

118TH Annual Meeting of The North Carolina Academy of Sciences

March 18-19, 2022

Multidisciplinary Research:
Focusing on the Big Questions

Greetings from the Local Arrangements Committee for the 118th Annual Meeting of the North Carolina Academy of Science! This meeting is the Academy's largest event of the year, and we are excited to be hosting it here at Campbell University. Please take time to listen, learn, and enjoy the wonderful research performed by our CASCAS and NCAS members. The presentations at this meeting represent the culmination of many semesters of education and research. For many, this will be their first time presenting at a state-wide meeting. As you attend the keynote and panels, consider how making connections and communicating with others furthers scientific research. Enjoy visiting the new Oscar N. Harris Student Union, and be sure to check out the convenient virtual presentation platform.

This meeting contains both in-person and virtual events to allow greater flexibility for attendees. In-person attendees only need to go to assigned rooms in the program schedule and <https://ncas2022.virtualpostersession.org/> for the virtual platform to experience all the events during the meeting. Virtual attendees can experience most of the meeting by using the Zoom links in the program schedule below and the virtual platform link. All presenters can be contacted by using the "Join the Discussion" button on the virtual platform.

The meeting's theme, Multidisciplinary Research: Focusing on the Big Questions, pays tribute to the recent achievements of scientists during the pandemic while looking forward to future research. Since the beginning of the recent global pandemic, scientists have been collaborating across disciplines to minimize its impact. Research necessarily shifted to focusing on a big question related to the pandemic: "How can science minimize the impact of COVID-19?" What followed were impressive examples of vaccines, tests, and exposure controls that have saved the lives of countless individuals. These approaches necessitated a multidisciplinary approach to research and problem solving. This meeting explores the multidisciplinary approach through presentations, a keynote, and panels.

We hope you enjoy your time here and walk away with new connections and fresh insight for your big questions.

The 2022 NCAS Local Arrangements Committee

Lin Coker and Jordan Womick (Co-chairs); Michael Gallagher, Stephanie Mathews, Evan Reynolds, Timothy Shenk, Michelle Thomas, and Taek You





Dear Friends:

On behalf of our entire academic community, welcome to Campbell University! We are honored to host the 118th annual meeting of the North Carolina Academy of Sciences. I hope that you will find the program engaging and the accommodations comfortable while here at Campbell University.

The purpose of the North Carolina Academy of Sciences annual meeting is to showcase the talents of the next generation of researchers and promote education in the sciences. Participants this year will focus on multidisciplinary research and the “Big Questions.” A university campus is an ideal setting for exploring new ideas and delving deeper into scientific research, so we trust that your time and involvement during the meeting will enrich your learning and encourage you in reaching your own educational and vocational goals.

Campbell University has a long and well-documented commitment to the natural sciences. Since the opening of the School of Pharmacy in 1986, Biology and Chemistry have become two of the most popular undergraduate majors on campus. In our various science programs are many Pre-Medicine, Pre-Pharmacy, and other Pre-Health Sciences students. In recent years, Campbell has added a new Physician Assistant program, Physical Therapy program, Nursing program, School of Engineering, and launched a new School of Osteopathic Medicine. While you are on campus, we hope you will take the opportunity to learn more about our science majors, professional programs, and Campbell University.

Thank you again for your participation at this year’s North Carolina Academy of Science’s annual meeting. It is an honor for Campbell University to host this important event.

Sincerely,

J. Bradley Creed

President, Campbell University



I am honored and delighted to welcome you to the 118th Annual Meeting of the North Carolina Academy of Science hosted by Campbell University. This annual event is one of North Carolina's premier scientific events dedicated to the promotion of scientific research and the fostering of education in the sciences. The annual meeting has been successfully held in different places across the State since 1902. While it's been around three years since we last convened in person, I hope you are as excited as I am to return.

