5TH STEM ED ANNUAL CONFERENCE

SCIENCE
TECHNOLOGY
ENGINEERING
MATHEMATICS

It Takes a Community!

Towards Transformitive Practices in STEM Education

Thursday, February 10th - Saturday, February 12th, 2022
Isla Grand Hotel
South Padre Island, Texas

UTRGV™
College of Education & P-16 Integration

UTRGV™
College of Engineering & Computer Science

UTRGV™ Office of Community Engagement

NSF

Conference Overview

Thursday, February 10, 2022

10:00 AM – 2:00 PM	Advisory Board Meeting (Closed Meeting)
5:00 PM – 8:00 PM	Preconference social on the Hammerhead Deck
	Live music by Vanguard Academy High School students Ricky Hernandez, Carlos Hernandez, Antonio Hernandez, Miguel Hernandez, Vanesa Calvillo, Viviana Calvillo, Nikssa Cuellar

Friday, February 11, 2022

8:00 AM – 4:00 PM	Check-in and onsite registration
9:00 AM – 10:30 AM	Concurrent Session A
10:45 AM – 11:15 AM	Concurrent Session B
12:15 PM – 1:45 PM	Luncheon featuring Keynote Speaker, Dr. Christopher Wright
2:00 PM – 3:00 PM	Concurrent Session C
3:15 PM – 4:15 PM	Concurrent Session D
3:45 PM – 4:45 PM	Poster Session

Saturday, February 12, 2022

8:30 AM – 12:00 PM	Check-in and onsite registration
9:00 AM – 10:30 AM	Concurrent Session E
10:45 AM – 11:45 AM	Concurrent Session F
12:15 PM – 2:00 PM	Luncheon featuring Keynote speaker, Dr. Joseph Whittaker
	Recognitions & Closing Business

Day 1 Friday, February 11, 2022

7:45 AM – 9:00 AM

Closed Session
This is a closed session for invited participants. Breakfast will be provided. For in-person attendees.

Location: Sundial

Concurrent Session 1
9:00 AM – 10:30 AM

A1 Practitioner Session

Energy literacy among high school students
Energy literacy is a broad term encompassing content knowledge as well as a citizenship understanding of energy that includes affective and behavioral aspects. In this study, we assessed the energy literacy of high school students and studied the effect of factors such as parental education, gender, and school location on the level of energy literacy of students. The results showed that only in the behavioral part, the male students had better proficiency than females and in other parts they are the same, there weren't any difference between performance of students in various parts based on school location and parental education was an important factor in cognitive part.

Samira Bahrami, Farhangian University, Noushin Nouri, The University of Texas Rio Grande Valley, and Maryam Saberi, Ministry of Education

Location: Royal

A2 Research and Scholarship

El papel de la mujer en la transformación y promoción de la educación para la salud *(Presentadora Remoto)*
Presentamos los resultados de un estudio de educación en salud para comprender a mujeres y madres de familia que viven en condiciones de vulnerabilidad cultural, económica y social. Pudimos desarrollar prácticas transformadoras mediante el desarrollo de alfabetización comunitaria informal sobre salud. Atender las necesidades de las mujeres de las comunidades mexicanas es uno de los compromisos sociales de la universidad.

S. Lizette Ramos de Robles & Beatriz Verónica Panduro Espinoza Universidad de Guadalajara, México

The role of women in the transformation and promotion of health education (Remote Presenter)
We present the results of a health education study to understand women and mothers of families living in conditions of cultural, economic, and social vulnerability. We were able to develop transformative practices by

developing informal community health literacy. Attending to the needs of women in Mexican communities is one of the university's social commitments.

S. Lizette Ramos de Robles & Beatriz Verónica Panduro Espinoza Universidad de Guadalajara, México

The stigma surrounding underrepresented minorities in STEM is affecting the United States globally
Over the last few decades negative stigmas have worked their way within the STEM field. The lack of minority representation has created an overwhelming gap, which is now moving over to create a weak global presence.

Cassia Guajardo & Johnny Salinas, The University of Texas Rio Grande Valley

This is not a research article: an invitation to mobilize knowledge from the epistemological borderlands of social science (Remote Presenter)
This paper recounts a teaching-research collaboration in the U.S. and Brazil. Via Anzaldua's (1987) borderlands, authors problematize the epistemological borders of Western social science. Findings illuminate: 1) how social science borders are policed, 2) researchers might allow space for not-knowing, and 3) potential for more expansive research epistemologies and ontologies.

Tricia Kress, Patricia Krueger-Henney, Simone Amorim, University of Massachusetts Boston

Location: Majestic

A3 Research and Scholarship

The importance of culturally relevant practices in engaging underrepresented learners in STEM
(Hybrid Presenters)
A synthesis of several studies focused on identifying evidenced-based practices to promote college student success among underrepresented learners in STEM will be presented to provide insight to educators and practitioners on effective approaches that can be used to engage diverse learners and nurture them toward their pursuit of STEM careers.

