SUMMARY AGENDA

8:00-9:00 am  
**EVENT CHECK-IN, BREAKFAST & COFFEE**  
Ellison Campus Center Lobby (Lower Level)

9:00-10:10 am  
**WELCOME & KEYNOTE ADDRESS**  
*Welcome*  
辙 Dr. Gail Gasparich, Dean, College of Arts and Sciences Salem State University  
*Learning to Notice, Understand, and Engage with Students’ Thinking in Introductory Science*  
辙 Presenter: Dr. David Hammer, Professor of Education and of Physics, Tufts University  
Veterans Memorial Hall (Upper Level)

10:15-10:40 am  
**CONCURRENT TALKS I**  
**THEME I. SUPPORTIVE TEACHING TECHNOLOGIES**  
*Lecture Captures in General and Inorganic Chemistry Courses: A Pedagogical Tool to Promote Personalized Student Learning*  
辙 Presenter: Jayashree Ranga, Salem State University  
The Metro Room (Lower Level)

**THEME II. SOCIAL JUSTICE & QUANTITATIVE LITERACY**  
*Approaching Social Justice through Projects in a Quantitative Reasoning Course*  
辙 Anne Yust, The New School  
Martin Luther King Jr. Room (Upper Level)

**THEME III. WELCOMING STUDENTS TO STEM**  
*STEMinars: Welcoming STEM Majors to College*  
辙 Presenters: Beryl Hoffman and Nina Theis, Elms College  
The Underground (Lower Level)

**THEME IV. CO-REQUISITE MATH CLASSES**  
*Corequisite Math Classes*  
辙 Presenter: John McColgan, Roxbury Community College  
Presidential Conference Room (Upper Level)

10:40-11:05 am  
**CONCURRENT TALKS II**  
**THEME I. SUPPORTIVE TEACHING TECHNOLOGIES**  
*Using Excel Pivot Tables and Solver to Develop Quantitative Literacy and Problem Solving Skills for All Learners*  
辙 Presenter: Victoria Ricciardiello, Salem State University  
The Metro Room (Lower Level)

**THEME II. SOCIAL JUSTICE & QUANTITATIVE LITERACY**  
*Quantitative Literacy in a First-Year Seminar*  
辙 Presenter: Maria Fung, Worcester State University  
Martin Luther King Jr. Room (Upper Level)
THEME III. WELCOMING STUDENTS TO STEM
Recruitment to Science through Slime Mold

Presenters: Megan Dobro and Amy Halliday, Hampshire College

11:05-11:25 am

COFFEE BREAK & NETWORKING
Veterans Memorial Hall
(Upper Level)

11:30 am-12:15 pm

CONCURRENT WORKSHOPS

WORKSHOP I.
Using a Flipped Classroom Approach to Solving Problems
Presenter: Kristin Pangallo, Salem State University

WORKSHOP II.
Three Breaths Reduce Stress
Presenter: Juditha Burchsted, Salem State University

WORKSHOP III.
Overcoming Race and Gender-based Biases on Student Teams: Asset Mapping as a Strategy for Equity and Inclusion
Presenters: Elisabeth Stoddard and Geoffrey Pfeifer, Worcester Polytechnic Institute

12:20-1:20 pm

LUNCH & PANEL
Veterans Memorial Hall
(Upper Level)

1:25-1:50 pm

CONCURRENT TALKS III

THEME V. SOCIAL JUSTICE, SCIENCE & COMMUNITY
Using Case-studies and Lab Experiments to Engage Freshman Biology Students in Conversations about Social Justice
Presenters: Rebecca Shearman, Amy Knapp, and Lina Rincón, Framingham State University

THEME VI. SKILL-BUILDING IN BIOLOGY
Common Expectations: Creating a Lab Report Handbook for Use Across the Biology Curriculum
Presenter: Anne Goodwin, Massachusetts College of Liberal Arts

THEME VII. APPROACHES FOR STUDENT-CENTERED LEARNING
More than Choosing the Right Words: Successful Techniques to Promote Active Class Participation
Presenter: Ana Mesquita Emlinger, Salem State University