Building on the success of previous meetings, the theme for this year is "Multidisciplinary Research: Focusing on the Big Questions," which highlights the importance of Multidisciplinary Research in helping to focus on the Big Questions. This annual conference brings together researchers, STEM faculty members and students from institutions across the state. With a brand-new Engineering session, the Conference program will be both exciting and ground-breaking in its wide ranging and multidisciplinary content. In addition to traditional and online oral/poster presentations, keynote lectures by renowned invited speakers, workshops, and exhibitors, the conference also certainly creates excellent opportunities for exchange of ideas, opinions, and the initiation or continuation of collaborative research partnerships.

Thus, I encourage all of you to take advantage of every opportunity to expand your knowledge by attending a variety of sessions, networking with your fellow students, colleagues, researchers, and professionals.

I would like to thank Dr. J. Bradley Creed, President of Campbell University, for allowing us the opportunity to share your beautiful campus and great facilities, and for all supporters especially local annual meeting arrangement committee who are making the 118th Annual NCAS meeting a success.

Thank you!

Lei Zhang
NCAS President, 2021 - 2022

Summary Schedule

This conference program contains two parts: this document and the virtual program. Please familiarize yourself with both.

Abstracts, posters, and chat features are found using the virtual platform at the link below. Passwords are sent to the email attendees used during registration in Eventbrite.

All other information for the meeting can be found in the schedule below.



<https://ncas2022.virtualpostersession.org/>

Friday, March 18th

1:00-2:00	Finance & Strategic Planning Committee Meetings (Student Union, Conference Room)
2:00-5:00	Board of Directors Meeting (Student Union, Conference Room)
5:00-6:00	Registration and Poster Setup (Student Union, 2nd Floor Great Hall)
5:30-6:00	Poster Judges Meeting (Student Union, Conference Room)
6:00-6:15	Welcome remarks from Dr. Lei Zhang, President of the North Carolina Academy of Science (Student Union, Banquet Hall) https://campbell-edu.zoom.us/j/98841927515
6:00-8:00	Poster Session and Reception with heavy hors d'oeuvres (Student Union, Banquet Hall) and virtually at https://ncas2022.virtualpostersession.org/
7:00-8:00	Virtual Poster Question-and-Answer Session (Student Union, Theater) https://campbell-edu.zoom.us/j/95160130373 See https://ncas2022.virtualpostersession.org/ for schedule.
8:00-9:30	CANCAS Social (Student Union, Banquet Hall)

Saturday, March 19th

7:30-8:30	Registration, Exhibit setup, Student Academy Posters setup, Breakfast (Lundy-Fetterman School of Business building (LFSB) first floor in designated areas)
7:30-11:00	Practice rooms available (LFSB 124 & 126)
8:00-8:30	Judges and Session Moderators Meeting (LFSB 123)
8:30-4:00	Exhibits from Meeting Sponsors and Exhibitors (LFSB Hallway)
8:30-9:45	Oral Session I <ul style="list-style-type: none">Ecology, Botany, and Zoology LFSB 121 and https://campbell-edu.zoom.us/j/94460853656Cell Biology, Molecular Biology, and Physiology LFSB 122 and https://campbell-edu.zoom.us/j/93993869504Engineering, Physics, Pharmacy, and Chemistry LFSB 123 and https://campbell-edu.zoom.us/j/96780315704
8:30-2:00	Pre-college Student Academy Posters: available to view [†] (LFSB Hallway) Posters will be attended from 9:30-9:50 and 10:50-11:05
9:50-11:05	Oral Session II <ul style="list-style-type: none">Ecology, Botany, and Zoology LFSB 121 and https://campbell-edu.zoom.us/j/94460853656Microbiology LFSB 122 and https://campbell-edu.zoom.us/j/93993869504
11:15-11:30	Welcome Remarks (Student Union, Banquet Hall) Dr. Lin Coker, NCAS Local Arrangements Committee Co-chair Dr. Mark Hammond, Vice President of Academic Affairs & Provost, Campbell University Dr. Lei Zhang, Winston-Salem State University, President of NCAS https://campbell-edu.zoom.us/j/96115715034
11:30-12:15	Keynote Speaker: Dr. Jonathan Chekan, Assistant Professor of Chemistry, University of North Carolina Greensboro (Student Union, Banquet Hall) https://campbell-edu.zoom.us/j/96115715034

