INCLUSION IN COMMUNITY MODELING
Importance and Need for Diversity & Inclusion

Panelists: Neil Jacobs, Sen Chiao, Bill Parker, Shakila Merchant, DaNa Carlis, and Mike Farrar

Chairs: Maoyi Huang and Kevin Garrett
Opening Remarks

Neil Jacobs, Ph.D.
UFS Chief Science Advisor
Panelists

Sen Chiao
Director, NOAA Cooperative Science Center in Atmospheric Sciences and Meteorology

William "Bill" Parker
Meteorologist-in-charge
Weather Forecast Office
Jackson, MS

Shakila Merchant
NOAA Center for Earth System Sciences and Remote Sensing Technologies

DaNa Carlis, Director
National Severe Storms Laboratory

Michael Farrar, Director
National Centers for Environmental Prediction
Innovative observations for advancing climate, weather, and air quality analysis and prediction

Interdisciplinary scientific research to support modeling and forecasting activities for building community resilience against extreme weather, water, atmospheric, and climate events

Integrated research in support of building public safety through impact-based Decision Support Services (IDSS)

Early NOAA Engagement

Center Wide Core Competencies

NOAA Experiential Research and Training Opportunities

Social Science Integration

NOAA Mission Enterprise Diverse Workforce

Training and graduation of students from underrepresented minority communities.

Developing candidates for NOAA and NOAA mission-related workforce

Providing post-secondary education and research capacity through competitive awards

NCAS-M II is supported by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Educational Partnership Program under Agreement No. NA220ECAE830015.
NCAS-M commitment and participation

NCAS-M have expertise and existing collaborations with NOAA line offices in simulations, measurements and field campaigns in the areas of:

- Process-level understanding and enhanced data assimilation/analysis and modeling capacities
- Improved quantification of forecast skills for weather, water, air-pollution, and climate events
- Advancing the development of high-resolution models to enhance impact-based decision support
- Integrated social and physical sciences for public safety and emergency management applications
- Effective communication of climate and weather risks for early warning and preparedness

NCAS-M Engagement in the collaborations in research and creating opportunities for students training through:

- Creating, expanding existing research and training capacity
- Participation in NOAA and all agencies organized/co-organized National and International field campaigns and observation networks
- Collecting and providing a wide variety of measurements/data for the validation of atmospheric models and satellite products
- Engagement in social science: communications/perceptions of risk and decision making, vulnerability to natural hazards, Climate Change Impacts and resiliency
- Joint proposals, publications and conference presentations
- Stakeholder engagement (local, NGOs, State, other Federal, Industry)
- Joint proposals, publications and conference presentations

- Experiential Training for early career professionals particularly from URM communities:
  - Experiential Research and Training Opportunities (12 week to 1 year)
  - Create future Graduate Fellowship Program projects (GFP – new pilot program initiated by NOAA OED/EPP-MSI), (1 year), and
  - Early career postdoctoral opportunities.

Output/Outcomes

Students training  Future Workforce  Annual Colloquium  Stakeholder Engagement  Joint Seminars  Monthly meetings
NCAS-M Facts & Figures
2016-2022

- 5 Million in Leveraged Dollars
- 71 Joint or Solo Research Publications
- 200+ NOAA Collaborative Research Projects
- 165 Students Supported over Lifetime Agreement
- 70 NOAA Collaborators
- 2K Young Students Reached at Outreach Events
- 4 AEROSE cruises on Atlantic Ocean
- 250+ Conference Technical Presentations
- 10 Alumni added to the NOAA Workforce
- 12 Doctoral Degrees (PhDs)
- 250 NOAA Student Experiential Learning Activities
The Department of Earth, Environment and Equity (E3), will open its doors in the College of Arts and Sciences in Fall 2024. The new department will offer undergraduates degrees in Environmental Science, Environmental Studies, Atmospheric Science and Earth System Science.

The department offerings expand upon the curriculum and current degree programs in Interdisciplinary Studies, which offer concentrations in Environmental Studies and Environmental Science. The E3 department will maintain its interdisciplinary training by emphasizing rigorous environmental scientific research, combined with course work in environmental justice and community-driven curricula.
NOAA Center for Earth System Sciences and Remote Sensing Technologies II (CESSRST) Program

NOAA CESSRST program was funded by NOAA/EPP Grant #NA16SEC4810008
NOAA CESSRST II program is funded by NOAA/EPP Grant #NA22SEC4810016
Four NOAA Cooperative Science Centers

There are four centers with 24 university members

NOAA Center for Atmospheric Science and Meteorology (NCAS-M) – Howard University, DC
NOAA Center for Coastal and Marine Ecosystems (CCME) – Florida A&M University, FL
NOAA Living Marine Resources Cooperative Science Center – University of Maryland, Eastern Shore, MD
NOAA Center for Earth System Sciences and Remote Sensing Technologies (CESSRST) – The City College of CUNY, NY
Training a diverse workforce in NOAA Mission Enterprise

Center Type Competencies
- Remote Sensing, Data Science,
- Environmental Modeling
- Social Science
- Professional Competencies

Experiential Training
- Cutting-edge mentored research projects
- Early NOAA Engagement
- NOAA Experiential Research & Training Opportunities
- Stake-holder Engagement

Integrated Social Science
Communications/perceptions of risk and decision-making, vulnerability to natural hazards, Climate Change Impacts and resiliency, Environmental Justice

Coastal Resilience
- Costal Ocean water quality
- Coastal erosion in Arctic
- Coral Reefs
- Harmful Algal Blooms

Atmospheric Hazards
- Weather Hazards/Storms/Heatwaves
- Atmospheric Composition/Air Quality
- Satellite applications to weather and air quality
- Weather and Air Quality Modeling

Water Prediction and Ecosystem Services
- Floods & Droughts - Risk Assessment and Ecosystem Outcomes
- Assessment and Application of National Water Model
- Monitoring Land-Atmosphere-Ocean Exchange/Fluxes
- Microwave and Visible Hyperspectral environmental observations from UAS platform
NOAA EPP/MSI Education and Training Model is Unique

A Holistic Training
Research, Academics, Professional

Prepares Fellows for
Future Workforce, and/or Further Studies
Increased number, annually, of CSC post-secondary students trained

The number of degrees earned annually in NOAA mission-related disciplines.

