

# ASEE MIDWEST SECTION CONFERENCE

Hyatt, Tulsa, Oklahoma  
September 11-13, 2022





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## Conference Chair



Dr. Charles Baukal, Director,  
Koch Engineered Solutions Institute

The 2022 Midwest Section Conference planning committee is excited for our section to meet in person again after the 2020 conference was cancelled and the 2021 conference was virtual, both due to Covid-19. The theme of this year's conference is "Justice, Equity, Diversity and Inclusion During a Pandemic." The 1.5-day meeting in Tulsa has an exciting lineup of presentations including faculty and student papers and posters, keynote speakers, and a student panel that will consider justice, equity, diversity, and inclusion. There is also some excellent entertainment planned: a social on Sunday evening at Oklahoma State University – Tulsa, a trip to the nationally-acclaimed Greenwood Rising museum on Monday afternoon, and dinner on Monday night that will include native American fancy dancers. There will also be awards and a business meeting as usual at Tuesday's lunch. Welcome to Tulsa!



## Debbie Cowan (Keynote Speaker)

Monday, September 12, 2022

8:30 am – 9:15 am

***Tulsa South***



Debbie Cowan, Senior Vice President, and Chief Human Resources Officer

An accomplished Human Resources professional with more than 20 years of experience, Debbie Cowan is Senior Vice President and Chief Human Resources Officer for Williams. Debbie oversees all aspects of the Human Resources function, supporting approximately 5,000 employees across the county. Prior to joining Williams, Debbie served as Global Vice President of Human Resources, Koch Chemical Technology Group, LLC, supporting seven different engineering and manufacturing companies with employees across 26 countries.

Debbie received her Bachelor of Arts in Psychology and her Bachelor of Science in Business Administration from the University of Arkansas and her Master of Arts in Organization Dynamics in Human Resources Management from the University of Oklahoma. She also has her PHR / SHRM-CP (Certified Professional in Human Resources) certification. In addition, she was awarded Top 50 Most Powerful Women in Oil & Gas in 2020 by the National Diversity Council and recognized as Top 100 Diversity Leaders in Energy by the Energy Diversity Council in 2021.

An active leader in the community, serves on the Tulsa Regional Chamber Board of Directors and Advisory Council for Meals on Wheels of Metro Tulsa. In addition, she serves on the Performance Contracting, Inc. Board of Directors serving on the Compensation and Ethics Committees.

## Stephanie Adams (Keynote Speaker)

Tuesday, September 13, 2022

8:30 am – 9:15 am

***Tulsa South***

Dr. Stephanie G. Adams is the 5<sup>th</sup> Dean of the Erik Jonsson School of Engineering and Computer Science at the University of Texas, Dallas and Past President of the American Society of Engineering Education.



Previously, Dr. Adams served as the Dean of the Frank Batten College of Engineering and Technology at Old Dominion University (2016– 2019), Department Head and Professor of Engineering Education at Virginia Tech (2011–2016) and held faculty and administrative positions at Virginia Commonwealth University (2008–2011) and the University of Nebraska-Lincoln (1998–2008). Her research interests include Broadening Participation, Faculty and Graduate Student Development, International/Global Education, Teamwork and Team Effectiveness, and Quality Control and Management. In 2003, she received the CAREER award from the Engineering Education and Centers Division of the National Science Foundation. Dr. Adams has worked with several colleges and universities, government agencies and non-profit organizations on topics related to graduate education, mentoring, faculty development and diversifying STEM.

Dr. Adams is an honor graduate of North Carolina A&T State University, where she earned her BS in Mechanical Engineering, in 1988. In 1991, she was awarded the Master of Engineering degree in Systems Engineering from the University of Virginia. She received her Ph.D. in Interdisciplinary Engineering from Texas A&M University in 1998, where she concentrated on Industrial Engineering and Management.

## Conference Program & Planning Committee

Dr. Charles Baukal	<b>Conference Chair</b> <i>Director</i> <i>Koch Engineered Solutions Institute</i>
Dr. Rohit Dua	<b>Conference Program &amp; Paper Awards Chair</b> <i>Associate Teaching Professor</i> <i>Missouri University of Science and Technology</i>
Dr. Laura Ford	<b>Conference Webmaster</b> <i>Associate Professor</i> <i>University of Tulsa</i>
Ms. Myra Fanning	<b>Conference Logistics Chair</b> <i>Training Leader</i> <i>Koch Engineered Solutions Institute</i>
Dr. Carisa Ramming	<b>Midwest Section Chair</b> <i>Assistant Dean</i> <i>Oklahoma State University</i>
Dr. Jena Asgarpoor	<b>Midwest Sec. Chair-Elect &amp; Awards Chair 2023 Conference Co-Chair</b> <i>Professor of Practice &amp; MEM Program</i> <i>Director University of Nebraska-Lincoln</i>
Dr. John Krohn	<b>Midwest Section Treasurer</b> <i>Professor</i> <i>Arkansas Tech University</i>
Dr. Ed Clausen	<b>Conference Planning Contributor</b> <i>Professor</i> <i>University of Arkansas</i>
Dr. Sohrab Asgarpoor	<b>Conference Planning Contributor 2023 Conference Co-Chair</b> <i>Associate Dean &amp; ECE Professor</i> <i>University of Nebraska-Lincoln</i>
Dr. Aysa Galbraith	<b>Conference Planning Contributor</b> <i>Associate Teaching Professor</i> <i>University of Arkansas</i>
Dr. Marisa Crawford-Gray	<b>Conference Planning Contributor</b> <i>Intentionally Designed Solutions, LLC</i> <i>Kansas City, KS</i>