Amy A. Weimer, Nick Weimer, Texas State University

Integrating technology into the STEM classroom and work-based learning to maximize skills for local employers
Workforce investment boards, community colleges, and K12 CTE programs prepare students for workforce. Translating formal education to entry-level STEM jobs is challenging. Technology can support diverse learners and accelerate their skills acquisition. Schools can implement technologies effectively to develop local workforces. This presentation demonstrates technology for STEM youth and adults.

Melissa Sadler-Nitu, The University of Texas Rio Grande Valley

Social, cultural, and psychological obstacles to advancing STEM agendas in rural Texas (Remote Presenter)
Educators are often faced with unique anti-science sentiments when trying to promote STEM initiatives in rural contexts. Following a review of the historical controversy surrounding evolution by natural selection, this

roundtable will explore the current obstacles faced by STEM educators and consider what opportunities for research exist as a result.

Brandon Bretl, University of Texas Tyler

Location: Sabal

A4 Practitioner Session

JSTEM: promoting STEM during the COVID-19 pandemic

The UTRGV JSTEM Program hosted South Texas high school students from La Joya and Vanguard Academy in bioinformatics-based experiential learning during Summer 2021. Traditionally the JSTEM Program takes a hands-on approach to engage and excite area high school students in journalism and STEM. This program was adapted to zoom-based collaborative research in which students investigated previously identified drug target genes for changes in expression in curated clinical cancer samples. Students performed ANOVA, Kaplan Meier survival analyses and Pearson correlations using the GEPIA_2 platform. The program culminated in a symposium where students presented their work to the UTRGV community. Student participations learned about team science, cancer research and resilience during the pandemic.

Megan Keniry, The University of Texas Rio Grande Valley

Location: Sundial

A5 Practitioner Session

Teaching and learning through STEM activities and student organizations

This practical presentation enables teachers to explore new ideas and learn how to integrate STEM Teaching and Learning in a Pandemic and Post-pandemic period. STEM is a great tool that allows educators to create and establish a sustaining Community that empowers students building their own intrinsic motivation to become transformative change agents. Learn how Vanguard Academy has incorporated Space Exploration (NASA, NWESSP, SpaceCRAFT Exploration Challenge), FIRST Robotics and assembly of electric vehicles for Greenpower USA F24 race competitions, during Pandemic and preparation for post-pandemic periods making these STEM opportunities relevant, intentional, and engaging while incorporating safety practices to improve the lives of students as well as promote improvements in the community and beyond.

Belinda Guzman, Oscar Flores and Gerardo Flores, Vanguard Academy

Location: Paradise

A6 Practitioner Session

Level up your classroom with gamification

Transitioning students back to a traditional classroom setting has been a challenge. One solution is to adapt gaming techniques to the classroom. Gamification in education refers to the introduction of game design elements and gameful experiences in the design of learning processes. Participants in this session

will learning about gamification and its benefits, including how gamification encourages mastery learning. Then you will see different examples of gamification that are both computer and paper based. They will have an opportunity to test out some virtual gamification tools including nearpod and blooket.

Pamela Groves, The University of Texas Rio Grande Valley

Location: Conch

A7 Practitioner Session

Creating a sustainable STEM learning community

In this session, explore an innovative approach to purposeful STEM partnership development between informal learning centers and school districts. Our goal is to deter summer learning loss, fill learning gaps for students and support teachers in igniting STEM curiosity, teaching STEM concepts, and having STEM career conversations in the classroom. Our Equitable Access to Future STEM Careers Initiative encompasses four distinct programs designed to better support STEM learning. We do so by addressing ever-present issues in education, including lack of access to affordable, quality programming with a focus on both engaging students and supporting teachers in order to drive 21st-century learning and career conversations in their schools. Join us and build a roadmap to sustainable, impactful long-term STEM programs.

Robert Elde, Amber Middlebrook, Mahek Shaikh, Henry Salgado, Elise Gonzalez, Science Mill

Location: Nautilus

Concurrent Session 2

10:45 am – 11:45 am

B1 STEM Teacher Practices Highlighted Session

Promoting growth through effective mentoring and leading

The presentation will explore effective ideas and methods for promoting growth-focused mentoring and progressive leadership. We propose that mentoring and academic leadership are in urgent need of transformation. Challenges highlighted by recent events such as the global pandemic and heightened racial unrest highlighted the need for rapid leadership pivots and innovations.

Beronda L. Montgomery, Michigan State University; Joseph A. Whittaker, Jackson State University

Location: Majestic

B2 Research and Scholarship

Inquiry as strategy for STEM education

The National Science Education Standards recommend that science instruction and learning should be well grounded in inquiry. So far little has changed. The objective is to review the history of inquiry, inquiry as a strategy, and present the Physics Inquiry model for in-service teachers.

