STEM Education Conference

February 25 – 27, 2021

Thank you for joining us at the 4th Annual STEM Education Conference. For access to presentations, click on the session titles.

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4th Annual STEM Education Conference

[P] P-16 Research and Scholarship [S] P-16 STEM Practitioner

FEBRUARY 25 • THURSDAY

3:00pm – 3:00pm P **Poster Session** ArtSteps

Moderators: Estela De La Garza

Speakers: Isamar Garcia, Jesus Castillo, Juan Carrizales, Isela Herrera, Eduardo Gonzalez, Rupesh Kariyat, Alexa Brown, Yemin Sanchez, Rosa D. Chavez, Ishveen Kaur, Ilse G. Perez Garcia, Paola Montufar Soria, Sibel Lacquement, Nate Rodriguez, Austin Coleman, Gerardo Salinas Sanchez

A Child's "Disruptive" Behavior: Insights on COVID19, Distance Learning & Technology, Yemin Sanchez,

Design and Optimization of 3D Printed Facemasks as Protective Gear Against Coronavirus Disease (COVID-19) Outbreak, Ilse G. Perez Garcia, Gerardo Salinas Sanchez, Javier Ortega PhD

Trichome rich herbivore-deterrent compounds present in *Langeneria sicerarja* wards herbivory, Ishveen Kaur, Dr. Rupesh Kariyat

Community, Collaboration, Assessment, and Technology: A Distance Education Lesson Planning Tool , Paola Montufar Soria, Rosa D. Chavez

Restorative Practices in STEM Education: Community Building Circles as a Tool for STEM Identity Development, Alexa Brown, Sibel Lacquement, Nate Rodriguez, Austin Coleman.

Women in STEM Careers / **Mujeres en Carreras STEM** Jaqueline Resendez, Melissa Lugo, Jhovana Sanchez and Analiza Vega

La investigacion de la brecha de ELL y no ELL, Rigoberto Medina, David Sanchez, Karren Tovar, Cristobal Ortiz

Students in English Language Learning Programs and the Effect on their Science Performance, Alec Cortez, Gissell Garza, Joanna Rosa

DREAM Act, Nicole Armstrong, Christian Cuellar, Valeria De Leon, Isamar Garcia

Do parents' education levels influence student academic performance? / **Influyen los niveles de educacion de los padres en el redimiento academico de los estudiantes?** Lizbeth Jimenez, Nancy Ibarra, Desiree Ramos, Michael White

English Language Learners and Student with Learning Disabilities , Eduardo Gonzalez, Isela Herrera, Juan Carrizales, Jesus Castillo

The ELL and Non-ELL Gap Investigation, Rigoberto Medina, David Sanchez, Karren Tovar, Cristobal Ortiz

4:15pm – 5:15pm P **(A1) DEI in STEM: Collaborative, Transformative, and Decolonizing Research** Zoom Concurrent 1

Moderators: Dr. Angela M. Chapman

Speakers: Regina Toolin, Leon Walls, Julia Perdrial, Mike Blouin, Chandar T. Lewis, Jacqueline M. Jackson, Deidre I. Wheaton, Donna Rizzo, Erin Seybold

Co-creating Collaborative and Transformative Educational Partnerships in Critical Zone Science

Regina Toolin, Leon Walls, Julia Perdrial, Mike Blouin, Chandar T. Lewis, Jacqueline M. Jackson, Deidre Wheaton, Donna Rizzo, and Erin Seybold

In this panel presentation, we will share current progress in the establishment of a unique partnership between the University of Vermont and Jackson State University in Critical Zone science education. The process for initiating this collaboration including co-creating collaborative spaces to build relationships amongst participating faculty will be emphasized.

