| National Science Foundation | October 20 -22, 2023 | NSF DUE #2001058<br>NoyceMidwest.org |
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# Retention and Success of Teachers and Students via Cultural Relevance in STEM Education

Renaissance St. Louis Airport Hotel
St. Louis, MO

2023 Midwest Annual Robert Noyce Conference Agenda

# Program Agenda

## *At a glance*


### *Friday, October 20, 2023*

Poster Presentation

Networking Evening

Introductory Session with hors d'oeuvre

### *Saturday, October 21, 2023*

Breakfast with Keynote Speaker
***Jennifer O'Malley***

Session 1

Session 2

Site Visits

Dinner with Keynote Speaker
***Lisa Gonsalves***

Saturday Night Fun Activity

### *Sunday, October 22, 2023*

Breakfast with Keynote Speakers
***Jennifer Grandfield and Alexandria Paulsen***

Session 3

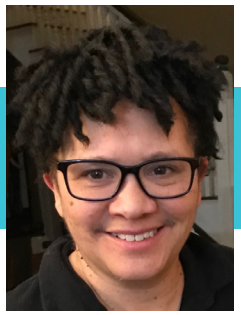
Closing Plenary Session

Adjourn

# OUR SPEAKERS

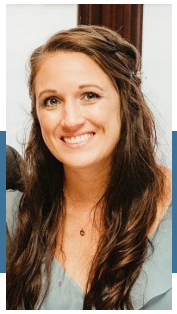
## Jennifer O'Malley

Chicago Teacher Education Pipeline (CTEP) within the National Center for Urban Education (NCUE) at Illinois State University



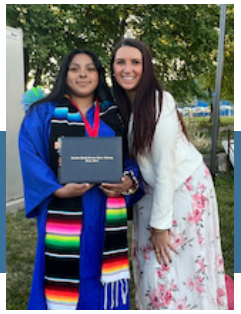
## Lisa Gonsalves

Full Professor in the College of Education and Human Development at the University of Massachusetts Boston



## Alexandria Paulsen

Science educator in the City of Chicago



## Jennifer Grandfield

Mathematics educator in the City of Chicago

## Dr. Jennifer Ellis

NSF's S-STEM Program, the Robert Noyce Teacher Scholarship Program, and the Improving Undergraduate STEM Education Program Director

# Keynotes

## Jennifer O'Malley

Chicago Teacher Education Pipeline (CTEP) within the National Center for Urban Education (NCUE) at Illinois State University

Jennifer O'Malley serves as the director of the Chicago Teacher Education Pipeline (CTEP) within the National Center for Urban Education (NCUE) at Illinois State University. A former middle and high school public school teacher in Chicago, she has worked at CTEP since its founding in 2005, collaborating with school and community partners to design the comprehensive programming that now encompasses the NCUE educator preparation model of community, school, and university integration. Most recently, Ms. O'Malley has developed ISU's new partnership with Chicago Public Schools (CPS) and City Colleges of Chicago called Teach Chicago Tomorrow. She also currently supports the design and implementation of the National Science Foundation-funded program SUPERCHARGE (STEM-based University Pathway Encouraging Relationships With Chicago High Schools in Automation, Robotics, and Green Energy). She has presented on the NCUE model at educational conferences across the country. She is the co-author of the chapter "Whose Voice Matters?: Intentionality in Building Authentic Community-University Partnerships" in Community-engaged Teacher Preparation Programs . She has supported many NOYCE scholars over the years on their path to becoming STEM teachers and is thrilled to continue to be a part of the program

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**SATURDAY OCT 21**

*9:00 AM - 9:50 AM*

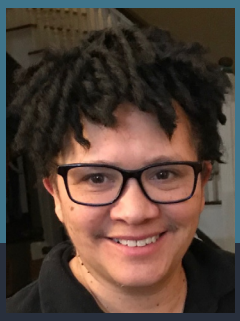
*Keynote Presentation*

**SATURDAY OCT 21**

*10:00 AM - 11:00 AM*

*Keynote Follow-Up*

Jennifer O'Malley, Chicago Teacher Education Pipeline (CTEP) within the National Center for Urban Education (NCUE) at Illinois State University. If you would like to discuss the presentation with the keynote speaker in greater detail, this breakout session provides an opportunity for you to have an in-depth conversation with the presenter.



## Lisa Gonsalves

Full Professor in the College of Education and Human Development at the University of Massachusetts Boston

Lisa M. Gonsalves is a Full Professor in the College of Education and Human Development at the University of Massachusetts Boston. She also serves as Chair of the Curriculum and Instruction Department and as the Director of the Teach Next Year Teaching Residency Program. Dr. Gonsalves teaches courses in Human Development and Assessment. She has worked closely with the Boston Public Schools since 1999 and has been a Principal Investigator on numerous National Science Foundation Robert Noyce Teaching grants and on two Teacher Quality Partnership grants. Dr. Gonsalves's research covers two broad areas: urban education and teacher preparation. She has brought in over 13 million dollars in grants for urban teacher preparation and is the author of Educational Folly: Teacher Well-Being and the Chaos of American Schooling (2023).

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## SATURDAY OCT 21

*5:00 PM - 6:00 PM*

*Keynote Presentation*

## SATURDAY OCT 21

*6:00 PM - 6:30 PM*

*Keynote Follow-Up*

Lisa M. Gonsalves, Professor in the College of Education and Human Development at the University of Massachusetts Boston. If you would like to discuss the presentation with the keynote speaker in greater detail, this breakout session provides an opportunity for you to have an in-depth conversation with the presenter.