Muhammad Bhatti, The University of Texas Rio Grande Valley

Location: Paradise

B3 Practitioner Session

Social emotional learning in a practical and fun way: Tree of self-awareness

Emotions can run high during STEM activities when students find themselves conflicted with projects, confused with their thoughts or potentially experiencing failure. This hands-on presentation provides educators, across ages and disciplines, with a practical and fun way to have students engage in exploration of the self. With this activity, students will be able to identify their feelings, strengths, weaknesses, goals, achievements and support systems in order to enhance their self-awareness. Students are more successful, not just in their STEM activities, but in life as well, when they build self-awareness.

Yovann M. Salinas and Yvette Cavazos, Vanguard Academy

Location: Royal

B4 Practitioner Session

Promoting research and reflection on social and political justice in STEM teacher preparation programs

In this session I will present and demonstrate a module that I developed for the UTeach in the Natural Sciences course *Perspectives on the History of Science and Mathematics* related to racial and social justice in STEM education and STEM Careers. I will first outline the module and summarize my experiences teaching it. We will then engage in an abbreviated version of the module by evaluating statistics and research about gender, racial, and ethnic demographics in STEM, briefly examining journal articles to about these statistics as related to issues of social and political justice and ask participants to reflect on their own experiences in relation to these issues. The workshop will provide a space for STEM educators and administrators to collectively consider research and reflect upon their own experiences related to these important issues and consider possible solutions.

Gregory Gilson, The University of Texas Rio Grande Valley

Location: Conch

B5 Practitioner Session

You received a grant, now what? How to ensure the target population of students are benefiting from initiatives on campus

The presenters will discuss successful strategies implemented on their campus to ensure marginalized students are given the chance to participate in EXPLORE including how we gain and sustain participation; and how these opportunities have led to the success of students in the long run. They will be sharing data that supports efforts and possible best practices for other colleges to promote activities and ensure success of students who have been historically underrepresented in STEM.

Marina Martinez, Bindhu Alappat, St. Xavier University

Location: Sabal

B6 Practitioner Session

We're all in this together: enhancing inclusion through PBL

With the ever-increasing complexities of student needs in the classroom, it is critical to recognize and actively remove barriers to learning to ensure the success of all students. Universal Design for Learning (UDL) is a learning framework which seeks to create more inclusive learning environments by identifying and removing practices that do not account for and support the diversity of the students in a classroom or school. Project-based learning has been recognized as an instructional strategy that allows for the adaptability and flexibility needed to create a fully inclusive learning environment, one which accounts for the neurodiversity of its students. This session will review the concepts of Universal Design for Learning, Inclusion, and Neurodiversity, and will provide practitioners with actionable steps to create a more inclusive learning environment through project- based learning and UDL.

Lindsey Balderaz, University of Texas Permian Basin

Location: Nautilus

B7 Practitioner Session

Beyond the four walls, full STEAM ahead!

Join us on our journey as we explore the power behind a National STEM certification to help build a solid foundation for STEAM success. Discover how creating real-world connections, innovation through engineering, and accountability with technology integration built a culture of personal growth, creativity, and student empowerment. Learn how San Benito CISD - Dr. Garza STEAM Academy extended learning beyond the four walls during the pandemic.

Elsa Lambert, Principal, Dilia Cornett, Director of Elementary Inst., Sara Leos and Esmeralda Montalvo, Teachers, Priscilla Gonzalez and Eduardo Farias, Instructional Technologists, San Benito CISD

Location: Sundial

Luncheon

12:15 PM – 1:45 PM

Palm Grand Ballroom

Keynote Speaker Dr. Christopher Wright, Drexel University

"Dream Chasers: Conceptualizing STEM Education through a Lens of Dreamspaces"

Dr. Christopher Wright is an Assistant Professor in the Department of Teaching, Learning, & Curriculum in Drexel University's School of Education and co-Director of the In/Formal Learning Linking Engineering, Science, & Technology (ILLEST) Lab at the ExCITe Center. His research deploys critical perspectives while engaging in design-based research that seeks to support opportunities for learning and positive identity development in k-12 engineering and science learning environments. This work investigates cultural and political elements within informal and formal learning spaces that could potentially impact the experiences of and learning opportunities afforded to those from historically excluded communities in STEM. By highlighting several engineering projects within the ILLEST Lab, Dr. Wright will discuss how this notion of dream spaces and dream chasing is conceived of in order to reimagine engineering and science learning environments as opportunities for affirming, cultivating, and building upon the intellectual and linguistic resources that young people possess.