4:15pm – 5:45pm	P	**(A3) DEI in STEM: Culturally Responsive Learning Environments in STEM** *Moderators: Roman Sanchez Martinez, Dr. Cindy Y. Marroquin-Garza* *Speakers: Michelle B. Burd, PhD, Elisabeth M Krimbill, Amber Middlebrook, Mahek Shaikh, Mary Ruggles, Robert Elde, Melinda Golinski* **Innovation Session: Creating STEM Learning Environments through Online Professional Development in Response to the COVID Pandemic** *Elisabeth M Krimbill, Amber Middlebrook, Mahek Shaikh, Mary Ruggles, & Dr. Bob Elde* Education is the key to success and too many low income, rural students have not experienced the spark that excites and engages them in STEM learning. To these needs, one Texas non-profit STEM learning center has created an innovative and accessible approach to STEM engagement through professional development training. **Good Disruption Through Program Evaluation Attuned to the Language and Cultural Values of Latinx Communities** *Michelle B. Burd, PhD* This workshop examines the knowledge, values, and skills necessary to seek truth and reveal useful insights for educational programs that aim to help Latinx communities, in particular. Attendees will explore issues that surround language, cultural values, and social justice unique to Latinx communities as well as the role of evaluation. **Self-efficacy development with a SMILE: Supporting female teachers implementing iSTEM education.** *Melinda Golinski* This ethnographic study contributes to the understanding of the processes involved in the self-efficacy development of female elementary school teachers in integrated STEM (iSTEM) education. The Teacher Self-Efficacy Development (TSED) Model supports teachers to develop confidence in using iSTEM pedagogical practices utilizing Bandura's four sources of self-efficacy development.	Zoom Concurrent 3
4:15pm – 5:45pm	S	**(A2) Teaching and Learning Through STEM Activities and Student Organizations** *Moderators: Estela De La Garza* *Speakers: Belinda Guzman, Gerardo Flores, Oscar Flores* This practical presentation enables teachers to explore new ideas and learn how to integrate STEM education and Student Organizations in the classroom and after school programs. Learn how Vanguard Academy has incorporate Robotics, Cyber Security, Electrical Car Racing, NESSP/NASA challenges making them relevant, intentional and engaging.	Zoom Concurrent 2
4:15pm – 5:45pm	S	**(A4) Making Sense of Mathematics through Engaging Conversations** *Moderators: Erika Pacheco* *Speakers: Sara Tudon* It is a challenge to help students develop computational skills, reinforce number sense, and work on the habits of mind that not only make them stronger mathematicians, but also stronger problem solvers and communicators. Participants will learn meaningful strategies to incorporate in their daily mathematics instruction and receive links to resources that will help them put these practices into play!	Zoom Concurrent 4
4:15pm – 5:45pm	S	**(A5) Come afloat with technology as challenges arise!** *Moderators: Aaron Carrillo* *Speakers: Carmen Matilde García Luna* This session includes creative technology practices to keep students engaged and motivated in challenging times. Use mobile and distance learning tools (Web Apps) and apply them to fun, innovative and interactive projects.	Zoom Concurrent 5
4:15pm – 5:45pm	S	**(A6) Augmented Reality in Education** *Moderators: Lilibeth Pesina* *Speakers: David Hernandez* Augmented reality (AR) allows students to learn about the world by enhancing how they can relate to, contextualize, and interact with it through movement and active exploration. With iPad, students can use AR to explore outer space, immerse themselves in the wonders of the world, and examine art and historical artifacts from national museums—in any learning environment. They can visualize experiences that would be impossible to see otherwise.	Zoom Concurrent 6
6:00pm – 7:00pm	P	**Plenary (Research and Scholarship) - Productive disruptions: Centering student identity in mathematics teaching and learning** *Moderators: Dr. Angela M. Chapman, Neida Gutierrez* *Speakers: Jennifer M Langer-Osuna, Rosa D. Chavez*	Zoom

6:00pm – 7:00pm	S	**Plenary (Practitioner): Incorporating Robotics in Disrupting K-12 Education: Ensuring Access for All** *Moderators: David Sadlier* *Speakers: Jason Arms* Robotics in education is nothing new, but how we apply the use of FIRST robotics reaches across all areas of education to ensure students can apply our principles and core values in grades from K-12 to be successful STEM leaders of tomorrow. We are much more than just robots. Join us to learn more.	Zoom

4th Annual STEM Education Conference

P P-16 Research and Scholarship **S** P-16 STEM Practitioner

FEBRUARY 26 • FRIDAY

9:15am – 10:15am P **Opening Keynote: Understanding and Confronting Racial Microaggressions in STEM** Zoom

Moderators: David Sadlier

Speakers: Melody Russell

As educators understanding and confronting racial microaggressions in STEM is critical if we are to be the change needed to tackle systemic racism and achieve equity. The political climate and civil unrest in our country highlight that racism runs deep and there is still much work to be done. The 4th Annual STEM Conference poses the question of how will we respond when the next generations' children ask "What did you do?" This question is a call to action for educators to understand the significant role that racial microaggressions play in perpetuating racism both in and out of the classroom. We as educators must be intentional and confront racial microaggressions and ensure that all students have the opportunity to reach their full potential in STEM. Confronting racial microaggressions and discrimination is essential to promoting equity and social justice in the classroom and broadening participation in STEM.

10:30am – 12:00pm P **(B1) Sociocultural Issues Related to Science Teaching and Learning in Borderlands** Zoom Concurrent 1

Moderators: Dr. Angela M. Chapman, Neida Gutierrez

Speakers: Alejandro Gallard, Bhaskar Upadhyay, Bal Chandra Luitel, Katherine Richardson Bruna

This panel discussion will explore tensions and issues related to the teaching and learning of borderlands. Recognizing that borderlands may include geographical, political, and historical spaces but can include accounts of competing ways of knowing such as the tensions between science and religion.