## Jennifer Grandfield

Mathematics Educator in the City of Chicago

Jennifer Grandfield has been a Mathematics educator in the City of Chicago for over 13 years. She is a first-generation college graduate and Noyce Scholar from Illinois State University. Her origin story as an educator began in high school when she was president of the Onward House Tutoring organization, where she worked as a tutor for other Chicagoland students. Jennifer started her teaching career as a founding teacher of Little Black Pearl Art & Design Academy in Chicago's Hyde Park neighborhood, and now she leads the Math Department at Instituto Health Sciences Career Academy in Chicago's Little Village neighborhood. In addition to teaching, Jennifer facilitates several after-school clubs in association with the Frida Kahlo Foundation. Her pedagogical focus is student-centered, project-based learning with a lens of cultural relevance. She and her students design a large-scale community event each year called Math Night, where high school students design and build Math literacy activities for elementary and middle school children. The event draws hundreds of community members annually and helps her students to gain confidence and leadership skills as well as Math competency.

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**SUNDAY OCT 22**

*9:00 AM - 10:00 AM*

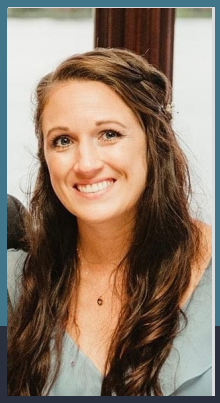
*Keynote Presentation*

**SUNDAY OCT 22**

*10:00 AM - 11:00 AM*

*Keynote Follow-Up*

Jennifer Grandfield and Alex Paulsen, Chicago Public Schools. If you would like to discuss the presentation with the keynote speakers in greater detail, this breakout session provides an opportunity for you to have an in-depth conversation with the presenters.



## Alex Paulsen

Science Educator in the City of Chicago

Alexandria attended Illinois State University for her undergrad, earning a degree in secondary education with a chemistry focus area. During her time at ISU, she studied abroad in the Netherlands to participate in a comparative education study. At the Noordelijke Hogeschool Leeuwarden (NHL), she built relationships with her classmates and learned about the educational experience in their home country. She and her classmates coauthored and edited a book about politeness and classroom management strategies, which was later used as the class textbook.

Alexandria has been teaching high school science in the city of Chicago for the past 10 years. She has experience teaching in public, alternative, and charter high school settings. More recently, Alexandria has been teaching Chemistry at Instituto Health Sciences Career Academy (IHSCA) in the little village neighborhood for the past 7 years. This past summer, she completed her English as a second language (ESL) endorsement. This will help her provide the support our growing population of emergent bilinguals (EBs) needs to be successful in school.

Alexandria actively supports her coworkers as the vice chair of the school's teachers union. She has also co-facilitated 7 all-staff sessions around adult social-emotional learning (SEL) at IHSCA. It is through her involvement with student organizations (like NHS) and her relationships with coworkers that gives her insight into what keeps people in school and what pushes them out. She has seen many teachers come and go and has also left teaching positions herself, so she understands the support needed to make teaching not only successful but sustainable.

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**SUNDAY OCT 22**

*9:00 AM - 10:00 AM*

*Keynote Presentation*

**SUNDAY OCT 22**

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*Keynote Follow-Up*

Jennifer Grandfield and Alex Paulsen, Chicago Public Schools. If you would like to discuss the presentation with the keynote speakers in greater detail, this breakout session provides an opportunity for you to have an in-depth conversation with the presenters.

## Dr. Jennifer Ellis

NSF's S-STEM Program, the Robert Noyce Teacher Scholarship Program, and the Improving Undergraduate STEM Education Program Director

Jennifer Ellis, ssociate professor and director of Science, Technology, Engineering, and Mathematics (STEM) education at University of Tennessee at Chattanooga, will begin a temporary Program Director assignment with NSF on Aug. 16. In her role, she will focus on grant funding for three NSF programs:

the NSF's S-STEM Program, the Robert Noyce Teacher Scholarship Program, and the Improving Undergraduate STEM Education Program.

NSF offers the chance for educators, scientists and engineers to join the agency as temporary program directors, referred to as rotators. They make recommendations about proposals to fund, influence new directions in their fields, support interdisciplinary research and mentor junior research members.

Ellis joined UTC in 2011 as an assistant professor, became the STEM director in 2015 and received a promotion to associate professor in 2016. In fall 2019, she was one of the pioneering UTC faculty members who moved into campus housing for the purpose of greater engagement, accessibility and a pproachability for students.

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**SUNDAY OCT 22**

*10:00 AM - 10:50 AM*

*Discussion with the PI's with Dr. Jennifer Ellis*

# Conference Agenda

## FRIDAY OCT 20

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|---|---|
| *5 PM* | Onsite Registration until 9 PM |
| *6:45 PM* | Poster Set Up |
| *7 PM* | Networking Evening<br>*Poster Session / Introductory Session with Hors d'oeuvre*<br>*Dr. Jessica S. Krim, Goshen Consulting* |

## SATURDAY OCT 21

| | |
|---|---|
| *8 AM* | Registration and Breakfast |
| *9:00 AM* | Opening Plenary Session<br>*Dr. Jessica S. Krim, Goshen Consulting*<br>*Keynote - Jennifer O'Malley* |
| *10 AM* | Keynote Follow-up |
| *10 AM* | ***Session 1*** (see page 13) |
| *11 AM* | ***Session 2*** (see page 16) |
| *12 PM* | ***Site Visit*** (see page 26) |
| *12:15 PM* | Pick up Boxed Lunches |
| *12:30 PM* | Buses leaving for site visits from the hotel |
| *4 PM* | Strands 1, 2, and 3 return from Site Visits |
| *4:15 PM* | Coffee and Snack Break |
| *4:15 PM* | 30 min of Site Visit reflection led by your leader |

# Conference Agenda

## SATURDAY OCT 21

| | |
|---|---|
| *5 PM* | Dinner / Keynote Speaker<br>*Dr. Jessica S. Krim, Goshen Consulting*<br>*Keynote - Lisa Gonsalves* |
| *6 PM* | Keynote Follow-up with Lisa Gonsalves |
| *6:30 PM* | Break/Freshen Up |
| *7:30 PM* | Evening at the Amp Up Action Park |

