



# 2024 ANNUAL STATE CONFERENCE

Thursday, November 21  
Alerus Center  
Grand Forks, ND

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# Welcome to the 2024 ND EPSCoR State Conference

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## *with special thanks to the Conference Planning committee*

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Khwaja Hossain, Professor, Biology, Mayville State University

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Dinesh Katti, Jordan A. Engberg Presidential Professor, Civil, Construction and Environmental Engineering, North Dakota State University

Kalpana Katti, University Distinguished Professor, Civil, Construction and Environmental Engineering, North Dakota State University

Sanku Mallik, Professor, School of Pharmacy, North Dakota State University

ND EPSCoR State Office staff

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## Conference Map



# All Presentations

Abstracts are available on the ND EPSCoR website. Scan the QR code to view abstracts, or visit [www.ndepscor.ndus.edu/2024-conference-abstracts](http://www.ndepscor.ndus.edu/2024-conference-abstracts).



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## Acknowledgement

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**NSF EPSCoR**  
ADVANCING GEOGRAPHIC DIVERSITY IN STEM



**ND EPSCoR**  
2024 ANNUAL STATE CONFERENCE

WiFi Name: Conference Center Events  
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# Program Overview

7:30 AM	Check in, light breakfast, hang posters
8:30 AM	Conference opening
9:00 AM	Plenary Speaker Dr. Rebecca Heise
10:00 AM	10 minute break
10:10 AM	Invited Speaker Dr. Andy Nonaka
10:40 AM	NSF EPSCoR Program Director Dr. Jose Colom-Ustariz
11:10 AM	10 minute break
11:20 AM	Concurrent Presentations Session 1
12:20 PM	Lunch and TCU panel: <i>Nurturing STEM and Research at ND Tribal Colleges and Universities</i>
1:50 PM	Poster Session A (even-numbered posters)
2:35 PM	Concurrent Presentations Session 2
3:35 PM	Poster Session B (odd-numbered posters)
4:20 PM	Concurrent Presentations Session 3
5:05 PM	Closing remarks

# Program

7:30 to 8:30	<b>Check in, enjoy a light breakfast, and hang posters</b>
8:30 to 9:00	<p><b>Conference opening</b> <b>Ballroom #5</b></p> <ul style="list-style-type: none"> <li>• James J. Doolittle, Head of Operations, ND EPSCoR : greeting, discussion of conference logistics, and introduction of speakers</li> <li>• Daniel Henry, Director, Indians into Medicine, University of North Dakota, with a land acknowledgement and opening prayer</li> <li>• Andrew Armacost, President, University of North Dakota</li> <li>• Mark Hagerott, Chancellor, North Dakota University System</li> <li>• Tomi Kay Phillips, President, Sitting Bull College</li> <li>• Randy Richards with remarks on behalf of Senator Kevin Cramer</li> <li>• Colleen Fitzgerald, Vice President for Research and Creative Activity, North Dakota State University, with an introduction of the plenary speaker</li> </ul>

## UND Land Acknowledgement

Today, the University of North Dakota rests on the ancestral lands of the Pembina and Red Lake Bands of Ojibwe and the Dakota Oyate - presently existing as composite parts of the Red Lake, Turtle Mountain, White Earth Bands, and the Dakota Tribes of Minnesota and North Dakota.

We acknowledge the people who resided here for generations and recognize that the spirit of the Ojibwe and Oyate people permeates this land. As a university community, we will continue to build upon our relations with the First Nations of the State of North Dakota - the Mandan, Hidatsa, and Arikara Nation, Sisseton-Wahpeton Oyate Nation, Spirit Lake Nation, Standing Rock Sioux Tribe, and Turtle Mountain Band of Chippewa Indians.

9:00 to  
10:00

**Plenary Speaker Dr. Rebecca Heise**

**Ballroom #5**

*Lung-derived Extracellular Matrix*


*Materials for Disease Modeling and Drug Delivery*




Dr. Rebecca Heise serves as the department chair of biomedical engineering at Virginia Commonwealth University (VCU). In 2023, Dr. Heise was awarded the Inez A. Caudill, Jr. Distinguished Professorship in Biomedical Engineering.

She holds an affiliate appointment in the Department of Physiology and Biophysics at VCU. She is a member of the Massey Cancer Center, the Institute for Engineering in Medicine, and the Center for Pharmaceutical Engineering. She earned her B.S. in chemical engineering with an additional major in Biomedical Engineering from Carnegie Mellon University in 2003. She then earned her PhD in bioengineering from the University of Pittsburgh in 2008. She then did her postdoctoral work in the Laboratory of Respiratory Biology at the NIEHS in Research Triangle Park, NC. She joined the faculty of Biomedical Engineering at VCU in 2010.