10:30am – 12:00pm P **(B2) DEI in STEM: Women in STEM Fields, A Meta-Synthesis Approach, From Linear to Authentic, & Racialized Alterity papers** Zoom Concurrent 2

Moderators: Estela De La Garza, Lilibeth Pesina

Speakers: Lorena C. Lopez, Jessica Sanchez, Juan Saldana, Cristina Rodriguez, Johanna Esparza, E. Anthony Muhammad

Recruitment and Retention Strategies Impacting Women in STEM Fields: A Meta-Synthesis Approach

Lorena C. Lopez, Jessica Sanchez, Juan Saldana, Cristina Rodriguez

Due to the disparity of women in STEM across the United States caused by the barriers and challenges they face; we followed a meta-synthesis approach to identify factors that impact women's recruitment and retention in STEM fields of study.

My Journey as an Elementary Science Teacher: From Linear to Authentic

Johanna Esparza

This autoethnography describes my journey as an elementary science teacher. In telling my story of identity construction, change, and growth will lead the way for future discussions about authentic science instruction in the elementary science classroom and enhance the dialogue on teacher identity and change.

Racialized Alterity: Manifestations and Implications for the STEM Fields

Edward Muhammad

The concept of alterity has long been the object of philosophical inquiry. In this article I offer a historical discussion of alterity as well as highlight its real-world implications in today's polarizing climate. I begin by defining alterity then I focus on its multiple conceptions and its various iterations. From there, I describe the negating characterization of alterity within traditional western philosophy, then I focus on more contemporary conceptions of alterity which offer a more ethical depiction of the concept. I conclude by discussing the implications of this rearticulated version of alterity on critical qualitative inquiry as a whole.

10:30am – 12:00pm

P **(B4) DEI in STEM: Faculty Perspectives of Active Learning via PRIMERS LxD; Cultivating the Concept of STEM Careers from Realistic Perspectives; Campus Enrollment Type and Public School Accountability in Texas**

Zoom Concurrent 4

Moderators: Dr. Cindy Y. Marroquin-Garza, Jared Cortez

Speakers: Pierre Lu, Yih-Jiun Shen, Francisco Rivera, Kristina Vatcheva

STEM Faculty Perspectives of Active Learning via PRIMERS LxD

Pierre Lu

The paper discusses perspectives of active learning from STEM faculty participants in the PRIMERS Learning by Design program. Analyses of videos made by STEM faculty participants reveal that there was a positive change in their understanding and practice of active learning. Implications and limitations will be discussed in the presentation.

Cultivating the Concept of Science, Technology, Engineering, and Mathematics (STEM) Careers from Realistic Perspectives

Yih-Jiun Shen

STEM careers are among the highest pay and fastest growing. One in 7 women in U.S. labor force is Hispanic (Department of Labor, 2016); however, only 3.5% of the STEM bachelor-degrees are awarded to Latina/Hispanic females (Gándara, 2015). This presentation intends to foster parents/educators' concept of STEM careers for Latina.

Campus Enrollment Type and Public School Accountability in Texas

Francisco Rivera & Kristina Vatcheva

The Texas Education Agency (TEA) collected a new data element in 2020 for every public school in Texas to explore the possibility of using that data to improve the public school accountability system by accounting for bias introduced through student selection. This analysis explores that data.

10:30am – 12:00pm

S **(B3) Make Coding Fun: Code a Robot! - Level 1**

Zoom Concurrent 3

Moderators: Miguel Ramirez, Karitza Garcia

Speakers: Andy Schaafs, Diana Fultz

Interested in coding, but are unsure where to start? Begin your journey into computer science as we introduce you to VEXcode VR. By utilizing this free web-based tool, you will enter the world of programming by using block-based coding. Participants need a computer with internet access to complete activities designed to develop an understanding of basic commands. Participants create a working project that enables their virtual robot to accomplish tasks.

Interested in taking your students' learning to the next level? We also cover information on grants for physical robot kits that include standard-based activities, resources, and online teacher certifications.

10:30am – 12:00pm

S **(B5) SLIDING INTO GREAT ENGAGEMENT! Ways to use google slides to increase student engagement.**

Moderators: Roman Sanchez Martinez, Alexis Exina

Zoom Concurrent 5

Speakers: Karime Flores

This session can be adjusted to be a 60, 90, or 120 minutes. In this session participants will be show how to use google slides in ways that will engage students on the daily. Google slides will be used to create lesson slides compatible to Peardeck and drag and drop activities. This session is intended to be used by K-12 teachers and implemented for both synchronous and asynchronous learning.

10:30am – 12:00pm

S **(B6) Ramping Up Analyzing Data**

Zoom Concurrent 6

Moderators: Erika Pacheco, Lorelei Lopez

Speakers: Kelly Bodner

In this K-5 physical science session, participants will learn how to engage remote and F2F learners simultaneously. Participants will plan and carry out investigations using a ramp to explore balanced and unbalanced forces as they design a device to change the speed and direction of an object. Participants will use the Engineering Design Process to understand the effects of gravity and motion. Using live polling, participants will vote on the height of a ramp (high, medium, low) and type of surface (smooth, rough, bumpy) to use. Participants will record and analyze data to make learning meaningful, purposeful and fun.