1:50-2:15 pm

CONCURRENT TALKS IV

THEME V. SOCIAL JUSTICE, SCIENCE & COMMUNITY
Out of the Classroom and into the Community: Integrating a Service Learning Project to an Immunology Course
Presenter: Aisling Dugan, Assumption College
THEME VI. SKILL-BUILDING IN BIOLOGY

Developing Simulation Modeling Skills in an Introductory Organismal Biology Course

Martin Luther King Jr. Room (Upper Level)

Presenter: Jackie Matthes, Wellesley College

THEME VII. APPROACHES FOR STUDENT-CENTERED LEARNING

Makerspace in a STEM Classroom? Let Students Guide Their Learning

The Underground (Lower Level)

Presenters: Reena Randhir and Robert Dickerman, Springfield Technical Community College

THEME VIII. ENGAGEMENT IN CS, CHEMISTRY & PHYSICS

No More Problem Sets: Prioritizing Engagement as an Effective Strategy for Teaching Large, Introductory Chemistry Courses

Presidential Conference Room (Upper Level)

Presenter: Kevin Shea, Smith College

2:15-2:45 pm

CONCURRENT TALKS V

THEME V. SOCIAL JUSTICE, SCIENCE & COMMUNITY

Improving Civic and Scientific Literacy through Scaffolded Thematic Classroom Research Experiences

The Metro Room (Lower Level)

Presenter: Davida Smyth, Mercy College

THEME VI. SKILL-BUILDING IN BIOLOGY

Got Milk? Using Lactase Intolerance as a General Biology I Lab Theme

Martin Luther King Jr. Room (Upper Level)

Presenters: Lisa Grimm, Meg Hoey, Ron Krieser and Eric Williams, Fitchburg State University

THEME VII. APPROACHES FOR STUDENT-CENTERED LEARNING

Integrating Gaming into Case Studies to Foster Student Learning

The Underground (Lower Level)

Presenters: Tracie Addy and Derek Dube, Yale University

THEME VIII. ENGAGEMENT IN CS, CHEMISTRY & PHYSICS

Integration of Sports and Physics Teaching

Presidential Conference Room (Upper Level)

Presenter: Dan Liu, University of New Haven

2:45-3:00 pm

FAREWELL RECEPTION

Alumni Plaza (Outdoor area in front of Ellison Campus Center)
NETWORK LEADERSHIP

The Massachusetts Regional PKAL Network recognizes the work of the local organizers from Salem State University in making this event a success. Local organizers:

Dr. Lorrie Comeford  
Chemistry and Physics

Dr. Ryan Fisher  
Biology

Dr. Tess Killpack  
Biology, Salem State University

Dr. Maura Murray  
Mathematics

The Massachusetts Regional PKAL Network Committee:

Bridgewater State University  
Dr. Tom Kling- Coordinator of the Steering Committee  
Phone 508 531 2895; TKLING@bridgew.edu

Fitchburg State University  
Dr. Elizabeth “Liz” Gordon

Framingham State University  
Dr. Margaret Carroll

Massachusetts College of Liberal Arts  
Dr. Ann Billetz

Salem State University  
Dr. Lorrie Comford

Westfield State University  
Dr. Robin White

Worcester State University  
Dr. Doug Kowalewski

Wheaton College  
Dr. Meg Kirkpatrick

Williams College  
Dr. Laura Mueller
# RESOURCES

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CONCURRENT WORKSHOPS

ABSTRACTS

WORKSHOP I.
Room: The Metro Room, Lower Level

Using a Flipped Classroom Approach to Solving Problems
Presenter: Kristin Pangallo, Salem State University

Many students in STEM courses find that they can follow the readings and lectures of a course and yet they still struggle when solving problems, especially when first performing these as homework. The “Flipped Classroom” alleviates this difficulty, allowing students to do the information transfer before class (readings, videos, etc.) and spend class time learning applying their new knowledge to concrete problems. In a flipped classroom, you are present to help your students as they first attempt a challenging aspect of any course: solving problems independently.

