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

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Neil Jacobs, Ph.D.

UFS Chief Science Advisor

Panelists

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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

NOAA Cooperative Science Center in Atmospheric Sciences and Meteorology (NCAS-M)

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

EDUCATIONAL PARTNERSHIP PROGRAM with MINORITY SERVING INSTITUTIONS

NCAS-M II is supported by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Educational Partnership Program under Agreement No. NA22SEC4810015.

HOWARD UNIVERSITY · UNIVERSITY AT ALBANY STATE UNIVERSITY OF NEW YORK · UNIVERSITY OF MARYLAND · UTEP · UMBC · SJSU SAN JOSÉ STATE UNIVERSITY · JSU JACKSON STATE UNIVERSITY · PennState

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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

SCAN ME

Students training | Future Workforce | Annual Colloquium | Stakeholder Engagement | Joint Seminars | Monthly meetings

Outcome of NOAA Funding

NCAS-M | NOAA COOPERATIVE SCIENCE CENTER IN ATMOSPHERIC SCIENCES AND METEOROLOGY

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

www.ncas-m.org @NCASNews

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The Department of Earth, Environment, and Equity (E3)

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NOAA-CESSRST CENTER FOR EARTH SYSTEM SCIENCES AND REMOTE SENSING TECHNOLOGIES

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

The City College of New York | UMBC | UTEP | HAMPTON UNIVERSITY THE STANDARD OF EXCELLENCE | Recinto Universitario de Mayagüez Universidad de Puerto Rico | SDSU San Diego State University

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

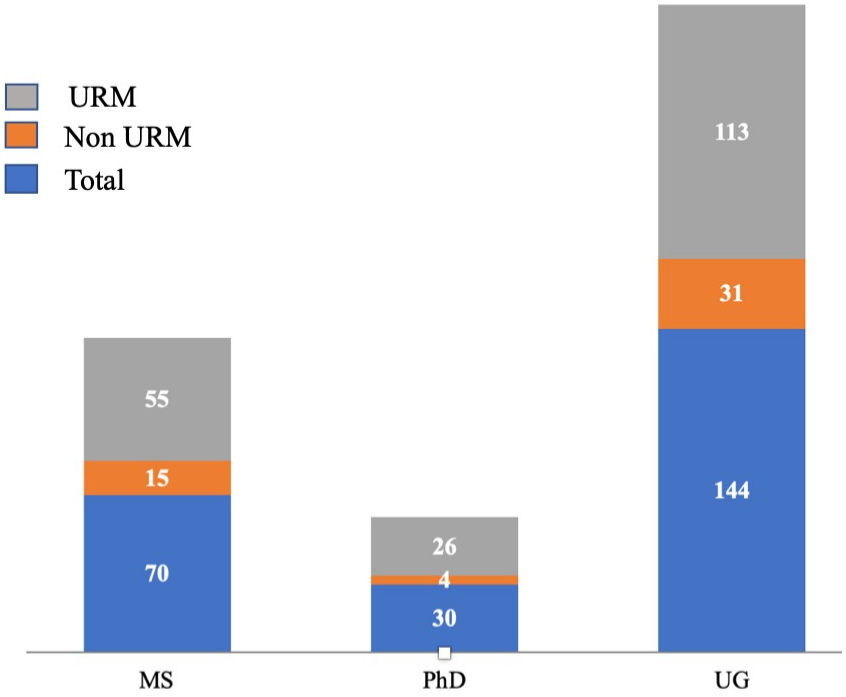
Prepares Fellows for

Future Workforce, and/or Further Studies

NOAA CESSRST by the Numbers (2016-2022)

COHORT STUDENTS

Total Cohort Students: 244 (193 URM)



Increased number, annually, of CSC post-secondary students trained

DEGREE MAJORS: Total: 247 and 193 URM

Major	Total	URM
Engineering	121	92
Physical Sciences	53	44
Computer & Information Sciences	10	7
Mathematics	4	1
Bio Sciences	23	22
Social Sciences	25	23
Arts and Humanities	0	0
Other	8	6

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

DEGREE MAJORS AWARDED

Major	Total	URM
Engineering	70	50
Physical Sciences	25	20
Computer & Information Sciences	3	1
Mathematics	4	1
Bio Sciences	7	7
Social Sciences	12	12
Arts and Humanities	0	0
Other	4	4