12:15pm – 1:30pm P **(C1) DEI in STEM: Mathematical Opportunities in COVID-19 Era, Secondary Science Curriculum Reform, Forming Antiracist Science Teacher Leaders for Indigenous Schools research** Zoom Concurrent 1

Moderators: Dr. Angela M. Chapman, Neida Gutierrez

Speakers: Rosa D. Chavez, Bhaskar Upadhyay

Mathematical Opportunities to Learn in Elementary Classrooms in COVID-19 Era

Rosa Chavez, Paola Montufar Soria

This study explores mathematics classroom practices and teachers' instructional decision-making shaped by standardized assessments in a COVID-19 era. The study also elucidated distance learning practices that support students' opportunities to learn and help students see themselves as learners and doers of mathematics, particularly for Latinx students.

Forming Antiracist Science Teacher Leaders for Indigenous Schools: Lessons From a Science Professional Development Workshop in Nepal

Bhaskar Upadhyay

This case study is a science professional development workshop in Nepal with teachers. The workshop focused on educating and building antiracist science pedagogies to support science teacher leaders for antiracist teaching. The themes are prioritizing content over sociopolitical issues, seeking affirmation from principals, and willingness for antiracist pedagogy.

12:15pm – 1:30pm P **(C2) Practitioner directed inquiry in STEM education; In Pursuit of Secondary Science Curriculum Reform: An Appropriate Alternative** Zoom Concurrent 2

Moderators: Estela De La Garza, Lilibeth Pesina

Speakers: Ruth R. Colyer, Mara Zapata

Practitioner Directed Inquiry in STEM Education, Mara Zapata

A STEM education practitioner understands the necessity to engage students in questioning and analyzing, by affording them experiences that will support the understanding of specific content and the development of analytical skills to apply this understanding. To do so practitioners can engage their students in learning, that is framed by an interdisciplinary approach by guiding students to make connections between content and its application to a series of real-world problems. However, the practitioner must reflect on their perspectives and beliefs about how to implement STEM education in their classrooms. By engaging in action research practitioners, can make their attitudes and beliefs explicit. But, they cannot do this alone. The role for a science teacher educator is to assist the practitioner in contextualizing their actions theoretically and practically.

In Pursuit of Secondary Science Curriculum Reform: An Appropriate Alternative, Ruth R. Colyer

This presentation provides an alternative science curriculum perspective to a currently used prescriptive rendition. I support my argument that the currently used overt curriculum lacks a link to the covert hidden and null curricula needed to enhance pedagogical enrichment for science students, particularly impoverished science students.

12:15pm – 1:30pm P **(C4) NSF Grant Writing Workshop** Zoom Concurrent 4

Moderators: Dr. Cindy Y. Marroquin-Garza, Jared Cortez

Speakers: Volker Quetschke

12:15pm – 1:30pm P **(C5) A Conceptual Infrastructure for Culturally Sustaining Science Practices in the RGV, Aztlán: Creating Agentes de Cambio** Zoom Concurrent 5

Speakers: Patricia Ramirez-Biondolillo, Dr. James Jupp, Elizabeth Kittleman

A Conceptual Infrastructure for Culturally Sustaining Science Practices in the RGV, Aztlán: Creating Agentes de Cambio

Patricia Ramirez-Biondolillo, Elizabeth Kittleman, & Dr. James Jupp

Latinx populations face a significant disparity of representation in STEM fields. This study aims to develop a theoretical framework that incorporates land-based education, place-based education, borderland epistemology, and pedagogical praxis in order to with the goal of decolonizing STEM education and improving Latinx student engagement in STEM.

12:15pm – 1:30pm	S	**(C3) Make Coding Fun: Code a Robot! - Level 2** *Moderators: Miguel Ramirez, Karitza Garcia* *Speakers: Andy Schaafs, Diana Fultz* Looking to advance your student's coding in an exciting way? Expand your journey into computer science by utilizing VEXcode VR, a free web-based tool, that begins with block-based coding and introduces text-based Python. Participants need a computer with internet access to complete robotics-based activities that teaches about project flow, loops, conditionals, and algorithms._x000D_ _x000D_ Educators are given time to explore professional development opportunities that encourage the understanding of fundamental concepts while accomplishing the VEXcode VR activity objectives. _x000D_ _x000D_ Interested in taking your students' learning to the next level? Information provided on robot kit grants that include standard-based activities and resources.	Zoom Concurrent 3
12:15pm – 1:30pm	S	**(C6) STEM Education: Student Voice** *Speakers: Alondra Infante, Leopoldo Razo, Jasmine Escalona, Angel Solano, Angela Gonzalez, Raul Gonzalez, Anthony Bailey* **My Experience as an Undergraduate Intern with the International Ocean Discovery Program** , Alondre Infante **La Joya High School Ambassadors Panel Discussion: Voices from STEM Classrooms** , Leopoldo Lazo, Jasmine Escalona, Angel Solano, Angela Gonzalez, Raul Gonzalez,	Zoom Concurrent 6
1:45pm – 2:45pm	P	**(D1) NSF HSI STEM HUB, a Valuable Resource for Hispanic Serving Institutions** *Moderators: Dr. Angela M. Chapman, Neida Gutierrez* *Speakers: Martha Desmond*	Zoom Concurrent 1
3:00pm – 4:00pm		**(E1) NSF and Transforming Undergraduate STEM Education** *Moderators: Dr. Angela M. Chapman, Neida Gutierrez* *Speakers: Ellen Carpenter*	Zoom Concurrent 1