Dr. Heise's research focuses on pulmonary mechanobiology and regenerative medicine. She seeks to understand how the mechanical environment in the lung influences cellular behavior in health and disease with in vitro and in vivo models. Dr. Heise also researches the use of naturally-derived extracellular matrix as a biomaterial for cell and drug delivery to the lung. The NIH and foundations have funded her to study the effects of ventilator-induced lung injury on inflammatory cell signaling and rodent pulmonary drug delivery, and she has earned a CAREER award from the National Science Foundation for studying cell-ECM interactions in pulmonary fibrosis.

<p>9:00 to 10:00</p>	<p>She is a firm believer in undergraduate research opportunities for underrepresented students and serves as co-PI on the NSF REU Site: Mechanobiology at VCU.</p>
<p>10:00 to 10:10</p>	<p><b>10 minute break</b></p>
<p>10:10 to 10:40</p>	<p><b>Invited Speaker Dr. Andy Nonaka</b>  <b>Ballroom #5</b>  <i>The AMReX Software Framework for Extreme Scale Modeling and Simulation</i></p>  <p>Dr. Nonaka is the Staff Scientist and Group Lead of the Center for Computational Sciences and Engineering at the Lawrence Berkeley National Laboratory. He is interested in HPC implementations of multiphysics and multiscale algorithms for PDEs using structured grid, adaptive mesh, particle/grid, and machine learning algorithms.</p>



<p>10:40 to 11:10</p>	<p><b>NSF EPSCoR Program Director Dr. Jose Colom-Ustariz</b> on the future of E-CORE and E-RISE <b>Ballroom #5</b></p>  <p>Dr. Colom-Ustariz has a Ph.D. in Electrical Engineering with a focus in Microwave Engineering from Penn State University, a MSEE from UMass in Microwave Remote Sensing and a B.S. in Electrical Engineering from the University of Puerto Rico at Mayaguez.</p> <p>After more than 25 years of experience in academia, in both research and education, as well as in administration, Dr. Colom-Ustariz joined NSF EPSCoR as a permanent Program Director. As a Program Director in EPSCoR he oversees the National Science Foundation's "gold standard" merit review process and helps define new funding opportunities focusing in the EPSCoR community. Some of the key responsibilities include interacting with potential principal investigators, forming and facilitating merit review panels, recommending funding decisions, and overseeing active awards. His research interests are in the area of Weather Radars, and while at UPRM he participated in the NSF CASA ERC and also received an NSF MRI to develop a Weather Radar Network for the Puerto Rico West Coast.</p>
<p>11:10 to 11:20</p>	<p><b>10 minute break</b></p>

11:20 to  
12:20

### **Concurrent Presentations Session 1**

ND-ACES and Related Research (Ballroom #1)

*Moderated by Kalpana Katti*

- Savannah Brown, UND, *Evaluation of Schlafen Family Proteins in Triple Negative Breast Cancer*
- Connor Edvall, NDSU, *Synergistic Delivery of Encapsulated Drugs to Hypoxia for Stemness Reduction in Triple-Negative Breast Cancer*
- Shrinwanti Ghosh, NDSU, *3D in-vitro Model: Platform for Evaluating Anticancer-Drugs Targeting Organ-Specific TME in Primary & Metastatic Breast Cancer*
- Rayat Hossain, NDSU, *Azobenzene-Incorporated Polymersomes for Control of Targeted Drug Delivery to Triple Negative Breast Cancer*

Research Track A (Ballroom #2)

*Moderated by Amanda Haage*

- Jeremy Straub, NDSU, *Overview of AI Development Efforts and the Opportunities They Provide*
- Boamong Asare, UTTC, *Analyzing Epsilon Effects on Exact and Composite Solutions via Matched Asymptotic Expansion*
- Benu Bansal, UND, *Nested Named Entity Recognition using Multilayer BERT-based Model*
- Ali Pakbaz, NDSU, *Numerical Analysis on the Design of an Evaporator for a PV/microchannel Direct-Expansion CO2 Heat Pump*

Research Track B (Ballroom #3)

*Moderated by Colin Combs*

- Wayne Seames, UND, *An Introduction to the NSF EPSCoR RII Track-2 Project: Sustainable Engineering Infrastructures and Solutions for Tribal Energy Sovereignty (TES)*
- Corey Smith, UND, *A Data Science Summer Program for Tribal College Students: The Virtual Indigenous Data Science Academy*
- Igor Ovchinnikov, UND, *Paleomitogenomics and the Holocene Population Demography of the Northern Plains Bison*

