

**Semi-Annual Performance Report for
Cooperative Agreement #: NA16SEC4810006
Reporting Period: March 1, 2017 to August 31, 2017**

**NOAA COOPERATIVE SCIENCE CENTER in
ATMOSPHERIC SCIENCES and METEOROLOGY
(NCAS-M)**

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I. Executive Summary

Howard University is pleased to report on the second six months of the first year of the NOAA Cooperative Science Center in Atmospheric Sciences and Meteorology (NCAS-M).

The NCAS-M promotes the expanded participation in education, training, capacity building, and collaborative research focusing on groups that are traditionally underrepresented in NOAA mission-relevant STEM, social, behavioral, and economic sciences disciplines (including communication sciences). The NCAS-M research and training activities support the primary goal of producing a diverse and highly skilled cadre of technical and environmentally literate professionals who will help build a more resilient nation in the face of increasing vulnerability to weather extremes and other environmental threats.

Throughout this reporting period, NCAS-M operated under the auspices of an implementation plan that has been submitted and received preliminary feedback but not final approval. The NCAS-M is making significant progress with respect to the five-listed metrics and for the program level outcomes and outputs. The NCAS-M has progressed towards full staffing, interacting with EPP MSI and other OED Program officials to finalize operational plans (e.g. evaluation plan, implementation plan, communication strategy), conducted an annual meeting, met with technical monitors and advisors, engaged with other CSC and NOAA leadership through the Center Champions Working Group (CCWG), and continued to develop collaborations and partnerships with NOAA personnel in a variety of facilities. These activities and interactions are provided in the following sections in accordance with OED reporting guidance.

The NCAS-M is comprised of a thirteen-member consortium with Howard University as the lead institution. The partnership has nine partners as sub-awardees and four affiliate partners (related through a non-funded articulation agreements). NCAS-M nine partners include, Howard University (lead), Jackson State University, University of Puerto Rico - Mayagüez, University of Texas - El Paso, San Jose State University, Pennsylvania State University, University of Maryland - Baltimore County, University of Maryland - College Park, State University of New York - Albany, and four affiliates: Fort Valley State University, San Diego State University, Tuskegee University, and Universidad Metropolitana. All thirteen of these academic institutions have been engaged in NOAA mission-relevant activities during this reporting period through faculty, student, or combined faculty-student engagement activities.

The NCAS-M recruited its first cohort of students from a variety of disciplines supporting NOAA mission-relevant research and connected these students and other NCAS-M supported students to opportunities at across NOAA. Examples of these engagements included:

- Group tours of NCAS-M sponsored students the National Weather and Climate Center

- Engagement of NOAA Mentors with NCAS-M post-doctoral Fellows at the Sterling Test Center (Dr. Richard Medina) and at NOAA ESRL (Dr. Keren Rosado)
- NOAA Personnel serving as co-advisors of PhD students – Dr. Henry Juang for Jia-Fong Fan and
- NOAA Personnel serving as mentors for PhD students – Dr. Thomas Knuteson (GFDL) for Vitaly Kholodovsky, Jesse Creamean (ESRL) for Catherine Liu, Dr. Geoff Manikin (NCEP) for Mussie Kebede, Dr. Renellys Perez for Kafayat Olayinka and Daniel Yeager, Bob Rabin (NSSL) for Anthony Salome and Eduardo Figueroa
- Collaborative engagement of NCAS-M faculty and NOAA personnel with examples including – Nick Nalli (NESDIS) and Vernon Morris on improving satellite retrievals in dusty environments, Jeff McQueen (NCEP) and William Stockwell on improving operational air quality forecasts, Vernon Morris and Benjie Spencer on developing new observational capabilities for NWS, and Vankita Brown (NWS) and Terri Adams on responding to the Weather Act requirements for integrated decision support.
- Training of undergraduate students at NWS Weather Forecast Office (WFO) in Jackson, MS and graduate student engagement at the Paducah, Kentucky WFO
- NOAA personnel were involved in NCAS-M professional development through participation in the Experiential Training Summer Program, seminars, and webinars
- NOAA personnel contributing to undergraduate courses and training at JSU (Latrice Maxie, Jonathan Moore)

The NCAS-M also engaged NOAA leadership and personnel in program planning and implementation through participation in the Center Champions Working Group Meetings, The OAR Stakeholders Forum, the NOAA “Emerging Technologies for Observations” Workshop, presentations to the NOAA Chief Economist, presentations to the acting NOAA Chief Scientist, Craig McLean, and coordination/alignment of NCAS-M efforts with technical monitors and advisors.

The following semi-annual performance report details the activities conducted during March 1, 2017 – August 31, 2017.

II. Accomplishments

Major Goals of NCAS-M: In this section, we have tabulated and displayed the progress against the specific objectives of the award as articulated in the FFO. The first column lists the FFO specific objectives and indicates the numerical targets that we have set. The second column lists the major activities executed as Center-sponsored initiatives. The final two columns provide more detail on the results and outcomes of the activities including participants and collaborator names and affiliations.

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

Specific Objectives	Major Activities	Significant Results	Key Outcomes/Other Achievements
<p>Increased quantitative and analytical skills;</p> <p>Goal: provide specific opportunities in this arena to 25 students per year. During this reporting period 39 students were engaged in specific CSC activities.</p>	<ol style="list-style-type: none"> 1. Conducted mini-workshop - Regional Climate Tutorial - at SJSU for Python programming (4 students trained) 2. Trained students on UAS technology for NWS measurements (4 HU students and 1 UMBC student) 3. Three (3) Students trained in GRUAN project 4. UMET Data Analysis Workshop in San Juan 	<p>Learned programming in Python</p> <p>Students enhance their research skills and receive the proper orientation.</p> <p>Students were able to produce simple plots from data acquired.</p> <p>Able to perform their research tasks more efficiently.</p> <p>Eighteen (18) students trained in 3-day workshop on R, GIS, and Environmental data analysis</p>	<p>Students learned to use numerical models for research.</p> <p>The method combines temporal and spatial high-energy characteristics to identify extreme episodes that are organized in large scales.</p> <p>Manuscript preparation. Student eclipse photo highlighted in Science News.</p> <p>A new method to detect extreme weather/climate episodes</p> <p>Students learned R and GS applications</p>
	<p>Providing training opportunities to faculty, staff, postdocs, and students on NOAA mission-relevant research on aerosols through AEROSE</p> <p>(4 students trained in AEROSE)</p>	<p>Students training to analyze environmental data sets for model input and verification and for satellite data analysis</p>	<p>Data sets from this research cruise were used in a course project at Millersville University; an undergraduate student (Amanda Sleinkofer), a CSC postdoc (Richard Medina), an NCAS-M faculty (Juan Arratia), and NCAS-M staff (Ricardo Sakai) engaged with NOAA Corps personnel during a one-week mission from Punta Arenas to Montevideo, Uruguay aboard the <i>NOAA Ronald H. Brown</i> was trained in NOAA-mission measurements at sea.</p>