4th Annual STEM Education Conference

[P] P-16 Research and Scholarship [S] P-16 STEM Practitioner

FEBRUARY 27 • SATURDAY

9:15am – 10:15am P **(F1) Disrupting hegemonic/colonial learning relationships in STEM education** Zoom Concurrent 1

Moderators: Dr. Cindy Y. Marroquin-Garza

Speakers: Jennifer D Adams, Miwa Takeuchi, Kori Czuy, Gabriela Alonso Yanez

This interactive workshop will invite participants to rethink STEM education that disrupts the hegemony of institutional schooling by exploring learning as complex social practices that are heavily shaped by both the immediate learning environment and as situated in varied social, political, and institutional structures.

9:15am – 10:15am P **(F2) Healing Informing Pedagogical Practices ThroughTransformative STEAM Pedagogy** Zoom Concurrent 2

Moderators: Estela De La Garza

Speakers: Bal Chandra Luitel, Indra Mani Shrestha, Binod Prasad Pant

Many teachers in Nepal have been facing various issues on teaching their subjects using informing pedagogy, thereby developing disciplinary egocentrism. However, this autoethnographic research study showed that transformative STEAM pedagogy helps them heal the informing pedagogical practices through critical self-reflection by finding and reducing the gap between theory and practice.

9:15am – 10:15am P **(F3) DEI in STEM: Understanding Female STEM Identity at UTRGV through Narrative Inquiry**

Moderators: Dr. Angela M. Chapman, Miguel Ramirez Zoom Concurrent 3

Speakers: Yau Yan Wong, Kristen Hallas, Nayeli Gurrola, Priscila de A. Drummond, Alyssa Rodriguez, Chatree Faikhamta, Stephanie Cano

Understanding Female STEM Identity at UTRGV through Narrative Inquiry

Nayeli Gurrola, Kristen Hallas, Priscila A Drummond, Alyssa Rodriguez, Stephanie Cano

We use narrative inquiry to explore the sociocultural factors that influence female STEM identity. By conducting interviews and identifying themes, we develop a better understanding of the identity women feel is most valued in STEM. Through this work, we can direct actions that promote inclusion.

Inquiry Beyond Thoughts Through the Middle Way

Yau Yan Wong, Chatree Faikhamta

Mindfulness practice nurtures awareness, mental clarity, and equanimity, which are essential for authentic inquiry and scientific argumentation. Through cogenerative dialogues with four Vipassana teachers from Theravada Buddhism, we explore how mindfulness help researchers become aware of their attachment to inquiry paradigms through understanding their body and mind.

9:15am – 10:15am P **(F5) Overview of STEM Education; The outcome of the (SMART) Program at UTRGV towards research**

Moderators: Aaron Carrillo Zoom Concurrent 5

Speakers: Nazmul Islam, Pierre Lu

STEM Education: Past, Present and Future

Pierre Lu

This paper aims to introduce the term STEM education, its background, U.S. STEM performance in international comparison studies, its key strategies, its challenges, 10 successful high school STEM education components, postsecondary STEM education initiatives, and STEM education resources from the timeline perspective of viewing STEM education.

The outcome of Student Mentoring and Research Training (SMART) Program at UTRGV to Improve Undergraduate Research Experience

Nazmul Islam

The SMART program at UTRGV was run in 2017 and the 2018-19 academic year. The program provides an increased number of undergraduate student research opportunities by building triadic teams comprised of the faculty mentor, graduate student assistant, and undergraduate research students. Here we will present the comparative analysis.

9:15am – 10:15am | S | **(F4) NASA in the Mathematics Classroom** | Zoom Concurrent 4

Moderators: Lorelei Lopez, Jared Cortez

Speakers: Roxana P. Jimenez

If "How are we ever going to use this?!" is a usual question you get, then come on in for a NASA filled application workshops of how math interacts with our every day world. Inspire your students to become interested in space exploration through STEM.

9:15am – 10:15am | S | **(F6) Effective Literacy Practices of Transnational Bilingual Students** | Zoom Concurrent 6

Moderators: Neida Gutierrez

Speakers: Cynthia Cantu

During this presentation, I will discuss the unique literacy practices of transnational families that travel and live part of the time in their home country and another in the United States. Many of these families continue to have ties and communication with their loved ones outside of the United States. A transnational life can allow students to gain and form knowledge about literacy and language practices. Their circumstances shape the students' language and overall way of life. Literacy practices such as, code-switching, biliteracy, and translanguaging can help transnational students form connections to both cultures.