## SUNDAY OCT 22

| | |
|---|---|
| *8 AM* | Breakfast |
| *9 AM* | Plenary Session<br>*Dr. Jessica S. Krim, Goshen Consulting*<br>*Keynotes - Jennifer Grandfield and Alexandria Paulsen* |
| *10 AM* | Session 3 (see page 23) |
| *10 AM* | Keynote Follow-up with Jennifer Grandfield and Aleandria Paulsen |
| *10 AM* | Discussion with the PI's with Dr. Jennifer Ellis |
| *11 AM* | Closing Plenary Session<br>*Dr. Jessica S. Krim, Goshen Consulting*<br>*Moving forward*<br>*Using resources and upcoming workshops/webinars* |

# Poster Session

## Friday, October 20th from 7:00 PM - 9:00 PM - Renaissance Ballroom


| Poster # | Author Name | Presentation Title | Institution Name |
|---|---|---|---|
| 1 | Ximena Uribe-Zarain and Ayanna Shivers | **Planning Program Evaluation for NSF's Noyce Teacher Program** | Missouri State University and Lincoln University |
| 2 | Betsy Leong and Lara Smetana | **Research Experience for Preservice Teachers** | Loyola University Chicago |
| 3 | Leah Peitzmann and Abigail Letts | **Planning Culturally Responsive Lessons Using a Simple Tool** | Loyola University Chicago |
| 4 | Todd France | **Workshop Preview: 3D Printer Basics** | Ohio Northern University |
| 5 | Meteicha Green and April Bartnick | **Noyce teachers leading their peers through the development of a grant program that supports innovative STEM learning** | Southern Illinois University Carbondale |
| 6 | Lori Ann Hall | **When Life Gives You Lemons, Make Music!** | Saginaw Public Schools |
| 7 | Katie Laux, Jeremy Durelle, Matt Simon, Marlene Franzen, Christina Williams | **Partnering to Promote the Success of Future Science Educators** | Upper Iowa University and Northeast Iowa Community College |
| 8 | Marlissa Stauffer, Young Mi Chang, Annie Witzky, Ron Zielke | **Scaffolding the Development of Culturally Relevant Teaching Practices from Methods Classes Through Student Teaching** | Ohio Dominican University |
| 9 | Corey Webel | **Mathematics Assessments that Reveal Student Thinking** | University of Missouri |
| 10 | Michelle Asa, Craig Kirchner, Keith Campbell | **Noyce teachers leading community learning in STEM through an annual family Eco Festival** | Murphysboro High School |

# Poster Session

## Friday, October 20th from 7:00 PM - 9:00 PM

| Poster # | Author Name | Presentation Title | Institution Name |
|---|---|---|---|
| 11 | Akhtar Mahmood, Kristin Cook, Marlisa Austin, Jessica Ivy | **Preparing Qualified STEM Teachers Who Can Teach Across Cultural Boundaries in Diverse Classrooms in High-Need Schools** | Bellarmine University and Jefferson Community & Technical College |
| 12 | Akhtar Mahmood, Kristin Cook, Marlisa Austin, Jessica Ivy, Nichole Diaz, Divya Joseph | **Noyce Internship at the Kentucky Science Center: Inspiring STEM Students to Pursue a Career in STEM Teaching** | Bellarmine University and Jefferson Community & Technical College |
| 13 | Julie Wittenborn-Sikorski, Cindy Hepp, Renee Lopez-Swalls, Karen Renzaglia | **Noyce Master Teaching Fellowship Programs Provide Lasting Positive Outcomes for STEM Education in Rural Schools** | Southern Illinois University Carbondale |
| 14 | Adem Ekmekci, David Gibson, Karen Renzaglia, Cindy Callard, Rebecca McGraw, Greg Rushton, Peter Sheppard, Guershon Harel, Mahtob Aqazade | **Comparison between Master Teaching Fellows (MTFs) and non-MTFs: STEM teacher retention and related factors** | Rice University, Southern Illinois University-Carbondale, University of Arizona, Middle Tennessee State University, University of Louisiana-Lafayette, University of California-San Diego, Texas A&M University-Corpus Christi |
| 15 | Paul Adams, Janet K. Stramel, William Weber, Earl Legleiter | **Building and sustaining a Noyce Scholar Community to aid retention.** | Fort Hays State University |
| 16 | Paul Adams, Eric Deyo, Matthew Clay, Earl Legleiter | **ETS Content Praxis Preparation PLUS** | Fort Hays State University |
| 17 | April Bartnick and Mallory Swafford | **Developing and sustaining a middle school eco-action club** | Southern Illinois University Carbondale and Murphysboro Middle School |
| 18 | Kate Bove | **The Effectiveness of Mathematician Monday on Inner City School Classrooms** | Loyola University Chicago |
| 19 | Deepika Menon, Jeanna R. Wieselmann, Sumreen Asim, Sarah Haines | **Research on Integrated STEM Efficacy: Year 1 Results and Next Steps** | University of Nebraska-Lincoln, Southern Methodist University, Indiana University Southeast, and Towson University |

# WORKSHOPS / ORAL PRESENTATIONS

## Session 1

## Saturday, October 21st from 10:00 AM - 11:00 AM


### Keynote Follow-up

**10 AM - 10:50 AM - Concource AB**

Jennifer O'Malley - Illinois State University

Jennifer O'Malley, Chicago Teacher Education Pipeline (CTEP) within the National Center for Urban Education (NCUE) at Illinois State University. If you would like to discuss the presentation with the keynote speaker in greater detail, this breakout session provides an opportunity for you to have an in-depth conversation with the presenter.

