60th Annual Meeting
October 21st – 22nd, 2016
Cardinal Stritch University
Milwaukee, WI
Driving Directions

**From the Madison area:**
Take I-94 East towards Milwaukee.
At downtown Milwaukee, continue North on I-43. Exit on Good Hope Rd. (exit #80).
Travel East on Good Hope Rd. to Port Washington Rd. Turn right onto Port Washington Rd. The entrance to Cardinal Stritch University is on the East side of Port Washington Road.

**From the Green Bay area:**
Take I-43 South towards Milwaukee. Exit on Good Hope Rd. (exit #80). Travel East on Good Hope Rd. to Port Washington Rd. Turn right onto Port Washington Rd. The entrance to Cardinal Stritch University is on the East side of Port Washington Road.

**From the Chicago area:**
Take I-94 West towards Milwaukee.
At downtown Milwaukee, continue North on I-43. Exit on Good Hope Rd. (exit #80).
Travel East on Good Hope Rd. to Port Washington Rd. Turn right onto Port Washington Rd. The entrance to Cardinal Stritch University is on the East side of Port Washington Road.
Park in parking lot 3. The conference center is in Bonaventure Hall (C) on the campus map.

A - Clare Hall
B - Serra Hall
C - Bonaventure Hall
D - Duns Scotus Hall
E - Roger Bacon Hall
F - Powerhouse
G - Assisi Residence Hall
H - Campus Center
J - Fieldhouse
K - Library
L - Joan Steele Stein Center for Communication Studies/Fine Arts
P - Reading/Learning Center
1-13 Parking
ACUBE’s 60th Annual Meeting Program Overview

All sessions take place in Bonaventure/Don Scotus Hall.

Thursday, October 20th
6:30 -8:00 pm  Steering Committee Meeting, Cardinal Lounge

Friday, October 21st (Registration open all day, starting 7:30 am)
7:30-8:30 am  Continental breakfast
8:30-9:00 am  Welcome Session (Dr. Scholz)
9:00-10:00 am  Keynote Speaker (Dr. Anne Prud’homme-Genereux)
10:15-10:45 am  Concurrent Presentations (20 minute Sessions)
11:00-11:50 am  Concurrent Round Table & Workshops
12:00-1:00 pm  Luncheon and Business Meeting
12:30-1:00 pm  Bioscene Meeting
1:10-2:30 pm  Concurrent Workshops
2:45-3:45 pm  Concurrent Round Table
4:00-5:00 pm  Concurrent Round Table/Workshops
5:00-5:30 pm  Concurrent Presentations
5:30-6:00 pm  Directions to Sprecher Brewery
6:00-8:30 pm  Tour of Sprecher Brewery and Dinner

Saturday, October 22nd
8:00-9:00am  Continental Breakfast and Registration (Poster set up)
9:00-9:20 am  Concurrent Presentations
9:30-11:00 am  Concurrent Workshops
11:00 – 12:00  Concurrent Workshops (60 minute Sessions)
12:00-12:30 pm  Luncheon
12:30-3:30 pm  Field Trips
3:30-3:50 pm  Root Beer and Ice Cream Social
4:00-5:20 pm  Concurrent Workshops and Round Table (80 minute Sessions)
5:30-6:30 pm  Posters/Exhibitors
6:30-8:30 pm  Dinner and Awards

Sunday, October 23rd
9:00-11:00 am Steering Committee Meeting, Board Room
Wireless login information for computers and portable devices:

Connect to Wifi Wireless via Wolfnet, no password required

Computer login information: See printouts next to computers
Our Mission
Members of ACUBE share ideas and address the unique challenges of balancing teaching, research, advising, administration, and service. We are a supporting and mentoring community that provides professional development opportunities to:

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

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

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

Local Arrangements Chair, Debbie Meuler, Cardinal Stritch University
Program Chair, Nighat P Kokan, Cardinal Stritch University
ACUBE gratefully acknowledges the support of the following exhibitors at the 60th Annual Meeting:

HHMI Biointeractive, 3 D Molecular Designs, FOTODYNE Technologies, iWorks, and LRNR
Keynote Speaker: Annie Prud’homme-Généreux

Biography

Annie Prud’homme-Généreux is one of the five founding faculty of Quest University in Squamish, BC, which has recently garnered attention by topping the National Survey of Student Engagement (NSSE) rankings. A firm believer in active learning, Annie has explored problem-based learning, team-based learning, the CREATE approach to scientific literature, and the case study discussion method. This latter approach is her specialty and she frequently shares her enthusiasm for it through workshops, publications, mentorships, and advisory boards. Annie received her BSc in Biology from McGill University and her PhD in Biochemistry and Molecular Biology from the University of British Columbia. She also completed a Provincial Instructor Diploma. She was awarded the 2012 National Association of Biology Teachers (NABT) Four Year College and University Teaching Award.

Quest for a Meaningful 21st Century Education

What would you do if you had the opportunity to create a teaching-focused university from scratch? How would you structure the degree? What would you prioritize? A decade ago, I embarked on a journey to create Canada’s newest university: Quest University Canada. Hired a year prior to opening, the five founding faculty wrestled with what it means to educate someone in the 21st century. We questioned conventions and wisdoms about higher education, researched the latest findings about learning and the brain, and reflected on our modern world and what an educated citizen ought to know to be successful contributing members of society. Similar discussions are happening throughout most university campuses across North America, but we had an advantage: a blank slate upon which to act on these discussions. We were afforded the freedom to design a liberal arts program that we thought would achieve our goals and to build an entire university structure in support of it. The experiment has been on-going for nearly a decade, has garnered attention by topping the rankings of the National Survey of Student Engagement, and is serving as a sandbox for pedagogical experimentation that informs the decision of other institutions. What did we do with our blank slate? What did we prioritize and how did we set out to achieve them? What were the responses and the outcomes? What happens when these ideas that academics are discussing everywhere are given the opportunity to take form? In this keynote address, I will reflect on my experience at Quest and what it has taught me about education, learning, teaching, faculty, students, and the university system...
# ACUBE 60th Annual Meeting

**Cardinal Stritch University**

**Milwaukee, Wisconsin**

**October 21st – 22nd, 2016**

## Program

### Thursday, October 20th, 2016

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<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>6:00-7:30 pm</td>
<td>Steering Committee Meeting</td>
<td>Cardinal Lounge</td>
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### Friday, October 21st, 2016

Registration Open all Day Bonaventure Hall (BH), 1st floor Atrium
Poster setup available starting Saturday morning in Bonaventure Hall 1109

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>7:30-8:30 am</td>
<td>Continental Breakfast</td>
<td>Bonaventure Hall 1109</td>
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<tr>
<td>8:30 – 9:00 am</td>
<td>Welcome Session</td>
<td>Bonaventure Hall 1108</td>
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<tr>
<td>9:00 – 10:00 am</td>
<td>Keynote Speaker (Dr. Annie Prud’homme- Généreux)</td>
<td>Bonaventure Hall 1108</td>
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<tr>
<td>10:00-10:10 am</td>
<td>Break (coffee, hot tea, water)</td>
<td>Bonaventure Hall 1108</td>
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### 10:15-10:45 am Concurrent Presentations

**Stereotype Threat in Introductory Biology**  
Natalia Taft and Cathy Mossman, *University of Wisconsin Parkside*  
Duns Scotus Hall 106

**PLTL Enhances Retention in STEM Majors among Women and First-Generation College Students**  
Jeremy D. Sloane, Julia J. Snyder, Ryan D. P. Dunk, Christina I. Winterton, and Jason R. Wiles, *Syracuse University*  
Duns Scotus Hall 108

**Online Student Default Rates During Different Semesters: Rethinking Online Offerings**  
James W. Clack, *Indiana University- Purdue University*  
Duns Scotus Hall 112

**10:45-11:00 Break (coffee, hot tea, water)**  
Bonaventure Hall 1108

### 11:00 – 11:50 am Concurrent Round Table and Workshops

**UW--Milwaukee AAUP Chapter Presentation**  
Nicholas A Fleisher and Rachel Ida Buff, *University of Wisconsin Milwaukee AAUP*  
Duns Scotus Hall 202

**Developing a Program Assessment Plan Tied to Vision and Change**  
Laura Salem and Ryan Elsenpeter, *Rockhurst University*  
Duns Scotus Hall 108