9:15am – 10:15am | S | **(F7) Opening Doors Through Coding** | Zoom

Moderators: Erika Pacheco

Speakers: Alexander Hernandez

Coming from the Humanities realm, I was extremely hesitant in teaching Coding at an elementary school. At the same time, establish and expanding a Computer Science program at a founding (newly established) elementary school. However, through my two years of trial and error, I saw the academic and social benefits of teaching elementary students early in their educational journey, especially as we deal with Distance Learning and language acquisition.

10:30am – 12:00pm | P | **(G1) Transforming Undergraduate Education in STEM at a Hispanic Serving Institution: A Candid Conversation with Students and Faculty About Culturally Relevant Pedagogy and Community Engagement** | Zoom Concurrent 1

Speakers: Tina Thomas, PhD, Alexis Racelis, PhD, Aaron Wilson, PhD, Iysha Flores, Kristen Hallas, Cristina Trejo-Vasquez, Joselyn Rodriguez

In this interactive workshop, chemistry, biology and mathematics faculty will discuss how they transformed teaching approaches to recognize and utilize the cultural capital and tools that students bring to the classroom as instruments for teaching and learning. Students from redesigned courses will convey their own perspectives about the impact culturally responsive pedagogy and community engagement has had on their personal and academic development. Session participants will:

1. Gain knowledge related to the value of community engagement and culturally relevant pedagogy to Hispanic Serving Institutions
2. Explore strategies for redesigning classroom instruction to imbed culturally relevant and community engagement pedagogy
3. Engage directly with students to discuss the impact of innovative teaching practices

10:30am – 12:00pm P **(G2) Mixed-Reality Simulation as a Teacher Preparation Tool: Does it really works?; Uncovering pedagogical shifts for Dual Language Preservice Teachers in STREAM// Campus Enrollment Type and Public School Accountability in Texas** Zoom Concurrent 2

Moderators: Estela De La Garza

Speakers: Jair J. Aguilar, Yajaira Flores, Esther Garza, Mamta Singh, Vianna Posadas

Mixed-Reality Simulation as a Teacher Preparation Tool: Does it really works?

Jair J. Aguilar & Yajaira Flores

The use of Mixed-Reality-Simulations in teacher preparation programs to improve teacher's skills for teaching, still needs to be researched to find evidence of its effectiveness. In this proposal the researchers present evidence of a successful implementation of MRSs with Elementary Pre-Service mathematics teachers in the context of eliciting and questioning.

Uncovering pedagogical shifts for Dual Language Preservice Teachers in STREAM

Esther Garza

In this paper, the author presents her exploration of how dual language pre-service teachers understand the engineering design process and how they feel about the process. After their exploration of traditional mathematics and science methods for teaching bilingual students, future dual language teachers describe their pedagogical shift to STREAM learning.

Assessing Elementary Science Lesson Plan: Creating Opportunities for Students to Showcase their Understanding

Vianna Posadas & Mamta Singh

It is crucial for teachers to include opportunities where students can show what they have learned through creative projects and hands-on demonstrations. The study assessed fifteen 4th and 5th-grade science lesson plans. The results suggested that 33% fully incorporated the Bloom's Taxonomy verb "create" in every lesson plan.

10:30am – 12:00pm P **(G3) Persistent Whiteness of Science Education in South Central Tejas// Embracing Teacher Identity During Covid 19// Cogenerative dialogues among preservice STEM teachers** Zoom Concurrent 3

Moderators: Dr. Angela M. Chapman, Miguel Ramirez

Speakers: Wipavadee Khwaengmek, Yau Yan Wong, Dr. Nora Luna, Chatree Faikhamta, Dr. James Jupp, Evangelina Guillen, Zulema Williams

Persistent Whiteness of Science Education in South Central Tejas: Do Mexican American Teachers Whiten their Students?

Dr. Nora Luna, Dr. James Jupp

The production of teachers of color is pertinent to reforming education. Emerging research recognized the impact by teachers of color in reproducing whiteness within communities of color (Morales 2018). Our study examines the persistent whiteness in standards based education through the practice of three Mexican American teachers in Central Tejas.

Embracing Teacher Identity During Covid 19

Evangelina Guillen, Zulema Williams

This paper is an autobiographical narrative inquiry of the lived experiences of two Hispanic women educators as they transition from face-to-face instruction to distance learning in their respective school settings. There is an essential partnership between a university and an elementary school located in South Texas by the Mexican/American border. Experienced teachers work closely with preservice teachers as mentors, engaging them in best teaching practices, that will help develop their teacher identity as they begin working with students. There is a strong urge for preservice teachers to subdue the challenges taking place in authentic settings and adapt to online platforms.

Cogenerative dialogues among preservice STEM teachers on nurturing a culturally responsive learning environment for effective scientific argumentation

Wipavadee Khwaengmek, Yau Yan Wong, Chatree Faikhamta

Our inquiry engages a group of Thai preservice teachers in a cogenerative dialogue that explore their perspectives of STEM and ways to cultivate a culturally responsive and democratic learning environment for STEM education based on their prior lived experiences as a learner and teacher of science.

