

2019

# PLTLIS Conference Presentations



Peer-Led Team Learning  
International Society

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### *Oral Presentation*

#### **Experience with Peer Led Team Learning in Sophomore Engineering Classes**

- **Eric Adams**, IUPUI
- **Christine Krull**, IUPUI

Peer Led Team Learning (PLTL) has an extensive history of use in introductory science classes, but has been used much less frequently in sophomore Engineering classes. At the School of Engineering and Technology at IUPUI, we have been employing PLTL in several sophomore engineering classes for 3 years. Began as a pilot in a single class, classes are now using PLTL in 4 different departments, covering 6 different classes, reaching approximately 300 students every semester. In addition to the benefits for students in the classes, the approximately 30 student leaders per semester are enrolled in leadership seminars concurrently with their classroom duties. We seek to offer leadership development opportunities for the leaders through the program. As might be expected for our campus, a high percentage of leaders, in some semesters up to 60% are from groups classified as underrepresented in engineering.

Research into PLTL in engineering at IUPUI has the goal of improving undergraduate education for the students as well as the leaders. Data suggests that PLTL has improved classroom outcomes. People attending PLTL workshops are significantly more likely to get "A" or "B" grades than those who do not. Identical classes taught by the same instructor with and without PLTL workshops suggest that PLTL improves scores by several points. Students have asked for more time in workshops. Leaders have reported how PLTL has impacted their school and internship opportunities. We are engaged in active feedback from the students and leaders to improve the classes.

The presentation will outline the breadth of classes where PLTL has been used and outcomes from its use. The multi-semester leadership development curriculum.

### *Oral Presentation*

#### **An Overview of Training Curriculum for Research Assistant Peer Leaders**

- **Jose Alberte**, Florida International University
- **Alberto Cruz**, Florida International University
- **Nataly Amaya**, Florida International University

A major component of managing a Peer-Led Team Learning (PLTL) program is evaluation and research, which can be challenging for faculty and staff to incorporate with the daily operational needs of the program. This challenge can be addressed by redefining the role of the Peer Leader (PL) to include evaluation and research. Research Assistant PLs (RAPLs) are selected from a pool of interested candidates of experienced PLs. The applicants are then scheduled into group interviews, with a focus on discussing their understanding of PLTL research articles, their interests, their potential for educational research, and their ability to interpret data. Once recruited, RAPLs attend weekly training meetings tailored to develop their own understanding of educational literature and to shift their perspective to comprehend literature less as a student and more as a researcher. The training curriculum continues in a modular format transitioning into methodologies in education research. An emphasis is placed on qualitative, mixed methods, and quantitative methodologies of conducting educational research. Throughout their experience in the training workshops they will develop and implement their own research projects. This

scheme lays the groundwork for training undergraduate PLs to develop skills in research and provides a service to the department.

### *Poster Presentation*

#### **Measuring Peer Leaders' Ability to Evaluate Scientific Information and Arguments**

- **Jose Alberte**, Florida International University
- **Mary Lavda**, Florida International University
- **Solange Cordovi**, Florida International University
- **Ann Barral**, Florida International University
- **Yahnell Judah**, Florida International University
- **Diego Guerrero**, Florida International University
- **Tasnia Arshee**, Florida International University
- **Nataly Amaya**, Florida International University
- **Alberto Cruz**, Florida International University
- **Thomas Pitzer**, Florida International University

Scientific literacy is a skill science students should develop during their time as undergraduates. The National Research Council defines scientific literacy as the ability to gather and use quality science information brought about by the scientific community (1996). In Biology, this skill may be focused on ecological perspectives that may impact species populations, epidemiological concerns, and determining the credibility of sources. The Test of Scientific Literacy Skills (TOSLS) survey was developed and validated by Gormally et al. (2012) to assess the scientific literacy of undergraduate biology students. The skills tested in this instrument fall under two broad categories: (1) Understand methods of inquiry that lead to scientific knowledge and (2) Organize, analyze, and interpret quantitative data and scientific information. We administered the TOSLS to Peer Leaders of the PLTL program at FIU. We predict that Peer Leaders with longer experience in the PLTL program will have greater scientific literacy skills. This study will allow us to explore the scientific literacy skills of Peer Leaders by identifying the elements of their experience that lead to the development of these skills.

### *Poster Presentation*

#### **Exploring the Development of Peer Leaders' Scientific Literacy Skills**

- **Jose Alberte**, Florida International University
- **Mary Lavda**, Florida International University
- **Solange Cordovi**, Florida International University
- **Ann Barral**, Florida International University
- **Yahnell Judah**, Florida International University
- **Diego Guerrero**, Florida International University
- **Tasnia Arshee**, Florida International University
- **Nataly Amaya**, Florida International University
- **Alberto Cruz**, Florida International University

- **Thomas Pitzer**, Florida International University

Scientific literacy has become an asset to develop for undergraduates pursuing scientific careers. It is defined as the ability of gathering and using quality science information put forth by the scientific community (National Research Council, 1996). Peer Leaders of the PLTL program at FIU were selected based on their responses from the Test of Scientific Literacy Skills (TOSLS) survey, developed and validated by Gormally et al. (2012). The purpose of the survey serves to assess the scientific literacy of undergraduate biology students. We developed an interview protocol to further investigate Peer Leaders' experiences in developing their scientific literacy. Using a grounded theory approach, interview transcripts were analyzed through magnitude, structural, and process coding methods. Themes connecting their experience as a Peer Leader and the development of various reasoning skills emerged from these data. This study allowed us to explore the scientific literacy, critical thinking, and metacognitive skills developed by the Peer Leaders.

### *Oral Presentation*

#### **Peer Leading pilot in the Permian Basin**

- **Aidely Aranda**, University of Texas of the Permian Basin
- **Jonathan Muniz**, University of Texas of the Permian Basin

In the Spring 2019 semester UTPB began a Peer Led Teaching Lesson (PLTL) pilot program as a requirement for a General Chemistry CHEM 1311 section. The purpose of this endeavor is to improve student performance in notoriously difficult core science classes. Based on findings from other universities throughout the United States, UTPB is anticipating successful results.

Students are required to attend two hour-long study sessions per week throughout the semester in addition to their regular scheduled class hours. During these meetings, the peer leader begins by briefly reviewing the module from the previous class. This is followed by reading the current module, and finally apply the knowledge from these modules directly to that day's experiment or to the PLTL specifically designed worksheet problems related to the module. Students are expected to participate interactively throughout the session. They read and analyze the modules together, with supervised guidance from the peer leader, however most of the weight falls on the students.

The peer leader facilitates peer to peer tutoring and motivates students to be self-initiating with their learning. The ultimate purpose of this project is for students to develop proper and effective study skills that they will be able to use effectively throughout the rest of their college career.

Due to the novelty of this pilot program, several issues have arisen throughout the semester. It is a still developing initiative and thus is not immune to unforeseen circumstances. Several of the key areas to improve include time management during the sessions, better organization of PLTL session course materials, and student motivational tactics. If proven successful, UTPB plans on expanding the PLTL program into other disciplines.