## Conference Program

### Sunday, September 11, 2022

3:00 pm – 6:00 pm: *Registration, Hyatt – Tulsa Foyer*

5:00 pm – 6:00 pm: *Registration, Helmerich Research Center  
Oklahoma State University-Tulsa\*\**

6:00 pm – 8:00 pm: *Evening Social, Helmerich Research Center  
Oklahoma State University-Tulsa\*\**

### Monday, September 12, 2022

7:00 am – 8:00 am: *Breakfast, Hyatt – Tulsa South*

7:30 am – 8:30 am: *Registration, Hyatt – Tulsa Foyer*

8:30 am – 9:15 am: *Welcome, Tulsa South: Chuck Baukal  
Opening Keynote Speaker, Tulsa South: Debbie Cowan*

## Morning Concurrent Sessions 1A & 1B

9:30 am – 10:30 am: *Concurrent Sessions 1 Session 1A*

*Tulsa Central:* Mechanical Engineering Education

Infusing High-Performance Computing and Machine Learning in  
Mechanical Engineering Education

*Christy Dunlap, Jeff Pummill, and Han Hu*

Evaluation of a Hybrid Copter Drone Using Hydrogen fuel cell and  
Batteries

*Gerardo Urdaneta, Jacob Crawford, Andres Dewendt, Zuhaneer  
Khan, Kyle McMillan, Christopher Meyers, and Seyed Ehsan  
Hosseini*



## Enhancing Undergraduate Mechanical Engineering Education with CAM and CNC Machining

*Stephen Pierson, Josh Goss, and Han Hu*

### o **Session 1B, Tulsa North:** Engineering Program Development

- Interdisciplinary Capstone Experience for Master's and Doctoral Students in STEM at Kansas State University

*Mirit Shamir, Stacy Hutchinson, Gaea Hock, Ryan Hansen, Jonathan Aguilar, Nathan Hendricks, Prathap Parameswaran, Matthew Sanderson, Rebecca Cors and, Melanie M. Derby*

- Accelerated BS/MS Program in Electrical and Computer Engineering

*Robert Woodley and Steve Watkins*

- Using Web of Science to Analyze Research and Collaborations within the University of Arkansas College of Engineering via Microsoft Excel and VBA Programming

*Aubrey Schultz, and Jay McAllister*

10:30 am– 10:45 am: ***Mid-morning Break: Snacks, Tulsa Foyer***

## Morning Concurrent Sessions 2A & 2B

10:45 am – 11:45 am: **Concurrent Sessions 2**

○ **Session 2A, Tulsa Central:** Chemical Engineering Program

- An inquiry Activity in Diffusion  
*Laura Ford*
- Chemical Engineering Alumni Student Mentoring Program  
*Heather Walker, W. Kent McAllister, Michael W. Mourot, J. Robert Dean, Greg Nesmith, and Edgar C. Clausen*
- Early Detection of Acromegaly Using a Novel Convolutional Neural Network  
*Anish Leekkala and Ukash Nakarmi*

○ **Session 2B, Tulsa North:** Student Posters

- The Lunar Terrain Vehicle Project  
*Shea E. Brown, Kasey A. Baker, and Kevin R. Lewelling*
- Design of an Instrumented Soiling Chamber for Solar Photovoltaic Coating Research  
*Mohamed Adawi, Landon Perdue, and Robert A. Fleming*
- Hydrogen Fuel Cell Characterization and Use in Hybrid Drone System  
*Gerardo Urdaneta, Jacob Crawford, Andres Dewendt Zuhanee Khan, Kyle McMillan, Christopher Meyers and Seyed Ehsan Hossein*