Saturday, March 19th

12:15-1:00	Boxed Lunches Available (Student Union, 2nd floor Prefunction)
1:00-1:50	Workshop and Panel (select one of following options) <ul style="list-style-type: none">■ Pharmaceutical Products: From Research to Manufacturing to Implementation LFSB 121 and https://campbell-edu.zoom.us/j/94460853656■ Graduate/Professional School Workshop LFSB 122 and https://campbell-edu.zoom.us/j/93993869504
2:00-2:55	Panels (select one of following options) <ul style="list-style-type: none">■ Research and teaching in the time of COVID LFSB 123 and https://campbell-edu.zoom.us/j/96780315704■ Being a student in the time of COVID LFSB 125 and https://campbell-edu.zoom.us/j/96264081364
3:00-3:50	NCAS Business Meeting* LFSB 121 and https://campbell-edu.zoom.us/j/94460853656
3:00-3:45	CANCAS Business Meeting* LFSB 122 and https://campbell-edu.zoom.us/j/93993869504
3:45-3:55	CANCAS Officers Award Preparation Meeting (LFSB 122)
4:00-5:00	Heavy Hors d'oeuvres (Student Union, 2nd floor Prefunction)
4:15-5:00	Awards Ceremony (Student Union, Banquet Hall) https://campbell-edu.zoom.us/j/99421577054
5:00-5:30	Board of Directors Meeting (Student Union, Conference Room)

* Everyone is eligible to participate in the business meetings. All participants are considered members of the NCAS or CANCAS because membership is included in the registration for those who were previously nonmembers.

† Student Academy members are in middle school or high school. Winners of the high school district competitions will present their posters as our guests.

ORAL SESSION 1, MARCH 19TH 8:30-9:45 AM

ECOLOGY, BOTANY, AND ZOOLOGY LFSB 121

<https://campbell-edu.zoom.us/j/94460853656>

8:30	Rebecca Carranza*, Elon University Examining the potential for evolutionary divergence by describing treehopper host plant use and mating signals
8:45	Seana Finn*, Shaw University Prey size does not scale linearly to raptor mass
9:00	Maggie Keller*, Lenoir-Rhyne University The Role of the Lateral Line System in Prey Acquisition Behaviors of <i>Xenopus laevis</i>
9:15	Emma Throneburg*, Lenoir-Rhyne University The Behavioral Effects of Integrating a New Male into an Established Herd of African Elephants (<i>Loxodonta africana</i>)
9:30	Maggie Lou Carter*, Lenoir-Rhyne University Copper tolerance in tardigrades (<i>Hypsibius exemplaris</i>) modeled by Na/K ATPase inhibition

CELL BIOLOGY, MOLECULAR BIOLOGY, AND PHYSIOLOGY LFSB 122

<https://campbell-edu.zoom.us/j/93993869504>

8:30	Jared Tuton*, UNC Pembroke Integrin inhibitor attenuates synaptotoxic pathogenic cascade following paraoxon exposure in hippocampal explants.
8:45	Philip Oji, Campbell University Interrogation of AADACL1 function via a new animal model of hemostasis

ENGINEERING, PHYSICS, PHARMACY, AND CHEMISTRY LFSB 123

<https://campbell-edu.zoom.us/j/96780315704>

9:00	Terry V. Chavez*, UNC Pembroke Faraday rotation in air and the dispersion of its verdet constant
9:15	Harrison Boston* and William Mauney*, Lenoir-Rhyne University Self-guided payload using grid-fins to translate

(*judged in CANCAS Derieux competition)

ORAL SESSION 2, MARCH 19TH 9:50-11:05 AM

ECOLOGY, BOTANY, AND ZOOLOGY LFSB 121

<https://campbell-edu.zoom.us/j/94460853656>

9:50	Angel Martin*, Lenoir-Rhyne University The effect of light intensity on <i>Chlorella vulgaris</i> biomass accumulation and chlorophyll concentration
10:05	Prashant Waiker, UNC Greensboro Urbanization is Associated with Mercury Accumulation in Honey Bees Across the United States
10:20	Michael Kingston, Elon University Less is more: Incorporating undergraduate research experiences into a general ecology course
10:35	Abdelmajid Kassem, Fayetteville State University Soybean seed isoflavone contents' QTL and candidate genes