<p>Increased competence in applying STEM to decision making, policy and management</p> <p>Goal: To increase competencies for a minimum of 25 students per year. During this reporting period, 10 students were reached through CSC activities.</p>	<ol style="list-style-type: none"> 1. ETSP - Summer internship (8 students trained) 2. A project was undertaken in California, which involved studying pollutants and how the different emission changes affect policy making, (please see leveraged funding Truck and Engine manufacturers Association). (2 UTEP students trained) 	<p>Eight rising freshmen from five institutions (UMBC, HU, SDSU, UMET, and JSU) were exposed to research experience of NOAA relevance</p> <p>The California project was very successful and several papers are being submitted in the near future with student co-authors</p>	<p>A poster by Jonathan Solomon (UMBC) on the cost-benefit analysis of remote-sensors and radiosonde was completed</p> <p>Eight individual projects completed and presented at summer colloquium</p> <p>A better understanding on how the emission changes will affect the pollutant concentrations to design a proper strategy for reductions on pollutant concentrations. Policy makers will be using the results of this study to make state regulations.</p>
<p>Increased skills to use large data sets, geographical information systems (GIS) and statistical analysis, computer modeling, and algorithm development.</p> <p>Goal - Increase skills for a minimum of 25 students per year. During this reporting period, 14 students were reached through CSC activities.</p>	<ol style="list-style-type: none"> 1. Regional Climate Tutorial 2017 (4 SJSU students) 2. Collaborative Student Training - Vitaly Kholodovsky (UMD) 3. Four (4) UTEP students have learned how to use GIS and have applied it on their own thesis work. Fitzgerald also supervises student learning on computer modeling and algorithm development 4. Six (6) Student research interns participated in NERTOS and summer collaborative research with NOAA 	<p>Introduction to R-studio, NCL, spatial analysis</p> <p>Analyzing large data sets from mesoscale CWRF simulations and corresponding observations over the United States</p> <p>Develop the necessary infrastructure to successfully complete the research tasks and pursue their degrees</p> <p>The method combines temporal and spatial high-energy characteristics to identify extreme episodes that are organized in large scales.</p>	<p>One grad student (Catherine Liu) learned to use regional climate results for thesis research.</p> <p>Gaining strong skills in GIS, NCL and statistical analyses, and developing empirical models for extreme episode identification (Vitaly)</p> <p>Students become more marketable and qualified for the job market.</p>

b.

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

Specific Objectives	Major Activities	Significant Results	Key Outcomes/Other Achievements
The number of degrees earned annually in NOAA mission-related disciplines.	Recruited two URM students in atmospheric sciences at HU; Kalen Fisher and Ayesha Wilkinson to Howard University	No graduates to report	
<p>The number of students (total and URM) who participated in professional development opportunities, to include at least one on-site experiential research and training opportunity at a NOAA lab, office, or facility with tangible training and research: (a) for a minimum duration of 4 consecutive weeks, and (b) resulted in a publication or an oral or poster presentation to experts, peers, and/or other stakeholders.</p> <p>Goal - 25 students per year. During this reporting period, 42 students were reached through CSC activities.</p>	<p>1. NERTO participation by 1 SJSU student) - Internship at NOAA /ESRL, 1 HU student at NCEP)</p> <p>2. NCAS-M professional development workshop (20 students)</p> <p>3. NCWCP Open House (8 HU and UMBC students showcased NWS observations and sounding technology)</p> <p>4. WFO site Visits (4 JSU students)</p> <p>5. GRUAN (4 students)</p> <p>6. AMS Washington Policy Forum.</p>	<p>- continuing project with NOAA- Boulder lab</p> <p>UMD student was trained in GFDL with Dr. Thomas Knuteson during July 16-27, 2017 on climate change and extreme attribution. His 2nd training of two weeks is planned within 5 months.</p> <p>Janae Elkins and Tony Hurt. (JSU) worked with Bill Parker of the Jackson WFO</p> <p>Three (3) students from UMBC participated in GRUAN training: Ephraim Alfa Damian Emerson Kendall Dawkins</p> <p>Four (4) HU students participated in AMS Washington Policy Forum</p>	<p>A SJSU grad student (Liu) was able to use data provided by NOAA for thesis research.</p> <p>- NCAS-M annual meeting: 1 oral presentation, 1 poster presentation</p> <p>Six (6) NCAS-M student abstracts submitted for presentation at the upcoming AMS annual meeting.</p> <p>Two (2) student presentations at SOARS in Boulder, CO.</p> <p>Eight (8) completed a poster Presentation at Howard University. A student who was an Intern during the summer has now become part of the group (through cross CSC collaboration and Cohort-2)</p> <p>Students engaged private sector leaders and learned about the intersection of government and business in the weather industry</p>

c. Increased CSC capacity to train and graduate students

Specific Objectives	Major Activities	Significant Results	Key Outcomes/Other Achievements
<p>Number of seminars, new courses, new programs, and new degrees offered to develop working skills and functional competencies to support the NOAA mission and workforce.</p> <p>Goal: 4 seminars/webinars per year and 3 training sessions. These goals were met during this performance period.</p>	<p>1. Seminars/Webinars</p> <p>2. Ozonesonde workshop hosted at UTEP, May 2017</p> <p>3. GRUAN – Mid-Consortium established</p> <p>4. UMET Data Analysis Workshop in San Juan</p>	<p>One (1) seminar on CWRf modeling and application</p> <p>Two (2) career training, professional development webinars</p> <p>One (1) NOAA Brown Bag Seminar by Ena Keys (JSU)</p> <p>A training session was held with NWS-Sterling personnel on how to launch Cryogenic-Frost Point Hygristor (CFH) at the Beltsville research Station. Personnel trained were Dr. Megan Letaille and Daniel Brewer. Both NOAA contractors at NWS-Sterling.</p>	<p>Students learned advances in modeling weather and climate and expressed strong interests to work on models. Two U.S. citizen students (one minority) are now studying at UMD under my supervision.</p>
<p>Total numbers of students supported by the CSCs and degrees awarded that reflect the changing demographics of the nation.</p> <p>Goal: Support twenty (20) students per year</p>	<p>18 Cohort-1 students supported</p>	<p>One M.S. degree in the area of extreme weather events</p> <p>One student (PSU) is working on the project</p> <p>Four undergraduate African-American students supported (2 male + 2 female)</p>	<p>Expect 4 JSU Meteorology students to graduate in Spring 2018 - all are African American</p>
<p>To Increased number of URM students who select to pursue higher education in NOAA mission fields.</p> <p>Goal: Increase the number by five (5) students per year</p>	<p>Recruited two URM students in atmospheric sciences at HU; Kalen Fisher and Ayesha Wilkinson to Howard University</p> <p>Recruit Emmanuel Dibia to UMD</p>	<p>Both will be encouraged for continuous study pursuing PhD in ATMS with CSC funding based on a successful first semester</p> <p>Dibia isa one of the first African Americans in UMD grad program</p>	<p>Two (2) students entered the MS program at HU in August 2017. They have participated in professional development sponsored by NCAS-M</p>

