Sat. May 2, 9:15-10:15

A1. IBLC 261 9:15-9:45. Pat Boleyn: East African Wildlife: Example of Natural Selection, Ethnobotany, Culture and Diversity. Lane Community College, Eugene, Oregon

This presentation is a slideshow and discussion of the wildlife I observed while on a two week walking safari with Maasai youth in Kenya, Africa in 2013. I present slides of the wildlife and the youth, who have formed a Maasai land conservancy at the edge of the Maasai Mara Preserve in Kenya. During this presentation I explain how I use the slides and experience to educate community college introductory biology students on divergent evolution, conservation and ethnobotany. I also will present ways that I have used this cultural experience to infuse diversity, including power and privilege and empowerment of young women, into biology and ecology curriculum. I will provide a handout on activities that can be used with this slideshow, and a link to the pdf of the slideshow online, for access by other educators.

A2. IBLC 155 9:15-10:15. Sharing Session Amy Siegesmund and Ann Auman. Vision and Change in the Introductory Biology Classroom: Challenges and Solutions. Pacific Lutheran University

Vision and Change was a national call for reforming biology education. The agenda for change centers on four areas: integrating core concepts and competencies throughout the curriculum; focusing on student-centered learning; promoting a campus-wide commitment to change; and engaging the biology community in the implementation of change. While educators agree that implementing change is central to reforming biology education many have faced practical challenges when putting these changes into practice. This sharing session will be a discussion of some of the challenges (e.g. student underpreparedness, faculty time for course development, bringing research into the classroom, financial challenges) and the various approaches that participants have been using to successfully implement Vision and Change. While the session has a particular focus on introductory biology, educators with experience in any level of biology education should feel welcome to participate.

A3. IBLC 185 9:15-10:15. Eleanor Vanderrift (Biology) & Sierra Dawson (Human Physiology). Experience Backward Design in Practice: Start with the End in Mind. University of Oregon

As National Academies Education Fellows, we used the process of Backward Design to create a classroom activity incorporating goals, learning objectives, assessments, and activities. During this interactive workshop participants will experience our “teachable tidbit” as students would. During the workshop, we will annotate with descriptions of the process of Backward Design. Then participants will have an opportunity to explore the Backward Design process themselves and align goals and objectives with assessments and activities for their own classrooms.

Participants will be able to:

1. Explain the process of Backward Design and contrast it with other common ways to plan a course.
2. Describe three active learning techniques that also serve as formative assessments.
3. Align one goal, objective, formative assessment, summative assessment and activity for a course they are teaching.

A4. IBLC 155 9:30-10:00. Denise Anderson. The Mini-flip: A Minor Change with a Big Impact. University of Washington

Are you interested in creating a more engaging classroom environment, but not convinced that a flipped classroom is your style? Come learn about a moderate form of that approach — Let's call it a "mini-flip".

A mini-flip moves straightforward concepts out of the traditional lecture format, requiring students to learn that information independently instead. An obvious benefit is it avoids using valuable class time to cover simple topics such as vocabulary, allowing for increased lecture coverage of complex topics and/or the incorporation of active learning activities during class. Additionally, when students come to class armed with the basics of a particular topic, they grasp the difficult concepts more readily.

The format has been successfully used in large classes up to 300 students, but can also be used in smaller classes. Students praise the format, reporting that it encourages them to stay current with the assigned readings and keeps them engaged in the lecture. In essence, the mini-flip encourages independent methods of inquiry that can lead to life-long learning habits.

B1. IBLC 261 9:45-10:15. Mark Taylor and Nina Barcenas Heritage / PNWU Bridge Program. Pacific Northwest University of Health Sciences

This session will discuss the Master of Arts in Medical Sciences (MAMS) degree at Heritage University, a predominantly Native American and Hispanic-serving institution. Learn how coursework taken alongside first-year medical students at Pacific Northwest University of Health Sciences, coupled with standardized exam preparation, service-learning opportunities, and access to medical school faculty/staff provide MAMS students with the capability to strengthen their applications as well as demonstrate their readiness for professional school. Since the program's inception in 2012, 100% of students have graduated and 92% of graduates have gained admission into a health professional school of their choice; 46% of students have been minorities. You will also learn about Heritage University's Bachelor of Science in Biomedical Sciences.