<p>12:20 to 1:50</p>	<p><b>Lunch and TCU panel</b>  <b>Ballroom #5</b>  <i>Nurturing STEM and Research at ND Tribal Colleges and Universities</i>  Moderated by Sheridan McNeil, ND EPSCoR Director of Tribal Partnerships</p> <ul style="list-style-type: none"> <li>• Austin Allard, Engineering Instructor, Turtle Mountain College</li> <li>• Emily Biggane, Research Faculty, United Tribes Technical College</li> <li>• Leander R. McDonald, President, United Tribes Technical College</li> <li>• Tomi Kay Phillips, President, Sitting Bull College</li> <li>• Brent Voels, Science Instructor, Cankdeska Cikana Community College</li> </ul>
<p>1:50 to 2:35</p>	<p><b>Poster Session A</b>  <b>Ballroom #4</b>  Participants with even-numbered posters will present</p>
<p>2:35 to 3:35</p>	<p><b>Concurrent Presentations Session 2</b>  ND-ACES and Related Research (Ballroom #1)  <i>Moderated by Yen Lee Loh</i></p> <ul style="list-style-type: none"> <li>• Hanmant Gaikwad, NDSU, <i>Evaluating the Role of Na-Montmorillonite Clay in Biomineralization and Stem Cell Osteogenesis in Nanoclay Scaffolds</i></li> <li>• Khwaja Hossain, Mayville State University, <i>The Development of Plant Polymer Scaffolds for the Growth and Development of Triple-negative Breast Cancer Cells</i></li> <li>• Archana Dhasarathy, UND, <i>Epigenetic Priming During the Epithelial-Mesenchymal Transition</i></li> <li>• Shubhashri Ambhore, NDSU, <i>Peptide Conjugated Hypoxia-Responsive Nanoparticles to Decrease Triple-Negative Breast Cancer Stemness</i></li> </ul>

<p>2:35 to 3:35</p>	<p><b>Concurrent Presentations Session 2 (continued)</b>  Research Track A (Ballroom #2)  <i>Moderated by Emily Biggane</i></p> <ul style="list-style-type: none"> <li>• Manohar Sah, UTTC, <i>Ethnomathematical Practices of the Tharu Community in Nepal</i></li> <li>• Katherine McCarville, Minot State University, <i>Implications of New Luminescence (OSL) Dates from Sediments Beneath a Giant Erratic Boulder on the Iowan Surface, Northeast Iowa</i></li> <li>• Ram Hona, UTTC, <i>Oxygen Deficient Perovskite as a Catalyst for Oxygen Evolution Reaction</i></li> <li>• Thomas Stach, NDSU, <i>Adsorption of H<sub>2</sub>S and SO<sub>2</sub> on SiO<sub>2</sub> Supported Graphene-A Surface Science Study</i></li> </ul> <p>Research Track B (Ballroom #3)  <i>Moderated by Michael Kjelland</i></p> <ul style="list-style-type: none"> <li>• Jenna Duttonhefner, NDSU, <i>Metabolic Reprogramming in PDAC: The Contributions of GSTP1 to Energy Metabolism and Lipid Homeostasis</i></li> <li>• Lavinia Iancu, UND, <i>Effects of Benzodiazepines on the Developmental Stages of Calliphora vicina Robineau-Desvoidy, 1830 (Diptera: Calliphoridae)</i></li> <li>• Gauthami Nair, NDSU, <i>Dual targeting of ERK and PI3K Pathways to Impede Pancreatic Adenocarcinoma Progression</i></li> </ul>
<p>3:35 to 4:20</p>	<p><b>Poster Session B</b>  <b>Ballroom #4</b>  Participants with odd-numbered posters will present</p>