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

TOTAL DEGREES AWARDED: 125 (URM: 95)

	Total	URM
UG	72	54
MS	43	33
PhD	10	8

Increased number of CSC post-secondary students educated and graduated annually

CESSRST Postdoctoral Fellows: 2 (URM:1)

POST GRADUATION
20 Years of investment

356

STUDENTS EMPLOYED IN PRIVATE INDUSTRY

11

STUDENTS EMPLOYED BY NOAA FEDERAL

142

STUDENTS EMPLOYED IN ACADEMIA JOBS

4

STUDENTS WORKING AS ENTREPRENEURS

18

STUDENTS EMPLOYED BY NOAA CONTRACTORS

112

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

Data Products

Air Temperature for Cities

Heat Index for Cities

CESSRST Lidar Network

Chl NN algorithm

Urban Thermodynamic Profiles

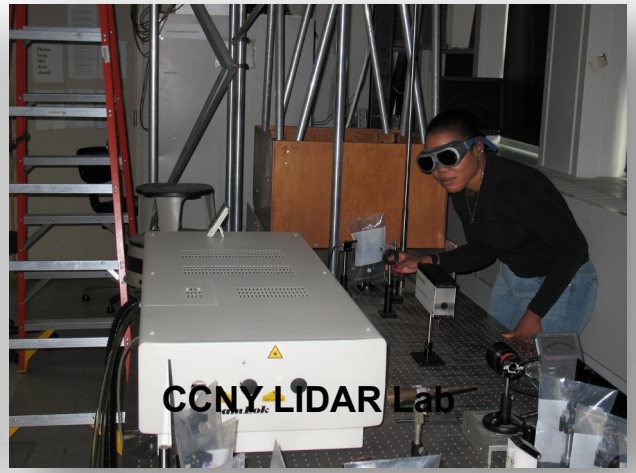
VIIRS Chl algorithm

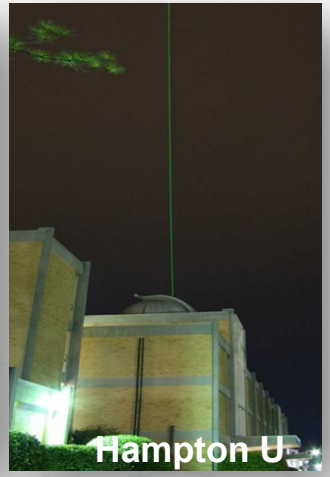
Regional PM2.5 Product

Urban Wind Pattern

Compilation of PBL heights

Lidar Network at CESSRST Institutional Sites (CCNY, UMBC, Hampton U)





Aerosol Lidars (CLN)

Unified Ceilometer Network (UCN)

Tropospheric Ozone Lidar Network (TOLNET)

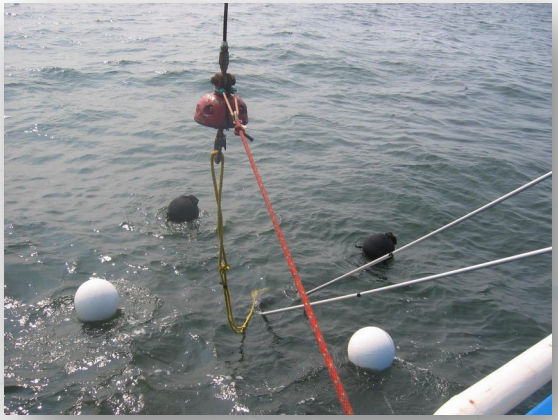
40 Federal Local and State environmental agencies

Two NOAA Cooperative Science Centers

One NOAA Cooperative Institute

9 Minority Serving Institutions

Long Island Sound Coastal Observatory (LISCO), NY



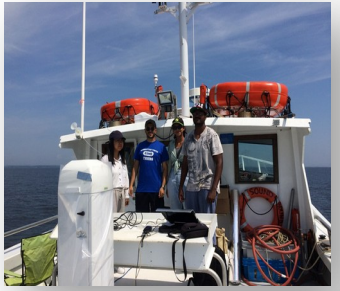
Coastal Ocean Water Quality/Ocean Color Satellite Calibration and Validation and Field Sites
https://www.star.nesdis.noaa.gov/socd/mecb/color/CalVal_n20.php