### *Oral Presentation*

#### **Guided Reflections & Storytelling for Increased Teamwork & Leadership Self-Efficacy**

- **Josue Arreaga**, Miami Dade College
- **Daniel Lopez**, Miami Dade College
- **Volrick Higgs**, Miami Dade College

This workshop will introduce peers leaders to the concept of self-efficacy. Through guided reflections and storytelling, participants will draw on their experiences facilitating PLTL sessions to better understand the impact of PLTL on their own self-efficacy. The session will focus particularly on teamwork and leadership self-efficacy; however, some attention will be given to the impact of peer leadership on mastering course content. Participants will learn about and explore potential mastery and vicarious experiences facilitating sessions as well as the impact of social persuasion and their own physiological reactions to the facilitation environment. Participants will leave empowered to actively reflect on the sources of their self-efficacy toward greater development of their communication and leadership skills.

### *Oral Presentation*

#### **Using interactive theatre to challenge assumptions about participation in PLTL workshops: a case study**

- **M.Cecilia Barone**, University of Rochester
- **Joseph Dinnocenzo**, University of Rochester
- **Robin Frye**, University of Rochester
- **Nicholas Hammond**, University of Rochester
- **Kyle Trenshaw**, University of Rochester

Peer-led collaborative learning has been successfully implemented at our institution for over two decades and is considered a staple of the undergraduate student experience on our campus, particularly in STEM disciplines. Overall, our PLTL program consistently shows benefits for students attending the sessions and provides opportunities for further growth in academic leadership and professional development to PLTL leaders through a semester-long, credit-bearing pedagogy course.

However, anecdotal and research evidence collected at our and other institutions, highlights how feelings of non-belonging and other factors related to students' social identity can prevent their active participation in the collaborative sessions, thus limiting the potential benefits of PLTL.

To address these implementation challenges, in collaboration with a local theatre-based training company, we have successfully piloted the use of live interactive theatre to train peer leaders in recognizing visible and invisible barriers to participation experienced by students in diverse teams, and in using inclusive strategies to troubleshoot complex group dynamics in this setting. We found that the critical elements that make this training valuable and impactful for the leaders are: (i) seeing challenging issues in a simulated collaborative session, (ii) interviewing the actors in character to understand students' hidden stories, identities, and behaviors, and (iii)



collaboratively problem solving with other leaders. We will present results from this pilot study and the implications for the training of PLTL leaders.

### *Oral Presentation*

#### **Propagating Peer-Led Team Learning Via the Workbooks Project**

- **James Becvar**, University of Texas at El Paso
- **Milka Montes**, University of Texas of the Permian Basin
- **AE Dreyfuss**, Peer-Led Team Learning International Society

Previous reports document how workbooks authored by Peer Leaders and practitioners facilitate learning in Peer-Led Team Learning (PLTL) workshops. Workbooks grant authorship credit to the writers of the original content. Workbooks centered on an academic course organize the sequence of content covered, provide short statements of text and problems for Leaders to use in workshop and as homework, give self-help reviews for students to prepare for exams, and certainly help faculty lecturers understand what Peer Leaders are doing on a weekly basis. The Workbooks Project involves students and faculty donating intellectual product and property to a non-profit. Earnings by the non-profit from sale of workbooks provide financial support (for example, through a university gift fund) for PLTL Program costs to further peer-facilitated learning. We report here that this workbook financial model has now been used by the non-profit Lead For America Corporation (LFAC) to help start and to partially support a PLTL program in chemistry at the University of Texas - Permian Basin, UTPB. Workbooks generated by Peer Leaders at the University of Texas at El Paso via LFAC are now sold at a bookstore at UTPB to partially support program costs at UTPB. This model is scalable. PLTLIS encourages this model to promote and sustain programs in PLTL everywhere.

### *Poster Presentation*

#### **Nineteen Years of Guiding Leaders to Deliver Facilitated Learning at UTEP**

- **James Becvar**, University of Texas at El Paso
- **Geoffrey Saupe**, University of Texas at El Paso
- **Mahesh Narayan**, University of Texas at El Paso
- **Juan Noveron**, University of Texas at El Paso
- **Dino Villagran**, University of Texas at El Paso
- **Wen-Yee Lee**, University of Texas at El Paso

A dozen faculty members have directed Peer-Led Team Learning in chemistry at the University of Texas at El Paso since 2000. A Peer Leader position for an undergraduate represents a significant job in STEM while the student takes coursework in a related field. A total of 652 semester-long Peer Leader positions in 38 cohorts have been paid to guide learning for first semester general chemistry and 280 Peer Leader positions in 21 cohorts for second semester general chemistry since 2008. Only about 15% of these undergraduates majored in chemistry. Many Leaders continued for multiple semesters. Counting each person only once, this represents 295 individual people trained for and leading first semester general chemistry workshops and

124 people trained for and leading second semester general chemistry workshops. The 19-year span involved valuable professional training for these undergraduates, about 2,750 hours counting about 20 hours pre-semester Leader Institute training each long semester and 30 hours each long semester for the one-hour Preview/Prep sessions twice each week for each 15 week semester. The Program represents significant faculty commitment to undergraduate professional development: each Preview/Prep session has two faculty members and sometimes three or four faculty members guiding each session. The UTEP PLTL Program produced significant literature on learning: 23 first-author undergraduate-student publications and 156 first-author undergraduate-student presentations at national and international meetings. The Workbook Project, originated at UTEP and made possible by undergraduate Peer Leader creation and donation of intellectual property, has resulted in financial support to the UTEP PLTL Program in excess of \$425,000.00 since 2012.

### ***Poster Presentation***

#### **Establishing a Rubric to Evaluate Student Performance in PLTL Workshop**

- **Paul Beltran**, University of Texas at El Paso
- **Tetyana Zhyvotovska**, University of Texas at El Paso
- **Mahesh Narayan**, University of Texas at El Paso
- **James Becvar**, University of Texas at El Paso

At the University of Texas-El Paso, the Peer-Led Team Learning (PLTL) program in chemistry focuses on creating innovative ways to address the many struggles students face in first- and second semester general chemistry. Each week, peer leaders hold a required two-hour workshop in which active and collaborative learning activities are implemented in an attempt to aid students in better understanding material covered in their respective lecture course. Although students are expected to arrive to workshop ready to discuss module topics, this does not always occur. It may be suggested that a majority of students often do not begin to study for a course until only a few days prior to their exam. As a consequence, an individual's opportunity for success in general chemistry is greatly diminished by "waiting until the last minute". This procrastination is often reflected in workshop quizzes and examination scores. It is this lack of preparation that "a rubric for workshop" aims to combat: this pedagogical tool provides an alternative to "a grade" to measure student preparation and performance in areas such as collaborative learning, meaningful conversation of chemistry, and understanding of new material. The rubric evaluation assesses preparation by students up to 4 weeks prior to examination time.