## Lunch, Student Poster Awards

12:00 pm – 1:00 pm: ***Lunch, Tulsa Foyer/Tulsa South Student Poster Awards***

## Afternoon Concurrent Sessions 3A & 3B

1:15 pm – 2:15 pm: ***Concurrent Sessions 3***

- ***Session 3A, Tulsa Central:*** Project Based Learning
  - Create Your Own WIMP51 Processor: Project Based Experience to Learn Basic Computer Architecture Development and Organizational Skills  
*Rohit Dua*
  - Make Students Confident in Thermodynamics: The Project Based Learning Methodology  
*Yang-Seon Kim and Keren Tshimanga*
  - Design of a Robotics Learning Kit incorporating Computer Vision  
*Dan Kilula, Mohamed Adawi and Shivan Haran*
- ***Session 3B, Tulsa North:*** Mechanical Engineering Education
  - Developing Community and Research Experience in A Freshman Mechanical Engineering Programming Course,  
*Sara Wilson*
  - A Lab Experiment Involving Free Convection Heat Transfer from a Flat Horizontal Plate  
*Alexa G. Moreno, Thomas W. Smith, and Edgar C. Clausen*
  - Introducing LabVIEW and Arduino as Data Acquisition System Alternatives  
*Jackson Marsh, Christy Dunlap, Stephen Pierson and Han Hu*

2:15 pm – 2:30 pm: *Afternoon Break: Snacks, Tulsa Foyer*

## **JEDI Student Panel**

2:30 pm – 3:30 pm: *Session 4: Student Panel, Tulsa South:*

- Justice and Equity in Engineering Education and Student Experience

## **Greenwood Rising Museum Tour**

3:45 pm – 5:30 pm: *Greenwood Rising Museum*

## **Banquet, Awards, and Entertainment**

6:00 pm – 8:00 pm: *Banquet Dinner, Tulsa South*

- *Banquet Entertainment:*  
*Native American Dance by Oklahoma Fancy Dancers*

## **Tuesday, September 13, 2022**

7:00 am – 8:00 am: ***Breakfast, Hyatt – Tulsa South***

7:30 am – 8:30 am: ***Registration, Tulsa Foyer***

8:30 am – 9:15 am: ***Opening Keynote Speaker, Tulsa South: Stephanie Adams***

### **Morning Concurrent Sessions 5A & 5B**

9:30 am – 10:30 am: *Concurrent Sessions 5*

○ ***Session 5A, Tulsa Central:*** Experiment Based Education

- Pasta Bending Experiment  
*Charles Baukal and Christopher Langley*
- Contact Resistance Demonstration  
*Randy Kelley*
- Microscopic and Video-Based Optical Techniques in Engineering Education  
*Amanda Williams, Hari Pandey, and Han Hu*

○ ***Session 5B, Tulsa North:*** Assessment in Education

- Observations of Remote and In-Persons Formats Using Partial Credit and Multiple-Choice Exams  
*David C. Jensen, and James A. Davis*
- Early Alert & Intervention System in Early Math Courses for Engineering Students  
*Sohrab Asgarpour, Amanda Bergeron-Bauer and Eric Einspahr*

10:30 am– 10:45 am: ***Mid-morning Break: Snacks, Tulsa Foyer***

## Morning Concurrent Sessions 6A & 6B

10:45 am – 11:45 am: **Concurrent Sessions 6**

o **Session 6A, Tulsa Central:** Challenges in Engineering Education

- The World Needs More Complete Engineers: Developing Students' Non-Technical Skills  
*Markeya S. Peteranetz, Tareq A. Daher, David Jones, Lance C. Perez, and Daniel G. Linzell*
- Engineering teaching approaches at the time of COVID  
*Pavel Navitski, Elena Gregg, Robert Leland, Viktor Taustyka, and Andrzej Gawlik*

o **Session 6B, Tulsa North:** Education and Research

- Undergraduate Research and Mentoring in Separations  
*Thomas McKean, Jorge Almodovar, Aubrey Schultz, Natacha Souto Melgar, and S.Ranil Wickramasinghe*
- Preparing K-12 Educators with a Holistic Reverse Engineering Approach to Exploring Planet Earth (Work in Progress)  
*Dominic Halsmer, Chris Jacob, Josiah Kessler, and Jasmin Marko*
- An Undergraduate Research Experience: A Computational Approach to Understand Acoustic Bandgap Features in Cement  
*Nanziri Esther Kayondo, and Shreya Vemuganti*

## Lunch, Paper Awards, Business Meeting

12:00 pm – 12:30 pm: ***Lunch, Tulsa Foyer/Tulsa South***

- ***Paper Awards***

12:30 pm – 1:30 pm: **Midwest Section Business Meeting, Tulsa South**

## Conference Hotel Map



## JEDI Panelists

**Oghenetega Allen Obewhere**, Ph. D. Student, Chemical & biomolecular Engr. (Univ.of Nebraska – Lincoln). MSc in Materials and Environmental Technology (Taltech).