d. Reduce the attainment gap for URM in NOAA mission-relevant fields

Specific Objectives	Major Activities	Significant Results	Key Outcomes/Other Achievements
Increased number of URM students in student development activities that will lead them to the attainment of degrees and/or employment in NOAA mission fields.	<p>1. Completion of Individual Student Development Plans</p> <p>2. Recruit Emmanuel Dibia to UMD</p> <p>Recruitment activities at SACNAS every year and the UTEP Career Expo</p>	<p>Students completed Individual SDPs throughout the year including the summer.</p> <p>Dibia is now studying for M.S. degree in numerical modeling</p> <p>Increase number of minority students. Use UTEP's built-in infrastructure to recruit minorities and offer them opportunities to succeed in NOAA's mission related fields.</p>	<p>NCAS-M students completed SDPS that included the following areas: research internships at NOAA, core competency attainment, integrative mechanism of social sciences, type of award, and publications and presentations (see SDP in <i>Appendix C</i>)</p> <p>Dibia M.S. degree is expected in September 2019.</p>
Increased number of URM students who select to pursue higher education in NOAA mission fields.	<p>1. ETSP</p> <p>2. Recruitment activities</p>	<p>Dibia (UMD) will be encouraged for continuous study pursuing PhD in UMD with CSC funding secured</p> <p>Recruiting two (2) JSU students for study in graduate school.</p> <p>Twenty (20) Students participated in professional development activities at Howard University during the Summer for 2-weeks.</p>	<p>Planned applications to graduate schools in Fall 2017. Visit with prospective graduate schools at conferences</p> <p>All four African American Students were recruited by PI-Demoz and all participated in the Professional Development provided by NCAS-M</p>

e. Increased NOAA mission-relevant research capacity at MSIs

Specific Objectives	Major Activities	Significant Results	Key Outcomes/Other Achievements
<p>Undergraduate student training</p> <p>Goal: Fifty (50) students per year.</p>	<p>1. WFO volunteer program and Field measurement Coordination (both at JSU)</p> <p>2. UMET Data Analysis Workshop in San Juan</p> <p>3. Ozonesonde workshop hosted at UTEP, May 2017</p>	<p>JSU students have been exposed to NOAA – relevant research.</p> <p>UMET and UPRM students trained in R and GIS</p> <p>HU and UTEP students trained in NWS sounding systems</p> <p>SJSU students trained in climate modeling</p>	
<p>Increase Number of research collaborations with NOAA and CSC faculty, staff and students.</p> <p>Goal: Five (5) new collaborations per year</p>	<p>1. Field Visits, Webinars NERTOs</p> <p>2. GRUAN, ASOS</p> <p>3. UAS collaboration with NWS</p> <p>4. AEROSE</p> <p>5. Thesis Advising by NOAA staff</p> <p>6. Meetings with NOAA leadership for collaborations</p>	<p>Students engaged in activities that allowed them to visit NOAA and other field facilities, participate in NOAA webinars, and collaborate with NOAA and NCAS-M staff and other students on NERTOs</p> <p>A joint NOAA-UMBC-HU group was formed for increased collaboration on GRUAN called GMAC.</p> <p>NCEP scientist (Henry Juang) Served on the PhD Thesis committee of Jia-Fong Fan, Howard University</p>	<p>Student participation in visits to NOAA and other field facilities, NOAA webinars, and NERTO activities.</p> <p>Enhanced cross-institution interactions between HU, JSU, UTEP, and UMBC in the Ceilometer and Lidar group and Air Quality, with Jackson state University. We interact with NOAA scientists from nearby Weather Station in Santa Teresa.</p> <p>See photo from the inaugural meeting attached. Air quality forecast data are routinely being generated at several sites by NOAA (J. McQueen) that has helped to bring together Howard, UMBC, and CUNY.</p> <p>Share intellectual discussions and equipment resources.</p> <p>Director met with Ariel Stein of ARL to discuss increased collaboration between ARL and NCAS-M</p>

<p>Increase Number of NOAA scientists serving as mentors and advisors for student research</p> <p>Goal: Five (5) new mentors per year.</p>	<ol style="list-style-type: none"> 1. NOAA Mentor recruitment 2. Engagement with NOAA facilities to enhance collaborations (ESRL, ATDD, NCEP, NWS-Sterling, WFOs in Jackson, Paducah, Santa Teresa, San Juan 3. NSSL mentor, Dr Rob Rabin, working with UTEP students 4. AEROSE 5. Collaborations with NOAA STC scientists at Beltsville 	<p>NOAA/ESRL scientists (Jesse Creamean) advised one grad student (Catherine Liu)</p> <p>This led to the successful field training of Vitaly working with Thomas in GFDL</p> <p>AOML and NESDIS staff work with HU students on data processing and field research in AEROSE</p> <p>Nalli (NESDIS) serves on thesis committees</p> <p>Sounding data from NWS STC (Micheal Hicks, James Fitzgibbons)</p>	<p>See list of approved NOAA Mentors in <i>Appendix D</i></p> <p>JSU students will have more network and experience associated with NOAA-mission.</p> <p>Increased knowledge and opportunities for the students.</p>
<p>Increase Number of intra-institutional collaborative partnerships established and maintained in support of NOAA's mission.</p>	<ol style="list-style-type: none"> 1. Trained Lanxi Min, SUNYA, on WRF-Hydro modeling 2. GRUAN PBL - ASOS 3. Currently interacting with another CSC, the CREST Center (UTEP is also one of its partner institutions, through M.Velez Reyes). 	<p>Facilitate her one-month visit in ESSIC and guide her how to design and run WRF-Hydro modeling experiments</p> <p>Ad hoc PBL working group. GMAC collaboration with NOAA</p>	<p>This effort enhanced the collaborative effort in training students, contributing my strength in modeling.</p> <p>Plan to train students on use of new radiosonde system: beginning in September 2017</p> <p>A strong collaboration with CUNY – CREST on PBL and air quality forecast has commenced</p>

<p>Increase Number of uses of NOAA data in research and tool development.</p>	<ol style="list-style-type: none"> 1. Acquired NOAA observational (Sterling) and modeling (GFS) data 2. Installation of SHARPy and GR2 Analyst software 3. Students (Robert Garrett, Catherine Liu, Daniel Yeager) are using GOES data and NESDIS products for SST and dust provided by NOAA 4. AWIPS data station installed in Physics at UTEP 5. Use of NOAA Ronald H. Brown Data system and NESDIS products during cruise 	<p>These include NCDC station data analysis (Russell Vose), CMIP5 NCA data (Kenneth Kunkel), CCPA precipitation analysis (Yuejian Zhu), and NOAA CFSR analysis.</p> <p>Analysis of NOAA radar data, with training by NWS JAN</p> <p>Analysis of NOAA Radiosonde data</p> <p>These include NCDC station data analysis (Russell Vose), CMIP5 NCA data (Kenneth Kunkel), CCPA precipitation analysis (Yuejian Zhu), and NOAA CFSR analysis.</p> <p>AWIPS is an NWS product that contains a comprehensive suite of decision support tools</p>	<p>We have increased the amount of NOAA data that students supported by CSC or other funding sources have been using in their research.</p> <p>NCAS-M students at HU, UTEP, UPRM, routinely use HYSPLIT, and GFS operational runs</p> <p>Plan for use of GOES-16 satellite data</p> <p>NOAA data is being increasingly used by students supported by CSC or other funding sources in their research, education, and training.</p> <p>Underway data as well as GFS model runs were used extensively throughout the AEROSE cruise</p>
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f.

f. CSC-supported faculty, staff and students’ research directly aligned with NOAA’s mission and strategic priorities.