### NSF Midwest Noyce – 2024 STEM Teacher Innovation Project (STIP) — STRAND 1

**10 AM - 10:50 AM - Orly A**

Todd France, Willy Hunter, Janet Moore, Nicolle von der Heyde, Josh Rappuhn, Sherri Martinie, Lara Smetana, Megan Leider

Are you an early career STEM teacher (years 1-10), teaching in a high-need school? Would you like collaborative, pedagogical, emotional, and financial support during the 2024-2025 school year? Midwest Noyce is developing cohorts of STEM educators to engage in immersive STEM lesson development connected to authentic research practices and culturally responsive pedagogy. This opportunity is for Noyce and non-Noyce STEM teachers. Noyce Scholars are encouraged to partner with a STEM teacher at their respective schools and work collaboratively on lesson development. NSF STIP Fellows will be selected based on their desire and aptitude to engage in project goals and their commitment to work in high-need school districts. Fellows will be paid $4000 for participating in pre-workshop meetings, the week-long Foundational Summer Workshop, and the Curriculum Redesign Finalization Workshop at the Midwest Noyce Conference in October 2025. Fellows will be paid an additional $2000 during the school year for implementing their new lesson in their classroom (including relevant student work), attending monthly workshop meetings, and keeping a reflective journal. We will also supply each teacher with $1,200 in Participant Support supplies and materials for their lessons, in addition to travel and housing funds. Find out more at this session!

## Round Table-NSF Grant Work: IUPUI Nano Labs, STEM, Community, and Cultural Relevance — STRAND 2

**10 AM - 10:50 AM - Orly B**

Krystal Brand, Monica Medina - Indiana University and Indiana University - Purdue University Indianapolis

2-4 of our teacher learners, as well as Dr. Medina, and myself will be sharing the work that we did with NSF and IUPUI nano tech labs. Specifically we will share how we used the information from the nano labs to create culturally relevant, STEM lessons that allow students to interact with the community. Some of the teacher learners will also be able to share how these lessons engaged their students more deeply in their content, community, and helped them to be re-inspired and creative in lesson planning.

## What Does Social Emotional Learning Look Like in a STEM Classroom? — STRAND 2

**10 AM - 10:50 AM - Gatwick A**

Jenna O'Dell, Todd Frauenholtz, Julia Petrich, Emily Herold - Bemidji State University

This session will share what we have learned about Social Emotional Learning (SEL) during the first three years of our Noyce project. We have partnered with a local non-profit agency specializing in SEL who work frequently with K-12 teachers, staff, and students. They have been training our Noyce staff and scholars to integrate SEL skills into their classrooms. This session will present some of the research base documenting benefits to including SEL skills into your classroom. Then Noyce scholars will share some skills to help you incorporate it into your classroom.

The presentation will be a collaborative effort between faculty and undergraduate students from the Bemidji State University Noyce project. Faculty will share some of the SEL research literature documenting the benefits to students' STEM learning when SEL skills are incorporated into their classroom. The four presenters will each share some SEL skills they have learned to use in a STEM classroom to improve students' learning STEM content.

## Chemistry / Physical Science Activities: National Chemistry Week and More — STRAND 2

**10 AM - 10:50 AM - Lambert CD**

Faith Yarberry - University of Central Arkansas

This workshop will provide hands-on activities and games that can be used in the Chemistry and Physical Science Classrooms. The activities will include:

- Cloudy with a Chance of Color
- Roses are Red
- Fruit Juice Sleuth
- Psychodelic Solubility
- Marbling Paper
- The Properties of Water
- Isotope Game

## Building Thinking Classrooms in Science

STRAND 1

**10 AM - 10:50 AM - Gatwick B**

Earl Legleiter - Fort Hays State University

Sense making in a science class has the expectation that students think. This workshop will engage participants in a thinking classroom in which thinking to make sense of a phenomena is the norm, and students are discouraged from slacking, stalling, mimicking, and faking their way through the science content. The goal of a thinking classroom is to build engaged students that are willing to think about any task. Thinking classroom practices create the optimal conditions for learner-centered, student-owned science thinking and learning, and have the power to transform science classrooms.

Participants will engage in thinking classroom to developing and using a constant velocity particle model by:

- Observing a constant velocity toy car moving across the floor
- Recording and summarizing their observations of the car
- Developing a driving question board about their observations
- Designing an experiment that could answer their question
- Working in small groups to make sense of the model and apply it to a new situation using a thinking task
- Discussing in a whole group a consensus model for any particle moving with a constant velocity
- Examine the pedagogy that led to student thinking and sense making of the scientific model

## A Framework to Promote Effective Teacher-Led PLCs

STRAND 3

**10 AM - 10:50 AM - Lambert A**

Stephanie Tubman and Amanda Gonczi - Michigan Technological University

Teachers are expected to be members of effective professional learning communities (PLCs). But what exactly is an “effective” PLC? How can project leaders and teachers help others learn to facilitate and participate in PLCs for productive outcomes? What can a person do if a PLC is unproductive or toxic? In this workshop we will help participants understand what an effective PLC is and how professional learning can be structured to provide teachers with the skills necessary for effective PLC participation. Through a group generated word cloud we will first identify participants conceptions of teacher led professional communities. We will then elicit PLC-related challenges and questions the group have to establish a focus for our workshop. A framework for helping teachers understand what an effective PLC is and to develop the skills needed to lead and/or participate in one will be presented and supported through our own project outcomes and existing research literature. The workshop will culminate with an opportunity for participants to identify and share how workshop elements could be applied in their own setting or project. This workshop is intended to be of value to project leaders and teachers alike.

## Building a Community Classroom for Diverse Learners Through Improvisation

STRAND 1

**10 AM - 10:50 AM - Lambert B**

Michelle Childress - University of Arkansas

Students in our classrooms come from a wide range of diverse backgrounds creating a challenge for teachers to fully engage with each student. Likewise, students must consistently become acquainted with various personalities and characteristics of their teachers throughout their day and/or lifetime. Social skills necessary for optimal student learning is often demanded, required, or often expected; however, with the technology age, cultural differences, post-Covid era, and increase in social anxiety, these skills seem to be lacking. Building a community classroom can easily be attained with simple and fun improvisation activities. Improvisation allows students to practice social skills in a safe space, help students who are shy to break out of their shells, and provide a fun way to learn.