Concurrent Session 3

2:00 PM – 3:00 PM

C1 Highlighted Session (will run consecutively with D1 for a total of 2 ½ hours)

Taking the role of the other (Hybrid Presenters)
Conversations about differences are among the most difficult for humans to engage. Why? Because they make us confront our implicit biases. And some are made explicit. This 2.5-hour workshop creates a space for such conversations—for learning about ourselves as well as others and how we are positioned by these beliefs.

Alejandro Gallard, Georgia Southern University, Daryl Chubin, Bhaskar Upadhyay, University of Minnesota

Location: Majestic

C2 Research and Scholarship

Will the real mentor please stand up? Intersectional mentoring preferences and Latina STEM students
Latina female high school students attending a summer STEM camp share their experiences as aspiring STEM students, the value they place on role models, and the importance of mentors being both female and Latina. The author will explore the construct of intersectional adaptation theory (I-ADAPT) to investigate their mentor preferences.

David Sparks, University of Texas Permian Basin

A socioscientific issues approach to ninth-graders' understanding of COVID-19 on health, wealth, and educational attainments
COVID-19 has brought light to the long-term discriminatory policies and practices that marginalized communities in the United States have endured for decades. This study used socioscientific issues to immerse 9th-grade students in investigating the relationships between health, wealth, and educational attainment and the impact of COVID-19 on their communities.

Wardell Powell, Framingham State University

Location: Paradise

C3 Research and Scholarship (Deeper Dive)

Do perceptions mirror the reality of the science field? Understanding Latina's perceptions of scientists
(Hybrid Presenters)
The study explored K-8 students' perceptions of scientists using the Identify-a-Scientist (IAS) instrument and the counter stories of three Latina doctoral students who are science education professionals using contextual mitigating factors or CMFs as an analytical lens. The findings can inform approaches aimed to empower Latina students' persistence in science.

Gianna Colson, Miriam Ortiz, Ruth Colyer, Angela Chapman, The University of Texas Rio Grande Valley

Location: Sundial

C4 Practitioner Session (will run consecutively with D5 for a total of 3 hours)

Wildlife and Climate
An Activity Module for Educators Grades 6-12. Learn about wildlife and climate change issues with aligned activities that will integrate exciting hands-on learning with important concepts for your students. Workshop training includes the Project WILD Climate and Wildlife Booklet, experience with activities, discussion, and planning, and 3-hours of TEA recognized CPW and TEEAC Credit.

Aarin Hartwell, Executive Director of Gulf Guardians

Location: Sabal

C5 Research and Scholarship

Social covenants as contextual mitigating factors (CMFs)
This presentation shares a conceptual framework to analyze the socio-historical-political conditions contributing to the development, construction, and either adoption or rejection of the NGSS or Next Generation Science Standards. We use the notion of covenants as a conceptual lens to examine the NGSS in teasing out how competing visions for science education can exist simultaneously.

Katie Brkich, Wesley Pitts, Alejandro Gallard, Georgia Southern University

High school physics teacher's attitude and rationales about integrating history of science into science classes (Hybrid Presenters)
While there are many reasons to integrate the history of science and science, it is not a common practice that is happening in science classes. It is interesting to know about teachers' perspective on using the history of science and compare it with the expert's perspective and expectations.

Noushin Nouri, Maryam Saberi, Leila Molaei, The University of Texas Rio Grande Valley

Location: Nautilus

C6 Research and Scholarship Deeper Dive

Addressing the skill gap of incoming freshman engineering students during the COVID-19 pandemic (Remote Presenters)
Addressing the Skill Gap of Incoming Freshman Engineering Students During the COVID-19 Pandemic
The objective of this session is to understand the skill gaps of incoming freshman engineering students exacerbated by the COVID-19 pandemic and to explore potential solutions such as interventions to improve student academic success.

Noe Vargas Hernandez, Arturo Fuentes, Eleazar Marquez, Stephen Crown, Karen Lozano, The University of Texas Rio Grande Valley

Location: Royal

Concurrent Session 4
3:15 PM – 4:15 PM

D1 Highlighted Session (will run consecutively with C1 for a total of 2 ½ hours)

Taking the role of the other (Hybrid Presenters)
Conversations about differences are among the most difficult for humans to engage. Why? Because they make us confront our implicit biases. And some are made explicit. This 2.5-hour workshop creates a space for such conversations—for learning about ourselves as well as others and how we are positioned by these beliefs.

Alejandro Gallard, Georgia Southern University, Daryl Chubin, Bhaskar Upadhyay, University of Minnesota

Location: Majestic

D2 Research and Scholarship

Language matters: how teaching biology and math courses using a bilingual modality impacts students at a Hispanic serving institution (Hybrid Presenters)
This interactive workshop will present research findings from three years of quantitative and qualitative data assessing the impact of a culturally relevant and bilingual teaching design on students' sense of belonging and academic achievement in Biology and Math courses. Instructors and researchers will share their observations from both treatment and comparison courses in this consequential Scholarship of Teaching and Learning project funded by the National Science Foundation.