Specific Objectives	Major Activities	Significant Results	Key Outcomes/Other Achievements
<p>Number of peer reviewed publications, presentations, and tools developed by faculty, staff and students.</p> <p>Goals: Five (5) publications, five (5) presentations, one (1) tool, and two (2) invited talks per reporting period.</p>	<ol style="list-style-type: none"> 1. Dr. Sen Chao attended one (1) conference (Meteorology and Climate – Modeling for Air Quality) 2. JSU PIs presented three (3) conference abstracts 3. Director gave two (2) invited talks 4. Three (3) manuscripts submitted but none published during this reporting period 	<p>A poster was presented at the conference</p> <p>Effects of lateral subsurface flow on soil moisture is nontrivial at 1km or finer resolution</p> <p>Only model development has been done so far.</p>	<p>Two students (Liu and Jordan) gained experience to present research results.</p> <p>Ji, P., X. Yuan, and X.-Z. Liang, 2017: Do lateral flows matter for the hyper-resolution land surface modeling? <i>J. Geophys. Res.</i> (submitted).</p> <p>Several numerical models have been evaluated to learn the most appropriate method to estimate actinic irradiance and photolysis of relevant molecules in plant canopies.</p>
<p>Use of CSC research results and tools by NOAA and other stakeholders.</p>	<ol style="list-style-type: none"> 1. NCAS-M ceilometer, NOAA’s data, etc. 2. AEROSE Data 	<p>STAR is routinely retrieving the satellite coordinated radio sonde for NUCAPS calibration.</p>	

III. Products of the Award

Within the Products section, recipient can list any products resulting from the FY16 CSC award, during the specified reporting period, such as:

- Publications in Journals:
 - Ji, P., X. Yuan, and X.-Z. Liang, 2017: Do lateral flows matter for the hyper-resolution land surface modeling? *J. Geophys. Res.* (submitted).
 - Medina, R., W.R. Stockwell and R.M. Fitzgerald, Optical Characterization of Aerosol Particles in the El Paso-Juarez Airshed, *Aerosol Science and Engineering*, Submitted, September, 2017.

- Conference Papers, Posters and Presentations:
 - Presentation made by UTEP student, Miguel Cortez, at AMS Forum, Washington DC, 2017.
 - White, L, 2017: Thermodynamic gradients across mountain ranges from mobile observational transects. *17th AMS Confer. on Mesoscale Processes*, San Diego, CA. (July 24-27)
 - Reddy, R., D. Lu, F. Tuluri, and M. Fadavi, 2017: Simulation and prediction of hurricane Lili during landfall over the central Gulf States using MM5 modeling system and satellite data. *IEEE International Geoscience and Remote Sensing Symposium*, Fort Worth, TX. (July 23-28)

- Other Products:



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Figure 1 Photo from the first meeting of the GRUAN Mid-Atlantic Consortium event, held at

ESSIC

IV. Participants in Award Performance

NCAS-M has engaged a variety of participants during the reporting period in question.

a. The following participants worked on the project during the reporting period:

Name	Most Senior Project Role	Project Hours Worked per Month
Dr. Vernon R. Morris	Director	80
Dr. Terri Adams	Deputy Director	20
Dr. Jo-Anne Manswell Butty	Education Expert	6 (CY) person months
Kimberly Smith	Assistant Director	12 (CY) person months
Catherine Liu	Graduate research assistant	160
Arianna Jordan	Undergrad research assistant	160
Sen Chiao	PI	12
Catherine Liu	Graduate research assistant	160
Arianna Jordan	Undergrad research assistant	160
Sen Chiao	PI	12
Vitaly Kholodovsky	Extreme episode identification method	160 hours per month
Xin-Zhong Liang	Climate/hydrology modeling and supervising Vitaly	32 hours per month
Jose D Fuentes	Adviser of graduate student	20 hours per month
Zachary Moon	PhD student	80 hours per month
Keon Gibson	Data collection and analysis	40
Janae Elkins	Data collection and analysis	40
Jaylond Harvey	Data collection and analysis	40
Tony Hurt	Data collection and analysis	40
Belay Demoz	Lead	20

b. Partner Organizations that worked on the project during the reporting period:

Type of Organization	Name	Location	Contribution to Project
Educational	UMBC	Baltimore, MD	Lead
Educational	Howard university	Beltsville, MD	Partner
Government - NOAA/ESRL	Jessie Creamean (supervisor: Allen White)	Boulder, CO	NERTO mentor
Advisory Firm	P.E.R.K Consulting	Powder Mill Rd, Silver Spring MD	Center-wide Professional Development

c. Other collaborators or contacts involved on the project during the reporting period:

1. Shala W. Graham, Branding Expert (Center-wide Professional Development)
2. Tanya Graham-Kirkland, Chief Visionary Officer – Kirkland Consulting LLC (Center-wide Professional Development)
3. Marline Walthall-Brown, Senior Compliance Office, Office of Regulatory Research and Compliance, Howard University (Center-wide Professional Development)
4. Dr. Leticia Williams, Dr. Thomas Searles, Dr. Talitha Washington, Dr. John Harkless, Jonathan Wynn Smith, Howard University (ETSP Professional Development)
5. Univ. of Missouri: Jeffrey Wood; Patrick Market; Neil Fox
6. Univ. of Oklahoma: Greg Blumberg
7. Northern Arizona Univ.: Benjamin Ruddell
8. Univ. of California – Santa Barbara: Leila Carvalho
9. Univ. Autonoma Nacional de Mexico: David Adams
10. Univ. of Texas at El Paso: Rosa Fitzgerald; Tom Gill
11. Walnut Canyon National Monument (NPS): Ian Hough
12. JSU Emergency Management Program: P.C. Yuan
13. Washington State Univ.: Heping Liu
14. Dave Campbell, DRI.
15. NOAA collaborators or contacts involved on the project during this reporting period:
16. Bob Rabin, NOAA/National Severe Storms Lab (mentor).

d. NOAA collaborators or contacts involved on the project during this reporting period:

- Michael Hicks, Tony Reale, Sam McClatchie, Huai-Min Zhang, Russell Vose, Vankita Brown, Cindy Woods, Benjie Spencer, Isha Renta, Thomas Salem, Hope Hasberry, DaNa Carlis, Yaitza Luna-Cruz, (ETSP mentors and presenters)
- Dr. Sen Chiao collaborated with Drs. Allen White and Jessie Creamean his MS student, Ms Catherine Liu, spent the summer at NOAA ESRL.
- GFDL Thomas Knuteson as mentor to Vitaly and hosted Vitaly visit for field training.

- JAN WFO: Latrice Maxie; Bill Parker; Eric Carpenter
- San Diego WFO: Alex Tardy
- Midland/Odessa WFO: Brian Curran
- Flagstaff WFO: Brian Klimowski
- H. Diamond; N. Nalli; J. Fitzgibbon

V. Impacts of Award

a. Impact on the development of future workforce candidates for the Atmospheric Sciences, Meteorology, and NOAA mission-aligned support in weather and climate.

NCAS-M engaged in several activities related to the training and development/professional development of Cohort 1 and other students to impact the development of future workforce candidates for Atmospheric Sciences and Meteorology during this reporting period: Activities included the participation and completion of the Experiential Training Summer Program, Individual Student Development Plan, NERTO experience, student attendance at professional meetings, advanced research trainings, field visits, and center-wide professional development.