**Learning How to Learn: Teaching Academic Skills in a Biology Context**  
Lynn Gillie, *Elmira College*  
Duns Scotus Hall 112
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<th>Time</th>
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<tr>
<td>12:00-1:00 pm</td>
<td>Luncheon and Business Meeting</td>
<td>Bonaventure Hall 1109</td>
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<td>Bioscene Meeting</td>
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<td>1:10-2:30 pm</td>
<td>Concurrent Workshops</td>
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<td></td>
<td><strong>Bringing Real Ecological Data into the Classroom: DryadLab on QUBESHub</strong></td>
<td>Bonaventure Hall 004</td>
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<td></td>
<td>Gabriela Hamerlinck, and Kristin Jenkins, <em>BioQUEST</em></td>
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<td></td>
<td><strong>Enzymes in Action!</strong></td>
<td>Duns Scotus Hall 108</td>
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<td>Margaret Franzen, Center for BioMolecular Modeling, <em>Milwaukee School of Engineering</em></td>
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<td><strong>Teaching Like a Pro in Your First Years</strong></td>
<td>Duns Scotus Hall 112</td>
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<td>Rebecca Burton, <em>Alverno College</em> and Conrad Toepfer, <em>Bressica University</em></td>
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<td>2:45-3:45 pm</td>
<td>Concurrent Round Table</td>
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<td><strong>Faculty Burnout: How Not to Get Too Crispy Around the Edges</strong></td>
<td>Dunn Scotus Hall 108</td>
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<td>Debbie Meuler, <em>Cardinal Stritch University</em></td>
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<td><strong>Sharing and Stealing Ideas: Flipping the A&amp;P Classroom</strong></td>
<td>Dunn Scotus Hall 112</td>
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<td>Tom Davis, <em>Loras College</em></td>
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<td><strong>A Learning Philosophy Assignment Positively Impacts Students’ Intellectual Development and Mastery of Course Content</strong></td>
<td>Dunn Scotus Hall 202</td>
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<td>Neil Haave and Tonya Simpson, <em>University of Alberta</em></td>
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<td>4:00-5:00 pm</td>
<td>Concurrent Round Table/Workshop</td>
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<td><strong>The New MCAT Format: First Years’ Experience, Future Challenges and Preparing Students for an Excellent Performance.</strong></td>
<td>Duns Scotus Hall 202</td>
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<td>Khadijah Makky, Diane Novotny, and Laurie Goll, <em>Marquette University</em></td>
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<td><strong>ACUBE Goals and Involvement</strong></td>
<td>Dunn Scotus Hall 108</td>
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<td>Christina Wills, <em>Rockhurst University</em></td>
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<td><strong>Undergraduate Summer Research Program Components—what works and what are the challenges?</strong></td>
<td>Dunn Scotus Hall 112</td>
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<td>Laurieann Klockow and Autumn Swanson, <em>Marquette University</em></td>
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<td>5:00–5:30 pm</td>
<td>Concurrent Presentations</td>
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<td><strong>A Multifactorial Analysis of the Acceptance of Evolution in College Students</strong></td>
<td>Duns Scotus Hall 106</td>
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<td>Ryan DP Dunk, <em>Syracuse University</em>, Andrew J Petto, <em>University of Wisconsin- Milwaukee</em> and Benjamin C Campbell, <em>University of Wisconsin- Milwaukee</em></td>
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<td><strong>Addressing, &quot;How Does This Relate to my Degree?&quot;</strong></td>
<td>Duns Scotus Hall 108</td>
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<td>Fara Dyke and Sarah Powell, <em>Grantham University</em></td>
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### Biology for the Greater Good: Factors Related to Biology Career Aspirations of African American College Students
Alissa Hulstrand, Northland College and Ronald Ferguson, Luther College

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<th>Time</th>
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<tr>
<td>5:30-6:00 pm</td>
<td>Directions to Sprecher Brewery with Debbie Meuler (maps and directions)</td>
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#### 6:00-8:30pm Tour of Sprecher Brewery and Dinner
Tour of Sprecher Brewery begins promptly at 6:00 pm with dinner to follow

#### Welcome to ACUBE: President Christina Wills, Rockhurst University

#### ACUBE at 60: Reflections from a Not-60 Historian, Conrad Toepfer, Brescia University

#### Saturday, October 22nd

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<tr>
<th>Time</th>
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<tr>
<td>8:00 – 9:00 am</td>
<td>Registration</td>
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<td>Continental Breakfast</td>
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<td>Poster setup available in Bonaventure Hall 1109</td>
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<tr>
<th>Time</th>
<th>Concurrent Presentations</th>
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| 9:00-9:20 am  | Changing Attitudes Toward Active Group-Based Learning and Increasing Performance in a Large Biology Course for Nursing Majors
Christopher Mayne, R. Charles Lawrence, and Michael Alfieri, Viterbo University

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<tr>
<th>Time</th>
<th>Concurrent Presentations</th>
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|               | Graduate/Postdoc Teaching Experiences with CREATE at the University of Wisconsin
Lindsy Boateng, Aayushi Uberoi, and Chris Trimby, Wisconsin Institute for Science Education and Community Engagement, University of Wisconsin-Madison

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<tr>
<th>Time</th>
<th>Concurrent Workshops</th>
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| 9:30-11:00 am | Case Studies in the Biology Classroom
Annie Prud’homme-Généreux

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<tr>
<th>Time</th>
<th>How to Create a C.R.E.A.T.E. Method Inspired Course?</th>
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</table>
|               | Lindsy Boateng*, Aayushi Uberoi*, Christopher M. Trimby, Wisconsin Institute for Science Education and Community Engagement, University of Wisconsin-Madison

| Time          | The Biology of Skin Color: Using HHMI’s Free Teaching Materials to Engage Students in Evidence-Based Reasoning
Elyse Bolterstein¹, Kara Nuss¹, and Javier Robalino²,¹Northeastern Illinois University, ²HHMI BioInteractive

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<tr>
<th>Time</th>
<th>Break (coffee, hot tea, water)</th>
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<td>11:00-11:10 am</td>
<td>Bonaventure Hall 1108</td>
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<td>Time</td>
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<tr>
<td>11:10 am - 12:00 pm</td>
<td>Concurrent Workshops and Round Table</td>
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<td><strong>Making Physiology Happen with the iWorx Physiology Teaching Kits</strong></td>
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<td>Ed Sachs, iWorx Systems, Inc.</td>
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<td><strong>Open Educational Resources: It's not just a buzz word anymore</strong></td>
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<td>Brad Beatty, LRNR</td>
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<td><strong>Nurses Need Physiology</strong></td>
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<td>Pat Bowne, <em>Alverno College</em></td>
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<td>12:00 – 12:30 pm</td>
<td>Luncheon</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>12:30-3:30 pm</td>
<td>Field Trips</td>
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<td>Field Trip 1: Growing Power Tour hosted by CEO and founder Will Allen (Check in with Dawn Wankowski)</td>
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<td>Field Trip 2: Milwaukee Public Museum with Freshwater Mussel Lecture (Check in with Nighat Kokan)</td>
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<td>Field Trip 3: Water Technology Accelerator/School of Freshwater Sciences Tour (Check in with Debbie Meuler)</td>
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<td>3:30-3:50 pm</td>
<td>Root Beer and Ice Cream Social</td>
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<td>4:00-5:20 pm</td>
<td>Concurrent Workshops and Round Table</td>
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<td><strong>Teaching Cancer in the Era of Genomics: HHMI’s Free Resources to Explore the Molecular Genetics of Cancer</strong></td>
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<td>Javier Robalino, HHMI BioInteractive</td>
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<td><strong>Assessment Across the Liberal Arts - How Can Biology Contribute?</strong></td>
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<td>Christina Wills, Jessica Allen, Robert Vigliotti, Anne Austin-Pearce, Laura Fitzpatrick, Jennifer Oliver, Mark Pecaut, Susan Proctor, Laura Salem, and William Stancil, Rockhurst University</td>
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<td><strong>Smoking and Lung Cancer Microarray</strong></td>
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<td>Betsy Barnard, FOTODYNE Incorporated</td>
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<td>5:30-6:30 pm</td>
<td>Social Hour and Poster Session/Exhibitors</td>
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<td>Bar and appetizers available</td>
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<td><strong>Poster Session/Exhibitors</strong></td>
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<td><strong>Teaching Scientific Method to Non-Science Majors via Student-Designed Research Projects</strong></td>
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<td>Sarah B. Lovern, Concordia University Wisconsin</td>
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<td><strong>Using our Assessments to Target our Misconceptions</strong></td>
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<td>Lee Ann Smith, Preston Aldrich, Allison Wilson, and Robin Rylaarsdam, <em>Department of Biological Sciences, Benedictine University</em></td>
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<td><strong>Assessment of Students’ Conceptual Understanding of Physiological Concepts</strong></td>
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<td>Judith A. Maloney, <em>Marquette University</em></td>
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<td><strong>Practice Gel Reduces Risk and Cost of Student Laboratory Activity</strong></td>
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<td>Christina I. Winterton and Jason R. Wiles, <em>Syracuse University</em></td>
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<td>Using Online Faculty Mentoring Networks to Bring Research Data into</td>
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<td>Undergraduate Classrooms</td>
<td>Gabriela Hamerlinck, BioQUEST; Arietta Fleming-Davies, Radford University; Alison Hale,</td>
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<td>University of Pittsburgh; Tom Langen, Clarkson University; Teresa Mourad, Ecological Society</td>
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<td>of America; Kristin Jenkins, BioQUEST</td>
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<td>A New Integrative Case Study That Targets Large, Upper Division Human</td>
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<td>Genetics Courses</td>
<td>Audra Kramer and Khadijah Makky, Marquette University</td>
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<td>The impact of Geographic Origin on Acceptance of Evolution in College</td>
<td>Ryan DP Dunk, and Jason R Wiles, Syracuse University</td>
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<td>Cooking Without a Cookbook: Using Food Chemistry to Teach the</td>
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<td>Scientific Method</td>
<td>Aaron Miller, Concordia University Wisconsin</td>
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<td>Using Primary Literature to Teach Content and Improve Scientific</td>
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<td>Literacy in an Undergraduate Classroom</td>
<td>Scott Shreve, Lindenwood University</td>
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<td>Assessment of a Video Design Project to Promote Conceptualization</td>
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<td>of Molecular Processes in an Immunology Course</td>
<td>Marlee B. Marsh, Columbia College</td>
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<td>The Genomics Education Partnership: Assessing and Improving a</td>
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<td>Course-based Undergraduate Research Experience (CURE)</td>
<td>Nick Reeves, Mt. San Jacinto College, Menifee, CA, Nighat P Kokan, Cardinal Stritch</td>
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<td>University, Milwaukee, WI and Sarah C R Elgin, Washington University in St Louis, MO</td>
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**Exhibitor information** - Please visit our ACUBE Sponsors:

- HHMI Biointeractive
- 3D Molecular Designs
- FOTODYNE Technologies
- iWorks
- LRNR

**6:30-8:30pm Dinner & Awards**

HHMI-BioInteractive Scientists at Work Videos:
- Virus Hunter: Monitoring Nipah Virus in Bat Populations
- Analyzing Patterns in the Savanah Landscape

Bonaventure Hall 1109

**Sunday, October 23rd**

9:00-11:00 am

Steering Committee Meeting, **includes newly elected members**

Board Room
ABSTRACTS BY CATEGORY

Presentations:

Stereotype Threat in Introductory Biology
Natalia Taft and Cathy Mossman, University of Wisconsin Parkside

Stereotype threat can be defined as distress associated with the prospect of confirming a negative stereotype about a group to which one belongs. Previous work has shown that stereotype threat is associated with lower performance in science courses in several groups including underrepresented minority groups and first-generation college students. At UW Parkside there is a much higher proportion of first generation students (52.9% in the 2015-2016 academic year) than the national average. We also have a relatively high proportion of underrepresented minority (URM) students (over 20%). Our population, therefore, is potentially at risk for stereotype threat in large science courses like introductory biology. I chose to implement an experiment implementing a one-time, brief (15-minute) values-affirmation writing intervention and a control exercise in the first week of an introductory biology course. In this exercise, students in the experimental group select three values from a list of 13 values and write about why those values are important to them. Despite its simplicity, this values-affirmation writing exercise has been shown to positively affect performance in first-generation and underrepresented minority groups. This intervention was based on a study performed at the University of Wisconsin-Madison that demonstrated that a similar values-affirmation intervention significantly improved course grades and retention for first-generation students. The current study was conducted in the fall of 2015 and spring of 2016 in four different sections with three separate instructors of BIOS 102: Organismal Biology. This course is an introductory course that is mandatory for prospective biology majors. In this study, students who had the opportunity to affirm their values in writing in the first week of classes showed a 7% better performance on their average exam scores for the semester. In contrast to previous work, all students benefitted, on average, from participating in the values affirmation compared to control, not just first generation students. This includes males and females, continuing and first-generation students, URM students and non-URM students. Although there was still an achievement gap between URM and non-URM students, URM students participating in the intervention had an 8.5% increase in exam performance overall compared with those in the control group. In contrast, there was not a significant gap between first generation and continuing-generation students. This suggests that stereotype threat can work differently at different college environments, and more work needs to be done to explore this issue on different types of campuses.

PLTL Enhances Retention in STEM Majors among Women and First-Generation College Students
Jeremy D. Sloane, Julia J. Snyder, Ryan D. P. Dunk, Christina I. Winterton, and Jason R. Wiles, Syracuse University

Expanding diversity in Science, Mathematics, Engineering, and Technology (STEM) fields is important for reasons of equal representation as well as for the benefits to these fields that accompany diverse perspectives among participants. Additionally, the President’s Council of Advisors on Science and Technology has called for a drastic increase in the number of STEM college graduates produced by the United States. In order to remain economically competitive, we must identify and adopt teaching methods that have been empirically validated by research to enhance achievement and persistence in STEM majors. In particular, efforts need to be made to support women and first-generation college students who are underrepresented in the STEM population. Peer-Led Team Learning (PLTL) is a pedagogical approach that appears to satisfy much of what PCAST deems necessary to improve student persistence in STEM—including providing role models and an opportunity to interact with peers and grow STEM identity—and as such may improve rates of recruitment into and retention in STEM majors. Herein, we present the results of a study that indicate that the gaps in retention rates between
Online Student Default Rates During Different Semesters: Rethinking Online Offerings
James W. Clack, Indiana University - Purdue University

Online courses are already known to have higher default (missed exams or course abandonment) rates than face-to-face courses. I have analyzed several years of course default rates on an online version of our two-course sequence of Human Biology. The data reveal that online course defaults occur at a higher frequency during summer semesters than during Fall and Spring semesters. I will compare exam and course default rates and compare/contrast these differences with those occurring in face-to-face classes. I will also discuss implications of the results in terms of curriculum, course scheduling, and student success.

A Multifactorial Analysis of the Acceptance of Evolution in College Students
Ryan DP Dunk, Syracuse University, Andrew J Petto, University of Wisconsin- Milwaukee and Benjamin C Campbell, University of Wisconsin- Milwaukee

Despite decades of reform to improve evolutionary understanding and acceptance, little change has occurred in the number of people who accept evolutionary explanations of life’s diversity as compared to supernatural ones (Gallup 2014). This rejection of biology’s overarching theme leads to an inability to correctly understand and an inability to reason appropriately regarding biological phenomena (Dobzhansky 1973). In addition, science denial by those responsible for setting policy leads to poor potential outcomes regarding future funding for biological sciences. It is for these reasons and more that a public literate in evolutionary biology is not only desirable, but necessary. There are a multitude of different factors that have been shown previously to affect acceptance of evolutionary biology: measures of epistemological sophistication (Sinatra et al. 2003; Deniz et al. 2008; John et al. 2008; Hawley et al. 2011), knowledge of evolution (Rutledge and Warden 2000; Deniz et al. 2008; Carter and Wiles 2014; Barone et al. 2014), higher education levels (Mazur 2004; Heddy and Nadelson 2013; Wiles 2014), an understanding of the nature of science (Johnson and Peeples 1987; Rutledge and Mitchell 2002; Trani 2004; Cavallo and McCall 2008; Carter and Wiles 2014), and strength of religious beliefs (Mazur 2004; Trani 2004; Nehm and Schonfeld 2007; Moore et al., 2011; Heddy and Nadelson 2013; Barone et al. 2014; Carter and Wiles 2014). While all of these factors have been shown to be related to acceptance of evolution, very few studies include multiple factors (especially in the same model), and to our knowledge none exist that include all of them. This is the aim of our study. Specifically, we predict that, when analyzed together, greater epistemological sophistication, evolutionary content knowledge, higher education levels, and understanding of the nature of science will increase acceptance of evolution, while higher religiosity will decrease acceptance of evolution.