Some students have a fear of failure that can inhibit learning and stifle student success. Improvisation is an excellent experience with failure that teaches kids to embrace failure as a part of learning.

This workshop will lead participants through several improvisation activities, provide resources for future activities that can be implemented in the classroom, and present teachers with concrete evidence that improvisation can build relationships and breakdown barriers.

# Session 2
# 11:00 AM - 12:00 PM

## Planning Program Evaluation for NSF's Noyce Teacher Program

STRAND 3

**11 AM - 11:25 AM - Gatwick A (moderator Chuck Granger)**

Alma E. Rodriguez Estrada, Chetna Patel, Lindsey Hill, Aubrey Southall - Aurora University, and

Recruitment and retention of students in the STEM disciplines is critical for the advancement of science in today's competitive world. Students who receive a solid and fulfilling experience early in their science classrooms are more likely to pursue a STEM-associated career. STEM educators can greatly and positively influence students' career choices. Unfortunately, many states across the United States are facing a shortage of qualified STEM teachers. This shortage might be due to different factors including few wanting to pursue STEM education as a career, leaving their studies before graduation or switching to a different profession after years of service. Aurora University's NSF Noyce Track 1 grant seeks to provide diverse and valuable resources for students and professionals in STEM and STEM education to boost recruitment and retention before, during and after graduation. Many of these resources include community-building activities and networks that facilitate partnerships among different entities at different levels. STEM and education faculty (at a 4-year university and community colleges), school district teachers and administrators come together to support the new generations of STEM educators. In this presentation, the overall goals of the grant and recently implemented activities will be discussed.

## Improving Cultural Responsiveness as a Member of an International Research Team

STRAND 1

**11 AM - 11:25 AM - Orly A (moderator Dorene Huvaere)**

Kara Hosman and Jerry Kavouras - Lewis University

"Soil, People, the Environment, and Food for Life" is a program funded by 100,000 Strong in the Americas. Its objective is to develop solutions for addressing climate change and soil degradation in rural areas of Colombia. The program aims to improve cultural competencies among the students, strengthen existing research networks, and develop relevant solutions to a real-world problem. The program has the students work as a research team, learning from each other, as they gain knowledge, master advanced laboratory techniques, and improve teamwork and collaboration skills. The program positively benefits Noyce scholars by shifting their cultural frame of reference and providing lessons and skills that will enhance the science classroom. An invaluable outcome of this international research project is the ability to view science and culture from another frame of reference. It provides an opportunity to step outside one's comfort zone and immerse oneself in another culture. This experience allows American Noyce scholars the ability to connect and network with peer international STEM majors, reinforcing the idea that despite our differences, science connects and transcends cultures. This experience challenges Noyce scholars to develop better communication skills for working with English Language Learners in STEM. Increased knowledge of other cultures will provide a wider frame of reference that allows teachers to reach more students, design a more inclusive curriculum, and educate from a global perspective. It also sharpens lab techniques that will be taught in STEM classes.

## Living Through a Pandemic: Noyce Program Lessons Learned

STRAND 3

**11 AM - 11:25 AM - Lambert A (moderator Todd France)**

Catherine Klehm and LeighAnne Locke - Oral Roberts University

The Noyce Program at Oral Roberts University, MASST (Math and Science Scholarships for Teaching), was built around a research-based, specialized training called Structured Dialogue. The timing of our Noyce Program led to having teachers who completed their training either before, during or after the pandemic, which required adjustments to the methods needed to accomplish program goals. Although educators worldwide experienced similar upheaval of what education meant during the pandemic, Scholars in our program demonstrated strong resilience due to the established community of teacher learners that provided a support group for each other. This presentation plans to share lessons learned from the faculty/PI perspective and the Scholar perspective, and will reflect on how the pandemic redefined education as a whole.

## Building Growth Mindset in STEM classrooms by encouraging students to tell STEM Stories (Bios, Fables, Myths, Memoirs)

STRAND 1

### 11 AM - 11:25 AM - Orly B (moderator Janet Moore)

Michael Matthews, Sydney Fuhrman, Kenzie Bias, Emi Rupp - University of Nebraska at Omaha

From Hypatia's myths inspiring Sophie Germain's to study mathematics in the shadow of the guillotine, to Leibniz' incredible vision to bridge hatred and the establishment of the great European Science Academies. From Ampere losing his electricity solution on the back of a taxi, to Katherine Johnson's conquering racism in Hidden Figures and helping man reach the moon, the world of STEM history is a world full of stories that can inspire students to pursue their dreams, work together, embrace their quirkiness, and fight oppression and on the way develop the growth mindset that will enable them to become future STEM leaders. In this workshop we will share some amazing stories that teach a moral about what a STEM student can do, be, and become. And participants will create their own. We will share some original video resources, games, and content.

## Developing Place-Based Units for Social Justice Science Instruction

STRAND 2

### 11 AM - 11:25 AM - Gatwick B (moderator Sherri Martinie)

Helen Meyer - University of Cincinnati, Randall Gibson, Lillian Sims - Cincinnati Public Schools

This workshop was collaboratively developed among the three presenter and used with high school students and pre-service teachers, although only the first presenter will deliver the workshop. Workshop participants will be introduced to Place-Based and Social Justice Science. They will then engage with the introductory activity completed by students using HS student generated data sets, google earth and street level views, and city produced data on tree cover and urban heat islands. At the conclusion of the introductory activity, workshop participants will discuss possible content and inquiry avenues that could be developed from the data depending on the needed science content to be developed. The presenter will then review the implemented lessons, one with HS environmental science students and one emphasizing physical sciences completed with pre-service teachers. In any remaining time, the participants will be introduced to a planning framework and resources for creating participants to create their own place-based materials and then have brainstorming time.