MICROBIOLOGY LFSB 122

<https://campbell-edu.zoom.us/j/93993869504>

9:50	Gabriel Corn*, Lenoir-Rhyne University The dispersion of aerosolized mouth bacteria when playing the trumpet
10:05	Lauren Bowman*, Guilford College Does peppermint essential oil affect the growth of <i>Staphylococcus aureus</i> ?
10:20	Bolaji Sadiku, NC Agricultural and Technical State University Enhanced Static Bacterial Cellulose Production through increased aerobic interface
10:35	Stephanie Mathews, Campbell University Allied Health Microbiology Course Redesign

(*judged in CANCAS Derieux competition)

Keynote Address

Bioinformatic Guided Discovery of New Chemistry and Molecules from Human Pathogens

Dr. Jonathan Chekan, UNC Greensboro
11:30 AM on Saturday



Jonathan R. Chekan is an Assistant Professor of Chemistry and Biochemistry at the University of North Carolina at Greensboro. His interdisciplinary research program is focused on the discovery, biosynthesis, and engineering of bioactive molecules from nature. These natural products have been a critical source of new medicines ranging from antibiotics to anticancer compounds. Moreover, natural product biosynthetic pathways often contain unprecedented enzymatic transformations that inspire biochemists and chemists alike. Dr. Chekan's Lab takes a bioinformatic-first approach to rapidly identify unstudied natural products with the ultimate goal of discovering new enzymatic reactions and bioactive natural products. His work has contributed to 24 scientific publications.

Dr. Chekan earned his B.S. in Microbiology from the Pennsylvania State University in 2011. He then moved to the University of Illinois Urbana-Champaign, joining the laboratory of Dr. Satish K. Nair. In 2016, Dr. Chekan graduated from UIUC with a Ph.D. in biochemistry and joined the laboratory of Dr. Bradley S. Moore at the Scripps Institution of Oceanography (University of California, San Diego) as a Simons Foundation Postdoctoral Fellow of the Life Science Research Foundation. In Fall 2020, Dr. Chekan joined the department of Chemistry and Biochemistry at the University of North Carolina Greensboro as an Assistant Professor.