Addressing, "How Does This Relate to my Degree?"
Fara Dyke and Sarah Powell, Grantham University

We have all had students confront us with this questions. As a result, we decided to address this issue through formal research. We will share our methods and results for helping students make career and content connections. Whether you teach face to face, blended or fully on-line you will find this interactive session useful. Take away fresh concepts to enhance your classroom and engage your students.
Biology for the Greater Good: Factors Related to Biology Career Aspirations of African American College Students

Alissa Hulstrand, Northland College and Ronald Ferguson, Luther College

Despite the frequency of reform initiatives within higher education regarding equity and access, African American students remain underrepresented in the sciences. The life sciences have not been immune to the dearth of future black scientists. The scope of this research was to examine potential factors that affect African American students’ choice of a career in biology. To assess students’ career priorities, we analyzed data from the Persistence Research in Science and Engineering (PRiSE) project, a study that surveyed 7505 college students. Among factors included in their choice of biology as a career, African American students reported that biology was most desirable as a career when there was an emphasis on science as a means of social justice and community support. As educators, institutions, and policy makers pursue strategies to confront continuing inequities, such findings could potentially shape how biology instruction may evolve to meet the needs and desires of future African American biologists.

Changing attitudes toward active group-based learning and increasing performance in a large biology course for nursing majors

Christopher Mayne, R. Charles Lawrence, and Michael Alfieri Department of Biology, Viterbo University

Current best practices in biology suggest increased use of active learning strategies as opposed to traditional lectures. Active learning-based approaches have led to increased student engagement and performance in numerous science courses, yet implementation of these techniques in foundational science courses for nursing majors has been more limited. This population is of particular interest since these students often have challenges recognizing the relevance of basic biology to their professional practice, leading to decreased engagement in the course. To meet this challenge, we implemented an active group-based learning technique in our first year anatomy and physiology series for nursing majors. Our collaborative approach emphasizes a student-centered strategy using a learning cycle of exploration, concept invention, and application. We will discuss the initial reactions among the students to this approach and our continued efforts to improve acceptance, the educational experience, and student success. We will also present quantitative and qualitative data over four years focusing on student performance and changing attitudes toward active group-based learning in introductory anatomy and physiology.

Astrobiology as a Unit in Cell Biology

Janet L. Cooper, Rockhurst University, Kansas City, MO

What is life? and how did life begin? are questions that surround biology that are not dealt with in a systematic way in most biology courses. Discussing the beginnings of life and the formation of a cell were integrated into the beginning of a Cell Biology lab. Topics covered included Cosmic Calendar, birth of the Universe, stellar evolution and the formation of the elements, formation of the solar system and the conditions on early earth, formation of simple organic molecules, assembly of macromolecules and the evolution of self-replicating collection of macromolecules. Discussions of defining life, what a first cell might have looked like, NASA’s attempts to find life on other planets and life in extreme environments were also integrated into the unit. Challenges were finding lab activities and videos that would keep students interested and still provide a good basis for understanding as well as getting students to see the connections to the class as a whole. The most difficult topic for students to grasp was the evolution of self-replicating macromolecules.
Graduate/Postdoc teaching experiences with CREATE at the University of Wisconsin
Lindsy Boateng, Aayushi Uberoi, and Chris Trimby, Wisconsin Institute for Science Education and Community Engagement, University of Wisconsin-Madison

The Teaching Fellows Program, administered by the Wisconsin Institute for Science Education and Community Engagement (WISCIENCE), facilitates the training and mentorship of graduate students and postdocs during their first independent teaching experiences. This program is based on the principles of Scientific Teaching, and Fellows are taught to incorporate active learning, aligned assessments and inclusive teaching practices to enhance the undergraduate science learning experiences on campus. Traditionally, Teaching Fellows accepted into the program have developed teaching materials and active learning strategies to use in a large freshman seminar course to expand on their teaching repertoire. However, in Fall 2013, a cohort of Teaching Fellows were encouraged to develop a new course on campus that utilized the CREATE method of teaching developed by Sally Hoskins and colleagues. Since the inception of this new course entitled “Secrets of Science” in Spring 2014, Teaching Fellows have been building on the basic CREATE method and incorporating their own improvements and adjustments based on course evaluation, assessments and instructor experiences. In this presentation, Lindsy Boateng and Aayushi Uberoi will share their personal experiences in teaching this course, how it is designed, and the new implementations they individually added to the course due to their co-involvement with the Delta program. They will present some findings on student feedback and learning gains that have been achieved in this uniquely evolving course, as well as some reflections on their own growth as educators.
Round Table:

UW--Milwaukee AAUP Chapter Presentation
Nicholas A Fleisher and Rachel Ida Buff, University of Wisconsin Milwaukee AAUP

We will discuss the founding of our chapter, UWM AAUP as a response to the crisis of public education in Wisconsin. Our chapter was founded with the AAUP national "One Faculty" campaign in mind: we represent faculty, staff and graduate students. Our work has included: defending tenure and academic freedom at the state level; working against austerity at our institution; networking with advocates for K-12 education; and working with student groups. Founded in crisis, our chapter is now working on institutionalization and on building and extending our membership base.

The New MCAT Format: First Years’ Experience, Future Challenges and Preparing Students for an Excellent Performance
Khadijah Makky, Diane Novotny, and Laurie Goll, Marquette University

The AAMC launched the new MCAT test in 2015. The new test evoked anxiety among students and left educators and pre-health advisors wondering what they can do to adjust curricula, and/ or find different resources to help students succeed. The medical field is changing and the new MCAT is designed to help students learn the knowledge and skills to succeed in medical schools and as future doctors. The new MCAT does not only test students’ foundational knowledge but also tests their skills in critical thinking, and in the natural, behavior, and social sciences. It was clear that many colleges and universities went to work immediately after the announcement to make the necessary changes in their students’ preparations. In the College of Health Sciences at Marquette University we approached this new test with careful examination of the contents and the topics that would be covered. We made recommendations to the students and our professors. Although, a lot of work was done before the launch in 2015, most of the changes we implemented (in preparing the students) occurred after the data from the first wave of scores were reported. This roundtable discussion is designed for educators from different institutions to share their experience with the new MCAT, starting with the Marquette experience, what we have done, our students’ challenges, and our future plan to enhance our students’ scores.

Undergraduate Summer Research Program Components- what works and what are the challenges?
Laurieann Klockow and Autumn Swanson, Biomedical Sciences Department, Marquette University

The benefits of undergraduate research are many and well documented (1,2) and the Association of American Colleges and Universities designated undergraduate research as a high impact educational practice. As such, summer undergraduate research programs (URPs) have become common practice at many institutions. Although summer research provides the best opportunity for undergraduates to engage in a meaningful, immersive research experience, the question is how best to design that summer undergraduate research experience? At Marquette University, our biomedical sciences summer research program evolved from a loosely structured experience for a handful of students to a highly structured program that involves on average 35 students each year. In this roundtable discussion, I will present the program components for Marquette University’s Biomedical Sciences Summer Research Program (MU SRP) and our assessment of what has worked well and what hasn’t. I hope to elicit ideas and feedback from audience members of the types of activities they have implemented at their home institutions’ summer research programs. Additional discussion points will
include measures taken to sustain the research experience into the academic year, how to obtain financial support, as well as how to cater a summer research program to meet the needs and interests of a diverse student cohort who vary considerably in their motivation, expectations and desired benefits. This discussion will benefit both faculty looking to update/revise their department’s summer research program, but also those who are just beginning the process of developing a departmental summer research program. 1) Russell S. H., Hancock M. P., McCullough J. (2007) The pipeline benefits of undergraduate research experiences. Science. 316 (5824), 548-549.  

A learning philosophy assignment positively impacts students’ intellectual development and mastery of course content
Neil Haave and Tonya Simpson, Dept of Science, Augustana Faculty, University of Alberta

Engaging students in metacognition can improve their learning outcomes (Ambrose et al 2010, Girash 2014). This study analyzed the effect of a learning philosophy assignment on students’ intellectual development and mastery of freshman biology and sophomore biochemistry course content. All students were required to complete the Learning Environment Preferences (LEP) survey (Moore 1989) at the beginning and end of the term to determine if students’ cognitive complexity was impacted by the assignment. The ability to master course content was assessed by comparing students’ midterm and final exam marks. We found that the learning philosophy assignment rescued Bachelor of Science students in the freshman biology course from a decrease in cognitive complexity. Additionally, the guided metacognition rescued sophomore biochemistry students from performing poorer on the final relative to the midterm exam and promoted an increase in their cognitive complexity. These results suggest that a learning philosophy assignment may be an effective way of engaging students’ in metacognition of their learning to improve their intellectual development and ability to master course material. 