### *Oral Presentation*

#### **Audiovisual Investigation into the Content Knowledge of Organic Chemistry Peer-Led Study Group Facilitators**

- **Jordan Boothe**, University of Pittsburgh at Greensburg
- **Rachel Barnard**, University of Pittsburgh at Greensburg
- **Luke Peterson**, University of Pittsburgh at Greensburg
- **Brian Coppola**, University of Pittsburgh at Greensburg

The content knowledge and teaching effectiveness of peer facilitators or instructors is often assumed, yet understudied in the broader literature. In this study, we used audiovisual recordings to better gain an understanding of the content knowledge possessed by the peer facilitators in our peer-led study group (PLSG) program that are responsible for study groups of first semester organic chemistry. In this program, peer facilitators are required to take a one unit (1 hour per week) content course to shore up their content knowledge and instructional techniques. Focusing on the units of stereochemistry and conformational analysis, we used audiovisual recordings of (a) this companion course, as well as (b) the actual PLSG sessions themselves. We observed two particularly interesting things in our investigations: (1) errors that were observed to be corrected in the content course did not propagate into the group sections, and (2) errors that were observed in during the study group sessions when backtracked to the content course involved topics or strategies that had not been addressed or attended during class.

### *Showcase Presentation*

#### **Showcase: The Making of a Peer Leader**

- **Pedro Brito**, University of Houston Downtown
- **Ana Garza**, University of Houston-Downtown
- **Mays Al-Maliki**, University of Houston Downtown

The peer leaders are an essential part of the PLTL model, so how should these leaders be trained? A professor training the leaders would create a mini-professor, thus losing that crucial peer portion of peer lead team learning. The peer leader should be just that: a peer. This is why, at the University of Houston Downtown, we have been using the PLTL model to train our PLTL leaders. Removing a traditional professor from training allows the leaders to further develop into peer leaders, guiding fellow students to think independently, as opposed to lecturing them directly to a solution. Peer leaders training future leaders encourages skill set growth by having the leaders share what they learned with the PLTL model; though a professor would also share insight, there will always exist an experience boundary that blocks potential peer leaders from being fully engaged, possibly from fear of speaking to a professor too casually or appearing unintelligent to someone who holds a high level of formal education. The PLTL program has become a legacy in UHD; each leader learns from the progress of previous leaders, picking up where the last leader left off. The leaders grow their skills, and refine the traits required to be good peer leaders. Professor-lead learning causes a barrier, no matter how soft-spoken or non-intimidating a professor may try to be. Sessions led by peers allow everyone to be fully immersed, bringing thought-provoking questions about what it means to be a leader. This incites

openness toward each leader's personal growth, as they flourish into the best possible student they can be.

### ***Poster Presentation***

#### **Understanding the Role of Gender in Mentorship Relationships and Interactions: A Pilot**

- **Isamar Camarena-Ubiera**, Florida International University
- **Jose Alberte**, Florida International University
- **Alberto Cruz**, Florida International University
- **Daniel Flores**, Florida International University
- **Ellen Dow**, Florida International University

Florida International University (FIU) is a minority serving institution, where 57% of the student population is female as of 2019. There is a clear reflection of the population of students within both the Biological Sciences and the Peer-Led Team Learning (PLTL) program. The PLTL model uses trained undergraduate students in the role of a Peer Leader (PL) to facilitate weekly workshops with student peers in the biological sciences. At FIU, PLs are periodically supervised and mentored by a Peer Leader Mentor Supervisor (PLMS). The PLMS is an experienced PL assigned to evaluate another PL's performance, provide feedback and support, both during and after a session. The PLMS program at FIU was implemented in 2007, as a means of quality assurance, and in 2015 reformed to gear the program towards mentorship and PL development. In 2016, the effectiveness of these new implementations were analyzed through multi-aimed approaches using qualitative and quantitative methods. To further explore the relationship between the PL and their PLMS, we piloted a case study to analyze the PLMS and PL interaction by gauging how binary gender (male/female) affects the relationship between mentor and mentee in the PLTL program at FIU. The case is further defined by the interactions between PL/PLMS of either the same or different binary gender, and were created as follows: Male PL/Male PLMS, Female PL/Male PLMS, Male PL/Female PLMS, and Female PL/Female PLMS. The perceptions of the participants were explored through observations. These observations were recorded, transcribed and analyzed to uncover themes involving the perceptions of the PL and PLMS about their overall interactions.

### ***Poster Presentation***

#### **Measuring the Development of Peer Leader Metacognitive Skills**

- **Amanda Canellas** (Speaker) Florida International University
- **Renee Suarez** (Speaker) Florida International University
- **Rosangela Garcia** (Speaker) Florida International University
- **Jose Alberte**, Florida International University
- **Alberto Cruz**, Florida International University

The interaction between metacognitive abilities and teaching styles implemented by the Peer Leaders (PLs) influence the instructional focus used by a PLs while facilitating their workshops. Through the Peer-Led Team Learning model, the PLs enhance their ability of metacognitive

transfer with use of student-centered pedagogical styles. To understand the phenomenon of transfer of metacognitive proficiencies, an explanatory sequential mixed methods study with a case-selection variant design was used. This portion of the study utilized a quantitative approach to assess the correlation of pedagogical approaches used by PLs and the three subcomponents of metacognition. The Approaches to Peer Leading Inventory (APLI) and the Awareness of Independent Learning Inventory (AILI) questionnaire was administered to the PLs and students. We predict these surveys will show an increase in metacognitive awareness as the PLs facilitate their workshops, further guiding their pedagogical style to a student-centered approach. Although there was no statistical significance found in gender and ethnicity, proportions showed an increase in metacognitive awareness as the PLs gain academic credits. As the surveys were validated, the results were utilized to create a pool of participants to conduct a think-out-loud problem-solving session and semi-structured interview. This pilot study aims to provide an understanding between the integration of metacognitive abilities of PLs and their teaching styles while facilitating their workshops.

### ***Poster Presentation***

#### **Understanding the Development of Peer Leader Metacognitive Skills Through Think Aloud Problem Solving**

- **Amanda Canellas**, Florida International University
- **Renee Suarez**, Florida International University
- **Rosangela Garcia**, Florida International University
- **Jose Alberte**, Florida International University
- **Alberto Cruz**, Florida International University

The Peer-Led Team Learning (PLTL) model establishes a collaborative learning environment that allows for mindful transfer of knowledge between Peer Leaders (PLs) and students. This pilot study employs a qualitative approach to evaluate the interaction between the nature of the PLs' leading strategies as they facilitate their workshops and their underlying metacognitive awareness. A purposive sample of PLs were chosen from a pool of participants who had taken the Approaches to Peer Leading Inventory (APLI) and the Awareness of Independent Learning Inventory (AILI) questionnaire. These PLs were sought to conduct a think-aloud problem-solving session during which they were instructed to verbalize their thought process as they completed the tasks followed by a semi-structured interview. The problem solving session and interview allowed for the PLs to elaborate on their reasoning, further exploring the depth and breadth of the PLs' metacognitive capabilities. We predict the centeredness exhibited by the PLs during their workshops will foster metacognitive awareness of both PL and student. Furthermore, the level of transfer revealed is predicted to be correlated with an increase in metacognitive cognizance. The use of Group Discussion and Supervising evaluation forms will be used for the purpose of triangulation. With the integration of the questionnaires and detailed analysis of interviews, the dependency between the level of transfer and pedagogical approach will be explored. This investigation aims to gauge the role of the metacognitive subcomponents with the evolving interaction of knowledge transfer between PLs and students.