- SJSU students established the connection with NOAA scientists which will help their future career path.
- UMD student -Vitaly was educated for how to conduct research focusing on extreme episode identification and also trained in the NOAA facility to learn how to relate his thesis research with NOAA missions.

- The graduate student involved in the project is working on a project related to air quality and impact of climate-related changes on formation of pollutants such ozone. These topics are related to NOAA mission-aligned activities.
- Keren Rosado began work at NOAA/ESRL as a postdoctoral fellow under the advisement of George Grell.
- Supported undergraduate students exposed to observational and analytical research environments through summer programs and site visits. Increase JSU students' interest in meteorology program and retain qualified meteorology major students.

Students are being trained in NOAA's relation missions and goals. Upon graduation students will be better prepared to join NOAA's workforce

b. Impact on other disciplines and Program Level Outputs and Outcomes aligned with the 2016 FFO.

Jackson State University: Archeology: Exploration of microclimate factors on prehistoric Sinagua Culture social structures at Walnut Canyon, Arizona. Civil Engineering + Geology: Invited seminar to graduate class at Univ. of Texas – San Antonio.

Pennsylvania State University: Advances in the knowledge of radiative transfer and chemical reactions in plant canopies can impact other disciplines such as atmospheric chemistry

University of Texas, El Paso: The use of meteorological air quality models to the assessment of air quality is aligned with NOAA/NWS/NCAP national air quality forecasting program. Furthermore, these air quality modeling results were used in a health and economics assessment, which is also a new NOAA priority.

Howard University: A Department of Geosciences proposal was developed at Howard University that would be instituted in the largest College in the University; the College of Arts and Sciences. The proposal received unanimous support at the Division Level and is being presented to the College for a vote in academic year 2017-2018. This program links faculty from across the college in both STEM and non-STEM disciplines. It will also offer general education courses that would be offered to students from all non-STEM disciplines in the College. If approved, these courses will significantly enhance the offerings of NOAA mission-relevant curriculum at the university over the next generation. Our estimates of enrollments in the next five years would exceed 500 students where there are no Geosciences general education courses at this point.

c. Impact of the Center activities to build institutional capacity in support of the NOAA FY16 CSC award

Jackson State University: New software for radar and radiosonde data analysis.

University of Texas, El Paso: The capability of students and faculty to run the Community-Multi-scale Air Quality Model (CMAQ, used by NOAA/NWS/NCEP for air quality modeling) was enhanced strongly at the University of Texas at El Paso. The University of Texas at El Paso can now participate more fully in NOAA/NWS/NCEP projects and will use these resources in leveraged funding.

Howard University: The Department of Geosciences mentioned above will build institutional capacity in Geoscience education at Howard University. The principal investigator provided the white paper on establishing a university research center activities called the Center for Atmospheric Sciences, Meteorology, Societal Impacts, and Environment; NCAS-M to the Provost. The response was positive and an invitation to complete the application for review was extended as a result.

Additional observational capacity (e.g. ceilometers, actinometer, AWIPS) was acquired at HU, UPRM, and UTEP. NCAS-M is negotiating with NWS to acquire ceilometers that have been decommissioned so that they can be installed at NCAS-M partner campuses. This will provide a training and research capacity at the MSIs that does not exist presently. It will also provide a cross-CSC link as some of the other CSCs are involved in remote sensing applications of lidars. We note that the recent hurricanes in the Caribbean have caused serious destruction to the infrastructure at our partners in Puerto Rico. At the date of this report submission, we are unable to assess the extent of the damage. Previously, a ceilometer, aerosol detector, and three drones instrumented with atmospheric sensors were acquired by our partners at UMET and UPRM. These additions to observational capacity enhanced their respective institutions with respect to training and NOO mission-relevant research.

d. Impact of the NOAA award on the Centers data and information resources. Communication of Center accomplishments.

The NCAS-M engages the School of Communications for issuing a combination of press releases, website stories, and social media communications on Twitter, Instagram, and Facebook. A static webpage has been developed and is being expanded to accommodate the information and resources that is reflective of NCAS-M activities and programs. The faculty, staff, and students of NCAS-M engaged in a variety of invited talks, seminars, workshops, interviews, and conference presentations. These interactions broaden the familiarity of NOAA mission science and service to non-STEM disciplines and exposes these students to career opportunities in NOAA.

Students are more familiar with High Performance Computing and GIS software.

e. How has the Center successfully conducted transfer of research results and new technologies in support of NOAA mission –aligned R2X?

JSU Coordination and collaboration with NWS Weather Forecast Offices and NSSL.

Making the ASOS CL31 data available, and in real-time if possible, will transform air quality forecast, improve understanding of summer night time convection initiation, volcano and fire smoke monitoring, as well as aid in visualization of the lower troposphere and aid in nowcasting. It will provide multiple benefits to National Weather Service products and customers resulting in a Weather Ready Nation. This task was engaged in recommending steps on how this will be accomplished.

Howard University and UTEP have a long history of collaborations. Dr. Emily Saunders, a Howard University graduate, is currently collaborating with UTEP. Dr. Jeff McQueen (NOAA/NWS/NCEP) served on Dr. Saunders PhD committee at Howard University. He has requested presentations of updates of her work at

Howard University and UTEP is working with Dr. Saunders and NOAA/NWS/NCEP to transfer that work to NOAA.

The NCAS-M participated in NOAA's "Emerging Technologies for Observations" Workshop and presented two papers at this meeting of NOAA and NOAA stakeholders. The two ideas proposed for innovations to operational observations centered on collaborative work with NWS STC on lidar applications to weather and novel use of aerosol optical thickness measurements with surface aerosol measurements to improve weather forecasts.

The NCAS-M also conducted proof-of-concept studies using drones as platforms for various sensors that are currently deployed on weather balloons (Temperature, pressure, relative humidity) and towers (sonic anemometers). The preliminary results were shared in a student forum and plans are to engage NOAA ATDD scientists and staff who are engaged in similar work. Plans to visit were initiated during this performance period but the site visit is planned to take place in fall 2017.

NCAS-M contributes all observed data to collaborating scientists but another specific example is the ongoing collaboration between Jeff McQueen of NCEP/EMC who is engaged in using both AEROSE data and Beltsville data sets for improvements of the description of the planetary boundary layer in operational models.

f. Societal impacts of the Center research activities. Communications to general public.

The NCAS-M has engaged the general public through community outreach:

- Visits to neighborhood commission meetings in Washington, DC
- Participation of students and faculty in the American Meteorological Society Washington Forum, which involves communications with legislative representatives and private sector
- Hosting several community groups to the Beltsville Campus to demonstrate weather and climate monitoring capabilities and the importance of environmental intelligence
- Dr. Vernon Morris appeared on AMSNews.TV to speak about science advocacy. http://www.amsnews.tv/wp-content/uploads/2017/05/AMSNEWS.TV-John-May-20-2017.mp4?_=7

VI. Changes/Challenges

a. **Changes in performance of the award objectives – approach and reasons(s) for change:**

The NCAS-M will continue to work with Program to cooperatively identify solutions and best modes of satisfying all FFO requirements and achieving the goals of the program.

b. **Actual or anticipated problems of delays and actions or plans to resolve them:**

Late receipts of funds. Unclear and/or changing requirements for student eligibility. Grossly inadequate funding for faculty in relation to time/effort required for project deliverables.