Learning How to Learn: Teaching Academic Skills in a Biology Context
Lynn Gillie, Elmira College

A college-wide study-skills course is often suggested for students who need help with learning how to master academic skills. Instead of this general approach, embedding academic skills explicitly in a particular discipline may help students see the relevance of these skills more clearly. As biology educators, we teach students to think as scientists by asking questions, conducting experiments, and persuading peers. How often do we explicitly teach students to construct the underlying scaffold first to help them ask relevant questions later? Students who do well in high school may not do as well in college because they have not really learned how to learn. Solving problems intuitively works until a problem comes along that needs a different approach. The author has used her Comparative Vertebrate Anatomy class to help students organize their thinking, try different approaches, and apply these ideas to other areas of biology. Some examples include etymology practice, drawing specimens, constructing concept maps, and peer mentoring during open lab sessions. Examples of student activities and discussion with attendees will be the focus.
Sharing and Stealing Ideas: Flipping the A&P Classroom  
Tom Davis, Loras College

This interactive roundtable discussion will start with the session leader giving a few examples of flipping strategies that have worked in his Physiology course and in his Human Anatomy course including using rotating spokespersons in each group, Draw Dis and Draw Dat and peer group critique sessions. But just don’t come to listen! Attendees will be asked to share their ideas and activities that increase student engagement and get students ready for class before they arrive.

Assessment Across the Liberal Arts - How Can Biology Contribute?
Christina Wills, Jessica Allen, Robert Vigliotti, Anne Austin-Pearce, Laura Fitzpatrick, Jennifer Oliver, Mark Pecaut, Susan Proctor, Laura Salem, and William Stancil, Rockhurst University

The Higher Learning Commission (HLC) currently designates general education (Core at Rockhurst University) as a program and requires program level assessment. Rockhurst’s Core was designed prior to assessment requirements and focuses on the acquisition of a wide breadth of knowledge across the liberal arts. Historically, Course Embedded Assessment (CEA) not program assessment has been used to assess specific areas (e.g. natural sciences) within the core. To bring Rockhurst into compliance with HLC standards while respecting the design and history of our core, we developed a pilot procedure to assess the core as a single entity rather than by individual area. Association of American Colleges and Universities (AAC&U) VALUE rubrics on critical thinking were modified to assess student Core learning outcomes (SLOs) in the natural sciences (introductory physics and non-majors biology), art (introductory painting and theater tech), global perspectives (upper level adolescent psychology across cultures and global economic issues), and introductory theology during the 2015-2016 academic year. Based on the rubric performance milestones (1 – lowest, 2 – intermediate, 3 – highest), the majority of the students across the core achieved the appropriate milestone (2 or 3) for their course level. Critical thinking on three assignments in non-majors biology was assessed as part of this project. Students performed well across categories (A – Selecting and using information to investigate a point of view or conclusion, B – Recognizing methods of inquiry that lead to knowledge, and C – Reasoning by deduction, induction, and analogy) with the majority of students achieving milestones 2 or 3. Students had slightly lower performance in category A than other categories.

Faculty Burnout
Debbie Meuler, Cardinal Stritch University

The days when academe was a low-stress working environment are over. Many faculty are experiencing academic burnout characterized by the depletion of emotional reserves (emotional exhaustion), an increasingly cynical and negative approach towards others (depersonalization) and a growing feeling of work-related dissatisfaction. Based on 12 peer-reviewed studies in the United States, Britain, Canada, South Africa, Spain, Turkey and the Netherlands, levels of burnout among those who teach in higher education are similar to those of schoolteachers and health professionals. During this roundtable we will discuss academic burnout and through discussion provide suggestions for dealing with it.

ACUBE Goals and Involvement
Christina Wills, Rockhurst University

A roundtable to discuss and receive feedback from members on the current state of ACUBE, setting future goals, and ways ACUBE can better serve its members.
Workshops:

Case Studies in the Biology Classroom
Annie Prud’homme-Généreux, Quest University Canada

Case studies are stories with a pedagogical objective. The narrative component engages students and helps them apply theoretical knowledge in concrete situations. To solve cases, students must work collaboratively and hypothesize, problem solve, research, evaluate, and make decisions, all skills at higher levels of Bloom’s taxonomy. Many free online databases of peer-reviewed cases are available, and cases exist in a variety of different formats (e.g. PBL, case discussion, intimate debate, role play, jigsaw, journal cases, etc), giving instructors options to best suit their classroom needs. In this session, you will experience a case study as a student, reflect on this pedagogical approach’s strengths and weaknesses, and familiarize yourself with some of the tools available to implement it in your classroom. Come prepared to do the intellectual heavy-lifting, and I’ll tell you a story...

Enzymes in Action!
Margaret Franzen, Ph.D., Program Director, Center for BioMolecular Modeling, Milwaukee School of Engineering

We’ll explore enzyme structure/function through a variety of interactive models that help to uncover common student misconceptions. In a series of hands-on activities, participants will investigate i) how the arrangement of amino acids in a protein influences the final three-dimensional protein structure, ii) how secondary structure helps to stabilize protein structure, and iii) how mutations can impact the shape of a protein. We’ll demonstrate how a simple but elegant model can be used to develop a conceptual understanding of many of the terms associated with enzymes: active site, substrate, competitive inhibitor, allosteric inhibitor and induced fit, then explore factors that impact enzyme-substrate specificity with another interactive model. We will conclude the workshop by exploring a specific enzyme, acetylcholinesterase, which is important in neurotransmitter recycling. This enzyme is the target of multiple inhibitors, including insecticides, snake venoms and nerve agents, as well as drugs for treating Alzheimer’s disease. Models will be used to demonstrate how a change in a single amino acid, from a glycine to a serine, can lead to insecticide resistance. Handouts include a project based learning activity exploring insecticide resistance. Models and materials are available for loan from the MSOE Model Lending Library; borrowers only pay return shipping.

Smoking and Lung Cancer Microarray
Betsy Barnard, FOTODYNE Incorporated

Are you looking for a hands-on lab activity that combines bioinformatics BLAST searches with a biotechnology experiment? Then this workshop is for you! Participants will learn how students can connect the phenotype of lung cancer to the genotype. Designed by a biotechnology teacher, this elegant activity allows participants to determine gene expression differences in a smoker, non-smoker and former smoker. We will set up our own microarrays, as time allows, and send them off for scanning. Expected results will be discussed along with several optional ideas for classroom activities and lecture presentation. Only minimal equipment is needed, making this sophisticated biotechnology experiment affordable!
Making Physiology Happen with the iWorx Physiology Teaching Kits (projector to connect a PC laptop)
Ed Sachs, Applications Specialist, iWorx Systems, Inc.

In this brief presentation, we will cover how to provide a comprehensive "hands-on" learning experience to make Physiology lab time fun!

Open Educational Resources: It's not just a buzz word anymore
Brad Beatty, LRNR

People have been discussing Open Educational Resources (OER) the past few years, but most professors still don’t know what OER is and how to effectively use it in the classroom. In this workshop, we'll review how many institutions are transitioning to OER content to help control costs for students while improving student outcomes. Note: I will also discuss Lrnr’s adaptive learning platform that uses OER content to build a complete course for Biology for Majors and Non Majors, as well as Anatomy & Physiology.

Nurses Need Physiology
Pat Bowne, Alverno College

Is your class full of nursing students who aren’t sure why they’re there? That’s one of the major challenges reported by Human Anatomy and Physiology professors, and it’s hard to address when you’re not entirely sure how nurses will use what you’re teaching them. This workshop discusses how to get buy-in from your nursing students starting on the very first day of class. Learn what nurses do with their A&P and how to rephrase standard textbook questions to make them nurse-friendly. Pat Bowne is co-author of the Pearson ancillary, Nurses Need Physiology, and has taught both undergraduate and graduate nursing students.

Teaching Like a Pro in Your First Years
Rebecca Burton, Alverno College and Conrad Toepfer

Which educational innovations have been validated by peer-reviewed studies and which have been debunked or never tested? 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 answer your questions and lead discussions on these and other topics.

The Biology of Skin Color: Using HHMI’s free teaching materials to engage students in evidence-based reasoning
Elyse Bolterstein¹, Kara Nuss¹, and Javier Robalino²,¹Northeastern Illinois University, ²HHMI BioInteractive

HHMI BioInteractive provides a large collection of free materials designed to engage students by bringing scientific discovery into the classroom. In this interactive workshop, you will watch short clips of the HHMI video, The Biology of Skin Color, and analyze data to refine hypotheses on why there is such rich diversity in human skin color. We will present our experiences using these materials in an introductory course for biology majors, and invite you to discuss modifications for other biology classes. We will also present examples of complementary activities and lead a discussion on strategies for using these materials to build student skills in experimental design, quantitative reasoning, and graphing.
How to create a C.R.E.A.T.E. method inspired course?