Cristina Trejo, LMSW, Alexis Racelis PhD, Dongkyu Kim PhD, Mirayda Torres Avila PhD, Jose Ponce, Angela Chapman PhD, The University of Texas Rio Grande Valley, Amy Weimer PhD, Texas State University

Location: Nautilus

D3 Research and Scholarship

Increasing access to STEM for students with disabilities
Traditionally, students with disabilities (SWD) have faced barriers to access to STEM fields. This is true from an individual perspective and a systems perspective. This presentation will discuss a variety of ways to increase access for SWD to STEM at both the P-12 and post-secondary levels.

Steve Chamberlain, Julie Pecina, The University of Texas Rio Grande Valley

Preliminary analysis of female STEM students' perception of identity at UTRGV
To explore why women are underrepresented in the STEM workforce, we conducted a qualitative research study, interviewing female students pursuing STEM degrees at The University of Texas Rio Grande Valley (UTRGV). We share preliminary themes observed between participants and offer suggestions as to how to better support female STEM students.

Kristen Hallas, The University of Texas Rio Grande Valley Honor's College

Location: Paradise

D4 Practitioner Session

Social emotional learning strategies leading to college and career success
Learn new strategies from school leaders in the Rio Grande Valley using EduGuide, an award-winning model that grows student's social-emotional strengths to tackle rigorous college curriculum. This online platform uses evidence based social-emotional learning activities and a coaching model. School leaders will discuss how EduGuide works to improve academic behaviors and help all students succeed in college and careers. Participants will walk away with key insight, and free activities they can start using with their students.

Luis Bocanegra, Academy Director, Lindsay Barajas, STEM Social Studies Educator, Lylia Cuevas, Social Studies Educator, Palmview High School T-STEM Academy

Location: Royal

D5 Practitioner Session (will run consecutively with C5 for a total of 3 hours)

Wildlife and Climate
An Activity Module for Educators Grades 6-12. Learn about wildlife and climate change issues with aligned activities that will integrate exciting hands-on learning with important concepts for your students. Workshop training includes the Project WILD Climate and Wildlife Booklet, experience with activities, discussion and planning, and 3-hours TEA recognized CPW and TEEAC Credit.

Aarin Hartwell, Gulf Guardians

Location: Sabal

D6 Practitioner Session

Empowering families through family math: creating a movement (Hybrid Presenters)
Research shows that entering kindergarten with strong early math skills is the best predictor of 8th-grade academic achievement. In this session, participants will learn what we mean by "family math," how to create family math activities, and how to start a family math movement in their own community.

Jennifer McCray, Erikson Institute, Vito Borrello, Reyna Hernandez, Eugenio Longoria Saenz, National Association for Family School and Community Engagement

Location: Conch

Poster Session

3:45 PM – 4:45 PM

Key Largo (first floor)

An innovative virtual and physical manipulatives technology for spatial training of engineering undergraduates: quantitative assessments
This presentation introduces to the audience an innovative virtual and physical manipulatives (VPM) technology the project team recently developed for spatial training of engineering undergraduates. The results of quantitative assessments of VPM technology, including both non-parametric and parametric analyses of normalized learning gains, are presented.

Ning Fang, Ahmad Farooq, Wade Goodridge, Utah State University

University migrant farm worker students initial experience in STEM research as a first-year college freshman
The UTRGV College Assistance Migrant Program (CAMP) and the UTRGV Center of Excellence in STEM Education have partnered to provide initial STEM research experiences to first-year freshmen farm worker students. Students participating in the program complete professional development activities along with a research shadowing/internship component. Two participating CAMP students share their initial exposure to STEM research as first-year freshman. Additionally, they will discuss their educational backgrounds, what led them to choose STEM as a major, their placement, apprehensions, and overall experience in the research internship.

Ally Garza, Andrea Garza, Cristina Villalobos, Idalia Mejia, UTRGV

Understanding the relationship between health literacy and health behaviors among adolescent students in south Texas
The study aimed to determine the onset of a significant relationship between adolescent students' health literacy and health behaviors. Participants answered an online survey assessing their health literacy level and health behaviors. Data analysis revealed a significant positive correlation between both variables. The findings help inform future educational approaches.

Miriam Ortiz, The University of Texas Rio Grande Valley

Strategies to support online asynchronous student engagement for better student outcomes
Strategies used in two large (over 70 students) online asynchronous chemistry courses to address time management, confidence and approach to learning for better student engagement and learning outcomes are explored.

Joanne Rampersaad-Ammons, The University of Texas Rio Grande Valley

Enhancing TiO2 nanoparticle performance in sunflower oil-based nanolubricants by using dispersing agents
Crude oil-based lubricants are both harmful to the environment and increasingly scarce. Vegetable oil-based lubricants make a fitting substitute because they have natural esters to attract metals. This study will stand as a base for further and deeper investigations on the stability of various nanomaterials in sunflower oil.