The NCAS-M has requested the approval of Dr. Terri Adams-Fuller as Deputy Director. In this role, she will act to represent the Center on occasions at which the Director and DS cannot attend or act on behalf of the institutional lead. This will help relieve some of the administrative burden on the Director.

Faculty Attrition and Recruitment. Attracting new faculty to a program that cannot offer start-up nor summer salary is extremely challenging as it offers little, if any, incentive to junior tenure-track faculty. Both JSU and HU are actively seeking replacements for positions vacated in the past two years. In particular, HU has two tenure track positions (one in Atmospheric Physics and one in Chemistry) being advertised and it is anticipated that both will be advertising in the 2017-2018 academic year.

Staff Hiring. The NCAS-M has sought and repeated identified qualified candidates for the Data Manager position but lost the candidates to more lucrative offers. This position is posted on the website and the search continues.

Distinguished Scientist (DS) Hiring. The DS position candidate was identified but the College reversed its decision on tenure. Thus, the letter is being revised and a modified offer is being made in which the DS will be able to go up for tenure after the first year. This reversal was due to the limited teaching experience of the DS candidate and the string teaching history of the institution. The Provost and Dean have both pledged support in achieving the goal of bringing the DS on board during the 2017-2018 academic year.

The following individuals have been identified to perform the duties of the key individuals for the current performance period until the key positions are filled:

Dr. Terri Adams will assist with representing the Center and Lead Institution in cases for which the Director cannot attend. Dr. Belay Demoz will also assist if the need for technical expertise in Atmospheric Sciences is critical. Dr. Jo-Anne Butty will perform the duties of the Data Manager with assistance from the Kimberly Smith until this position is filled. The NCAS-M is also seeking work-study assistance for clerical support until the Data Manager position is filled. Dr. Tia Tyree is also assisting as the Communications Lead in coordinating all social media and branding. The role of the Distinguished Scientist will be fulfilled by Vernon Morris until this position is filled.

c. **Changes that have a significant impact on expenditures:**

The funds for year 1 came late and sub awards will issue late due to the late receipt of primary funds.

A competent student from UMBC resigned because of an opportunity of a life time was made available to the student – making it harder to recruit midway through Cohort-1. Although this occurred early in cohort-1 period and we were able to find a replacement – it would create an issue in the burn rate of funds.

d. Other

The NCAS-M continues responding to the budget threats and uncertainty as effectively as possible under the current federal and institutional (university) administration. We acknowledge that these are issues common to all academic entities but the plight of minority-serving institutions remains more dire and tenuous than large, historically white public and well-endowed private institutions. The NCAS-M seeks alternate and complementary revenue streams to support efforts in education and training. We have been able to successfully acquire physical resources and in-kind contributions of instrumentation. We have also secured commitments from the University to support a limited number of additional students associated with the atmospheric sciences program.

VII. Special Award Conditions

This section details the progress made during this reporting period (March 1, 2017 – August 31, 2017) for the specified special award conditions written below.

a. Multi-Year Special Award Condition

NCAS-M is in receipt of \$3,190,000.00 for year 2 of this 5-year period. This year two funding was received in two separate award files (award file 1 and 2). Award file one (1) was received in May 2017 in the amount of \$1,600,709.00 and award file two (2) was received August 31, 2017 in the amount of \$1,589,291.00. Award file two (2) combines two revenues of funding - \$1,399,291.00 for ASM Center activities and \$190,000.00 to host the NOAA Office of Education, Educational Partnership Program Education and Science Forum. This funding represents a shortfall of \$100,000.00 from the proposed amount. The funding period for year two is 03/01/2017 to 08/31/2017.

b. New Award Special Award Condition

NCAS-M acknowledge the terms and conditions of Award #NA16SEC4810006 and are following them accordingly.

c. NOAA Environmental Data and Information

NOAA environmental data are used and students are trained on their applications: synoptic surface data; radiosonde data; NEXRAD weather radar; GOES satellite data. The NCAS-M actively encourages the use of NOAA data in core curriculum and in the execution of thesis research and training.

d. Center External Evaluator Support on Award Funds Special Award Condition

NCAS-M has not expended any funds on the external evaluator position during this performance period.

e. EPP/MSI CSC Evaluation Plan for Center

Collaborative Professions, LLC decided to resigned from the being the evaluation firm for the Center. They have been replaced with SmartStart Evaluation and Research. SmartStart Evaluation and Research credentials have been submitted to NOAA program office for approval. A preliminary evaluation plan has been developed and is under review by the Center before submission to NOAA program office.

f. Direct Student Support, Post-Doctoral Program and Pre-Publication Manuscript Submission

Direct Student Support

NCAS-M financially supported 24 full-time students across the Center in its first cohort who are US citizens with a minimum GPA of 3.0 during this performance period. Fourteen of the 24 students reported are students

previously supported on the FY11 award. A request for the transfer of the fourteen students from FY11 award to the FY16 award was submitted through Grantsonline (GOL). The Cohort 1 official composition awaits the approval of this request. The level of support provided for Cohort one during this performance period is presented in Table 1.

Cohort-2 students are being on-boarded starting in the 2017-2018 academic year and many are starting officially after the end of this reporting period. At present, students are still being recruited for Cohort 2 but twelve students have been recruited this far.

Table 1: Direct Student Support

Name	Academic Classification	Tuition	Stipend	Travel	NERTO	One-time Research
Kafayat Olayinka	Ph.D.	\$32,973.00	\$25,384.70	\$3,943.61	\$0.00	\$0.00
Shadya Sanders	Ph.D.	\$32,973.00	\$30,000.00	\$2,232.68	\$0.00	\$1,592.98
Cassandra Shivers	Ph.D.	\$6,639.00	\$30,000.00	\$0.00	\$0.00	\$1,592.98
Daniel Yeager	Ph.D.	\$32,973.00	\$24,230.85	\$3,804.79	\$0.00	\$0.00
Michelle Dovil	Ph.D.	\$32,973.00	\$30,000.00	\$4,630.00	\$0.00	\$0.00
Tierra Ellis	Ph.D.	\$32,798.00	\$30,000.00	\$1,144.03	\$0.00	\$0.00
Carla Mejias	Ph.D.	\$1,961.00	\$0.00	\$0.00	\$0.00	\$0.00
Zachary Moon	Ph.D.	\$1,766.00	\$12,046.50	\$0.00	\$0.00	\$0.00
Vitaly Kholodovsky	Ph.D.	TBD	TBD	TBD	TBD	TBD
Catherine Liu	M.S.	\$989.00	\$14,000.00	\$0.00	\$4,022.96	\$0.00
Mussie Kebede	M.S.	\$32,798.00	\$25,000.00	\$4,152.26	\$0.00	\$590.00
Miguel Cortez	M.S.	\$0.00	\$23,437.50	\$1,274.71	\$2,351.88	\$2,531.88
Robert McAfee	M.S.	\$0.00	\$23,437.00	\$3,347.63	\$2,533.82	\$2,533.81
Janae Elkins	B.S.	\$0.00	\$6,350.00	\$0.00	N/A	N/A
Yanna Chen	M.S.	TBD	TBD	TBD	TBD	TBD
Stephen Solimine	M.S.	TBD	TBD	TBD	TBD	TBD