Lindsy Boateng*, Aayushi Uberoi*, Christopher M. Trimby, Wisconsin Institute for Science Education and Community Engagement, University of Wisconsin-Madison

Keywords: C.R.E.A.T.E., course construction, student-centered

Background & Introduction: The C.R.E.A.T.E. (Consider Read, Elucidate the hypotheses, Analyze and interpret the data, and Think of the next Experiment) method of teaching developed by Dr. Sally Hoskins and colleagues utilizes strategies such as concept mapping, cartooning experiments, and student-driven discussions to help students experience the nature of science in their learning. Several reports suggest that teaching with C.R.E.A.T.E. can help in facilitating a student-centered approach to learning and may enhance student understanding of primary scientific literature above traditional teaching methods. We have adapted components of the C.R.E.A.T.E. method in our course, Biology 375: Secrets of Science from the Bench to Popular Press at the University of Wisconsin-Madison, to aid in development of critical thinking skills in freshman students. Learning objectives: (Participants will be able to…)

1. Consider what course or unit that they might apply the C.R.E.A.T.E. framework.
2. Read and interpret the steps of the C.R.E.A.T.E. framework.
3. Elucidate their goals for implementing C.R.E.A.T.E.
4. Analyze the factors that may influence their implementation of the C.R.E.A.T.E. framework.
5. Think of how they will implement the C.R.E.A.T.E. framework to develop (or redevelop) a learning experience for students.

Workshop purpose: The aim of this 80-minute workshop is to familiarize participants with the components of the C.R.E.A.T.E. model. We will guide the participants through individual components of the C.R.E.A.T.E. framework, while they work on developing a unit or course that incorporates the elements of this teaching method. Workshop Description: In this hands-on workshop the participants will identify a course they will restructure based on the C.R.E.A.T.E. framework. The C.R.E.A.T.E. method incorporates hypothesis design, analysis of experiments and proposal writing as methods to teach students the scientific process. At the end of the workshop the participants would have experienced the teaching methodology and have participated in developing their own course based on this method. Workshop interactivity: This will be a hands-on workshop with worksheets and group exercises

Teaching Cancer in the Era of Genomics: HHMI’s Free Resources to Explore the Molecular Genetics of Cancer

Javier Robalino, HHMI BiolInteractive

Genomic studies are increasingly illuminating the genetic basis for cancer, and challenging our ability as educators to help students grasp an accurate and relevant understanding of how cancer works. In this hands-on workshop, we will explore active learning exercises that use real patient data to allow students to visualize and appreciate the genetic complexity of cancer. Participants will receive free classroom-ready resources to implement these exercises in their teaching.
Posters:

Teaching Scientific Method to Non-Science Majors via Student-Designed Research Projects
Sarah B. Lovern, Concordia University Wisconsin

In an effort to relate the scientific method to non-major undergraduate students, research projects were incorporated into BIO 368: Ecology of the Tropics Lab during the fall 2015 semester. While research projects can be expensive and time consuming, this assignment streamlined individualized projects into a manageable four-week long undertaking. Student groups were given a list of available equipment and brainstormed topics. Students acquired ownership in the project by choosing a topic rather than being assigned a subject. Under the guidance of the instructor, each group developed a hypothesis and designed ways it could be tested. Students then used materials already available on campus to answer a research question. Data was collected at the start of lab each week before the course continued with the introduction of new material. Students experienced the pitfalls of conducting actual research not usually encountered in “cookbook” lab experiments. At the conclusion of the trial period, students wrote individual manuscripts explaining their work. This project allowed for hands-on experience for students in a cost-effective way. Changes in the assignment including more specific guidelines for the research paper are currently underway during the fall 2016 semester. Detailed guidelines for replicating this assignment will be offered to instructors.

Using our Assessments to Target our Misconceptions
Lee Ann Smith, Preston Aldrich, Allison Wilson, and Robin Rylaarsdam, Department of Biological Sciences, Benedictine University, Lisle, IL 60532

In recent semesters we have added questions to our traditional pre-post knowledge and comprehension multiple choice questions to target the faculty’s perception about students transferring into our program and be proactive in providing any interventions necessary to remedy the possible deficits. The pre-test was given in the 200-level Genetics course, which usually does not articulate from community colleges, and is taken by all of our majors in the program at our institution. Two questions asked where students earned credit for the Introductory Biology Courses (Organismal and Cell Processes) to establish if the credit was earned at our institution or community colleges in the area. This allowed us to separate the results of the pre and post tests based on this distinction. Although some faculty have perceived differences between the aggregated groups, our results demonstrate that there are no statistical differences between students who have passed our Introductory Biology Courses and students who transferred those courses (total n=201 over three semesters). We also evaluated students in the introductory, intermediate, and upper-level cell processes courses using the same multiple choice question on a common misconception regarding DNA replication. On the final of introductory biology course, students correctly answered this question 70% (n=69), students in the intermediate course initially answered correctly 25% on the pre-test and after spending at least one lecture on the material within the semester were up to 51% correct on the post-test (n=201). When students were asked the same question in the upper-level pre-test, again the correct answer was down to 15% (n=79). Given this eye-opening data that our students are not retaining significant details to a topic covered multiple times within the curriculum, we will re-evaluate how to address this topic and other common misconceptions within our courses.
Assessment of Students’ Conceptual Understanding of Physiological Concepts
Judith A. Maloney, Marquette University

Many biomedical science courses utilize multiple choice questions (MCQs) to assess students learning of course content. It is well known that MCQs can assess students’ foundational knowledge, but how well it assesses their conceptual understanding of the material is unclear. We addressed this issue in a physiology course, by having students write their rationale for their answer to one MCQ on each exam. The students’ understanding of the material was evaluated based on their reasoning for selecting their answer. This evaluation provided feedback to the students on the extent of their ability to master the subject. In addition, the instructor gained insight into any student misconceptions of physiological processes. The students were surveyed to see if this activity helped them formulate their thought process when answering the question. The majority of the students believed this was a helpful exercise and should be continued. To determine if this activity improves student’s ability to select the correct answer, we compared students’ performance in this class to the performance of the previous class on these same questions. Preliminary data indicate that there was no benefit in regards to question performance. In conclusion, this exercise can give instructors insight into students’ misconceptions. In addition, while not demonstrating an immediate benefit, may, over the long run, improve students’ metacognitive skills.

Practice Gel Reduces Risk and Cost of Student Laboratory Activity
Christina I. Winterton, Syracuse University and Jason R. Wiles, Syracuse University

The laboratory component of introductory biology courses serve a number of key goals including strengthening students’ scientific thinking skills and conceptions of the nature of science, reinforcing concepts in an interactive and social context, and of course, developing techniques and skills which will provide students with the tools to transition to upper division courses and research. Basic techniques for advanced laboratories include properly calibrating, setting, and dispensing micropipettes, which are in turn useful across many other fundamental biological tools like PCR and gel electrophoresis. However, due to the volume of students in a typical introductory course, practicing these skills can become costly. In order to provide ample practice with minimal costs in terms of materials, time, and lost experimental results, students were given “practice gels” made from clear gelatin to gain proficiency with pipetting before engaging in “real” experiments. There were no harmful chemicals in this set up, only clear gelatin, water, and food coloring. The instructor performed a demonstration of proper loading technique, then groups of students practiced together. When the students believed they were proficient in these skills, they gained approval from the instructor before loading samples on a proper gel set up in the electrophoresis chamber. This practice activity appeared to engage the students and increased discussion and teamwork. Students appeared to gain confidence in their ability to use the pipets and load gels, and the number of students volunteering to load agarose gels in later experiments increased after the practice gel activity compared to prior iterations of the course without the practice run. Utilizing a practice gel is an inexpensive and safe method that allows all students in a laboratory to practice a basic skill that will be required in upper level laboratory courses.

Assessment of a Video Design Project to Promote Conceptualization of Molecular Processes in an Immunology Course
Marlee B. Marsh, Columbia College, Columbia, SC

Immunology is a subject area where most of the content is cellular and molecular in scope. Cellular processes that can be difficult for students to visualize are often difficult to understand. In this new iteration of an upper level immunology course, each student was tasked to create and produce an instructional video that would teach a molecular concept that they found difficult to visualize. One lab, near the beginning of the semester, was devoted to video production- storyboarding, video design methods (e.g. stop motion animation, use of
instructional apps, etc.), and the components of a quality educational video. At the end of the semester, we had a screening of each video, and the students and I graded each video using a rubric we developed as a class. Students were given a pre- and post-assessment of how comfortable they were in making an educational videos and their thoughts on what makes a good educational video. Production methods and assessment data will be presented within the poster.