## Addressing Civil Rights Movement and other historical events through STEM

STRAND 1

### 11 AM - 11:25 AM - Concourse AB

Brad Christensen, Anne Marie Jacobs - Hebron Christian Academy

An excellent means for addressing significant historical events is through appropriate literature. The reading of literature can be enhanced through carefully designed STEM activities. The main topic of discussion will be the exploration of the Civil Rights Movement through a STEM lesson, but other events illustrated in literature will also be addressed. This workshop will provide ideas for how the STEM philosophy of education can be applied to the study of history through literature.

## Do Meteorologists Study Meteors? STEM Career Resources for Teachers — STRAND 1

**11 AM - 11:25 AM - Lambert B (moderator Faith Yarberry)**

Tia Hohler, Jen Pera, Danielle Niergarth - Michigan Technological University

With all of the things teachers have to do these days, it can be difficult to add more to the curriculum, including introductions to various STEM careers. In our own experiences as educators, we have found that one barrier is that teachers lack the materials needed to plan and incorporate STEM career resources into their curriculum. However, if students do not know the breadth of STEM careers out there, how can we expect them to pursue degree programs and career paths in these fields? Therefore, teachers need easy-to-use resources that can fit into any curriculum to introduce students to STEM careers. We want to introduce an exciting new resource that will help teachers of all grade levels introduce students to a wide variety of STEM careers. It is a website created by teachers, for teachers, in partnership with the Mi-STAR program from Michigan Technological University. The lessons are organized and matched to specific Mi-STAR units and by topic for non-Mi-STAR teachers. While the lessons are written for middle schoolers, they can be scaffolded to meet the needs of various ages.

## Creating Active Learning Environments in Math Classrooms Using Learning Assistants — STRAND 2

**11 AM - 11:25 AM - Lambert CD (moderator Monica Medina)**

Susan (Susie) Brooks - Western Illinois University - Quad Cities

Every math professor has heard students exclaim, “I’m terrible at math,” or “I put this class off for years because I didn’t want to take it.” All too often, students dread enrolling in mathematics courses because they view math as “a bag of tricks” or they solve problems in a mechanical fashion “because their teacher told them to”. How do we address this issue?

Although one overarching fix has yet to be determined (and probably doesn’t exist), creating a welcoming active learning environment is a great way to start, and learning assistants (LAs) can help instructors do just that! Learning assistants, which were first introduced at the University of Colorado in Boulder, are undergraduate students that facilitate learning and problem solving skills within university courses. They receive instruction in teaching pedagogy and work directly with instructors and their peers to help students succeed.

At Western Illinois University (WIU), we have been using LAs since the fall of 2017. More recently, WIU is using its Learning Assistant Program within its NSF Noyce Grant as means to recruit and prepare STEM education majors. In this presentation, we will discuss how LAs are utilized in some of our mathematics and physics courses, and how they have impacted retention as well as the sense of community over the past six years.

## Lesson Planning for Newbies (or really anyone!!) STRAND 1

### 11:30 AM - 11:55 AM - Orly B (moderator Janet Moore)

Alyssa Hoffmann and Antonio Castillo - Loyola University Chicago

Lesson planning can be a lot! How do you know what to teach if you don't have the year mapped out? How can you make connections to the real world while planning? Wouldn't it be nice to have your unit at a glance in an easily accessible way? With our simplified lesson/unit planning template, teachers can easily identify objectives, standards, assessments, modification and make culturally relevant connections all on one page. Additionally, educators are able to then make easier connections between units so it is clear for both students and the teacher how what was learned connects to what is to come.

## Empowering Teachers in AI Education through Participatory Co-Design STRAND 2

### 11:30 AM - 11:55 AM - Orly A (moderator Dorene Huvaere)

Kyungbin Kwon, Keunjae Kim - Indiana University

This study introduces a project activity with the aim of empowering teachers new to AI education. The scarcity of resources and learning opportunities for educators can present one of the most formidable challenges in implementing AI education within formal school settings. The project endeavors to address these challenges by incorporating participatory co-design activities, while also providing professional development opportunities for teachers situated in rural areas, where such support is often more constrained.

Five teachers have actively engaged in the project and successfully integrated AI curriculum into their classes since 2021. They have participated in regular monthly meetings with researchers, delving into fundamental AI concepts and learning tools such as Teachable Machine or Machine Learning for Kids (PD). Additionally, they have engaged in collaborative design of learning activities with researchers, considering the specificities of their subjects and class schedules (co-design). These educators have also assumed mentoring roles for incoming teachers, thereby fostering the establishment of a robust teacher community.

Close observations of teaching practices and interviews pertaining to the effectiveness of the AI curriculum have revealed a gradual enhancement in teachers' subject knowledge, teaching skills, and confidence in embracing innovative pedagogical approaches.

The vibrant learning and teaching experiences in AI education of the participating teachers can serve as invaluable resources in nurturing teacher communities, where educators can share insights and best practices. The building of teachers' identities and participatory co-design experiences with researchers will be presented, and best practices for teacher education will be discussed in the context of AI education.

## Student Voice in STEM using Cogens

STRAND 2

**11:30 AM - 11:55 AM - Gatwick B (moderator Sherri Martinie)**

Dawn Kahler - Kalamazoo Public Schools

Student input and relationships encourage buy-in to learning. When students were at home during the pandemic, this seemed to be a missing piece of the online classroom. This session is based on a book study of, "For White Teachers Who Teach in the Hood:... and the Rest of Y'All Too" by Christopher Edmin. Teachers who taught at different middle schools in Michigan used this book to connect with their students during the Covid-19 virtual learning and then brought the Cogen groups into the classroom when schools returned to in-person learning.