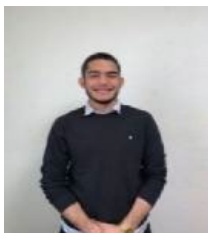


Currently working in the Nanomaterials Laboratory under the supervision of Professor Shudipto Dishari. Research focus is on the modification of electrode interfaces and the characterization of ion-conducting polymers (ionomers) in fuel cell systems. His hobbies and interests include listening to music, gaming, biking, sports, and reading.

**Aaron Frater**, Senior in Electrical Engineering (Missouri Sci & Tech). Aaron is a nontraditional student who started the degree journey at 28 and worked as a mechanic. He is now a Quality Engineer for John Deere Reman Electronics.



**Gerardo Urdaneta**, Senior, Mechanical Engr. (Arkansa Tech Univ.). Gerardo is from Maracaibo, Venezuela. From June 2019 to October 2021, he worked as a tutor helping students with such as Calculus, Differential Equations, and Thermodynamics.



Since January 2021, he has been working as a research assistant in different groundbreaking projects such as the creation of a drone powered by hydrogen and the development of a deep learning algorithm capable of detecting checkboxes in scanned documents. Has published 2 articles about drones' potential benefits for human life, and the feasibility of space power satellites.



**Nyawa Allieu**, Junior, Construction Mgmt, minor in Business & Architectural Studies (Univ. of Nebraska – Lincoln). Plans to start a General Contracting Firm and work on green building in construction.



She is a member of UNL Engineering Student Advisory Board, President of UNL Associated General Contractors and the UNL National Society of Black Engineers. Her Hobbies include baking, cooking, hiking, painting, listening to music, and anything related to nature or food.

**Andrew Obiesie**, BS in Toxicology, minor in Chemistry (St. John's Univ.). Andrew is from Kansas City and currently a graduate student in Environmental Engineering (New Jersey Inst. of Technology) and works full time at Novartis as Cell Processing Specialist II. Interests: Collects vinyls, plays video games, trains in Muay Thai, goes camping



**Ebryane Alvarado**, Senior, Construction Mgmt. (Univ. of Nebraska – Lincoln). Born & raised Nebraskan and Mexican American. President of the UNL Women's Basketball Club team and the UNL AGC Secretary.



In the future I hope to collaborate with others in creating cost-efficient, sustainability focused, eco-friendly, and people centered projects.

## Greenwood Rising Museum



Visitors explore the history of Tulsa's Historic Greenwood District and connect to the spirit of its Black citizens through an immersive journey that uses projection mapping, holographic effect, and environmental media. The experience brings to life the memories of the past and the visions of success for the

future and catalyzes important dialogue around racial reconciliation and restorative justice. Greenwood Rising is the specific story of the dignity of a people who turned trials, tribulations, and tragedy into a triumph of the human spirit.

## Oklahoma Fancy Dancers



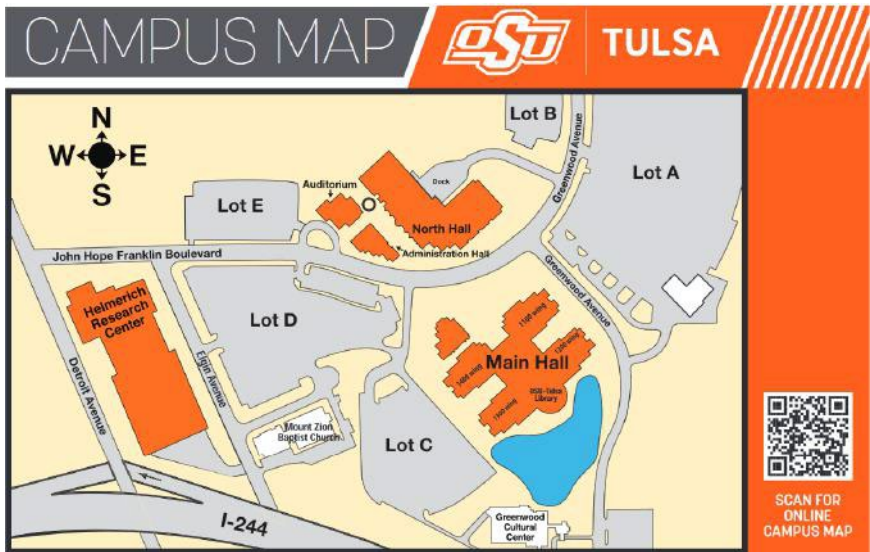
The Oklahoma Fancy Dancers are a group of powwow champions that come together to form a professional and highly acclaimed Native American dance troupe. All the dancers are enrolled tribal members, most of whom are full blood, representing various tribes. The award-winning dance regalia worn by each dancer is brilliantly colorful, traditional, and representative of the dancer's tribe and dance performed.



# Sunday Evening Social Event Location

**\*\* Helmerich Research Center**

**526 N Elgin Ave, Tulsa, OK 74106**



**Parking is in Lot D as shown above**