Panels and Workshop

Pharmaceutical Products: From Research to Manufacturing to Implementation Panel

1:00 – 1:50 PM Saturday, LFSB 121

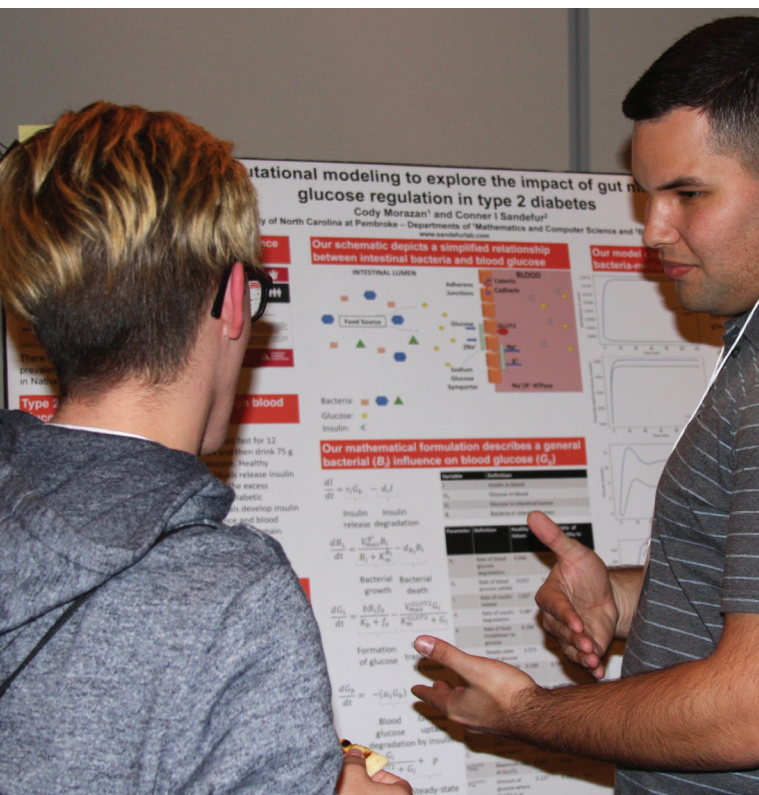
This panel discusses pharmaceutical products from research to manufacturing to implementation through panelists who specialize in each field. Dr. Rachel Bleich, Assistant Professor of Biology at Appalachian State University, investigates microbial community structure and functions for their role in inflammatory bowel disease. Dr. Bleich has written for *Science* magazine and the *Proceedings of the National Academy of Sciences*. Dr. Mark Chavez is Senior Principal Scientist at FUJIFILM Diosynth Technologies, USA. Dr. Chavez brings over 27 years of pharmaceutical industrial and manufacturing knowledge in cell culture and microbial purification processes. Dr. Chavez has worked with several drug designs focusing on the chemical modification and molecular level, including PEGylation, VLPs, liposomes, monoclonal antibodies, antibody fragments, fusion proteins, and interferons. Dr. Amanda Fuller Moore is a pharmacist within the Division of Public Health for the North Carolina Department of Health and Human Services. Dr. Fuller-Moore coordinated North Carolina's initial operational response for COVID-19 vaccines and now serves in the role of COVID-19 Public Health Coordinated Response Lead which includes pandemic testing, vaccines, and therapeutics.



Graduate/Professional School Workshop

1:00 – 1:50 PM Saturday, LFSB 122

Graduate and professional school representatives provide insight for prospective graduate and professional students. Dr. Erik Brady is the Director of Biomedical Science Graduate Programs at Wake Forest University. Dr. Mark Moore is Associate Dean for Admissions & Student Affairs in the College of Pharmacy & Health Sciences at Campbell University. Dr. Dale Patterson is Associate Professor in the Master of Science in Physician Assistant Program at Pfeiffer University. Stephanie Goral is the Director of Admissions in the School of Osteopathic Medicine at Campbell University. Mary Stokes is the Admissions Support Coordinator for the Occupational Therapy Program at Pfeiffer University.



Research and teaching in the time of COVID Panel

2:00 – 2:55 PM Saturday, LFSB 123

Faculty members lead a discussion of challenges and lessons learned while continuing research and teaching during the pandemic. Dr. Joi Walker is Associate Professor of Chemistry at East Carolina University. Dr. Walker's research projects include cross-disciplinary practice-focused undergraduate laboratory transformation, increased access to authentic undergraduate research, assessment design and validation, and team science and mentoring strategies for undergraduate research. Dr. Jennifer Hamel is Associate Professor of Biology at Elon University. Dr. Hamel's research studies behavioral ecology and evolution primarily through the mating behavior and communication of insects. Dr. Lin Coker is Associate Professor of Chemistry and Chairman of the Department of Chemistry & Physics at Campbell University. Dr. Coker teaches General Chemistry and Quantitative Analyses. His research interests include the presence of heavy metals in consumer products and indicators for success in introductory science courses.



Being a student in the time of COVID Panel

2:00 – 2:55 PM Saturday, LFSB 125

Students discuss their challenges and lessons learned during the pandemic. Keelie Butler is a graduate student at UNC Greensboro in Jonathan Chekan's laboratory studying genome mining strategies to discover bioactive natural products. While working under Jonathan Chekan's instruction, Keelie Butler has been a recipient of the NIH T32 training grant. Keelie received her B.S. in Chemistry and Biochemistry from Campbell University. Maggie Carter is the CANCAS Secretary and student at Lenoir-Rhyne University. Gabriel Corn is the CANCAS Historian and student at Lenoir-Rhyne University.