10:30am – 12:00pm S **(G4) DEFINEtly Vocabulary Masters! Virtual STEM tools to help your students master vocabulary** Zoom Concurrent 4

Moderators: Lorelei Lopez, Jared Cortez

Speakers: Karime Flores

This session can be adjusted to be a 60, 90, or 120 minutes. In this session participants will be presented with virtual tools that will help facilitate collaborative and hands-on vocabulary ac tivities . Pa rticipants will be shown how to create tools and customize to fit their student's needs . Virtual tools will include bingo, board games, matching games, among many others! These activities are intended to be implemented in grades 5th -12th.

10:30am – 12:00pm S **(G5) Using high-quality virtual-reality tools for physics laboratory instruction** Zoom Concurrent 5

Moderators: Aaron Carrillo

Speakers: Volker Quetschke, Ivan Davila

We present how modern virtual reality headsets with approximate 4k resolution can be used to teach physics laboratories to students. The project is in the early development stages and we will show a demonstration how kinematics experiments can be performed by students in an immersive, simulated environment. The presented setup does not require the student to be on campus and can be used for remote instruction without physical contact.

10:30am – 12:00pm S **(G6) The Permaculture Mindset for Educational Sustainability** Zoom Concurrent 6

Moderators: Neida Gutierrez

Speakers: Katheryn Allala King, Melissa Ann Hernandez

What is Permaculture and what does it have to do with STEM/STEAM education? Participants will come away with a knowledge about the history and philosophy of permaculture, and how using the tenets of permaculture could directly impact ecology and future sustainability in the Rio Grande Valley as it influences changes all over the world. Why not here?

10:30am – 12:00pm S **(G7) Build Your 'Ant' Farm: Using Free Video Annotation Software to Engage Students** Zoom Concurrent 7

Speakers: Elizabeth Goldberg

Learn how to use free video annotation 'ant' software to engage your students. Join us as we model a mitosis lesson to see how you can use videos and annotations to help students discover scientific concepts for themselves.

12:15pm – 1:45pm P **(H1) A community of practice contextualized within sociocultural phenomena: Mitigating teaching and learning of STEM through counter-praxis** Zoom Concurrent 1

Moderators: Dr. Cindy Y. Marroquin-Garza

Speakers: Ariana Garza Garcia, Anthony Bailey, Juan Lazo, Alicia Corbitt

We describe how preservice and in-service teachers have developed their teacher agency by engaging in counter-storytelling in a community of practice. We will share the findings from this research and engage in critical discussions about how they enact agency in their classrooms today.

12:15pm – 1:45pm P **(H2) How to Implement Best Practices in STEM Learning in an Online/Blended Environment// How One STEM Learning Center Pivoted to Online Learning During COVID// Lesson Learned from Teaching Science Methods for Teachers Course** Zoom Concurrent 2

Moderators: Estela De La Garza

Speakers: Dr. Elisabeth M. Krimbill, Mary Ruggles, Amber Middlebrook, Mahek Shaikh, Robert Elde, Mamta Singh

Case Study: How to Implement Best Practices in STEM Learning in an Online/Blended Environment

Dr. Elisabeth M. Krimbill, Mary Ruggles, Amber Middlebrook, Mahek Shaikh, Robert Elde

No one has a clear picture of what classrooms will look like in 2021 and beyond. There is a great deal of apprehension about how to deliver instruction while keeping students and teachers safe. This presentation provides a fresh perspective on best practices in an evolving STEM learning environment.

A Case Study of How One STEM Learning Center Pivoted to Online Learning During COVID

Elisabeth M. Krimbill, Mary Ruggles, Amber Middlebrook, Mahek Shaikh, Robert Elde

This case study tells the story of how the Science Mill team pivoted to an online learning environment in support of their mission. The problem-solving processes, collaboration, and innovation they employed may inspire other STEM focused organizations and educators who are facing challenges in their own work environments.

COVID-19 Pandemic: Lesson Learned from Teaching Science Methods for Teachers Course

Mamta Singh

The purpose of the study was to address the challenge and opportunity faced during P-16 teaching and learning during the COVID-19 pandemic. Due to the pandemic, the P-16 system had to be deviated from the usual face-to-face operating system to a virtual platform to accommodate students' needs and their well-being.

12:15pm – 1:45pm P **(H3) Creating Opportunities for Students, Overcoming Misconceptions in Kinematics, & How bilingualism Enhances Learning** Zoom Concurrent 3

Moderators: Miguel Ramirez

Speakers: Mirayda Torres-Avila, Ph.D., Maryam Saberi, Noushin Nouri, Amy Weimer, Dr. Angela M. Chapman

Using Nature of Science Skills to Overcome Misconceptions in Kinematics

Noushin Nouri & Maryam Saberi

Informed understanding of nature of science (NOS) is a lifetime skill. We suggest that a proper knowledge of NOS (i.e. observation and inference) can lead to a knowledge of science. The paper discusses how high school students were able to overcome one common misconception in kinematics using observation and inference.