**Using online faculty mentoring networks to bring research data into undergraduate classrooms**

Gabriela Hamerlinck; BioQUEST, QUBES Arietta Fleming-Davies; Radford University Alison Hale; University of Pittsburgh Tom Langen; Clarkson University Teresa Mourad; Ecological Society of America Kristin Jenkins; BioQUEST

Using ecological research data in undergraduate courses has many potential benefits for student learning, including increased understanding of the scientific process and meaningful opportunities to develop and practice quantitative skills. As ecological datasets continue to become larger and more complex, faculty may need additional support to teach effectively with research data. We report on the design, implementation, and outcomes of two faculty mentoring networks (FMNs) collaboratively developed by the Ecological Society of America education community and the Quantitative Undergraduate Biology Education and Synthesis (QUBES) project. FMNs are semester long online communities of faculty working toward a set of shared goals with content specialists and pedagogy mentors. The 28 faculty participants in the FMNs focused on the customization and classroom implementation of data rich teaching materials from the Teaching Issues and Experiments in Ecology (TIEE) project. The two FMN communities differed in that one FMN included a face-to-face workshop component while the other interacted entirely virtually. Participants in both groups were widely distributed geographically and taught at a wide range of institution types. Measures of faculty participation including meeting attendance and assignment completion showed no significant differences between the groups. Analysis of data on faculty attitudes, and module use are ongoing.

**A New Integrative Case Study That Targets Large, Upper Division Human Genetics Courses**

Audra Kramer and Khadijah Makky, Marquette University

In genetics courses, case studies have been used as an active-based learning tool to enhance students’ understanding of complex concepts. The case presented here was designed to remove many genetic misconceptions that are often hard to unlearn. Together with the teaching professor I based the case study on a published Science article. It represents a real life genetic phenomenon that integrates many genetic concepts that are presented to students throughout the semester. It was written for a large upper division human genetics class. This case was presented at the end of the semester to help students demonstrate their understanding of these topics. Students answered questions that tested their ability to analyze and critically evaluate basic genetic principles, and more specifically allele frequencies in a population using Hardy-Weinberg equilibrium. The case was briefly introduced in the classroom but the majority of the work was done as a take-home assignment. Students uploaded the completed assignment to the Marquette University learning management system and it was filtered through Turnitin® software. This submission allowed for immediate feedback to the students as the assignment being graded and a faster detection of any plagiarism. As a teaching assistant, grading the assignment allowed me to see where the misconceptions still remained and where the students had a clear understanding of the material. It also gave me the ability to give individual written feedback as I was grading. I was able to point out the areas where each student needed to focus on for the final and provide positive feedback for the students who had very strong grasp on the material. Additionally, students gave positive feedback concerning this assignment, specifically the ability to connect many of the concepts that
they were expected to master for the final exam. I see the use of case studies as a powerful tool to both engage students in the classroom and to assess their learning. This case has been accepted for publication at the National Center for Case Study Teaching in Science.

**The impact of geographic origin on acceptance of evolution in college students**

Ryan DP Dunk, and Jason R Wiles, Syracuse University

Evolution is the unifying theme of all biology, and therefore is crucial to an understanding of biological phenomena (Dobzhansky 1973). However, evolutionary biology is somewhat unique amongst scientific topics with regards to the deep opposition it faces in the eyes of many members of the general public. While there are many individual level metrics that influence acceptance of evolutionary biology (Johnson and Peeples 1987; Rutledge and Mitchell 2002; Sinatra et al. 2003; Mazur 2004; Trani 2004; Nehm and Schonfeld 2007; Cavallo and McCall 2008; Deniz et al. 2008; Hawley et al. 2011; Moore et al. 2011; Heddy and Nadelson 2013; Barone et al. 2014; Carter and Wiles 2014; Wiles 2014), larger scale metrics also have an influence. Historically, antievolutionism has had a stronghold in the southern United States (Berkman and Plutzer 2010), and it seems that is still true today (Mazur 2004). However, others have successfully chosen to focus not on regional differences, but rather on differences in rurality (Short and Hawley 2012).

To explore the geographic nature of evolution acceptance, we took a small scale approach. Using students from a single university, we explored the effect of region of origin and rurality on the acceptance of evolution. Specifically, we expected to find students from the south and from more rural areas to have lower rates of acceptance of evolution. We also explored the possibility of an interaction between terms, specifically with the thought that being in more urban southern areas may have a “rescue effect” on evolution acceptance.

**Cooking without a cookbook: using food chemistry to teach the scientific method**

Aaron Miller, Concordia University Wisconsin

Good laboratory exercises immerse students in the scientific method while also demonstrating important biological concepts. This can be difficult to achieve in introductory biology courses, where time constraints, large numbers of students and small budgets sometimes favor a cookbook-style approach over inquiry-based labs. In order to negotiate these challenges, I have adapted a lab examining the food chemistry of pancakes to my course. Students are given background information related to the chemical reactions that occur during the cooking process, as well as a standard recipe to use as a control. They make a hypothesis about the effects of changing one variable from the recipe, which can be either an ingredient or preparation step. Students test their hypotheses by making the control and experimental pancakes and comparing the taste, texture, color and thickness of each batch. This lab satisfies two important educational objectives: it demonstrates biochemical concepts and gives students an introduction to the scientific method. It is also inexpensive, uses no hazardous chemicals and can be completed during a 110-minute laboratory period. Finally, the relevance of the experiment to life outside the lab and ability to eat the products of the experiment lead to very high student engagement.

**Using Primary Literature to Teach Content and Improve Scientific Literacy in an Undergraduate Classroom**

Scott Shreve, Lindenwood University-Belleville, IL

The ability to read primary scientific literature, interpret scientific data, and evaluate the evidence supporting authors’ conclusions are important skills to develop in science majors. They are not only relevant to the scientific careers of students, but also help to improve their overall scientific literacy. However, it can often be difficult to sacrifice content-oriented class time to teaching and developing these skills in undergraduate classes. I hypothesize that regular, repeated exposure to the scientific literature will improved the scientific literacy skills
of students. In order to retain as much science content in the class as possible, I implemented weekly journal discussions in a 200-level Biodiversity course. Journal articles were selected in part to enhance or expand the material presented during the more conventional classroom time. Student scientific literacy skills were evaluated at the beginning and end of course using an instrument modified from Gormally et al (2012). At the end of the semester, students reported greater comfort levels reading scientific literature compared to the beginning of the semester. However, the instrument showed no significant differences in scientific literacy skills before and after the semester of weekly discussions. Even by the end of the semester, students still had difficulty linking specific results as evidence to specific claims or conclusions in the papers. Article selection may be an important factor influencing the efficacy of journal discussions.

The Genomics Education Partnership: Assessing and Improving a Course-based Undergraduate Research Experience (CURE)

Nick Reeves, Mt. San Jacinto College, Menifee, CA, Nighat P Kokan, Cardinal Stritch University, Milwaukee, WI and Sarah C R Elgin, Washington University in St Louis, MO

The Genomics Education Partnership (GEP http://gep.wustl.edu ) started in 2006 with 16 member institutions interested in providing genomics research experiences for their upper division students. Over 10 years, GEP has grown to a consortium of faculty from over 100 colleges and universities that provide a course-based undergraduate research experience (CURE) in genomics and bioinformatics to students at all levels. The GEP CURE is a cutting edge lab experience that can be implemented at any post-secondary institution, even at schools that have limited laboratory capabilities. The objectives of the Genomics Education Partnership are four-fold: 1) provide professional development in genomics for college and university faculty, 2) develop genomics curriculum for a variety of educational settings, from small group seminar courses to large introductory courses, 3) assess student gains in knowledge of genomics and attitudes toward research, and 4) accomplish research into genome structure and evolution. The partnership engages approximately 60 faculty and 1000 students per year in the manual sequence improvement and gene annotation of selected genomic regions from different species of fruit flies (Drosophila spp.). Students are guided by their instructors on how to use genomics databases (e.g., FlyBase, NCBI) and bioinformatics tools (e.g., UCSC Genome Browser, BLAST) while learning about gene structure, chromosome organization, evolution, programming, and other topics, depending on the level and the focus of the course. GEP students have improved the quality of the DNA sequence and annotated the genes and other features of interest (e.g., transposons, non-coding RNAs) from the euchromatic Muller D element and the heterochromatic Muller F element of several Drosophila species. The results of this comparison reveal that F elements have greater transposon density, and their genes have larger coding spans, more coding exons, larger introns, and lower codon bias than the euchromatic reference regions from the D element (Leung et al. 2015 G3 5: 719 and ongoing research). Regardless of the implementation strategy (i.e. short lab modules, stand-alone research courses, computer science/biology hybrid courses, or independent research projects) the students participating in the GEP show learning gains on attitude and knowledge assessments; these gains correlate with the amount of time invested in the project. Faculty assessment shows that some barriers to the implementation of a research-based curriculum (e.g., campus acceptance of this pedagogical approach, availability of IT/computer services, faculty expertise) can be alleviated through a central core facility that provides curriculum materials, computational resources, collaborative pedagogy development, and a supportive community. We are currently focused on developing new curriculum for first and second year students, including students at community colleges. Small working groups, alumni workshops and webinars keep the momentum going and sustain this large community. The consortium is actively recruiting faculty interested in developing course-based research experiences for first and second year students.
ACUBE 2016 ATTENDEE CONTACT INFORMATION