This workshop will focus on how to flip your own classroom by focusing on a single unit from a course of your choice. After a brief introduction, participants will focus on a unit in their own course, working in groups based on similar courses. This will allow participants to share ideas, strategies and insights with others in their area of expertise. We will sort through what pieces could be shifted out-of-class and which would be best practiced in-class. Then we will develop scaffolded activities that capture students’ attention, allow them to practice problem-solving, and result in a deeper understanding and less frustration than when using lecture and homework problems.

WORKSHOP II.
Room: The Underground, Lower Level

Three Breaths Reduce Stress
Presenter: Juditha Burchsted, Salem State University

Mindful engagement is necessary for success in higher education, particularly in STEM disciplines. However, many students face mental health and cultural challenges undermining success, notably overwhelming anxiety. Some experience stress as first generation students or English language learners, while varying cultural backgrounds or gender identities may also contribute to anxiety and stress. Finances, work/school/life balance and living away from home result in increased anxiety around relationships, social media activity and time management.

This workshop will explore contemplative pedagogy: what it is and how it can be incorporated into STEM courses to decrease anxiety and increase engagement. Participants will be introduced to the stress reduction breathing technique “Three Breaths Reduce Stress” requiring no specialized knowledge or experience to teach. We will practice this low stakes technique during the workshop. A rubric for assessing student engagement with course content will be presented with implementation strategies. Finally we will brainstorm how contemplative pedagogy techniques can be used in any STEM discipline to support culturally responsive teaching for STEM students of all cultures and backgrounds.
Overcoming Race and Gender-based Biases on Student Teams:
Asset Mapping as a Strategy for Equity and Inclusion

Presenters: Elisabeth Stoddard and Geoffrey Pfeifer, Worcester Polytechnic Institute

STEM graduates will enter a diverse workforce and need to be prepared to work with people of differing backgrounds. Studies show that diverse teams are better at solving problems and innovating. Research also shows that bias and stereotyping on teams can eliminate these benefits and reduce student learning. Over the last two years, we have explored problems of bias and stereotyping on student teams at Worcester Polytechnic Institute. We have developed several tools and modules to help students and faculty identify, manage, and mitigate these issues. Asset mapping and team asset charting are two tools we have used with over 150 students on project teams. Our research shows these tools can improve equitable and effective teamwork by overcoming stereotypes, building student confidence, and minimizing task assignment bias. Participants will engage with these tools on teams as their own students would. They will fill out asset maps and discuss their assets (backgrounds, experiences, interests) with their team members. Team members will then determine who will take on what parts of a sample project in rural Guatemala, based on each member’s assets and areas they want to develop. After testing the tools, participants will work to adapt them to their own assignments.
THEME I. SUPPORTIVE TEACHING TECHNOLOGIES

**Room: The Metro Room, Lower Level**

**Moderator: Tess Killpack**

**Lecture Captures in General and Inorganic Chemistry Courses:**
*A Pedagogical Tool to Promote Personalized Student Learning*

**Presenter:** Jayashree Ranga, Salem State University

In a classroom, instructors face challenges such as assisting students who missed multiple classes due to health reasons, teaching tired students especially in the evening/night classes, and helping postbac students with pre-requisite course content. To alleviate student anxiety related to aforementioned concerns, lecture captures were explored as beyond the classroom resources in General and Inorganic Chemistry courses. This presentation will discuss the advantages and challenges of utilizing lecture captures in these courses. About 83% of the students from these courses rated this intervention to be helpful or very helpful.

**Using Excel Pivot Tables and Solver to Develop Quantitative Literacy and Problem Solving Skills for All Learners**

**Presenter:** Victoria Ricciardiello, Salem State University

The amount of data available has been mimicking the famous Moore’s law and doubling approximately every two years. And there is an increasing demand to use quantitative literacy skills to quickly process, analyze, and summarize this data to form useful information that can be acted upon in all fields. According to the AACU virtually all of today’s students, regardless of career choice, will need basic QL skills.

Participants will learn how to work with various Excel functions and data analysis tools particularly Pivot tables, charts, and Solver to complete various assignments. During this presentation, the instructor will explain how and why the various steps to complete the assignments are being completed.