Victoria Martinez, Allan Cedillo, Javier Ortega, The University of Texas Rio Grande Valley

Development and Characterization of Cold Spray Coatings for Aerospace and Industrial Manufacturing
Cold Spray is a type of thermal metal spraying which uses heated gas/air to propel metal powder onto the surface of a substrate to create a coating. The main objective of this project is to develop and characterize cold spray coatings using nickel powders deposited on aluminum substrates.

Javier Ortega, Albert Alejandro, The University of Texas Rio Grande Valley

Dinner on your own

The Isla Grand Beach Resort is a full-service resort located directly on the beach and has everything in place to make your visit one to remember. Enjoy dinner at Windjammers or explore one of the island's restaurants.

Day 2 Saturday, February 12, 2022

Concurrent Session 5
9:00 AM – 10:30 AM

E1 Research and Scholarship Highlighted Session

Creating space for transformation: collective decolonizing autoethnography (Hybrid Presenters)
This Interactive Workshop creates space for participants to engage in a collective decolonizing autoethnographic process to explore issues (social/cultural, political/historical, identities, language) contributing to disenfranchisement of minoritized students in STE(A)M--to emphasize/acknowledge the importance of language, creativity, and arts in STE(A)M education-the power of language in addressing marginalization, micro-aggression, and disenfranchisement.

Karin Lewis PhD, Eunice Lerma PhD, Miryam Espinosa-Dulanto PhD, Vejoya Viren PhD
The University of Texas Rio Grande Valley

Location: Majestic

E2 Practitioner Session

Engaging scholars in work-based experiences & industry-based certifications (Remote Presenter)

As educators, our mission is to engage scholars in hands-on experiences that will expose them to real-world scenarios. Combining work-based learning experiences and STEM classroom instruction can be complicated at times, but not when you implement HOSA Future Health Professionals and Registered Dental Assistant Industry Based Certifications to your classroom. Through student-centered learning, scholars will participate in research, competitive events, shadowing experiences and much more.

Maria Martinez, Harmony School of Excellence Laredo

Location: Paradise

E3 Research and Scholarship

The impact of prerequisites for undergraduate Calculus I performance (Remote Presenter)
The author conducted a quantitative analysis to determine how the prerequisite path of students taking Calculus I impacts their grade performance. It was then investigated the number of prerequisite credit hours as a predictor of Calculus I GPA. The author hopes this study can be replicated to help with decision-making regarding course listings.

Wiktor Mogilski, Zach Hurdle, Utah Valley University

Matching form to fit: finding the right evaluative approach in a changing context
This session considers different approaches to evaluation, including summative, formative, and developmental/adaptive, their purposes, and how to adapt them to changing programs. We apply these three approaches to case studies of higher education change models that are top-down and bottom-up, dynamic, adaptive and designed to improve pedagogy.

Michelle Burd, Elisabeth Johnson, Burd's Eye View

Location: Royal

E4 Research and Scholarship

Preliminary findings on high school students' attitude toward math and their self-reported identity measures (Hybrid Presenters)
The Follow Me into Math! project, funded by the NSF, affects high school students' attitudes toward mathematics and their mathematics and science identities. We report preliminary findings from 534 local high school students on their attitudes toward math and their math and science identities. We explore the connection of students' identities to their parents/guardians' education and how students' perception of their guardian impacts their math attitude. Additionally, we examine the difference between participants that did engage/did not engage with UTRGV near-peer mentors.

Aaron Wilson, Sergey Grigorian, Xiaohui Wang, Mayra Ortiz Galarza and Xavier Rios, The University of Texas Rio Grande Valley

Roadmap to glory: scaffolding real analysis for deeper learning
In this talk we describe changes made in an introductory Real Analysis classroom that address common challenges and that allow for all levels of students to meet a high standard of learning and written work. We accomplish this by fusing elements of a hybrid course with scaffolded collaborative work to improve student learning. The hybrid structure allows students to engage new material at their pace, while the scaffolding allows

for more challenging coursework and models typical arguments in analysis. As a result, students that initially submitted proofs needing significant improvement in coherence and organization show positive gains in self-confidence and are enabled to progress quickly to submitting mathematical writing of a high caliber. Our case study occurred at a large institution serving many underrepresented and non-traditional student populations. The approach may be effective at schools with similar goals and challenges.

Timothy Huber, Josef Sifuentes, Aaron Wilson, The University of Texas Rio Grande Valley

Pushing the frontiers of chemistry research during the COVID-19 pandemic (Remote Presenter)
It has been a challenge during the pandemic to perform research in a laboratory environment. However, the group of Polymers research in the Chemistry Department adapted to the circumstances and has been able to continue to work. Students in this group completed projects on electrospinning polymers and composites thereof to produce fibers with potential applications as high-performance materials, to produce fibers to emulate the anterior cruciate ligament and to depolymerize plastics for chemical recycling. To minimize interactions and possible contagion, students worked in small groups or individually while research planning and relevant discussion was continuous through zoom meetings.