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

Felicitas Avendano
Grand View University
1200 Grandview Ave
Des Moines, IA  50316
favendano@grandview.edu

Betsy Barnard
FOTODYNE Incorporated
950 Walnut Ridge Drive
Hartland, WI 53029
t.dlugi@fotodyne.com

Brad Beatty
Advisor - Emergent Technology
175 Varick Street
New York, NY  10013
Brad@noblestream.com

Lindsy Boateng
University of Baltimore
1420 N. Charles Street
Baltimore MD  21201
lboateng@wisc.edu

Elyse Bolterstein
Northeastern Illinois University
5500 N. Saint Louis Ave.
BBH-358G, Chicago IL  60635
e-bolterstein@neiu.edu

Patricia Bowne
Alverno College
3400 S. 43rd St
Milwaukee, WI  53234
pat.bowne@alverno.edu

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

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

Liane Cochran-Stafira
Saint Xavier University
3700 West 103rd Street
Chicago, IL  60126
cochran@sxu.edu

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

Tom Davis
Loras College
1450 Alta Vista St.
Dubuque, IA  52001
tom.davis@loras.edu

Leah Dudley
UW-Stout
Jarvis Hall
Menomonie, WI  54751
dudleyl@uwstout.edu

Ryan Dunk
Syracuse University
107 College Place
Syracuse, NY  13210
rrdunk@syr.edu
Fara Dyke  
Grantham University  
16025 W 113th Street  
Lenexa KS 66219  
fdyke@grantham.edu

Ryan Elsenpeter  
Rockhurst University SC220C  
Kansas City, MO 64111  
ryan.elsenpeter@rockhurst.edu

Margaret Franzen  
Center for BioMolecular Modeling  
Milwaukee School of Engineering  
1025 N Broadway  
Milwaukee, WI 53202  
franzen@msoe.edu

Lynn Gillie  
Elmira College  
1 Park Place  
Elmira, NY 14901  
lgillie@elmira.edu

Anjali Gray  
Lourdes University  
6832 Convent Blvd  
Sylvania, OH 43560  
agray@lourdes.edu

Neil Haave  
University of Alberta  
Augustana Campus  
4901 - 46 Avenue  
Camrose, AB T4V2R3  
nhaave@ualberta.ca

Gabriela Hamerlinck  
BioQUEST; QUBES  
3902 Maple Grove Dr # 2  
Madison, 53719  
gaby.hamerlinck@bioquest.org

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

Deena Hergert  
Rock Valley College  
3301 N. Mulford Road  
Rockford, IL 61114  
d.hergert@rockvalleycollege.edu

Eric Hill  
Northwestern University  
2205 Tech Drive - Hogan 2-100  
Evanston, IL 60208  
eric.hill@u.northwestern.edu

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

Kristin Jenkins  
BioQUEST  
PO Box 126  
Boystons, MD 20841  
kristin.jenkins@bioquest.org

Laurieann Klockow  
Marquette University  
PO Box 1881 SC 446  
Milwaukee, WI 53201  
laurieann.klockow@mu.edu

Karen Klyczek  
University of Wisconsin-River Falls  
410 S. 3rd St  
River Falls, WI 54022  
karen.k.klyczek@uwrf.edu

Nighat P Kokan  
Cardinal Stritch University  
6801 N Yates Road  
Milwaukee, WI 53217  
npkokan@stritch.edu
Audra Kramer
Marquette University
561 N. 15th St.
Milwaukee, WI  53233
audra.kramer@marquette.edu

Jacqueline Krueger
Olive-Harvey College
10001 S Woodlawn Ave
Chicago, IL  60628
jkrueger4@ccc.edu

Charlie Lawrence
Viterbo University
900 Viterbo Dr.
La Crosse, WI  54601
rclawrence@viterbo.edu

Sarah Lovern
Concordia University of Wisconsin
12800 North Lake Shore Drive
Mequon, WI  53097
sarah.lovern@cuw.edu

Rebecca Maas
Rock Valley College
3301 N Mulford Rd
Rockford, IL  61114
r.maas@rockvalleycollege.edu

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

Judith Maloney
Marquette University
561 N. 15th St.
Milwaukee, WI  53233
judith.maloney@marquette.edu

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

Wendy Martin
University of Oklahoma
1118 Louise Lane
Norman, OK  73071
wmmartin@ou.edu

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

Chris Mayne
Viterbo University
900 Viterbo Dr.  RCE 016
La Crosse, WI  54601
cgmayne@viterbo.edu

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

Aaron Miller
Concordia University Wisconsin
12800 N Lake Shore Dr
Mequon, WI  53217
aaron.miller@cuw.edu

Liza Mohanty
Olive-Harvey College
10001 South Woodlawn Avenue
Department of Natural Sciences
Chicago, IL  60628
liza.mohanty@gmail.com

Catherine Mossman
University of Wisconsin-Parkside
900 Wood Road Box 2000
Department of Biological Sciences
Kenosha, WI  53141
moossman@uwp.edu
Lee Ann Nadolski
Benedictine University
5700 College RdBK-340
Lisle, IL  60532
lsmith@ben.edu

Kara Nuss
Northeastern Illinois University
Department of Biology
5500 N. St. Louis Avenue
Chicago, IL  60625
k-nuss@neiu.edu

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

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

Tara Prestholdt
University of Portland
5000 N Willamette Blvd
Portland, OR  97203
holdt@up.edu

Annie Prud'homme-Généreux
Quest University Canada
3200 University Boulevard
Squamish BC Canada V8B 0N8
apg@questu.ca

Javier Robalino
Howard Hughes Medical Institute
4000 Jones Bridge Rd.
Chevy Chase, MD 20815
robalinoj@hhmi.org

Ed Sachs
iWorx Systems, Inc.
62 Littleworth Road
Dover, NH 03820
dcs@iworx.com

Laura Salem
Rockhurst University
1100 Rockhurst Road
Kansas City, MO  64110
laura.salem@rockhurst.edu

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

Jeremy Sloane
Syracuse University
107 College Place
Syracuse, NY 13244
jdsloane@syr.edu

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

Holly Snyder
Lewis University
One University Parkway
Romeoville, IL  60446
snyderho@lewisu.edu

Natalia Taft
University of Wisconsin - Parkside
900 Wood Road
Kenosha, WI  53141
taft@uwp.edu

Tatiana Tatum Parker
Saint Xavier University
3700 West 103rd St
Chicago, IL  60655
tatum@sxu.edu
Aeisha Thomas
Crown College
8700 College View Drive
St Bonifacius, MN  55387
aeisharobb@gmail.com

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

Aayushi Uberoi
University of Wisconsin-Madison
1920 Birge Terrace, Apt 2
Madison, WI  53726
aayushi.uberoi@wisc.edu

Lance Urven
Marian University
45 S. National Avenue
Fond du Lac, WI  54935
lurven@marianuniversity.edu

Dawn Wankowsky
Cardinal Stritch University
6801 N Yates Road
Milwaukee, WI  53217
dmwankowski@stritch.edu

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

Christina Wills
Rockhurst University
1100 Rockhurst Rd
Kansas City, MO  64110
christina.wills@rockhurst.edu

Christina Winterton
Syracuse University
107 College Place
Syracuse NY  13244
ciwinter@syr.edu

Robert Yost
IUPUI
IUPUI Biology SL378
723 W. Michigan St.
Indianapolis, IN  46202
ryost@iupui.edu