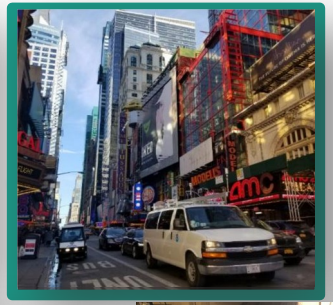
Algal Bloom Experimental Products NOAA NCCOS Chlorophyll-a
https://coastwatch.noaa.gov/cw_html/NCCOS.html

NOAA Collaborative Field Campaigns and Cruises

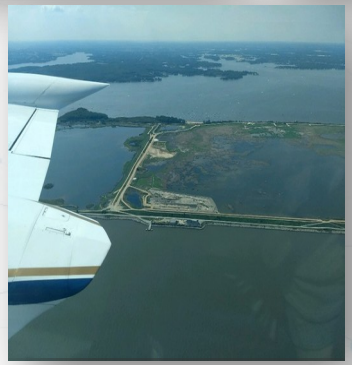
Multi-agency Long Island Sound Tropospheric Ozone Study (LISTOS 2018)

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





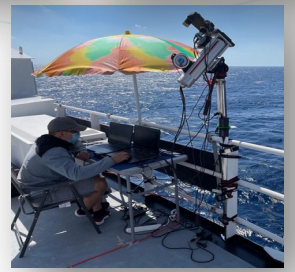
Multi- agency Ozone Water Land Environmental Transition Study (OWLETS 1 and 2 - 2017/2018



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

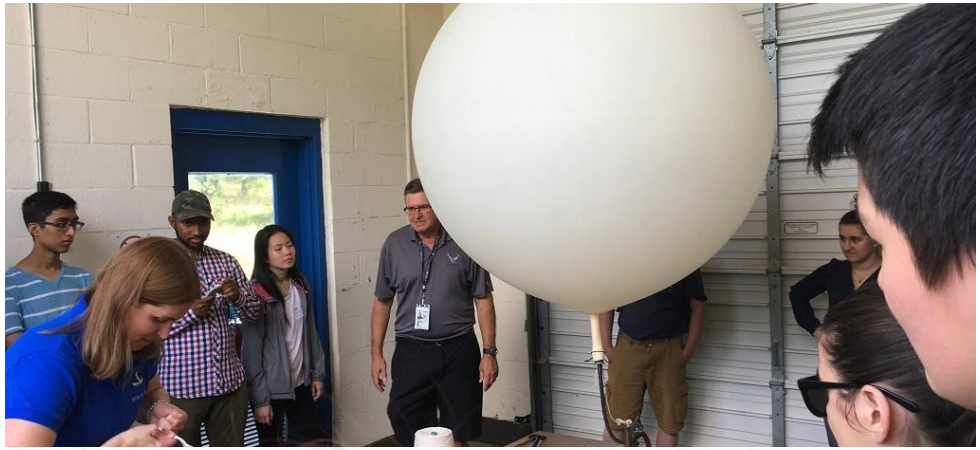
NOAA and Multiagency Ocean Water Color and Water Quality Cruises

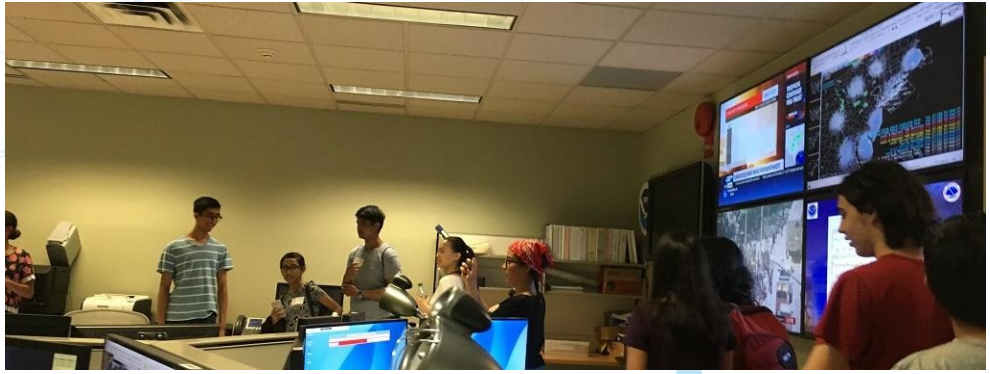
CESSRST groups participated in multiple cruises (many on NOAA ships) for the validation of satellite sensors: VIIRS on SNPP and NOAA-20 satellites and European Space Agency (ESA) OLCI sensors on Sentinel 3A and 3B satellites.