Javier Macossay-Torres, The University of Texas Rio Grande Valley

Location: Sabal

E5 Research and Scholarship

Misconceptions on the operation of integers
The operation of integers is a topic that students often have trouble with. In this research, the author investigated what are the misconceptions students have that are making them not obtain a correct answer when presented with these types of problems.

Lidya Leija, Mayra Ortiz Galarza, The University of Texas Rio Grande Valley

Community-driven STEM teacher leadership: experiences of Indigenous female teachers (Remote Presenter)
The paper explores indigenous thinking around teacher leadership. Specifically, I present the perceptions of Indigenous elementary female teachers' on what STEM teacher leadership means to them and how they see STEM teacher leadership models prevalent in their schools create challenges in a school that serves mostly Indigenous students.

Bhaskar Upadhyay, University of Minnesota

Assessing elementary preservice teachers' knowledge and awareness of pond ecosystem
The purpose of the study was to assess the knowledge and awareness of elementary preservice teachers toward the pond ecosystem. The participants for this study were twenty-six preservice teachers enrolled in the scientific method for teachers' course.

Mamta Singh, Lamar University

Location: Conch

E6 Research and Scholarship

The effect of engaging in STEM activities with real scientists, mathematicians, and engineers at the elementary level in students' career choices (Remote Presenters)
Integrating Science, Technology, Engineering, and Math (STEM) is recommended in the standards of many countries including Iran especially after emerging of Next Generation Science Standards (NGSS). However, in Iran, while theoretically, it seems ideal, practically due to the lack of experience of elementary teachers with STEM, it is still practically suspended. To fulfill this gap, as a result of a grant supported by the Ministry of Education, a team of STEM experts was sent to the elementary schools to engage students with STEM projects. The team consists of a physical scientist, a mathematician, a mechanical engineer, and a software engineer. Students from 5 elementary schools attended the program and later we followed them to learn about the effect of the program on their career choices compare with the control group. The results support engaging in STEM projects at an early age can provoke interest in related fields. We also noticed the program was more effective in girls compared with boys probably due to the fact that the three members of the team were women.

Mobina Mobini, Melika Mobini, Institute for Advanced Studies in Basic Sciences

PRIMERS for STEM Ed during the pandemic
The NSF-funded PRIMERS project aims to promote active learning for STEM education and to transform STEM Ed culture at UTRGV and other institutions. The paper will report the progress and discuss the PRIMERS efforts for STEM Ed during the pandemic.

Pierre Mingtsan Lu, The University of Texas Rio Grande Valley

Location: Nautilus

E7 Practitioner Session

Follow me into math! - Impacting high schools with near-peer-centric informal learning
The Follow Me into Math! project, funded by the NSF, aims to motivate high school students' choices to study advanced mathematics through near-peer mentorship. College students take the lead to demonstrate mathematical concepts to their near-peers, high school students, through "MathShows". These presentations consist of discrete 'acts', i.e., interactive mathematical demonstrations explained within 15 minutes. The purpose of this workshop will be to showcase the most successful MathShows, as well as how they can be modified for a high school mathematics classroom environment.

Lilian Chavez, Kristen Hallas, Eli Patino, Dylan Wu, Mayra Ortiz-Galarza, and Aaron Wilson, UTRGV

Location: Sundial

Concurrent Session 6
10:45 AM – 11:45 AM

F1 Research and Scholarship Highlighted Session

Place-based education: understanding the past to envision a more equitable and sustainable future
(Remote Presenter)
This presentation examines frameworks of place-based education (PBE), specifically how liberal, critical and indigenous perspectives are represented in the place-based education literature. Using this framework as a lens, we present an analysis of a new undergraduate place-based certificate program at the University of Vermont.

Regina Toolin, University of Vermont

Location: Majestic

F2 Practitioner Session

Integrating computational thinking in K-12 instruction
While computational thinking skills are relatively new in educational curriculum and standards, we know that they are valuable, timely, and promote equity while preparing students for the workforce of the future. These skills are not just for computer science and can be integrated in all K-12 content areas. During this workshop, participants will discover what computational thinking is, explore specific methods for integrating it, and witness the value of adding it to daily instruction to improve student engagement during class. Computational thinking is a thought process that benefits every student, and every student should have access to these skills.