Attendees will be able to expand their quantitative literacy skills and use Excel in their own classrooms to solve problems and to help their students understand the relationship between data and usable information and how software can be used to process this information to a usable format. They will also be able to use excel to present graphical and numeric information in their classroom to help visual and auditory learners as well as students who have difficulty with reading comprehension, understand and learn the material being presented.
THEME II. SOCIAL JUSTICE & QUANTITATIVE LITERACY  
*Room: Martin Luther King Jr. Room, Upper Level*  
*Moderator: Kathi Crow*

**Approaching Social Justice through Projects in a Quantitative Reasoning Course**  
**Presenter:** Anne Yust, The New School

We will present two projects oriented toward social justice that we developed for an introductory course sequence on quantitative reasoning. One project focuses on financial literacy through case studies of low-wage workers in the US. The other project explores data analysis and visualization through measures of health and wealth across the US and the world. We’ll walk through our student learning objectives for each project and outline the specific resources used when assigning and assessing each project. The presentation will conclude with remarks on changes made from iterative reflection on student work and feedback.

**Quantitative Literacy in a First-Year Seminar**  
**Presenter:** Maria Fung, Worcester State University

In this presentation I describe a way to incorporate quantitative and information literacy as part of the first-year seminar program at Worcester State University. I share some successful assignments from the course and ideas for incorporating quantitative literacy examples in other introductory STEM courses. These assignments focus on population growth, environmental concerns, nutrition and learning about social justice issues through numbers.

THEME III. WELCOMING STUDENTS TO COLLEGE  
*Room: The Underground, Lower Level*  
*Moderator: Jennifer Carr*

**STEMinars: Welcoming STEM Majors to College**  
**Presenter:** Beryl Hoffman and Nina Theis, Elms College

Elms College has developed two welcoming seminars for STEM students. STEM First Year Seminar is focused on science and technology innovations that help society. The Elms First Year Seminar is required for all first year students to provide tools to succeed in college. Students in the STEM First Year seminar work collaboratively on projects researching topics that connect STEM content with societal applications such as renewable energy, bioenergy, genetic engineering of food and medicine, water purification, 3D printing of prosthetic limbs, organs, and houses, and self-driving vehicles. Elms College is also piloting a similar seminar for transfer students focused on STEM communications skills to welcome and support students as they adjust to a new college. This course encourages the students to polish the skills they have accumulated from their first two years of college, by creating and demonstrating a “STEM Day” activity and presenting a poster at a poster session. The Elms STEMinars have been successful in creating a welcoming and supportive environment for students from all cultures and backgrounds to promote a sense of belonging as well as providing tools for success in STEM majors.
**Recruitment to Science through Slime Mold**  
**Presenters:** Megan Dobro and Amy Halliday, Hampshire College

At Hampshire College, we created The Plasmodium Consortium as a way to recruit students to the sciences. In an introductory science course, students identified human problems (they chose the opioid crisis, border policy, wealth distribution, food deserts, and public transportation shrinking in Western Massachusetts) and worked with faculty to design experiments to model the problems and search for potential solutions using slime mold. Participants represented fields in all areas of discipline, from art and design to anthropology and philosophy. The work was exhibited in the college’s art gallery and in a public symposium, resulting in campus-wide conversation about slime mold and social justice, as well as international news coverage in NPR, Wired, Fast Company, Big Think, and many others. The students, staff, faculty, and community members who participated were able to work in a science lab for the first time, learning about experimental design and gaining comfort with the scientific method. This resulted in a few students switching majors to the sciences and many more learning to think like a scientist in their daily lives.

**THEME IV. CO-REQUISITE MATH CLASSES**  
*Room: Presidential Conference Room, Upper Level*  
*Moderator: Maura Murray*

**Corequisite Math Classes**  
**Presenter:** John McColgan, Roxbury Community College

Since Spring 2016, Roxbury Community College has let up to 60 students per semester who would normally have been in developmental education instead take College level math with corequisite support. Based on the data we’ve gathered, we are going to launch to full scale and eliminate devopmental education as of Summer 2018. Come hear about what’s happening at Roxbury.