B4. IBLC 158 9:45-10:15. Fayla Schwartz. Revolution, Happiness, Work and Enlightenment: How Science and the Humanities Intersect. Everett Community College.

For several years, Everett Community College has had a Humanities program in which the sciences are strongly integrated. Our campus presence includes a quarterly Honors Seminar consisting of themed lectures by a variety of faculty, and frequent Travelogue presentations by faculty, staff and students. This presentation will focus on the role of science faculty and students in the Humanities programs. Revolution, Happiness, Work and Enlightenment are a few of the themes that the Humanities lecture series has taken in the past. Can you see how biology and other sciences fit into each of these themes?

Sat. May 2, 10:30-11:30

C1. IBLC 261 10:30-11:00. Anu Singh-Cundy Using Visual Aids and Manipulatives to Enhance Conceptual Understanding in Introductory Cell and Molecular Biology. Western Washington University, Bellingham, WA

Reaching students from diverse backgrounds, different learning styles, and varied pre-college preparation can be challenging. Learning in and outside the classroom can be enhanced when students are afforded multiple pathways for processing information, using a variety of sensory inputs, including kinesthetic feedback. I will share examples of simple, inexpensive visual aids and manipulatives that foster visual learning, and a deep engagement with concepts in biological chemistry, cell and molecular biology, and genetics. They include pop-a-bead toys, toobers and zots, and pairs of socks (decked out with homozygous and heterozygous 'genetic loci') that stand in for chromosomes in simulations of mitosis and meiosis. These visual aids adds novelty and interest to the classroom, and because they accompany the instructor's narrative, instead of being add-on activities, they don't take up much class time. 'Playing' with the manipulatives outside of class is especially beneficial for visual and tactile learners, and enables students to process and organize information at their own pace.

C2. IBLC 155 10:30-11:30. Sharing Session Sarah Cabbage Flipping Your Course. South Puget Sound Community College.

Have you flipped your course? Are you thinking about flipping a course? Let's get together and talk about how to do it, including potential pitfalls and successes. I've experimented with flipping Anatomy & Physiology this year, with both ups and downs. I'll share what I've tried and what I think I've learned so far and I'd love to hear the same from you!

C3. IBLC 185 10:30-11:30. Sharing Session Lori Kayes. Transformation of the Introductory Biology Experience for All Students: Progress of the Northwest Bioscience Consortium (NWBC). Oregon State University

The NWBC is a group of two-year and four-year college faculty at both public and private institutions in the state of Oregon. Funded by an NSF grant, this group is working towards creating modern, student-centered, integrated, and investigative introductory biology experiences for ***all*** students, aligned with the action items in *Vision and Change.* We report on the activities of this group and seek input on topics such as

1) data about the diversity of student enrollments in introductory biology courses at our institutions; 2) insights arising from observations of each other's courses and discussions with faculty; 3) strengths of our introductory programs, with attention to how our various courses align with *Vision and Change* concepts and competencies and how they facilitate student transition towards upper division biology courses; 4) obstacles we have encountered especially in the area of smoothing the transition for transfer students taking an introductory sequence at a two year college followed by advanced coursework in biology at a four year college; and 5) outcomes and plans for professional development activities for faculty across our institutions to encourage the adoption of student-centered pedagogies aligned with *Vision and Change* and collaboration with other networks such as NW PULSE, PKAL, and NABT.

C4. IBLC 15810:30-11:30. Sharing Session Mitra Panahi. Biologists Try New Tacks To Teach College Students. Alexander College, Vancouver, BC

"Biologists who teach their subject to first-year college students face a troubling dilemma. Over the past 20 years, the amount of subject matter that they must cover has expanded several fold. During the same time, by most accounts, incoming students' scientific background and ability to understand theoretical concepts has declined. So freshmen with less preparation than their predecessors must somehow acquire more biological knowledge than those predecessors ever did." (Peter Gwynne, 2007, The Scientist).
Following the above discussion, it is crucial to address and discuss the following questions:

1. Is helping students acquire more knowledge to answer to this dilemma?
2. Should instructors focus on helping students acquire the skills to be able to access this expanded knowledge base?
3. Should instructors focus on teaching central organizing concepts and improved thinking/analysis skills to overcome their poor preparation?