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<th>Major</th>
<th>Total</th>
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<td>Physical Sciences</td>
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### DEGREE MAJORS AWARDED

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The number of degrees earned annually in NOAA mission-related disciplines

### TOTAL DEGREES AWARDED: 125 (URM: 95)

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<th>Degree Type</th>
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<tr>
<td>PhD</td>
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Increased number of CSC post-secondary students educated and graduated annually

### CESSRST Postdoctoral Fellows: 2 (URM: 1)
Data Products

- Air Temperature for Cities
- Heat Index for Cities
- CESSRST Lidar Network
- Urban Thermodynamic Profiles
- VIIRS Chl algorithm
- Regional PM2.5 Product
- Urban Wind Pattern
- Compilation of PBL heights

POST GRADUATION
20 Years of investment

356
STUDENTS EMPLOYED IN PRIVATE INDUSTRY

142
STUDENTS EMPLOYED IN ACADEMIA JOBS

18
STUDENTS EMPLOYED BY NOAA CONTRACTORS

112
STUDENTS EMPLOYED BY OTHER FEDERAL, STATE, LOCAL OR TRIBAL GOVT.

4
STUDENTS WORKING AS ENTREPRENEURS

11
STUDENTS EMPLOYED BY NOAA FEDERAL
11
STUDENTS WORKING AS ENTREPRENEURS
Lidar Network at CESSRST Institutional Sites (CCNY, UMBC, Hampton U)

- Aerosol Lidars (CLN)
- Unified Ceilometer Network (UCN)
- Tropospheric Ozone Lidar Network (TOLNET)

40 Federal Local and State environmental agencies

Two NOAA Cooperative Science Centers

One NOAA Cooperative Institute

9 Minority Serving Institutions
Long Island Sound Coastal Observatory (LISCO), NY

Coastal Ocean Water Quality/Ocean Color Satellite Calibration and Validation and Field Sites

Algal Bloom Experimental Products NOAA NCCOS Chlorophyll-a
https://coastwatch.noaa.gov/cw_html/NCCOS.html
Multi-agency Long Island Sound Tropospheric Ozone Study (LISTOS 2018)

Follow-on NOAA OAR/ESRL/CSL campaigns AEROMMA Atmospheric Emissions and Reactions Observed from Megacities to Marine Areas in Summer 2023

Multi-agency Ozone Water Land Environmental Transition Study (OWLETS 1 and 2 - 2017/2018)

NOAA OAR participation Washington Post “Air quality study over Chesapeake Bay seeks to understand pollution

NOAA and Multiagency Ocean Water Color and Water Quality Cruises

CESSRST groups participated in multiple cruises (many on NOAA ships) for the validation of satellite sensors: VIIRS on SNPP and NOAA-20 satellites and European Space Agency (ESA) OLCI sensors on Sentinel 3A and 3B satellites.
Building future Weather Ambassadors and Community of Scientists & Engineers
What does it mean to be Weather Ready
Networking with NOAA
NWS Forecasters – understanding Weather and
Sensing one Borough at a time - New York Urban Hydro-meteorological Testbed (uHMT) Project

The New York Urban Hydro-meteorological Testbed (NY-uHMT) project uses autonomous weather stations to collect comprehensive, real-time data on meteorological and hydrological conditions in New York City regions.
Mapping the Location of Autonomous Weather Stations
• Establishing Partnerships
• Hosting Community Dialogues
• Offering Technical Assistance
• Providing Education and Training
Building capacity (or lack of?) within MSIs/HBCUs R1 Institutions, challenges and opportunities for (all – faculty, staff, students)

Build upon existing NOAA EPP/MSI CSC Education and Training Models

- Recruitment & Outreach
- Private – Academia-Federal Synergy
- Summer Bridge and Pathways
- NERTO and other NOAA internships
Major Academic Programs Developed in Last 20 Years Through NOAA Partnership at CUNY

- **2006**: B.S/B.E in Earth System Sciences and Environmental Engineering
- **2010**: ABET Accredited M.E in Earth System Sciences and Environmental Engineering
- **2012**: M.S in Data Science and Engineering
- **2019**: M.S in Data Science and Engineering
- **2023....in progress**: PhD in Earth System Sciences and Environmental Engineering

- **20 years Of NOAA Investments**
- **3 Academic Programs**
  (Supported in the formulation of two Academic & one Certification Programs at CUNY and Hampton U.)
- **25 NOAA Mission related STEM courses**
Discussion Topics

- What government-university programs/projects have worked to engage students vs. which ones have not…and why?

- What is the best role for the private sector in building a diverse cadre of scientists and engineers? What can we do better in government and academia to partner with the private sector?

- What are the barriers for underrepresented groups to contribute to UFS development?

- How can we improve UFS public releases, tutorials, training, user support, and community outreach to make UFS more accessible to all?