**Design and Implementation of Corequisite Model in a Freshman Level Quantitative Reasoning Course**  
**Presenters:** Santhosh Mathew and Upasana Kashyap, Regis College

Many colleges and universities are increasingly seeking to alter the existing remedial education with corequisite model in which students enroll simultaneously in a credit-bearing course and a course that provides remediation. In this talk, we present design, implementation, and discuss how we facilitated this model in a freshman level Quantitative Reasoning course. We provide evidence of the success of this approach using data that compare student performance under corequisite model with the more traditional prerequisite model. Our study concludes that student performance and perceptions were significantly higher when they completed the course under corequisite model compared to the prerequisite model.
THEME V. SOCIAL JUSTICE, SCIENCE & COMMUNITY
Room: The Metro Room, Lower Level
Moderator: Ryan Fisher

Using Case-studies and Lab Experiments to Engage Freshman Biology Students in Conversations about Social Justice

Presenters: Rebecca Shearman, Amy Knapp, and Lina Rincón, Framingham State University

In this presentation, I will discuss our efforts to incorporate social justice issues and develop student social literacy in an introductory biology course at Framingham State University. Our goal is to promote equity for all STEM students while contributing to a culturally and socially aware campus. Our activities in this course support two objectives: 1) developing a science identity in freshman biology students of all ethnic, cultural, and racial backgrounds, and 2) engaging students in conversations about the social implications of genetic diversity. To support our first goal, we developed a guest speaker series in which three professional biologists of color came to the classroom and answered questions, posed by our students, about their career pathways. Students reflected on the speakers’ stories as well as their own identity as a scientist. To support our second objective, we used laboratory experiments and an in-class case study to engage students in conversations about the science of genetic variation and race as a social construct. Students analyzed their own DNA and studied the genetic variation within the class. Through the analysis of the class data, students explored the broader social context of genetic diversity and the relationship between science, society, and social justice.

Out of the Classroom and into the Community:
Integrating a Service Learning Project to an Immunology Course

Presenter: Aisling Dugan, Assumption College

Integrating a community service learning component to a science course, does not always feel like a natural fit. Where both depth of content and material covered is valued, there is little time to slow down and incorporation a qualitative community project. In an attempt to provide a unique experience and enrich the kind of learning in my classroom, Immunology students partnered with AIDS Project Worcester (APW). APW is a social and clinical service non-profit organization that provides support for HIV positive individuals and those at risk. The reciprocal relationship we set up required that we identify a specific and realistic project. APW provided students with a tour of their facilities, a HIV 101 lecture, and an employee of APW shared his life’s journey. In return, students researched, compiled, and organized a list of free resources and services (food, shelter, mental and clinical health service, etc.) in the city of Worcester for the clients of APW. Students also hosted a warm-clothing drive donating over 100 items of clothing. In class, seminar-style primary literature discussions focused on the immune response to HIV and use of lentiviruses in vaccine development and cancer treatments. A reflection of what worked and didn’t work will be examined.
**Improving Civic and Scientific Literacy through Scaffolded Thematic Classroom Research Experiences**

**Presenter:** Davida Smyth, Mercy College

To encourage civic and scientific literacy at our institution, we’re scaffolding research experiences throughout the curriculum. At the novice level, we’ve targeted the lecture component of two introductory courses, Environmental Science and Introductory Biology course and for the intermediate level, Microbiology. To foster mastery in the scientific method, students are participating in a classroom based authentic research experience in the area of urban microbial ecology. To encourage literacy, students are given textbook surveys, strategic reading assignments and instructed in concept mapping and reading strategies. The classroom experiences include think-pair-share moments, case studies, active learning assignments and plenty of teamwork and collaboration. Through these projects, students are able to take their first steps towards understanding and immersing themselves in the scientific method using authentic student-driven discovery. Students have gained experience with the generation of posters, educational brochures and bibliographies owing to the novice experiences. The urban microbiology course has resulted in students presenting their work at local, national and international conferences and joining my lab to continue and develop their research projects. These pilots have shown the feasibility of intervening in the lecture to enhance civic engagement and scientific literacy while exposing all students to research and the scientific method.