### *Oral Presentation*

#### **Beyond Content Knowledge: Transferrable Skills and Long-Term Impacts of Being a Peer Leader in a PLTL Program**

- **Anthony Chase**, IUPUI
- **Anusha S. Rao**, IUPUI
- **Prathima Lakmala**, , University of South Florida
- **Gabrielle Kline**, IUPUI
- **Izabelle Manning**, IUPUI
- **Pratibha Varma-Nelson**, IUPUI

Numerous academic programs utilize peer-led team learning as a compliment to lecture. These programs have shown to benefit both students and peer leaders. Specifically, students who have been peer leaders have been shown to have improved content knowledge, presentation skills, teamwork skills, group facilitation skills, as well as others. The various skills obtained from serving as a peer leader, however, do not terminate at the end of one's undergraduate program. These skills stay with individuals into the workplace across a variety of fields. Former peer leaders seem to value these experiences to the extent that many of them denote having been a peer leader on their LinkedIn profile. This study examines the value of being a peer leader as it relates to one's current position. In this exploratory sequential mixed-methods design, qualitative interviews were used to develop a quantitative instrument that measures this value. Former peer leaders were asked about the transferrable skills they have obtained from their PLTL experience as well as how that impacts their current position. Thematic analyses of the interviews revealed skills such as leadership skills, teamwork skills, self-confidence and others as being important and relevant to former peer leaders. These skills were then used to develop a quantitative instrument for larger dissemination. Interview data, instrumentation, piloting and reliability testing are presented.

### *Showcase Presentation*

#### **Learning Through Competitive Jeopardy in PLTL Workshop**

- **Shawnan Chen**, University of Texas at El Paso
- **Dania Chairez**, University of Texas at El Paso
- **Ryan Floresca**, University of Texas at El Paso
- **Jessica Guerra**, University of Texas at El Paso

For seventeen years the General Chemistry courses at the University of Texas at El Paso (UTEP) have enhanced student learning by implementation of Peer Led Team Learning (PLTL) Workshops. This Program has enabled creativity development and innovation among the leaders. Here we report that General Chemistry II Peer Leaders have adopted the game Jeopardy to help students understand chemical concepts. Because lecture is passive learning, students do not fully understand how to apply concepts beyond what has been said to them. Using the Jeopardy game in the small, 15-student, learning workshop setting permits Peer Leaders to help students further their understanding of concepts in an interactive way based on team learning rather than lecturing. The game is set up on a tri-fold board and contains envelopes to hold the questions.

This allows the Peer Leader to adapt the game to different topics and create more questions. An element of trickery is also employed in the Jeopardy activity: sometimes the wording in the questions is altered, making the students read the question carefully rather than just plugging numbers into some equation. The game is played in groups of 3 to 4 students which enables them to teach each other, thus furthering their understanding. Following the game, students can reflect on their performance and identify the topics where they struggled the most for further review.

### *Oral Presentation*

#### **Peer-Led Team Learning Applied to Laboratory Instruction**

- **Joseph Dinnocenzo**, University of Rochester
- **Terrell Samoriski**, University of Rochester

Problem-solving (PS) and inquiry-based (IB) laboratory experiments offer numerous advantages over demonstration (i.e. cookbook) experiments. Despite their clear advantages, PS/IB experiments place significantly greater intellectual demands on students. As a result, the potential benefits of PS/IB experiments often go unrealized. This leads to frustration for both students and instructors. We have responded to this pedagogical challenge at the University of Rochester by applying the Peer Led Team Learning (PLTL) model to laboratory instruction. Recent efforts to design, implement, and evaluate the PLTL model for laboratory instruction will be described. Topics to be discussed include: the design of appropriate discussion problems (pre-lab, in-lab, and post-lab), logistics, leader training, student feedback, and the evaluation of learning outcomes.

### *Poster Presentation*

#### **Leadership Development through Peer Facilitation**

- **AE Dreyfuss**, Peer-Led Team Learning International Society

Students who are Peer Leaders through the Peer-Led Team Learning model are in a unique position because they are responsible for leading a group of students to learn course material over the course of a semester within the context of a structured program. The PLTL program at the study site, in having established practices and institutionalized support had been in place for over 15 years. This structure allowed for regularity and stability for the "peer-led workshop" since all students taking the courses also participated in workshop, and thus had the experience of a peer-facilitated group.

Twenty-two (22) former Peer Leaders were interviewed about their experiences, in a study (Dreyfuss, 2012) conducted at a four-year public institution in the Northeast United States. Their experiences as Peer Leaders were embedded in the context of the PLTL program in an introductory science course with some 700 students enrolled per semester. The study found that study participants depicted leading as explained in three metaphors. These metaphors are familiar and familial models found in an Older Sibling, the study participants' internalized views of leadership described by the Faces of the Mountain, and a role supporting leading and learning

in the Catalyst. The findings are presented in participants' words to illustrate the many and subtle shadings inherent in meaning-making regarding the phenomenon of leading.

The study participants explained their reasons for becoming a Peer Leader, the initial challenges of engaging students in the workshop setting, and what they learned from leading. They provide definitions of leading through the three metaphors which form a continuum of experiences related to Relational Leadership (Uhl-Bien, 2006) and leadership development.

### ***Poster Presentation***

#### **After Implementation: An Examination of Supporting Factors Toward Sustainability**

- **AE Dreyfuss**, Peer-Led Team Learning International Society
- **Jose Alberte**, Florida International University

Many studies have demonstrated the improvement in students' performance in courses that include a peer-led session; other studies support the learning by Peer Leaders in their role (see [www.pltlis.org](http://www.pltlis.org)). However, no matter the improvement in important measures for retention in the course, the major, in STEM and non-STEM disciplines, many PLTL programs do not continue after their initial implementation. Most PLTL programs have started with funding from grants, with a defined period to implement the intervention. Funding has generally been used to pay peer leaders, and when the grant funds run out, the program ends.

What factors demonstrate that a PLTL program has become part of the institutional culture? What role does the institution play in sustaining a PLTL program, so that the benefits continue to accrue for successive cohorts of students and Peer Leaders? This poster will present two contrasting PLTL programs as case studies, by examining their operations in light of the Six Critical Components, and comparing their sustainability to Rogers'<sup>TM</sup> (2003) five factors.

### ***Oral Presentation***

#### **Training and Supervision: A Validity Study on Workshop Observation Form**

- **Daniel Flores**, Florida International University
- **Alberto Cruz**, Florida International University
- **Jose Alberte**, Florida International University

Training and supervision of Peer Leaders (PLs) is a major challenge in any PLTL program. As a critical component for successful implementation of PLTL, this programmatic element needs a robust instrument to aid in the evaluation of the workshop. At Florida International University Peer Leaders (PLs) are assessed and given feedback from Peer Leader Mentor Supervisors (PLMS) using newly developed evaluation forms. PLMS are experienced PLs assigned to evaluate PL performance and the workshop, provide feedback, and mentor the PL. Based on responses on evaluation forms, four themes emerged: Workshop Interactions, Critical Thinking, Time Management, and Effective Presentation. The new form incorporates these four themes as sections, along with quality assurance, and open-ended questions. To validate the newly



developed forms, an exploratory factor analysis was used to establish constructs followed by a confirmatory factor analysis to test significance of the established constructs and their line items. This analysis is the first of four of its type to create a 360° Evaluation of the PL. The aim of adapting the 360° Evaluation to PLTL is to create a suitable set of instruments for other institutions to evaluate PL performance.

