and assignment types. After a class discussion on the
   effectiveness of these activities and assignments, students voted on 25% input for section II, 50% input for
   section III and 75% input for section IV. At the end of each section, I administered a survey evaluating
   students’ perceptions. Students consistently voted for more class time spent in lecture and discussion of
   practice worksheets and weekly quizzes and case studies for assignments. Exam means were highest when
   students had 50% input. In this poster, I will be presenting the results of the survey analysis and exam
   performance.

9. Students’ Acceptance of Evolution and Their Understanding of The Central Dogma and Protein
   Structure/Function: Is There a Connection?
   **Jill Jaksetic – Bowling Green State University**
   Although the concept of evolution is considered to be a unifying and core concept in biology, a large
   percentage of biology students, and indeed many people, still fundamentally resist accepting the
   theory of evolution. Much has been written concerning this resistance and many investigators are
   exploring why this is so. One of our hypotheses is that biology student resistance to the concept of
   evolution is due to the difficulty students have making the connection between how genetic variation
   at the molecular level results in phenotypic variation. More specifically, we and others have observed
   student difficulty in understanding the concepts of the central dogma and protein structure/function.
   We would like to know if this specific lack of conceptual understanding impacts students’
   fundamental understanding and acceptance of evolution. In order to test this hypothesis, we are
   identifying and adapting assessment instruments to measure students’ conceptual understanding of
   the central dogma. Similarly, we are evaluating instruments that assess understanding and
   acceptance of evolution in this context. The ultimate goal is to design teaching strategies to promote
   molecular level understanding of the central dogma to, in turn, facilitate student understanding and
   acceptance of evolution.

10. An Open-Ended, Learner-Driven Approach to a Content-Heavy Diversity Course
    **Conrad Toepfer – Brescia University**
    During a reorganization of the biology curriculum, two semesters of botany and zoology were combined
    into a single-semester Biological Diversity course. The new course was intended to cover diversity of
    protists, fungi, plants, and animals along with extensive coverage of comparative plant and animal
    physiology. Given the enormous quantity of content in the course, “old school” techniques of fast-paced
    lectures and PowerPoints were used for the first three years of the course. Students struggled to absorb
    the content and performance of lab practicals, in particular, rapidly declined over the years. The course
was overhauled as part of project sponsored by the Biology Scholars Program and students in the spring of 2010 were presented with an open-ended approach to the course. They were given sheets indicating the information that they were responsible for learning but they determined when and how they accessed the information. The lab was also restructured so that all of the specimens for the entire semester were randomly amassed on lab benches and students sorted and classified the specimens as they came upon each group in the “lecture” portion of the course. Preliminary results suggest that students were more successful at learning the material and their attitudes were definitely improved over previous years.

CONTACT INFORMATION (for ACUBE members who presented)

Janice Bonner
College of Notre Dame of Maryland
4701 North Charles Street
Baltimore, MD 21210
410-532-5723
jbonner@ndm.edu

Catharine Clark
University of Missouri
134 Research Park Drive
Columbia, MO 65211
573-882-7789
cgcvf2@mail.mizzou.edu

James W. Clack
Indiana University-Purdue University
CC160A, 4601 Central Ave
Columbus, IN 47203
812-348-7266
jclack@iupui.edu

Marya Czech
Lourdes College
6832 Convent Blvd.
Sylvania, OH 43560
800-878-3210
mCzech@lourdes.edu

Melissa Daggett
Missouri Western State University
4525 Downs Drive
St. Joseph, MO 64507
816-916-8427
daggett@missouriwestern.edu

Stephen Daggett
Avila University
11901 Wornall Road
Kansas City, MO 64145
816-501-3654
Stephen.Daggett@Avila.edu
Thomas A. Davis
Loras College
1450 Alta Vista
Dubuque, IA 52004-0178
563-588-7767
563-557-4070 FAX
tom.davis@loras.edu

Neval Erturk
Converse College
Department of Biology
580 East Main Street
Spartanburg, SC 29302
864-596-9210
neval.erturk@converse.edu

Cori Fata-Hartley
Michigan State University, Lyman Briggs College
E-186 Holmes Hall
East Lansing, MI 48825
517-353-4855
fatahart@msu.edu

Tim Henkel
Murray State University
2112 Biology Building
Murray, KY 42071
270-809-2589
thenkel@murraystate.edu

Barbara Hass Jacobus
Indiana University-Purdue University Columbus
4601 Central Avenue, RC 104B
Columbus, IN 47203-1739
812-348-7205
812-348-7370 (fax)
www.iupuc.edu

Jill Jaksetic
Advisor: Karen Sirum
202 Life Sciences Building
Bowling Green State University
Bowling Green, OH 43403-0001
419-372-3877
ksirum@bgsu.edu

Douglas D. Kane
Defiance College
Division of Natural Sciences and Mathematics
701 N. Clinton St.
Defiance, OH 43512
614-783-2593
dkane@defiance.edu
Miki Katuwal
Park University
8700 NW River Park Drive
Parkville, MO 64152-3795
miki.katuwal@park.edu

Nighat P Kokan
Department of Natural Sciences
Cardinal Stritch University
6801 N. Yates Road
Milwaukee, WI 53217
414-410-4138
414-410-4239 (fax)
np kokan@stritch.edu

Lynn Gillie
Elmira College
One Park Place
Elmira, NY 14901
607-735-1859
lgillie@elmira.edu

Chiron Graves
Department of Biology
316 Mark Jefferson
Eastern Michigan University
Ypsilanti, MI 48197
734-487-0796
cgraves6@emich.edu

Tara Maginnis
University of Portland
5000 N Willamette
Portland, OR 97203
503-943-8986
maginnis@up.edu

Alexis Majorczyk
Bowling Green State University
202 Life Sciences Building
Bowling Green, OH 43403

Mark Milanick
University of Missouri
702 West Rollins Road
Columbia, MO 65203
573-443-0198
milanickm@missouri.edu

Paul C. Pickhardt
Lakeland College
PO Box 359
Sheboygan, WI 53082-0359
920-565-1406
pickhardtp@lakeland.edu
Laura Salem
Rockhurst University
1100 Rockhurst Road,
Kansas City, MO, 64110
816-501-3239
laura.salem@rockhurst.edu

Karen Sirum
Bowling Green State University
202 Life Sciences Building
Bowling Green, OH 43403
419-372-3877
ksirum@bgsu.edu

Gregory R. Smith
Lakeland College
PO Box 359
Sheboygan, WI 53082-0359
smithgr@lakeland.edu

Aggy M. Vanderpool
Lincoln Memorial University
6965 Cumberland Gap Parkway
Harrogate, Tennessee 37752
800-325-0900 Ext. 6463
aggy.vanderpool@lmunet.edu

Kristen LW Walton
Missouri Western State University
4525 Downs Drive
St. Joseph, MO 64507
816-271-5613
kwalton1@missouriwestern.edu

Donald L. Williams
PMB #76
Park University
8700 NW River Park Drive
Parkville, MO 64152-3795
816-584-6516
don.williams@park.edu

Christina Wills
Rockhurst University
1100 Rockhurst Road
Kansas City, MO 64110
816-501-4380
christina.wills@rockhurst.edu
Thanks for a great conference! We will see you next year at Lincoln Memorial University for our 55th Annual Meeting!

Sincerely,

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