**THEME VI. SKILL-BUILDING IN BIOLOGY**

**Room:** Martha Luther King Jr, Upper Level  
**Moderator:** Jennifer Carr

**Common Expectations: Creating a Lab Report Handbook for Use Across the Biology Curriculum**

**Presenter:** Anne Goodwin, Massachusetts College of Liberal Arts

Students enter introductory biology courses with varying degrees of experience in writing lab reports. To allow a more-even playing field and promote development of writing skills across the biology curriculum, the biology faculty at the Massachusetts College of Liberal Arts developed a lab report handbook containing instructions, examples and clearly identified expectations for the components of a lab report. This resource is freely available online and has been adopted as a common set of guidelines by all faculty teaching laboratory courses in our department. In this presentation I will describe the development process, share components of the handbook, and encourage discussion about how writing skills can be promoted from introductory to advanced courses in biology.

**Developing Simulation Modeling Skills in an Introductory Organismal Biology Course**

**Presenter:** Jackie Matthes, Wellesley College

Simulation modeling is a critical skill for undergraduate biology, and is a core competency within the Vision & Change goals. However, there are many potential challenges to incorporating simulation modeling into introductory biology courses, such as student unfamiliarity with the concepts and vocabulary, technical aspects related to running models, and understanding what is going on “under the hood” of models. In this presentation, I’ll introduce three apps that were designed for introducing modeling concepts in an Introductory Organismal Biology course. The apps are designed to connect with core content in the course, including evolutionary processes, metabolism-size constraints of animals, and ecological processes of vector-borne disease. The apps are accessible by any web browser, so they do not rely on specialized software. The exercises developed around these apps provide an “on-ramp” for the introduction of modeling concepts in the classroom that students can draw on within higher-level courses.
**Got Milk? Using Lactase Intolerance as a General Biology I Lab Theme**  
**Presenters:** Lisa Grimm, Meg Hoey, Ron Krieser and Eric Williams, Fitchburg State University

One major component in retaining and engaging students in introductory courses is to have them be involved in the research process as soon as possible. We redesigned our General Biology I lab curriculum based on the central, thematic concept of lactose intolerance in human populations across Europe and Africa. During this lab experience, students will begin learning about the research on the lactase gene in humans on day one. They continue building knowledge around this concept through inquiry-based enzyme kinetic labs, fermentation experiments, PCR, pedigree analyses, and a bioinformatics project all focused on the activity, function, expression, and evolution of the lactase gene and protein. We will continue teaching traditional labs for one year to collect data on interest and assessments of content knowledge. We will then fully implement the new labs and compare the results with traditional labs. We hypothesize that students will stay engaged in classes, retain more concept knowledge, and enjoy the more inquiry-based, thematic lab experience than traditional labs.

**THEME VII. APPROACHES FOR STUDENT-CENTERED LEARNING**  
**Room:** The Underground, Lower Level  
**Moderator:** Kathi Crow

**More than Choosing the Right Words: Successful Techniques to Promote Active Class Participation**  
**Presenter:** Ana Mesquita Emlinger, Salem State University

What comes to mind when we think about effective classroom participation? We certainly think about insightful comments building interesting connections that will foster a high level of energy and enthusiasm in the classroom. Research is very solid about active class participation as a way to improve critical and higher level thinking skills. The challenge is how to engage more than the often 5 talkers that usually dominate our classroom discussions, giving us a false idea of successful class participation. How can we encourage the quieter students to communicate their opinions? Understanding communication as more than words, sentences and languages is a key element in effective teaching. Non-verbal communication can also be very powerful and motivate students with different behavioral and learning styles, diverse backgrounds and life experiences. Communication is the foundation of almost every human interaction, and it has to be understood as more than simply choosing the right words. In this presentation you will get to know two strategies that ensure 100% of class participation in a dynamic and supportive way!