D1. IBLC 158 11:00-11:30. Ann Petersen & Tish Wiles Teaching molecular genetics using models: a teachable tidbit on histone modification. University of Oregon

We will share a teachable tidbit developed during a 2014 National Academies SI. The tidbit learning goal is for the students to understand epigenetic gene silencing, the mechanisms involved and the role of epigenetics in organism health and development. The learning objectives are that the students will be able to:

Model DNA packaging / Model histone – DNA interactions
Question: Describe the basic components of coiled DNA in a chromosome, and draw the structure both coiled and uncoiled. Which state represents actively transcribing DNA?
Answer: DNA is wrapped around a histone octamer and forms nucleosome; then nucleosomes organize themselves to form fibers (10 nm or 30 nm) and chromatin fibers make up chromosomes. The open chromatin configuration allows exposure of the promoter and therefore access for RNA polymerase to begin transcription.

Activity: use tennis balls or people or basketballs to create a model of this process. Modify the situation so that there are varying levels of access/wrapping etc., ask how this would affect gene expression, disease? Provide students with a case study, give the data, and ask the students to interpret in light of what we learned.

Sun. May 3, 9:00-10:00

E1. IBLC 261 9:00-10:00. Sarah Porter. Molecular modeling, bioinformatics, digital biology. Digital World Biology, Shoreline Community College

Many of the concepts taught in molecular biology, and related subjects like nanotechnology, microbiology, immunology, and genetics, focus on interactions between objects that are invisible to the naked eye. Molecular models, generated from experimental data, can facilitate student learning in these subjects in multiple ways. Models couple visual images to abstract names, making it easier to recall both the names of proteins and their functions. Models also allow students to interact with and explore molecules by changing their display according to their chemical and physical properties. A user-friendly molecular modeling program, Molecule World™, that works on the iPad, also lets students explore the sequence properties of biological molecules like proteins and nucleic acids. Sequence composition, organization, and the spatial arrangements of macromolecules can be interrogated by using a sequence viewer together with visualization features. In this session, we will discuss our use of molecular modeling in courses at Shoreline Community College and demonstrate how students can use molecular models to understand the location, structure, and function of the capsaicin receptor, identify important epitopes on Ebola Virus, and view changes in molecular structures that lead to breast cancer.

E2. IBLC 155 9:00-9:30. Lee Beavington. Creative Teaching in Science: Getting Students to Embody Their Learning. Kwantlen Polytechnic University

For many students science is scary, full of intimidating terminology, difficult concepts, and a formidable methodology. How can we learn about biological cells, electrophoresis, and carbon cycles—not to mention how our bodies work—in a fun, accessible, yet still scientific way? Art provides an answer. Through engaging activities, movement, drawing, metaphor and storytelling we can bridge the fear gap and tap into learner creativity. Active learning has been shown to increase student performance in science classrooms (Freeman et al., 2014, Haak et al., 2011), although this increase appears to only be relevant when constructivist approaches are used (Andrews et al., 2011). Arts-based approaches to learning—including aesthetic/sensory engagement, embodied activities, and creative student-led presentations—present an opportunity for active, hands-on learning that is experiential in nature. This workshop will include props, poetry, music and other unexpected surprises, and will be highly interactive. As a lab instructor for the past 12 years at KPU, and also an instructor for KPU's Interdisciplinary Amazon Field School, I offer a unique skillset blending science, art and education. Participants will make biological drawings of their presenter, dance like nematodes, and be part of a lively discussion.

References

Andrews, T.M., Leonard, M.J., Colgrove, C.A., & Kalinowski, S.T. (2011). “Active learning not associated with student learning in a random sample of college biology courses.” CBE Life Sciences Education *10*(4), 394–405. doi: 10.1187/cbe.11-07-0061

Haak, D.C., Hille Ris Lambers, J., Pitre, E., & Freeman, S. (June 3, 2011). “Increased structure and active learning reduce the achievement gap in introductory biology.” *Science, 332*(6034)1213–6.