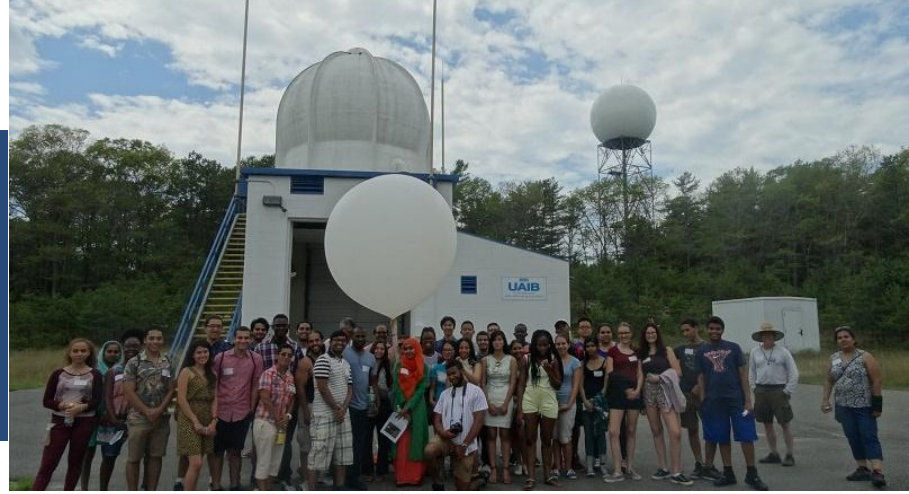
Building future Weather Ambassadors and Community of Scientists & Engineers