### *Showcase Presentation*

#### **Showcase: OCHEM BINGO- A Gallery Walk Game for Naming and Recognizing Organic Functional Groups**

- **Sahlma Hernandez**, University of Texas at El Paso
- **Omar Marin Sanchez**, University of Texas at El Paso
- **Mahesh Narayan**, University of Texas at El Paso
- **James Becvar**, Professor of Chemistry, University of Texas at El Paso

Organic chemistry is a challenging course that students with many careers related to science have to take. However, these students also see some elementary organic chemistry topics like nomenclature and functional group structure in their general chemistry course. Naming and recognizing these important features in organic compounds can be difficult for many students to study and memorize. This activity is called OCHEM BINGO, a game to learn organic functional groups based on the game BINGO. Quickly recognizing and naming the functional groups is often more challenging than recognizing alkanes, alkenes, or alkynes. CHEM BINGO contains cards showing organic compounds with one functional group. Students receive one of several different paper BINGO cards with 16 different organic compounds as names or structures. The peer leader has a deck with all the organic compounds on the different cards. Students must recognize the named compound and correlate the named compound with the drawing that is on their BINGO card. If there is such drawing, the student puts a marker on top of that drawing stating that item has already been called out. When a student believes the peer leader has called all of the organic compounds on their card, they yell "OCHEM BINGO!" stating that they completed the task. The peer leader will ask for the names of each of the drawings on the student's paper and review the information given. If all organic compounds were mentioned, that student wins the game. If not, the student is out of the game but can watch the rest of the game. This is a fun and competitive game activity where students will gain knowledge about recognizing and naming functional groups.

### *Oral Presentation*

#### **PLTL as Critical/Cultural Communication Praxis in Introduction to Speech Communication**

- **Volrick Higgs**, Miami Dade College

This presentation will draw connections between PLTL and the guiding commitments of Critical Communication Pedagogy (CCP) (Warren and Fassett 2007) focusing on specific examples integrating PLTL into introductory speech communication courses. Warren and Fassett's (2007) ten guiding commitments of CCP offers a theoretical framework at the intersection of

communication and critical pedagogy through which to better understand PLTL as a critical intervention for underrepresented and marginalized students. Starting with CCP as the underlying framework, I created modules aimed at helping students learn critical literacy, alliance building, dialogue, and reflexivity. Sample modules "Social Constructionist Perspective: Women in the Army" and "Examining Constructions of Women in Media (Examples of Pop Media & Narrative Accounts)" will be shared to further the discussion of how PLTL can be used in the introductory speech communication course.

### ***Oral Presentation***

#### **Exploring the Impact of PLTL on Peer Leader and Students' Self-Efficacy Beliefs**

- **Volrick Higgs**, Miami Dade College
- **Will Neris**, Miami Dade College

Research suggests that students' abilities to navigate the rigors of a STEM education successfully are linked to their self-efficacy beliefs. There are four primary sources of self-efficacy: mastery experience, vicarious experience, social persuasion, and physiological reaction (Bandura, 1997; Gist & Mitchell, 1992; Pajares, 2005). At Miami Dade College-Eduardo J. Padron Campus, the Faculty Institute of Teaching and Learning (FITL), PLTL offers students and Peer Academic Leaders (PAL) the opportunity to develop domain-specific self-efficacy in STEM and non-STEM courses as well as communication and leadership self-efficacy which transcend any specific career or educational domain. Does participating in the Peer Academic Leaders (PAL) program have any impact on participants domain-specific STEM self-efficacy and/or Teamwork/Leadership self-efficacy beliefs? Does students' participation in PLTL have an impact on their self-efficacy beliefs? This presentation will present a preliminary analysis of data gathered from both Peer leaders and students to explore the impact of PLTL on participants' self-efficacy beliefs.

### ***Oral Presentation***

#### **The long term professional effects of being a peer leader in a peer-led team learning course: A mixed-methods exploratory study**

- **Gabrielle Kline**, IUPUI
- **Izabelle Manning**, IUPUI
- **Anthony Chase**, IUPUI
- **Pratibha Varma-Nelson**, IUPUI

Instrument development is a challenging task in an area that has not been explored with much quantitative research. Specifically, the long-term effects of being a peer leader in a peer-led team learning (PLTL) course has not been quantitatively examined with much instrumentation. This study shows the development of a quantitative instrument that examines the value of being a peer leader as it relates to one's current position. Questions were derived from thematic analyses of interviews indicating that former peer leaders recognize leadership skills, the ability to cope with many challenges (including not having the right answer), collaboration/teamwork skills, self-confidence, and problem-solving skills all as being relevant and frequently used in their current

work. In this exploratory sequential mixed-methods design, transferable skills are identified from qualitative interviews and then further developed into a quantitative instrument. Results from instrument piloting and reliability testing are presented.

### ***Poster Presentation***

#### **PLTL in Middle School Works**

- **Karen LesPierre**, Path to College Program, The First Tee of Metropolitan New York

The ACE Scholars Program at The First Tee of Metropolitan New York has had as its purpose to implement group learning in its education program for the last four years. We have substantial positive results in academics and well-being. Originally, we started out simply with group work, but now realize that we have been utilizing PLTL methods and practices all along, as a result of my previous work with PLTL in chemistry at CCNY.

The First Tee of Metropolitan New York is a 501C3 youth organization which instills nine core values, such as respect and honesty, in youth through the merger of golf and educational programs, with a focus on serving underrepresented and minority groups. In Spring 2016, we partnered with Breakthrough New York to model their middle school program, preparing students for high school through advanced academic coursework and consulting with parents and students in the application process with the goal of their attending top tier high schools and colleges.

We found that the problem was that our participants needed holistic academic support which could be enhanced by their playing the sport of golf. As golf is in its off-season during the winter months, we also needed to fill the gap to have something in which our families could engage during the golf off-season. Therefore, The First Tee decided to partner with Ms. Karen's A+ Tutoring Center, LLC to provide tutoring services to its participants. As our program grew and expanded, we incorporated the ACE Scholars Program throughout the academic year. Each session, students required 20 hours of academic instruction from peer leaders. As a result, students' grades increased and their socio-emotionally well-being improved, as gauged by surveys.

### ***Oral Presentation***

#### **Peer Teaching to Expand Information Literacy Instruction**

- **Sara Lowe**, IUPUI
- **Katharine V. Macy**, IUPUI
- **Bronwen K. Maxson**, University of Oregon
- **Sean Stone**, IUPUI

Peer-teaching, used extensively in other disciplines and campus units, has extended its reach into academic libraries over the last decade. Implementing peer-to-peer strategies presents challenges of time, resources, and institutional support. This presentation will detail an internship program librarians developed to train undergraduates to become peer teachers in the vital critical thinking concept, information literacy. Information literacy is the set of competencies students need to find, use and evaluate information effectively and ethically. The presentation will highlight the

curriculum created to train peer teachers. Presenters will encourage participants to strategize where in their classes or curriculum they could utilize peer teachers in teaching non-discipline based concepts such as critical thinking and information literacy.