## The intersection of value and growth: Noyce participants' development through collaborative clinical experiences and intentional support

STRAND 3

**11:30 AM - 11:55 AM Gatwick A (moderator Chuck Granger)**

Kelly Gomez Johnson, Paula Jakopovic, Janice Rech, Frances Anderso - University of Nebraska at Omaha

The Association of Mathematics Teacher Educators (2017) cites the important role teacher preparation programs play in providing opportunities for preservice teachers to learn mathematics content and pedagogy and to engage in real world teaching experiences in clinical settings. Content and pedagogical coursework and field experiences are pillars of most teacher preparation programs (Darling-Hammond et al., 2002); however, examining the design, execution, and impact of particular models on student development and what they find valuable in their experiences are less prevalent in research. Our project team explored an innovative model for teacher development created in collaboration with university faculty from both the teacher preparation and mathematics departments. In this session, we will share findings from our Noyce Track 1 project, where we integrated the use of intentional faculty, formal and informal clinical experiences, and structured reflection activities to interrogate the types of value our Noyce participants derived from their early experiences as undergraduate preservice teachers.

## Transgender Students 101

STRAND 2

**11:30 AM - 11:55 AM - Lambert B (moderator Faith Yarberry)**

Bri Saab - Loyola University Chicago

More and more, students are coming out as a variety of genders and using a variety of pronouns. This workshop will teach the basics: Things to Know, In the Classroom, and Advocacy. It starts with an exploration of identity and intersections, as well as first-person accounts. Then, we will discuss integrating transgender topics into your classroom, and supporting any trans students you might have. Finally, we will explore ways to step up and advocate for your transgender students - and colleagues - beyond the classroom.

## Equitable Science Instruction – Teachers Beliefs and Actions

STRAND 3

**11:30 AM - 11:55 AM - Lambert A (moderator Todd France)**

Amanda Gonczi and Stephanie Tubman - Michigan Technological University

This presentation will share findings from a study that included 19 STEM teacher leader fellows. All fellows were observed teaching one science or math lesson between 2019 and 2023. They also all participated in a semi-structured interview in 2021 that probed their beliefs about equitable science instruction. Lessons were coded for evidence of practices that promoted equity including culturally-relevant context and/or pedagogy, differentiated instruction, and other instructional moves that responded to learner needs. Interviews were open-coded for themes. Findings indicated that many of the teachers implemented instructional moves designed to promote equitable outcomes. However, in interviews several of these teachers indicated they feel it is the role of the administration to attend to issues of equity and largely described it in terms of differences in technology access across students. These findings indicate "equity" in education is not a transparent term and teachers may not understand the breadth of their potential role in promoting equitable instruction. Findings also suggest there is an opportunity for project leaders to develop teacher leaders' understanding of equitable instruction and the potential power they have in the classroom to attend to student needs and facilitate equitable outcomes.

## Community College Partnerships to Promote a Noyce Scholarship Program

STRAND 3

**11:30 AM - 11:55 AM - Lambert CD (moderator Monica Medina)**

Earl Legleiter - Fort Hays State University, Charlotte Cates - Barton Community College, Jeff Sekavec - Colby Community College

Fort Hays State University's Noyce scholarship project, "Recruiting, Preparing, and Retaining STEM Teachers for Western Kansas" increased the number of high school STEM teachers for rural areas of western Kansas. Increasing the STEM teaching supply requires effective and targeted recruitment. To accomplish this, the project team collaborated with five community colleges in western Kansas and implementing targeted recruitment on the community college campus to attract preservice teachers from STEM majors and return them to their high needs' communities in the western Kansas region. The community colleges also developed STEM clubs on their campus to engage students in activities that increased their interest in teaching careers. Activities and results of the Noyce community college partnerships will be shared.

## Keynote Follow-up

**6 PM - 6:30 PM - Concourse AB**

Lisa M. Gonsalves - University of Massachusetts Boston

Lisa M. Gonsalves, Professor in the College of Education and Human Development at the University of Massachusetts Boston. If you would like to discuss the presentation with the keynote speaker in greater detail, this breakout session provides an opportunity for you to have an in-depth conversation with the presenter.

# Session 3
## October 22nd from 10:00 AM - 11:00 AM

### Keynote Follow-up

**10 AM - 10:50 AM - Concourse AB**

Jennifer Grandfield, Alexandria Paulsen - Chicago Public Schools

Jennifer Grandfield, and Alex Paulsen, Chicago Public Schools. If you would like to discuss the presentation with the keynote speakers in greater detail, this breakout session provides an opportunity for you to have an in-depth conversation with the presenters.

### Discussion with the PI's

STRAND 3

**10 AM - 10:50 AM - Orly A**

Dr. Jennifer Ellis- NSF

Dr. Jennifer Ellis, associate professor and director of Science, Technology, Engineering, and Mathematics (STEM) education at University of Tennessee at Chattanooga, will begin a temporary program director assignment with NSF

### Recruiting and Retaining Racially/Ethnically, Linguistically, and Gender-diverse STEM Teacher Educators Who are Prepared to Teach Students in Culturally Relevant Ways

STRAND 3

**10 AM - 10:50 AM - Gatwick A**

Aubrey Brammar Southall - Aurora University, Teresa Bixby - Lewis University, Huseyin Colak - Northeastern Illinois University, Dorene Huvaere - Lewis University, Chetna Patel - Aurora University, Theresa Y. Robinson- Elmhurst University

The purpose of this longitudinal research study is to explain four Midwest institutions' attempts to recruit and retain racially/ethnically, linguistically, and gender-diverse STEM teacher educators who were prepared to teach students in culturally relevant ways. We acknowledge understanding and respecting cultural differences is required to imagine STEM spaces free of racial injustice. The low numbers of diverse STEM teachers raises concerns among STEM programs and STEM teacher preparation programs, prompting a call to action to increase the representation of these underrepresented populations in the STEM workforce. Researchers believe it is essential for teacher preparation programs to be prepared to actively encourage and recruit more STEM majors from these groups.