Freeman, S., Eddy, S.L., McDonough, M., Smith, M.K., Okoroafor, N., Jordt, H., & Wenderoth, M.P. (2013). “Active learning increases student performance in science, engineering, and mathematics.” Proceedings of the National Academy of Sciences of the United States of America, vol. 111, no. 23, 8410–5. doi: 10.1073/pnas.1319030111

E3. IBLC 185 9:00-10:00. Kathy Nomme, Lynn Norman, Chin Sun W 60 Three Hands-on Ecology Activities for First-Year, University of British Columbia

Ecological concepts can be reinforced by using manipulatable materials. In this presentation we share three activities developed by the laboratory faculty associated with the First-Year Biology Program. These activities include an exercise using cards to demonstrate food web connections, a predator-prey simulation for the marine intertidal environment, and a marine invasive species exercise. Participants will learn about the context in which we use these materials and have the opportunity to try out these fun activities.

E4. IBLC 158 9:00-10:00. Liane Chen. Practice makes perfect: Clickers as a tool for student writing and feedback. University of British Columbia

The development of strong writing skills requires repeated cycles of practice and feedback. Due to time and resource constraints of large classes, the feedback piece is often most difficult to achieve. One general approach for providing feedback to students in these settings is peer instruction, using a personal response system (such as i<Clicker). This tool improves student engagement in large classes by allowing all students to attempt answers, and giving feedback to the room about student knowledge. However, clicker problems are limited to multiple choice questions, which are a challenging format for developing higher order thinking skills such as synthesis and evaluation of written work. Here, I discuss how clickers may be combined with open-ended questions, by providing students with practice and evaluation of their own writing. In this strategy, the question posed in class requires a written explanation or a diagram to illustrate a concept, and representative student answers are selected while circulating the class. Students vote on what they perceive to be the best answers, prompting a discussion about best practices in communication. Instructor feedback is centred

around evaluation of the written statement, prompting students to improve their own writing. In this workshop, participants will design and evaluate this type of question, discuss logistical classroom approaches, and practice facilitating feedback to best support student learning.

F2. IBLC 158 9:15-9:45. Austin Hocker & Sierra Dawson. Identify core teaching values: aligning philosophy and pedagogy. University of Oregon

Core teaching values are concise, memorable statements about our beliefs and philosophy regarding teaching and learning. They provide focus and a means to align philosophy with the teaching practices used every day. Examples include “practice like you play”, “your grade book is your value system”, “make the big class feel small”, and “know your students”. We will lead an interactive workshop in which we begin by sharing how we have identified these values and used them in our classrooms. Participants will then begin to uncover their own core teaching values through a series of questions regarding what they believe about learning, what they believe motivates students, and what they are most proud of as a teacher. Participants will conclude by brainstorming strategies for aligning core teaching values with their teaching practices.

Participants will be able to:

1. Describe core teaching values and differentiate them from goals, outcomes and mission statements.
2. Identify their core teaching values.
3. Align a newly identified core teaching value with their teaching practices.

Sun. May 3, 10:15-11:15

G1. IBLC 261 10:15-10:45. Joanna Urban & Mila Kwiatkowska Experiential learning in multidisciplinary course: Biology Meets Computing Science. Thompson Rivers University, Kamloops, BC

This talk will present the real-life experience of teaching an introductory bioinformatics course by two faculty members from two different departments: Computing and Biology. Bioinformatics is a field concerned with usage of information modelling techniques, database systems, and algorithms in biology. Thus, the course topics span computing science and biology. We will talk about the hands-on student projects and their role in introducing the students to undergraduate and graduate research in both fields.

G2. IBLC 155 10:15-11:15. The Pacific Northwest PULSE Fellows: Gita Bangera (Bellevue College), Bill Davis (Washington State University), Alyce DeMarais (University of Puget Sound), Pamela Pape-Lindstrom (Everett Community College), Jenny McFarland (Edmonds Community College), Joann Otto (Western Washington University) and Gary Reiness (Lewis & Clark College)NW-PULSE Workshops for Departmental Transformation: from "Vision” to “Change”.

The NW-PULSE workshop is a no-cost opportunity for life science departmental teams to engage in strategic planning to align their department’s curriculum and practice with

the recommendations of “Vision and Change in Undergraduate Biology Education” (2011). PULSE Leadership Fellows have been developing strategies for the widespread implementation of the these recommendations, including a resource website, workshops to build regional networks, a certification program for departments implementing the Vision and Change recommendations, and a mentoring “ambassadors” program for departments. Our NW workshops are focused on colleges and universities in the Northwest US (in AK, ID, MT, OR, WA and WY).