### *Oral Presentation*

#### **Designing PLTL Problem Sets to Develop Higher Order Thinking**

- **Lisa Kuehne**, Washington University in St. Louis

Calc PLTL at Washington University serves over 900 students each academic year. Many of these students are not math majors, but are taking the course to meet a requirement or prerequisite. Calc PLTL was created as an optional resource to help students perform better on exams by developing and improving problem-solving skills through group work on challenging problems. Problem sets are designed based on best practices for learning, including spaced practice, interleaving and retrieval practice. Examples of ways in which to build an effective problem set as well as suggested ways to test for effects will be presented.

### *Oral Presentation*

#### **Placement Factors Impacting PLTL Success**

- **David Malik**, IUPUI
- **Lin Zhu**, IUPUI
- **Marie L. Nguyen**, IUPUI

The IUPUI Department has long used a Chemistry Placement Exam for determining suitability for admission to the science majors' general chemistry sequence. Recently, the Chemistry exam (a version of the ACS Toledo version) was replaced by the ALEKs Math Placement Test. Previous reports had suggested correlation in ALEKs scores in chemistry placement accuracy was strong. In disagreement with those reports, we provide evidence on the consequences of using the chemistry placement exam alone, the ALEKs Placement exam alone, and the chemistry placement exam and the ALEKs Placement exam together. The impact on student success statistics was dramatically impacted by student preparation as measured by exams and college level pre-requisites.

### *Showcase Presentation*

#### **Showcase: Solu-Bingo- A Gallery Walk Activity**

- **Marianne Marin**, University of Texas at El Paso
- **Chelsea J. Moreno**, The University of Texas at El Paso
- **Edna Tepezano**, The University of Texas at El Paso
- **Paulina Torres**, University of Texas at El Paso
- **Juan C. Noveron**, Associate Professor, University of Texas at El Paso
- **Jeff Saupe**, University of Texas at El Paso

- **James Becvar**, Professor of Chemistry, University of Texas at El Paso

Developing a fun activity that can keep college students engaged is not usually the easiest thing to achieve. Solu-Bingo is a speed-dependent game created to allow students to engage with a competitive aspect while pushing them to work with peers and solve problems together. This game merges the classic game of Bingo with fundamental chemistry concepts. Although this specific activity was designed for aqueous chemistry, it can be modified to fit various topics from First Semester General Chemistry. Each pair of students will receive a bingo sheet, which contains the answers for questions previously developed by the peer leader. During the activity, the peer leader will adopt the role of the caller while students solve the chosen problems to determine if the answer is on their respective card. Students must rationalize problems within the context of the chosen subject without the specifications and format usually provided by traditional questions. Students should critically approach every question rather than think only within the testing parameters they have grown accustomed to. The competitive aspect of the game also incentivizes students to remain on task and be active in their own learning. We will show how the outcomes of this friendly competition between students can prove to be beneficial not just in learning the material but in retaining it as well.

### *Oral Presentation*

#### **Lessons and Results from a Peer-Led Undergraduate Organic Chemistry Research Initiative (PLURI)**

- **Rob Minto**, IUPUI
- **Sebastien Laulhe**, IUPUI
- **Anthony Chase**, IUPUI

It is well documented that PLTL leads to major pedagogic gains elicited from the reciprocal teaching environment it generates for the students. However, this environment has been mainly limited to workshop-like recitations in which the students solve problems provided to them by instructors and supervised by peer leaders. With the development of undergraduate research modules in teaching laboratories using the CASPiE model, we saw an opportunity to develop a Peer-Led Undergraduate Research Initiative (PLURI) module in which peer teaching assistants (PTAs) actively guide a research project, while students through their in class research will contribute to the project design, data collection, and analysis. This approach not only benefits the students taking the lab, but also represents a unique research and managerial opportunity for the PTAs. Additionally, in contrast to traditional CASPiE modules, PLURI projects examine state-of-the-art research projects that advance the scientific knowledge and that will be published in peer-reviewed journals with the undergraduate students as authors. PLURI aimed to expose students to a real research experience, though a high-risk/high-reward approach of in which experimental failure is an option, thereby exposing students to the realities of the scientific inquiry and helping them develop resilience and perseverance. For the past three semesters, we have performed qualitative interviews of the students and PTAs involved in these new research exposure modules. Research data and results will be presented.

### *Oral Presentation*

#### **The impact of PLTL on non-cognitive factors in two Foundation Mathematics Courses**

- **Nadia Monrose**, University Of The Virgin Islands
- **Camille McKayle**, University Of The Virgin Islands
- **Robert Stolz**, University Of The Virgin Islands
- **Angelicque Blackmon**, University Of The Virgin Islands
- **Sandra Romano**, University Of The Virgin Islands

The University of Virgin Islands' (UVI) Growth model was designed to address systemic inequities in undergraduate students' performance in STEM courses. This intervention model is based on Tinto's models of student retention and persistence (Tinto, 1993). The UVI Growth Model also integrates Growth Mindset theory (Dweck 2006) into student and faculty professional development and includes support activities utilizing formal and informal peer-to-peer interactions to enhance undergraduate STEM learning environments. This study shows how peer led team learning (PLTL) serves as a moderator of mathematics self-efficacy and anxiety, stereotype threat, and sense of belonging, three non-cognitive psychological variables that influence performance in undergraduate STEM courses. Valid and reliable pre-post surveys such as the Mathematics Self-Efficacy and Anxiety Questionnaire of the MSEAQ and Sense of Belonging Inventory (SOBI) were administered before and after students participated in 12 weeks of PLTL sessions. Results show that men and women in foundations mathematics courses attending PLTL sessions, at an HBCU, have similar mathematics self-efficacy, anxiety and sense of belonging scores with both showing high scores for testing anxiety. Ongoing analysis of data have allowed us to also use these results to make improvements to our training of the peer leaders to include growth mindset training, strategies to increase mathematics self-efficacy, decrease mathematics anxiety in general and mathematics testing anxiety specifically, and improve sense of belonging. PLTL activities include short writing sessions, identifying fixed mindset phrases and providing follow up growth mindset phrases, and sharing of good test preparation techniques.

### *Oral Presentation*

#### **Partnering in developing a new PLTL program at a neighboring institution**

- **Cassandra Lissett Orozco**, The University of Texas at El Paso
- **Jonathan Muniz**, The University of Texas at El Paso
- **Aidely Aranda**, The University of Texas at El Paso
- **Milka Montes**, University of Texas of the Permian Basin

Using a neighboring to neighboring campus strategy, it is possible to extend Peer-Led Team Learning from west coast to east coast. The University of Texas at El Paso (UTEP) provides the example of an experienced program assisting a neighboring campus, the University of Texas of the Permian Basin (UTPB) in establishing a new PLTL program in general chemistry. The idea is that students from class are put into small learning community groups in workshop where they take turns listening and teaching each other. Students are guided and encouraged by their peer leaders to participate in activities that connect textbook material to something practical. They are

encouraged to write down observations of what they see in an experiment and are challenged to verbalize the reason for such phenomenon based on what they are hearing from lecture and studying in their book material. A campus that has an established PLTL program can assist a neighbor if the following conditions are met: there must be demand and need, there must be willingness, there must be faculty buy-in, and there must be a process. Do faculty observe a low passing rate in course? Are students demonstrating the need for extra help beyond Teaching-Assistant-led recitation sessions or tutoring hours? Are students not knowing how to engage in their learning or how to study material? We will give details of how this campus-to-campus facilitation process has occurred using a workbook as the facilitating resource. The outcome in starting a new PLTL in an institution is solving the challenge of communicating between long distances as an integral part of this dissemination.