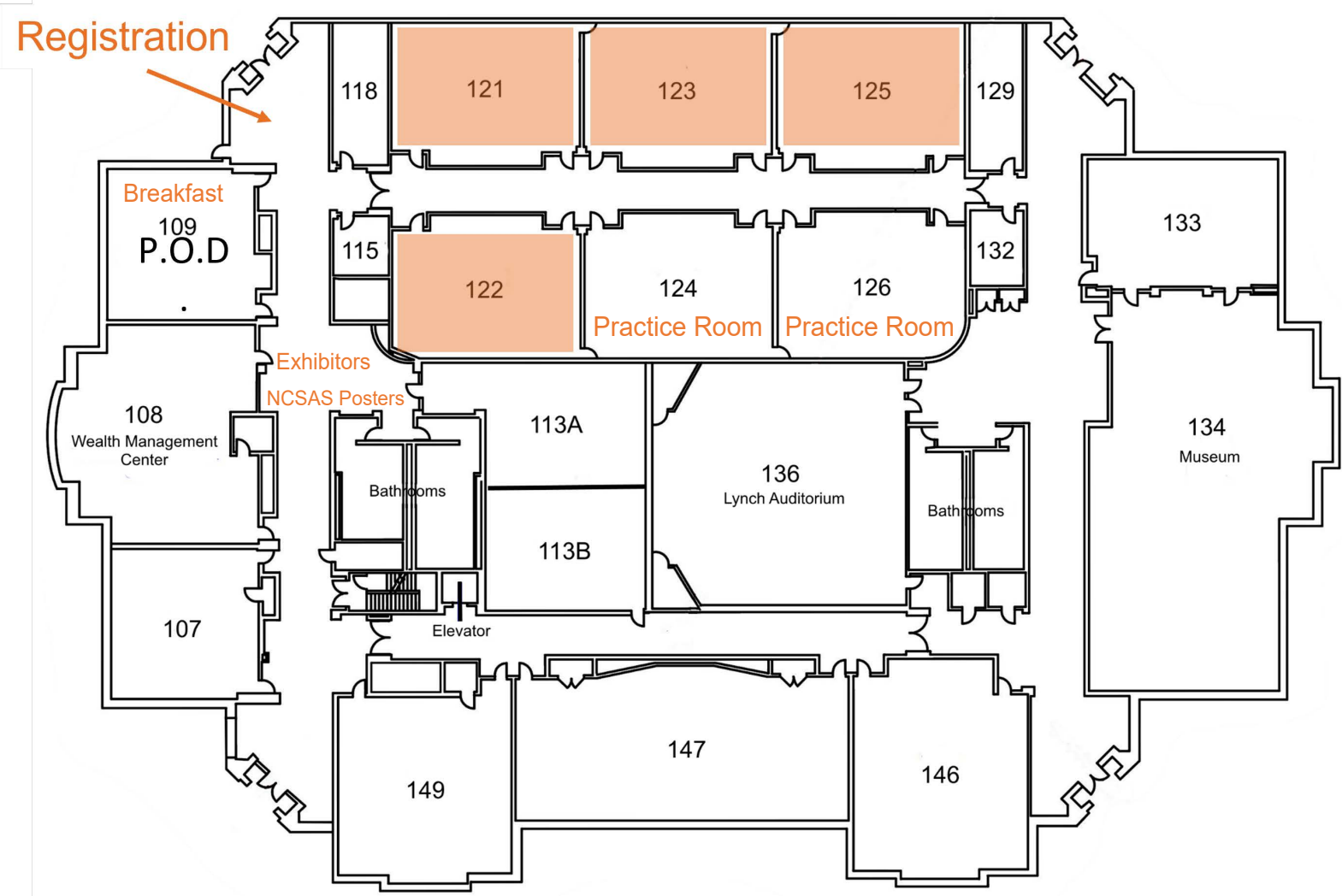


Saturday Morning and Afternoon Rooms

Lundy-Fetterman School of Business

FIRST FLOOR

Oral Presentations and Panels
Rooms 121, 122, 123, and 125





The 2022 Local Arrangements Committee thanks you for your commitment to the Academy and promoting science in North Carolina.

See you next year!



Annual Meeting 2023
East Carolina University
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