What does it mean to be Weather Ready



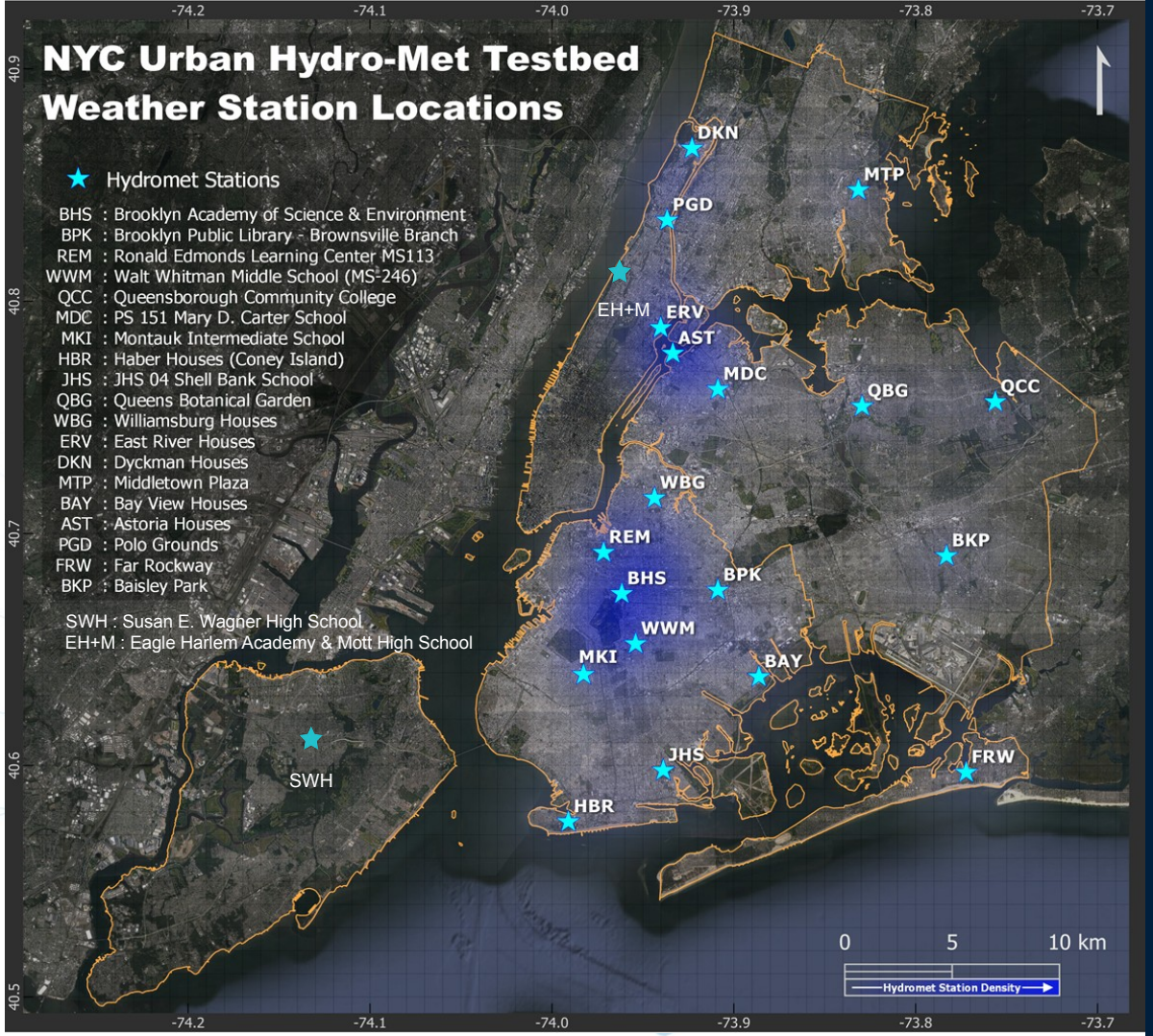


Networking with NOAA NWS Forecasters – understanding Weather and



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

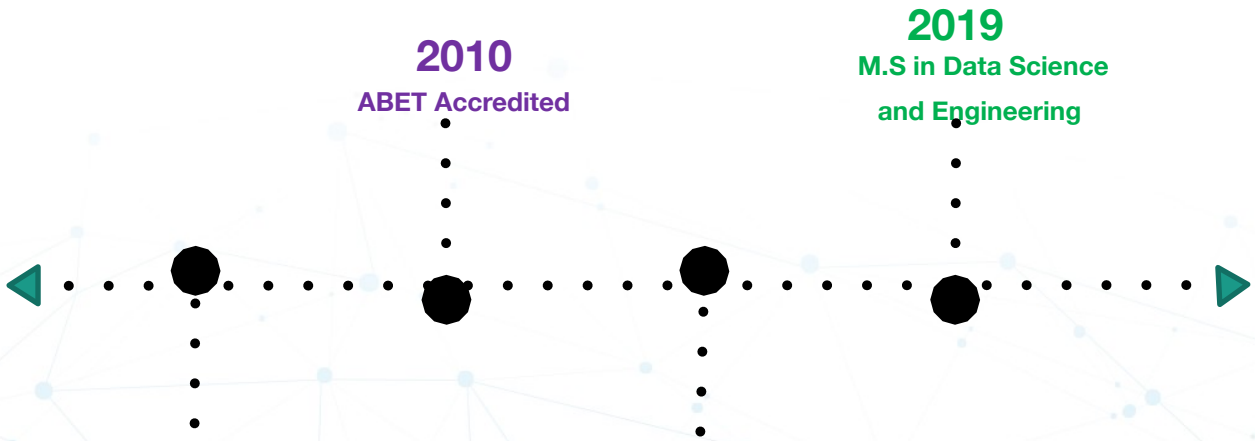
- Establishing Partnerships
- Hosting Community Dialogues
- Offering Technical Assistance
- Providing Education and Training

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

Building capacity (or lack of?) within MSIs/HBCUs R1 Institutions, challenges and opportunities for (all – faculty, staff, students)

Major Academic Programs Developed in Last 20 Years Through NOAA Partnership at CUNY



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?

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