During this NWBio session you will engage in activities using the transformation tools from the NW PULSE October workshop. You will:

- use rubrics to assess your department’s alignment with the Vision and Change report recommendations.
- learn how to apply systems thinking to implement change within a department.
- share successful strategies for adopting Vision and Change recommendations, including the PULSE ambassador program.
- learn about a PULSE toolkit of resources for life science education,

We will have applications for the October 2015 NWPULSE and NW PULSE fellows will be available to answer questions. *Supported by NSF #1345033.*

G3. IBLC 185 10:15-10:45. Allison Kang & Rachel Zaccaro. Strategies to Increase Learning in a General Biology Classroom. Bellevue College

Most instructors in a general biology classroom experience challenges when trying to help students comprehend complex biological concepts. Many different pedagogical efforts are implemented to ensure that students read their textbooks and synthesize the material before coming to lecture. However, instructors often find that many students are not delving into their course material until close to exam time. As a result, instructors use multiple methods (reading quizzes, weekly questions, etc.) to make sure that students are keeping up with their content material. These types of curriculum innovations can be very effective in helping students learn, but it may be at the expense of instructors spending large amounts of time perfecting and grading learning materials. The Smartbook/Learnsmart system has changed how I conduct this type of formative assessment in the classroom while saving time that can be spent on using other learning tools that are effective in the classroom. This session will introduce this Smartbook/Learnsmart system and give information on the effectiveness of how the system is being used in the general biology classrooms at Bellevue College in Washington.

H1. IBLC 261 10:45-11:15. Jennifer Klenz and Lisa McDonnell. A variant two-stage exam conducted during lecture time. University of British Columbia

Two stage collaborative exams are examinations where students write an examination individually, hand it in and then work in a group to rewrite some part of the exam or an isomorphic question from the exam. This group discussion makes the exam longer so that it cannot easily occur during regular class time and night exams are routinely scheduled. Studies within our biology program have indicated that all students benefit

from two-stage exams with improved short-term retention of the material discussed in groups. We created a variant of the two stage exam where students write a normal examination during their lecture period and they are told that the following class they will be doing an exam-related activity for some marks. The next class students are told to work in groups of 4-5 and are then presented with a blank copy of the original exam. They are given twenty minutes to discuss the questions. After discussion, student groups disassemble and each student is given a question that is isomorphic to one of the original exam questions, which they have to write individually. The question is selected by the instructors as one of the most difficult questions on the exam, based on experience and quickly scanning student performance on the exam from the previous class. We opted to make the student scores on the isomorphic question count towards their midterm score only if their grade improved. Using a pop-quiz the following week, we have measured that students have significant retention of the material they discussed in groups and rewrote, suggesting that the discussion combined with the individual re-write may help students reinforce their understanding. Although there were significant gains and retention among all student groups, the most significant gains were measured in students who performed poorly (less than 60%) on the first individually written test question. Survey data also indicates that the majority of students see the modified group exam as valuable to their learning. We will discuss how this can be implemented in multi-section courses, ways to minimize the number of questions that need to be created and how credit can be assigned.

H3. IBLC 185 10:45-11:15. Brett Couch The Wow Factor - Lab activities exploring the world of eukaryotic microbes. University of British Columbia

Ask most kids about their favourite animals and the likely answers will be: dinosaurs, whales, lions, etc. These animals excite the imagination and consequently they want to learn about them. When introducing microbiology, instructors need to stimulate students' interest and train students to use microscopes. If students leave an introductory lab saying "Wow, that was cool" they are likely to want to learn more. I will present three simple, inexpensive activities I have used in my introductory eukaryotic microbiology lab. These activities can be stand-alone or part of a larger curriculum. To introduce students to basic microscopy principles, students make and use simple, working replicas of early microscopes made by van Leeuwenhoek. To stimulate students' imagination and excitement about the microbial world, they observe the community of organisms that live in the hindguts of termites. Not only do these organisms live in an unusual place, they are very large and abundant. Students' early experience with the microbial world is therefore characterized by success rather than frustration trying to find an organism. To spread the wealth, students produce posters about eukaryotic microbes in the form of childrens' placemats modeled after the ubiquitous dinosaur placemats that abound in most museum gift shops.