## Do Dogs Know Calculus? STRAND 1

### 10 AM - 10:50 AM - Gatwick B

Timothy Pennings - Davenport University

A standard calculus problem is to find the quickest running-swimming path from a point on shore to a point in the lake. Elvis, my Welsh Corgi, never had a calculus course, but when we played fetch at Lake Michigan, he appeared to choose retrieval paths close to the optimal answer revealed by calculus. In this talk we reveal what was found when we experimentally tested this ability.

Objectives of talk: i) Show the usefulness and power of mathematics in understanding our world, ii) Show the process of mathematical modeling - using math formulas to describe natural phenomena. iii) Show effective pedagogoical techniques of engaging students in a lecture.

## Teacher Leaders Model Standards for Teacher Leadership STRAND 1

### 10 AM - 10:50 AM - Lambert A

Jenne VandePanne, Jessica Wagenmaker - Michigan Technological University

Teacher leaders are the superheroes of education. They have a measurable, positive effect on students, school districts and other teaching professionals. What standards do these superheroes live by? In this session participants will look at and evaluate the National Teacher Leader Model Standards. Consisting of seven domains these standards will stimulate dialogue among educators regarding teacher leadership and their role as a teacher leader. Participants will walk away with a set of standards useful to teachers as they begin or further their explorations into effective teacher leadership.

## Discovery Learning: The Pósa Method STRAND 1

### 10 AM - 10:50 AM - Lambert B

Dani Ellis, Catherine Althoff - University of Nebraska at Omaha and Rhodes College

This workshop will provide an overview of a unique “Hungarian style” method of discovery learning in mathematics developed by Lajos Pósa. The “Pósa method,” which is similar to inquiry-based learning, is designed to guide students to discover mathematical concepts on their own. In this student-centered approach, teachers act as a facilitator which allows students to develop problem-solving skills, and deepen their mathematical understanding while promoting agency and curiosity. Following an introduction to the Pósa method, participants will solve a thread of Pósa problems, offering a firsthand experience of learning mathematics as a student of the Pósa method. This workshop will conclude with a discussion, centering on how to integrate Pósa method elements into the classroom to promote diverse thinking and inclusion.

## ELL in the Science Classroom - Examples on Adapting for a Range of Ability

STRAND 1

**10 AM - 10:50 AM - Orly B**

Kevin Knack, Kawther Mohammed, Tracy Chappell, and Megan Doorlag - Kalamazoo Public School

In 2022 Milwood Middle School in Kalamazoo, Michigan became the home to Kalamazoo Public School's Newcomer program. This entailed a large group of refugees and other students with limited or no English language proficiency being welcomed to our school. This session will describe how those ELL students were integrated into our science education program across a spectrum of skill levels.

The first part of the session will describe the logistics of Milwood's ELL and Science teachers working together to develop strategies and modifications for our science curriculum. It will describe how the ELL/Science PLC operated and how students were scaffolded from sheltered instruction to the mainstream science classroom.

The second portion of the session will review a portion of a physics unit based on forces. Participants will see examples of modifications and strategies to make a unit challenge accessible to a culturally and linguistically diverse classroom. They will also participate in a brief lab and compare a version modified for limited English proficiency students to an unmodified version.

## STEM Careers, Science Identity, and Student Engagement

STRAND 1

**10 AM - 10:50 AM - Lambert CD**

Krystal Brand - IUPUI School of Education

Today science-based job opportunities continue to rise. Unfortunately, there is a severe shortage of students enrolling in science majors and/or choosing science careers. In this oral presentation, I will define the issues students have in developing positive science identities, discuss the roles that schools and communities can have in helping to develop strong science identities, and give examples of lessons that allow students to explore their science identities. When schools and communities work together in helping students develop their science identity it increases students' science engagement in the K-12 classroom and promotes an increase of students choosing science majors and careers

# Strand 1, 2 , & 3 Site Visit Schedule

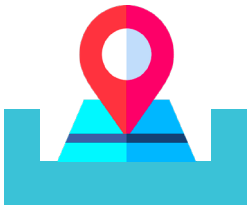
## Saturday, October 21st from 12:00 PM - 5:00 PM

***12 PM***

*Pick up Boxed Lunches*

***12: 15 PM - 12:30 PM***

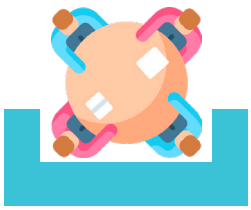
*Buses Leaving for site visits from the Hotel*



***1 PM - 4 PM***

*Site Visits*

| *Group # and Color* | *Site Visit Name* | *Home-base Room* |
|---|---|---|
| Group - 1 - Red | EarthDance Organic Farm School and Bellefontaine Fall Tree Walk | Orly A |
| Group 2 - Orange | The Gateway Arch National Park | Orly B |
| Group 3 - Yellow | The Danforth Plant Science Center | Gatwick A |
| Group 4 - Green | Saint Louis Zoo | Gatwick B |
| Group 5 - Blue | Missouri Botanical Garden and Tower Grove Park | Lambert A |
| Group 6 - Purple | Weldon Springs Nuclear Waste Site | Lambert B |



***4 PM - 5:00 PM***

*Attendees return from the Site Vistis*

- Strands 1, 2, and 3 return from Site Visit
- Coffee and Snack Break
- 30 mintues of Site reflection let by your site leader in Homebase Rooms

# Saturday Night Fun Activity

*7:30 PM - 10:00 PM*

*Evening at the Amp Up Action Park*

Enjoy access to go karts, laser tag, high ropes course, and VR. This is time for fun, networking, and optional Scavenger Hunt.

*10 PM*

*Return to Hotel*

# Contact

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**Social Media**

#MidwestNoyce

**Place Contact**

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*Dr. Sherri Martinie*

*Dr. Tuan Nguyen*

*Dr. Charles Granger*

*Dr. Monica Medina*

*Dr. Dorene Huvaere*


*Joshua Rappuhn*


*Dr. Todd France*


*Dr. Margaret Mohr-Schroeder*


*Dr. Lara Smetana*


*Dr. Laura Barwegen*


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