Keon Gibson	B.S.	\$0.00	\$6,300.00	\$0.00	N/A	N/A
Jaylond Harvey	B.S.	\$0.00	\$6,400.00	\$0.00	N/A	N/A
Tony Hurt	B.S.	\$0.00	\$6,400.00	\$0.00	N/A	N/A
Arianna Jordan	B.S.	\$2,871.00	\$6,000.00	\$0.00	N/A	N/A
Kendall Dawkins	B.S.	\$1,281.17	\$5,332.52	\$0.00	N/A	N/A
Damian Emerson	B.S.	\$0.00	\$5,460.00	\$0.00	N/A	N/A
Nirav Shah	B.S.	\$0.00	\$438.00	\$0.00	N/A	N/A
Myrna,Santiago	Ph.D.	\$0.00	\$6,400.00	\$0.00	\$0.00	\$0.00

Post-Doctoral Program

The goal of the ASM postdoctoral fellowship (PF) program is to support advanced training in NOAA-related sciences. ASM will support PFs in the thematic areas of atmospheric sciences and meteorology.

The NCAS-M currently supports two postdoctoral fellows; Dr. Richard Medina, who works at NWS Sterling, and Dr. Keren Rosado, who is currently located at NOAA /ESRL.

Pre-Publication Manuscript Submission

1. Ji, P., X. Yuan, and X.-Z. Liang, 2017: Do lateral flows matter for the hyper-resolution land surface modeling? *J. Geophys. Res.* (submitted).
2. White, L., and M. Koziara: Surface thermodynamic gradients associated with Gulf of Mexico sea breeze fronts. Submitted to *J. Geophys. Res-Atmos.*
3. Medina, R., W.R. Stockwell and R.M. Fitzgerald, Optical Characterization of Aerosol Particles in the El Paso-Juarez Airshed, *Aerosol Science and Engineering, Submitted, September, 2017.*

g. EPP MSI CSC Substantial Involvement and Collaborative Engagement

NCAS-M acknowledge the terms and conditions of this special award condition and will continue to work openly and collaboratively with NOAA. During this reporting period, Dr. Morris met with the technical monitor (Dr. Ming Ji) once and the technical monitor and technical advisor (Dr. Jason Tuell) also attended the annual meeting. All other communications during this reporting period have taken place via email. A plan to schedule quarterly face-to-face briefings to the technical monitor; has been proposed. NCAS-M solicited its faculty and staff for recommendations for an advisory board during the annual meeting and this list will be presented to the technical monitor in the upcoming meeting for a final decision.

The NCAS-M leadership engages with OED and EPP MSI Program leadership on a regular (near weekly) basis via telephone and email. The NCAS-M engages with the CCWG during the quarterly meetings and teleconferences as well as presenting to the NOAA Chief Economist, Dr. Monica Grasso (July 13), participation in the OAR Stakeholders Forum (June 15-16), Tag-Ups with Cindy Woods and Dr. Vankita Brown (May 2), and Craig McLean (August 16).

h. Center Implementation Plan is Required

NCAS-M implementation plan has been submitted to NOAA program office and currently under review.

i. EPP CSC Programmatic Special Awards Condition

The NCAS-M continues to work toward full staffing, interacting with Program officials to finalize operational plans (e.g. evaluation plan, implementation plan, communication strategy), setting up an advisory board, engaging with other CSC leadership and Program to further program sustainability and success through the Center Champions Committee, and building coalitions within NOAA. Many of our interactions have been spelled out in previous sections.

Provide FY16 Center award information for:

- **Number of EPP-funded post-secondary students from underrepresented minority communities** who are trained **4** and graduate **0** in NOAA-mission sciences.
- **Total number of EPP-funded post-secondary students** who are trained **5** and graduate **0** in NOAA-mission fields relevant to this announcement
- **Number of EPP-funded graduates who enter the NOAA mission workforce as hires** by NOAA **0**, NOAA contractors **0**, NOAA partners **0**, resource management agencies **0**, NGO community **0**, academia **0** or as entrepreneurs **0**.
- **Number of EPP-funded graduates who participate in and complete NOAA agency mission-related postdoctoral level programs** **2 (Dr. Richard Medina and Dr. Keren Rosado)**.
- **Total new funds leveraged with NOAA EPP award** (including post-secondary student support) **\$1.3M (Laser Laboratory), \$30K (MDE trailer)**

Provide FY16 Center award information to demonstrate contribution to supporting CSC Desired Program level Outcomes and Outputs defined in FFO p. 7 - 10, for this reporting period.

Professional Development

- Professional Development Webinar for NCAS-M Cohort Attending 2017 AMS Washington Policy Forum, Student as Rapporteurs (May 2-4, 2017) – *see Appendix E*
- 2017 AMS Washington Policy Forum (May 2-4, 2017) – *see Appendix F*
- NCAS-M One-Day Professional Development (R. Garret, JSU; May 31, 2017) – *see Appendix G*
- NCAS-M Two-Day Professional Development (M. Feaster, JSU; June 8-9, 2017) – *see Appendix H*
- ASM Webinar – NERTO (June 16, 2017) – *see Appendix I*
- NCAS-M ETSP at Howard University (July 16-29, 2017) – *see Appendix J*
- NCAS-M Center-Wide Professional Development (July 24-26, 2017) – *see Appendix K*
- NCAS-M ETSP Research Colloquium/ Poster Presentations – *see Appendix L*
- JSU student training by JAN WFO staff

Experiential Training Summer Program (ETSP)

8 students participated in ETSP. Summer experiential training; professional development, and poster presentations. Applications to be submitted to NOAA scholarships in fall 2018 (see *Appendix J*)

j. Performance Progress Reports

This current report represents the performance progress report for the performance period beginning March 1, 2017 to August 31, 2017.

VIII. Financial Information

a. Total NOAA Funding Breakout*

Budget Category	Funds Budgeted	Funds Used	Funds Encumbered	Funds Remaining
Salary	\$438,563.00	\$182,954.17	\$0.00	\$255,608.83
Fringe Benefits	\$127,622.00	\$50,267.63	\$0.00	77,354.37
Supplies	\$83,615.00	\$22,956.19	\$312.00	\$57,162.81
Travel	\$43,184.00			
Participant (HU student) cost	\$912,249.00	\$517,083.37	\$1,416.12	\$340,749.51
Sub-Awards	\$1,150,501.00	\$44,013.95	\$1,064,898.69	\$41,588.36
Equipment	\$0.00	\$0.00	\$0.00	\$0.00
F&A	\$222,450.00	\$0.00	\$0.00	\$222,450.00

*Please note that the numbers/amounts given above are estimates and are in the rear by 30 days.