Speaking My Language: How Teaching Undergraduate Freshmen Biology Courses Bilingually Enhances Learning

Mirayda Torres-Avila, Amy Weimer & Angela Chapman

Retention of undergraduate students pursuing a STEM degree has, in part, been attributed to success in science and math courses during their first two years of college. We investigated the effectiveness of teaching a bilingual general biology course. Students in bilingual biology courses outperform students in equivalent English only courses.

12:15pm – 1:45pm S **(H4) STICKY FINGERS! Early Education virtual STEM tools** Zoom Concurrent 4

Moderators: Lorelei Lopez, Jared Cortez

Speakers: Karime Flores

This session can be adjusted to be a 60, 90, or 120 minutes. In this session participants will be_x000D_ presented to hands on activities they can use during synchronous virtual learning. Participants_x000D_ will be shown how to create a digital spinner and choice board. Both tools will be demonstrated_x000D_ in ways to strengthen vocabulary and inquiry. These activities are intended to be implemented in_x000D_ grade PK-2nd .

12:15pm – 1:45pm S **(H5) Think Differently! STEM and Special Education** Zoom Concurrent 5

Moderators: Aaron Carrillo

Speakers: Melinda Wright

Traditionally special education has been about weakness rather than strengths. Much of the focus is about where students need support and what they don't do well. Let's be the disruption and change the language to include what they do well. Many students have natural skills and abilities that go unrecognized. Students with special needs are not only capable of doing STEM activities, but they also enjoy them. Teachers know when a student enjoys something they will want to do it more. Join us in learning ways to include and excite all exceptional learners.

12:15pm – 1:45pm S **(H6) How to Teach Inquiry Online** Zoom Concurrent 6

Moderators: Neida Gutierrez

Speakers: Elizabeth Goldberg

Inquiry. Manipulatives. Hands-on. Student-Centered. When it comes to online learning, it's hard to imagine how to incorporate these high engagement techniques into your lessons. Join us to learn some tips and strategies for how to make your online lessons into inquiry-based lessons.

12:15pm – 1:45pm S **(H7) Using Nearpod to Create Inquiry-Based Instruction in a Virtual Environment** Zoom Concurrent 7

Moderators: Erika Pacheco, Alexis Exina

Speakers: Pamela Groves

Transitioning to online teaching has been one of the greatest challenges encountered by teachers this past year. While some teachers have returned to their classrooms, many are still required to teach in virtual environments, sometimes simultaneously. How can we make our lessons engaging and inquiry-based in a virtual environment? In this session, I will show you how to harness the power of Nearpod interactive technology to teach a 5E lesson over the topic of energy. We will use the Phet energy simulation to explore this topic in an inquiry-based manner.

2:00pm – 3:00pm

P **Closing Keynote: Transforming science education: Knowing that you have become a good disruptor helps you to understand why you are a good disruptor** Zoom

Moderators: David Sadlier

Speakers: Wesley Pitts

With inspiration from the late Rep. John Lewis and other trailblazers such as the current National Youth Poet Laureate Ms. Amanda Gorman, Dr. Pitts will lead a discussion framed by the following central question: *How can we help support and move the agency and practices of good disruptors in STEM education into central positions so that they can be afforded opportunities to build and share their practices?*

Being and becoming a good disruptor is always associated with opportunities and uncertainties in that every sociocultural action can potentially help to transform systems and can also help to reinforce systems and their boundaries. Accordingly, the constructive practices of disruptors help to challenge the contexts of deep-rooted ideologies and practices that help to perpetuate institutional inequalities. For example, transformative practices that challenge systems of political ideologies, such as national and state level covenants, can change the power structures and boundaries that exist to maintain systems of education that continually stratify opportunities for students and educators in STEM.

The challenge of disrupting systems, sometimes with unanticipated consequences, raises the possibility of finding new ways to understand why you are a disruptor. Additionally, disruptive positions can simultaneously provide opportunities for transforming or reinforcing structural inequalities in STEM education. From this perspective, being a good disruptor can be camouflaged and lead to being labeled as a troublemaker. However, the rewards of being a good disruptor will lead to expanding the impact of STEM education in more socially transformative ways such as the creation of more welcoming spaces for underrepresented people. As such, it is important to keep in mind that disruptions, as well as being a good disruptor, cannot be enacted as socioculturally neutral or contextually neutral. Interrogating the sociocultural landscape and disruptions of STEM education also draws questions about how and the extent to which new and transformative forms of social and institutional arrangements arise in the presence of disruptive practices. Specifically, it is knowing the context in which you have become a good disruptor that helps you to begin to understand why you are a good disruptor. Good disruptors support the next generation of STEM students and educators and pave the way for the next generation of good disruptors.