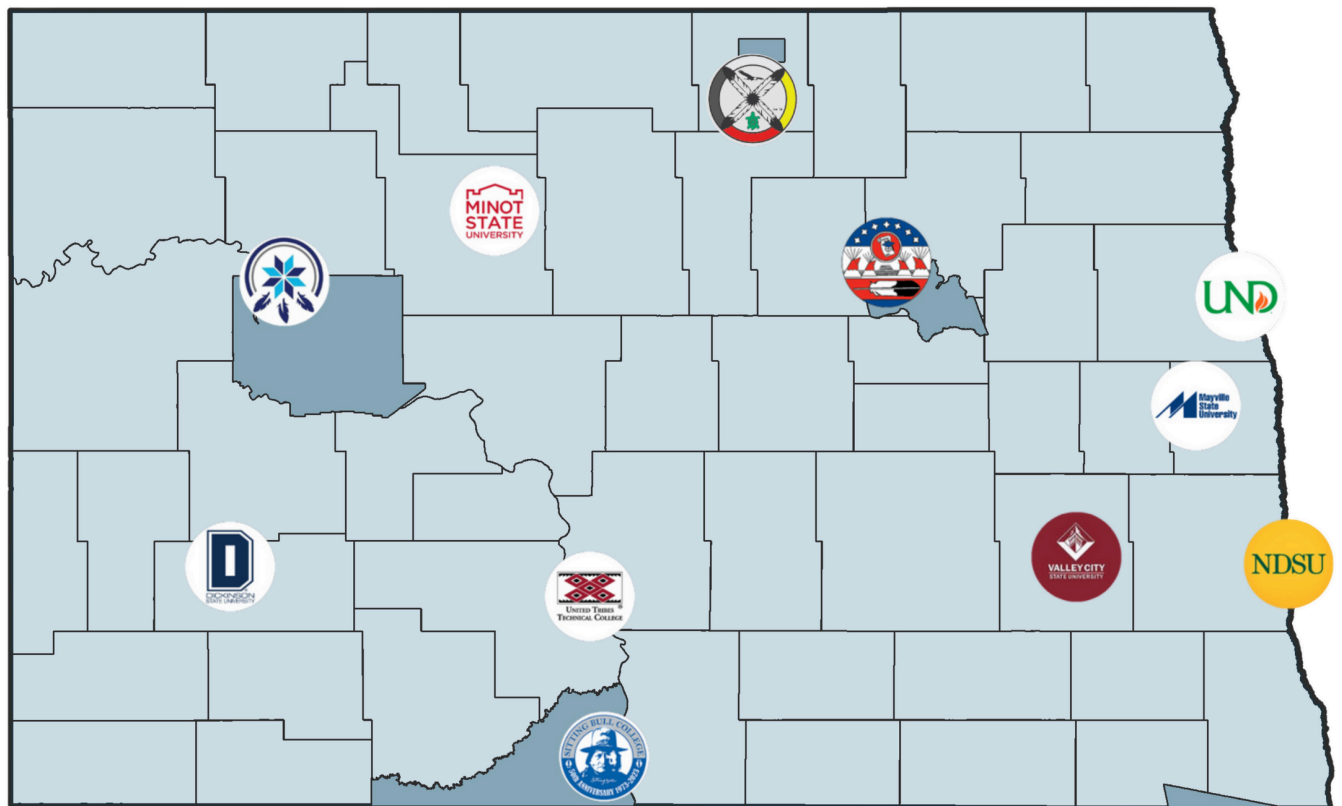
4:20 to 5:05	<p><b>Concurrent Presentations Session 3</b>  ND-ACES and Related Research (Ballroom #1)  <i>Moderated by Julia Zhao</i></p> <ul style="list-style-type: none"> <li>• Karl Van Horsen, NDSU, <i>Development of a 3D Printed Bioreactor to Simulate Tumor Metastasis in vitro</i></li> <li>• Nimasha Samarawickrama, UND, <i>Machine Learning Approaches for Classifying Temporal Patterns and Tracing Causality in RNA-Seq Datasets</i></li> <li>• Mouhmad Elayyan, UND, <i>A Theoretical Investigation of the Selectivity of Aza-Crown-Ether Structures Chelating Alkali Metal Cations for Potential Biosensing Applications</i></li> </ul> <p>Research Track A (Ballroom #2)  <i>Moderated by Giancarlo López-Martínez</i></p> <ul style="list-style-type: none"> <li>• Sai Susmitha Guddanti, UND, <i>Control of Fast Nuclear Reactor for Space Propulsion Using Reinforcement Learning</i></li> <li>• Xiangfa Wu, NDSU, <i>Massive Production of Functional Nanofibers for Use in Advanced Composites, Energy Conversion and Storage, and Environmental Protection</i></li> <li>• Tiansong Qi, NDSU, <i>An Enhanced Modeling Framework for Simulating Hydrologic Processes in a Depression-dominated Watershed</i></li> </ul> <p>Research Track B (Ballroom #3)  <i>Moderated by Brent Voels</i></p> <ul style="list-style-type: none"> <li>• Sonia Tudjeu Chendjou, UND, <i>Cocaine LC-MS Analysis in Insects for the Determination of Post-Mortem Interval</i></li> <li>• FNU Tabish, UND, <i>Buckling of Imperfect Unstiffened and Stiffened Cylindrical Shells under External Pressure</i></li> <li>• Pooyan Vahidi Pashaki, NDSU, <i>Threshold Optimization of in Situ HAPclay in Polymeric Scaffolds for Superior Biomechanical Tuning</i></li> </ul>
5:05 to 5:15	<p><b>Closing remarks</b>  <b>Ballroom #5</b></p>

# Notes

# Notes

# ND EPSCoR

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