### ***Showcase Presentation***

#### **Showcase: The Six Circle Challenge**

- **Ashly Powell**, University of the Virgin Islands
- **Jordina Pierre**, University of the Virgin Islands
- **Darryle Cyrille**, University of the Virgin Islands
- **Mackean St. Croix**, University of the Virgin Islands
- **Nadia Monrose**, University Of The Virgin Islands

At the University of the Virgin Islands, PLTL is institutionalized in two foundational mathematics courses, Introduction to Algebra Concepts I & II. The Six Circle Challenge is presented in Part I of these two courses. This problem was adopted from an activity included in the text, *Mathematical Reasoning for Elementary Teachers* (Long, DeTemple, & Millman, 2009) designed to build on students' knowledge of adding, subtracting, and multiplying integers.

In the Six Circle Challenge, participants begin working in pairs where they are given numbers in larger circles whose sums are found by adding the values in the two adjacent smaller circles. Students typically begin to solve this problem using the guess and check method. When they have found the solution, they are then asked about the uniqueness of the solution, a very advanced idea in mathematics but one that they can relate to in this context. After students have informally responded to the uniqueness of their solution, they are led to an algebraic representation of the problem and asked to manipulate the equations to find a solution. This step is a challenge in its original context because solving systems of equations has not been introduced. This problem is followed by a second one where integer multiplication and division is used. Students pairing and sharing ensure that everyone is engaged and active during the activity. Peer-leaders are using the time that the students are working in pairs to formalize the problem-solving process. The peer-leaders follow up by facilitating the whole group discussion.

### *Oral Presentation*

#### **Birds of a Feather: An Exploratory Study of the Effects of Similarity with Peer-leaders**

- **Virginia L. Rhodes**, IUPUI
- **Evava Pietri**, IUPUI
- **Leslie Ashburn-Nardo**, IUPUI
- **Pratibha Varma-Nelson**, IUPUI

Students experience several benefits from participating in peer-led team learning (PLTL). More specifically, research shows that PLTL positively influences students' self-efficacy in science, technology, engineering, and math (STEM), and these effects are particularly pronounced for students who have been traditionally underrepresented in STEM (e.g., women and ethnic minorities). However, previous research has yet to explore whether the peer-leaders' gender and ethnic identity influences students' self-efficacy. Literature on role models (i.e., individuals with whom one feels similar and aspires to be like) would suggest that peer-leaders who share the same gender and ethnic identity as the students in their group can increase those students' self-efficacy. Across two PLTL chemistry courses, the current study examined whether having the same identity (i.e., gender or ethnic identity) as their peer-leader may be particularly beneficial for women and ethnic minorities. At the beginning of the semester, women and ethnic minorities reported lower self-efficacy compared to men and White students. However, at the end of the semester, female and minority students with a peer-leader who matched their gender or ethnicity reported higher self-efficacy and did not differ significantly from their male or White counterparts. Thus, identity matching plays an important role in whether a peer-leader acts as an effective role model, and peer-leaders with overlapping gender and ethnic identities can increase women and ethnic minorities' self-efficacy in STEM. Therefore, STEM educators may consider matching students with similar peer-leaders.

### *Oral Presentation*

#### **PLTL Workshops: C++ Data Structures (CSII) and Introductory Python**

- **Eva Ruiz**, University of Houston Downtown
- **Ivan Rocha**, University of Houston Downtown

Supplemental instruction, tutoring, and other means of helping students in higher education with their coursework has been established in numerous schools. However, there are few schools who have implemented the Peer Led Team Learning (PLTL) Workshops method to help students fully comprehend difficult subjects, such as Computer Science topics. At the University of Houston - Downtown (UHD), we currently run C++ Data Structures (CSII) and Introductory Python workshops that mirror the same topics that the professors cover every week in order to aid the students throughout their learning process. Because these workshops are guided by a student who has mastered the material and are ran by the participants of the workshops, the participants can obtain a better understanding of the material due to the collaboration, discussions, and teamwork that these workshops promote. Most of the workshop material that we cover include Computer Science topics that students usually have a hard time understanding such as logic, linked lists, recursion, etc. By collaborating with other students to work through the problems and workshop material, these topics are broken down to a level that may have not been



reached in their lectures. As a result, the participants gain a deeper understanding of the topics covered in class, perform higher, and are better prepared for their future course work as they continue to pursue their STEM degree.

### *Oral Presentation*

#### **PLTL Pre-Registration: Streamlining PLTL Registration for Large Programs**

- **Marie Schier**, University of Texas at Dallas

Has your PLTL program outgrown your current registration processes and procedures? In fall 2018, the PLTL program at UTD implemented a pre-registration process to meet student demand, streamline PLTL registration, and prevent system failure. Learn how you can adopt a similar system at your institution!

### *Oral Presentation*

#### **How PLTL & Demographics affect Sense of Belonging and Belonging Uncertainty in Introductory Physics**

- **Siera Stoen**, Washington University in St. Louis
- **Angela Fink**, Washington University in St. Louis
- **Mike Cahill**, Washington University in St. Louis
- **Regina Frey**, Washington University in St. Louis
- **Mark McDaniel**, Washington University in St. Louis
- **Mairin Hynes**, Washington University in St. Louis
- **Nicole Hudson**, Washington University in St. Louis

A recent concern for educators is that URM, women and less prepared students might have a lower sense of belonging and higher belonging uncertainty, particularly in STEM courses. PLTL may be a pedagogy that strengthens sense of belonging because it allows students to form a community of learners with in large introductory STEM courses. We will explore whether or not PLTL can boost their sense of belonging and lower their belonging uncertainty in Introductory Physics at a selective private university. We will test whether the PLTL effect varies across race, first generation status, gender, and preparedness of students. In addition we will report on how sense of belonging and belonging uncertainty predict performance in Introductory Physics. Identifying the characteristics of students that have a low sense of belonging and high belonging uncertainty will allow instructors to strategically intervene with students who may need additional support.