Ellen Lukasik, Texas Tech University

Location: Paradise

F3 Practitioner Session

Engineering a brighter future!
The Research Experiences for Teachers (RET) program at UT Austin has provided rigorous lab-based research for the past 8 years to Texas teachers who work with a graduate student mentor in graduate-level nano-science labs in summer programs. Participants in this session will learn about the program as well as gain access to a lesson developed during the program. Participants will engage in a hands-on activity that was developed to explore the engineering design process while exploring real-world problems. The session will emphasize how merging engineering concepts and activities into science/math classrooms helps students to understand and experience engineering. The coupling of engineering research with classroom TEKS and national standards gives students and teachers options to experiment, inquire, network, and create excitement around STEM; thus, increasing the stream of potential post-high school students whose college and career pathways include engineering.

Melinda Wright, Killeen ISD

Location: Royal

F4 Practitioner Session

STEM and sustainability: empower the next generation of green leaders

Student-driven, real-world STEM and project-based learning with a focus on the issues that matter most to young people: the climate crisis, environmental sustainability, and environmental justice. EcoRise is a Texas-based non-profit with a mission of empowering youth to tackle real-world challenges in their schools and communities. Our resources and programs support students to develop critical thinking skills through student-centered learning experiences. Join educator and Texas program manager, Elizabeth Stephens, for a fast-paced, hands-on, eco-audit learning experience and hear from our local partner in PSJA ISD about their environmental and outdoor learning projects and their transformative impact on students and their communities.

Elizabeth Stephens, Program Manager, EcoRise
Location: Sabal

F5 Practitioner Session

Inclusive Leadership Development for Future Engineers
This workshop equips participants with a standards-aligned, strategy-driven leadership development model for equipping engineering students with skills to appreciate differences in the workplace and to collaborate and lead inclusively.

Meagan Pollock, Engineer Inclusion

Location: Conch

F6 Research and Scholarship

The impact of virtual learning environments: a multi-disciplinary study of motivational and academic impact (Remote Presenters)
Perceive the creation of Virtual Learning Environments by faculty and students for virtual and face to face classrooms. Play with Extended Reality tools. Learn to apply the ARCS-V motivational model, the Community College Survey of Student Engagement survey questions, and academic assessments to evaluate the motivational impact and academic gain.

Jo Duncan-Mosier, Spencer L. Galvan, Dr. Basu Panthi, Jemal Nelson, Mauro Frazier,
St. Philip's College

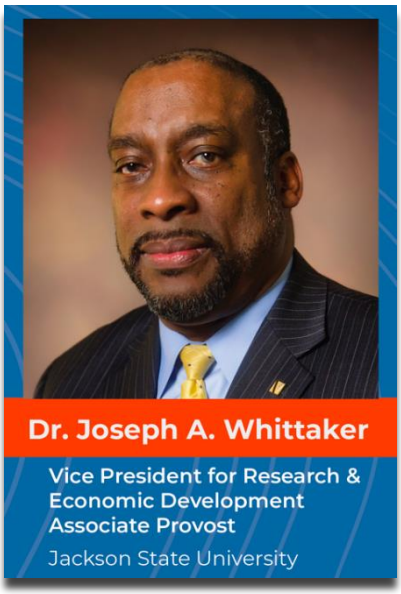
Location: Nautilus

Closing Session Luncheon
12:15 PM – 2:00 PM

Palm Grand Ballroom
Keynote Speaker Dr. Joseph Whittaker

Disrupting the Academic Status Quo to Transform STEM Ecosystems
Recent local and global events have forced us to look closely and reassess the environments and cultures in which we live, work, and play. Far too often those of

us in the academic space become lost in traditional quests for personal and career accolades, and in the process miss significant opportunities for supporting collective success and ecosystem change and transformation. In this presentation, I will use examples from my own career path to demonstrate efforts in transformation and reflect on ways to navigate institutional culture and potential barriers.



Dr. Joseph A. Whittaker is currently the Vice President for Research & Economic Development and Associate Provost at Jackson State University (JSU). In these capacities, he provides support to the provost in academic affairs, and has responsibility for research, sponsored programs, regulatory compliance, technology transfer and commercialization, grants & contracts, and federal relations. Prior to joining JSU, Dr. Whittaker served as Dean and Professor of the School of Computer, Mathematical and Natural Sciences at Morgan State University (MSU), and simultaneously as Associate Director of the NASA GESTAR Program at the Goddard Space Flight Center. At MSU, Dr. Whittaker led the development and implementation of several research and academic initiatives. He has served on several review panels for National Institutes of Health, the National Science Foundation, National Oceanic and Atmospheric Administration, and other federal agencies. Early in his academic career, he led efforts in the design and construction of the Neuroscience Institute at Morehouse School of Medicine, which became the prototype for 12 additional NIH-supported Specialized Neuroscience Programs. He holds several board and committee memberships and was elected the 73rd President of Sigma Xi Scientific Research and Honor Society. Dr. Whittaker received his Ph.D. in Physiology and Biophysics from Howard University and was a Neurobiology Postdoctoral Fellow at the Neuroscience Center of Excellence at the University of Tennessee Health Sciences Center.