**Makerspace in a STEM Classroom? Let Students Guide Their Learning**  
**Presenters:** Reena Randhir and Robert Dickerman, Springfield Technical Community College

STEM concepts can be challenging to comprehend. Providing a makerspace in the STEM classroom boosts student creativity, innovation and learning. Teachers can often be intimidated by the cost and time involved in such activities. However, hands-on construction and experimentation with simple everyday materials can transform into a powerful learning tool to equip students with basic concepts and a ‘makerspace mindset’. As the students embrace the ‘maker’ growth mindset the classroom becomes lively as students are engaged in learning! Instead of the instructor trying to ‘cover all the content’ the students ‘uncover the content’ as they design and build. In addition to understanding complicated concepts, they begin to think divergently and make connections between systems. This novel approach to learning, by providing a platform for students to create structures to mimic STEM concepts has increased class completion rates compared to the traditional lecture methods. This also encourages team work and critical thinking, thereby leading to collaborative, inquiry-based learning experience. The STEM Starter Academy at STCC supports classroom makerspace activities by providing supplies.
Integrating Gaming into Case Studies to Foster Student Learning

Presenters: Tracie Addy and Derek Dube, Yale University

The case study approach is an established method known to foster student learning. During this presentation, we will describe how cases can be combined with gaming to enhance the student learning experience. We will discuss our collective efforts to publish and implement the science case study, The Ebola Wars: Mission Immune Evasion which integrates the game Operation: Ebola! When completing the case, students assume the perspective of an Ebola virus infecting host cells. Learners work collaboratively to complete the case study and play the game to apply their knowledge. We will also present the outcomes of our research study on the implementation of the case study demonstrating positive effects on student engagement and learning.

THEME VIII. ENGAGEMENT IN CS, CHEMISTRY & PHYSICS

Room: Presidential Conference Room, Upper Level
Moderator: Deborah Mason-McCaffrey

Motivating Students’ Learning in Introductory Programming Courses

Presenter: Li Enping, Bridgewater State University

Programming languages are widely used in various disciplines for different application purposes. To motivate and engage students’ learning in introductory programming courses and equip them with foundational programming skills is essentially important for them to be successful in programming-related future career. The first-year computer science programming courses are generally used to server this purpose. This proposal discusses several teaching strategies used in the first-year computer science programming courses (Python programming and Java programming). Firstly, a teaching sample (such as in-class activities, teaching styles and assessment methods) will be demonstrated and discussed for each teaching strategy. The information such as students’ in-class engagement, students’ in-class performance, and students’ overall performance is collected through class observation and students’ narrative feedback. This information is further analyzed for each teaching strategy. Finally, we compare all the involved teaching strategies based on our observation and students’ feedback, and conclude the effectiveness of teaching and learning for each teaching strategy.

No More Problem Sets: Prioritizing Engagement as an Effective Strategy for Teaching Large, Introductory Chemistry Courses

Presenter: Kevin Shea, Smith College

At Smith College, our introductory general chemistry and organic chemistry sections range between 50-90 students. Efforts to improve student experiences in these gateway courses over the past 10+ years have focused on student engagement during actual class time. The primary method to prepare students for active learning in class is to assign problems due in each class. Elimination of weekly problem sets forces students to think about and interact with chemistry at least three times per week, improving their comprehension and participation in class. Discussion about the daily problems, both between students and the professor, can then become a major component of class time. In one study, we found that an introductory chemistry class using this approach reduced professorial lecture time to 33% of the total class time. We will discuss how combining this problem-set-free approach with other engagement strategies has reformed our core chemistry sequence.
**Integration of Sports and Physics Teaching**  
**Presenter:** Dan Liu, University of New Haven

In order to promote students’ interests in physics and to present the connections between physics and its applications in daily life, physics educators develop interdisciplinary physics courses, such as Physics of Music, Physics of Color, Physics of Sports, etc. I have developed and have taught Physics of Sports since 2015. Here I will present some examples which can adapted to physics teaching: 1) video analysis of basketball in lab/interactive lecture of projectile motion; 2) vertical jump measurement by using force table sensors to better understand Newton’s laws; 3) Critical reading of NFL deflategate in 2015 by using thermodynamics knowledge.