### *Poster Presentation*

#### **Peer Led Team Leading in an Interprofessional Practice and Educational Curriculum**

- **Cynthia Stone**, IUPUI
- **Laura Romito**, IUPUI
- **Brittany Daulton**, IUPUI

The Peer Led Team Learning (PLTL) program in the Indiana University Interprofessional Practice and Education (IPE) Center was launched in 2017. Recruitment of twelve peer leaders from the pilot year were trained to assist with the Team Education Advancing Collaboration in Healthcare (TEACH!) curriculum. Students participated from the Schools of Dentistry, Optometry, Public Health and Rehabilitation Sciences, Medicine, Nursing and Social Work learning how to work collaboratively to improve health outcomes. TEACH! provides a longitudinal, competency based, systematic sequence of foundational interprofessional learning and assessment experiences called Interprofessional Learning Anchors which move hundreds of learners at a time through levels of Exposure and Immersion to Entry-to-Practice Competence in collaborative practice. Due to the large scale nature of Learning Anchors 1-3, learner teamwork is directed by a session leader with a faculty member facilitating several groups or learners. Use of PLTLs in these anchors was intended to increase facilitator capacity while enhancing learner engagement. PLTLs were introduced in each of the first learning anchors which occurred throughout the academic year. A curriculum enhancement grant was awarded which enabled an official pilot of the program. The project sought to answer the questions; 1) Can IP student learning outcomes be achieved with Peer Leaders? 2) What impact does serving as a Peer Leader have on the Peer leaders? 3) Is the PLTL model a reasonable and sustainable tool for IP learning? Results indicated the PLTLs were satisfied with their training and improved their confidence and skills in interprofessional collaboration.

### *Oral Presentation*

#### **It takes a village: Strengthening Campus Partnerships to Synchronize and Sustain PLTL Programs**

- **Gabriela Szteinberg**, Washington University in St Louis
- **Jay Sriram**, Washington University in St Louis
- **Lisa Kuehne**, Washington University in St Louis
- **Megan Daschbach**, Washington University in St. Louis
- **Nicole Hudson**, Washington University in St. Louis

As PLTL programs have now been established within three science departments at Washington University in St. Louis, partnerships were strengthened between the Learning Center and the academic departments. This collaboration has allowed the programs to support each other logistically and philosophically, offer guidance as a new Physics PLTL program emerged, align the training curriculum, provide ongoing assistance to Peer Leaders, and ensure proper functioning of the programs. The partnership structures will be discussed, with supporting evidence from Peer Leaders, as well as staff and faculty involved in the programs, in relation to how the partnerships have helped strengthen the programs.

### *Poster Presentation*

#### **General Chemistry I Concepts Implemented in Everyday Careers: Developing and Benchmarking an Engaging Workbook to Improve STEM Learners' Understanding, Interest and Attitudes of Chemistry**

- **TeErica Tatum**, Dillard University
- **Taylor Bosie**, Dillard University
- **Tomeika Simeon**, Dillard University

Dillard University (DU), a Historically Black College and University (HBCU), offers the Bachelor of Science degrees in five STEM majors which are Biology, Chemistry, Computer Science, Mathematics and Physics housed in the College of Arts and Sciences (CAS). Data from the Office of Institutional Research revealed that from 2011-2016 science gateway courses, such as, the first two biology courses, Biology (BIO 111; BIO 112), the first four chemistry courses, General Chemistry (CHE 111; CHE 112) and Organic Chemistry (CHE 211; CHE 212) are potential barriers to retention and completion for many aspiring STEM majors at DU.

We have piloted PLTL for CHE 111, of the students who elected to participate in the workshops their grades demonstrated a continued improvement in exam scores and had a higher overall grade for the course. Of the ones that attended many spoke about how PLTL would be beneficial for assisting in preparing for various graduate, medical and professional schools applications. From this feedback, the idea to create a workbook and/or action guide of chemistry based problems for various careers came to fruition.

With this in mind, our goal is to create an active-learning environment with various career-related chemistry concept scenarios that will help in increasing students learning of various chemistry concepts, increase retention rates for General Chemistry, the confidence in their ability to learn chemistry, and to prove these undergraduate concepts useful for graduate school.

### *Oral Presentation*

#### **Constructing the Critical Thinking Assessment in Biology: A Mixed Method Validation Study**

- **Nicole Vargas**, Florida International University
- **Richard Suarez**, Florida International University
- **Jose Alberte**, Florida International University

Peer Leaders (PLs) are trained to facilitate discussion and foster in-depth understanding; this experience may influence the maturation of PLs' critical thinking abilities. Critical thinking is the intellectually disciplined process of conceptualizing, analyzing, applying and manipulating information to arrive at an answer or conclusion. The aim of this study was to assess the components of critical thinking: specific knowledge base, experience, competencies, attitudes and standards within general biology. We developed and distributed an assessment to PLs to evaluate the relationship between time of exposure to the PLTL model and critical thinking

ability of the PL. Through this examination, participants were classified into the three levels of critical thinking: basic, complex and commitment. This explanatory concurrent mixed methods study categorization occurred through validity tests completed with student focus groups and faculty expert reviews; and reliability tests completed through the creation of composite scores. It allows for a greater in-depth exploration of PL critical thinking skills for the purpose of extending the breadth and range of inquiry through the use of these different methods. We predicted a positive trend in the data where PLs with longer participation in the program experience a greater level of critical thinking. This research may assess differences in critical thinking between PLs and non-PLs to establish the effect PLTL has on students' critical thinking abilities.

### ***Poster Presentation***

#### **The PLTL Melting Pot: Accommodating Different Types of Students**

- **Carmen Vaz**, University of Texas at Dallas
- **Vartika Varshney**, University of Texas at Dallas

Peer-Led Team Learning (PLTL) is a peer-facilitated program that accommodates all students, including those that are classified as traditional and non-traditional. In order to have a cohesive session that every student benefits from, peer leaders (PLs) must possess the skills necessary to foster an environment that is open to students of all ages, backgrounds, ethnicities, educational backgrounds, etc. There are various tools also utilized to facilitate discussion, inspire teamwork, and stimulate problem-solving amongst these diverse student populations. We will be exploring various facilitation techniques PLs can use to engage their students of all backgrounds in order to increase student learning outcomes.

### ***Oral Presentation***

#### **Co-Creation of Knowledge in Peer-Led Team Learning and Cyber Peer-Led Team Learning Environments**

- **Sarah Wilson**, University of Evansville
- **Pratibha Varma-Nelson**, IUPUI
- **Kyle Hartke**, University of Evansville

Peer-Led Team Learning (PLTL) and cyber Peer-Led Team Learning (cPLTL) workshops are an educational intervention based on Vygotsky's principles in which students, with the facilitation of a trained undergraduate peer leader, work collaboratively in small groups to develop problem-solving and critical thinking skills. The purposes of this parallel convergent mixed methods study was to assess the impact of implementing cPLTL in an organic chemistry course and evaluate dialogue for evidence of co-construction of knowledge during PLTL and cPLTL workshops. Statistical analyses revealed comparable attendance rates, distributions of course grades, and achievement on an American Chemical Society First-Semester Organic Chemistry Exam. However, the frequency of discourse phases were significantly different among students from the PLTL and cPLTL settings. Implications for faculty will be suggested.

*Oral Presentation*

**Using Zoom in cPLTL Workshops**

- **Lin Zhu**, IUPUI
- **Blake Brookshire**, IUPUI
- **Anthony Hunger**, IUPUI
- **Ethan Cornwell**, IUPUI
- **Laurinda Godfrey**, IUPUI

cPLTL is the evolution of Peer-Led Team Learning (PLTL) to an online format. cPLTL model engages students as active participants in online activities that involve complex problem solving, working collaboratively, communicating effectively, and fostering self-directed learning. Zoom has used as the online platform to conduct cPLTL workshops at IUPUI for two years. In this talk, we will discuss how we utilize the features of Zoom, such as whiteboard, breakout rooms, chat, in cPLTL workshops.