It is important to note that even though the award period had a start date of 9/1/16, partners did not receive their respective sub awards until mid to late spring of 2017.

b. Total Leveraged Funding Breakout:

Funding Source	Funding Type	Funding Amount	PI	Project Title	Contribution to ASM Center
JSU internal	Travel award	\$1,400.00	Loren White	San Diego conference	Faculty travel
NSF	Research and education	\$140,000.00	Loren White	“EAGER: Novel Applications of Mobile Observational Strategies to Non-Severe Atmospheric Scenarios”	Student support, faculty travel, faculty salary, equipment
Coordinating Research Council, Atlanta, GA (CRC) - June, 2017		\$119,999.00	Rosa Fitzgerald	Project A-101, Air Quality Modeling of the Relationship Between Projected Ozone and PM Trends and Changes in Precursor Relationships in the South Coast Air Basin in Response to Varying Reductions of Precursor Emissions	
Coordinating Research Council, Atlanta, GA (CRC) - July, 2017		\$7,000.00	Rosa Fitzgerald	Project A-109, Air Quality Modeling of the Relationship Between Simulated PM2.5 in Response to Varying Reductions of Ammonia Emissions over the South Coast Air Basin,	
The Truck and Engine Manufacturers Association (EMA), Alpharetta, GA- June, 2017		\$29,999.00		Modeling the Health Impacts Due to Projected Ozone and Particulate Matter Trends in Response to Varying Reductions of Precursor Emissions for the South Coast Air Basin	

IX. APPENDICES

Appendix A: List of NCAS-M Fellows – Cohort 1 (2016-2017)

List of NCAS-M Fellows – Cohort 1 (2016-2017)

No	Name	Level (BS, MS, PhD)	Institution	Degree Program	Email	Ethnicity
1	Dovil, Michelle	PhD	HU	Sociology	michelle.dovil@gmail.com	AA
2	Ellis, Tierra	PhD	HU	School Psychology	tierra.ellis@bison.howard.edu	AA
3	Kebede, Mussie	MS	HU	Atmospheric Sciences	mussie.kebede@bison.howard.edu	AA
4	Olayinka, Kafayat	PhD	HU	Atmospheric Sciences	jummykay@icloud.com	AA
5	Sanders, Shadya	PhD	HU	Atmospheric Sciences	shadya.sanders@gmail.com	AA
6	Shivers, Cassandra	PhD	HU	Social Psychology	cassandra.shivers@bison.howard.edu	AA
7	Yeager, Daniel	PhD	HU	Atmospheric Sciences	daniel.yeager7@gmail.com	AA
1	Elkins, Janae	BS	JSU	Meteorology	janae.n.elkins@students.jsu.edu	AA
2	Gibson, Keon	BS	JSU	Meteorology	keon.l.gibson@students.jsu.edu	AA
3	Harvey, Jaylond	BS	JSU	Meteorology	jaylondharvey@gmail.com	AA
4	Hurt, Tony	BS	JSU	Meteorology	tonyhurt30@gmail.com	AA
1	Moon, Zachary	PhD	PSU	Atmospheric Science	zlm1@psu.edu	White
-	-	-	-	-	-	
1	Santiago, Myrna	PhD	UPRM	Marine Sciences	myrna.santiago@upr.edu	Hispanic
1	Cortez, Miguel	MS	UTEP	Physics	macortez7@miners.utep.edu	Hispanic
2	McAfee, Robert	MS	UTEP	Physics	rdmcafee@miners.utep.edu	Hispanic
1	Dawkins, Kendall	BS	UMBC	Physics	dawkins1@umbc.edu	AA
2	Emerson, Damian	BS	UMBC	Chemical Engineering	mieron1@umbc.edu	AA

1	Kholodovsky, Vitaly	PhD	UMD	Atmospheric and Oceanic Sciences	vkholodo@umd.edu	White
1	Jordan, Arianna	BS	SJSU	Meteorology	arianna1930@hotmail.com	AA
2	Liu, Catherine	MS	SJSU	Meteorology	catherine.n.liu@sjsu.edu	Asian

AA= African American

Appendix B – NCAS-M Individual Students Development Plan

NOAA Center for Atmospheric Sciences and Meteorology (NCAS-M) Individual Student Development Plan (SDP)

DIRECTIONS: The **SDP** consists of five sections: **1) Background Information, 2) Annual Planning Form, 3) Mid-Year Progress Report, 4) Year-End Progress Report, and 5) Summer Progress Report.**

	SDP Section	Description
1	Background Information	To be completed by student at the <u>start of the fiscal year</u> to gather background and contact information.
2	Annual Planning Form	To be completed by student and approved by faculty advisor and NOAA mentor at the <u>start of the fiscal year</u> to plan student education and research activities for the upcoming year.
3	Mid-Year Progress Report	To be completed by student and approved by faculty advisor and NOAA mentor at <u>mid-year</u> to document accomplishments, challenges, and needs by mid-year (report will cover fall semester).
4	Year End Progress Report	To be completed by student and approved by faculty advisor and NOAA mentor at <u>year-end</u> to document accomplishments, challenges, and needs by year-end (report will cover spring semester).
5	Summer Progress Report	To be completed by student and approved by faculty advisor and NOAA mentor at the <u>end of the summer</u> (report will cover summer experience).

Thank you!

Background Information

Directions: Please complete all items in this section.

1. Today's Date:

2. Name:

3. NCAS-M Institution:

4. Phone: _____ 5. Email:

6. Semester/Year entered NCAS-M Program (e.g., Fall/2016): _____/ _____
7. Cohort (or academic year entered the NCAS-M program) (*select one*)
 - a. Cohort 1, 2016-2017 _____
 - b. Cohort 2, 2017-2018 _____
 - c. Cohort 3, 2018-2019 _____
 - d. Cohort 4, 2019-2020 _____
 - e. Cohort 5, 2020-2021 _____
8. Degree and Degree Name (e.g., MS, Atmospheric Sciences):

9. Expected Date (Semester/Year) of Graduation (e.g., Spring/2018): _____/ _____
10. Name of Faculty Advisor:

11. Name of NOAA Mentor:

12. Research Thematic Area¹:

13. Title of Research Project:

¹ 1) Process-level Understanding and Enhanced Modeling Capabilities, 2) Improved Quantification of Forecast Uncertainty, 3) Advancing the Development of High Resolution Models, 4) Integrated Social Sciences, 5) Effective Communication of Climate and Weather Risk

14. Current Cumulative GPA:

15. Previous Semester's GPA:

ANNUAL PLANNING FORM EDUCATION ACTIVITIES

EDUCATION AND TRAINING REQUIREMENTS	ACTIVITIES
<p>COURSEWORK: List all courses you will enroll in during the current academic year (fall and spring).</p>	
<p>RESEARCH: List research activities you will be involved in during the academic year (fall and spring) <u>and</u> your role. <i>(Students are required to attend one (1) professional meeting <u>or</u> research-related travel one time per academic year)</i></p>	
<p>PROFESSIONAL MEETINGS/CONFERENCES: List all professional meetings/conferences you will attend during the academic year (fall and spring). <i>(Students are required to attend one (1) professional meeting <u>or</u> research-related travel one time per academic year)</i></p>	
<p>NOAA EXPERIENTIAL RESEARCH AND TRAINING OPPORTUNITY (NERTO): List the NERTO research activity for which you will apply or participate in during the academic year or summer at a NOAA facility <u>and</u> your role. <i>(All <u>graduate students</u> are required to participate in one (1) NERTO experience as a NCAS-M fellow; All <u>undergraduates</u> must attend the applications training workshop for NOAA undergraduate summer programs <u>and</u> all <u>rising sophomores</u> must apply for a NOAA summer internship program)</i></p>	

	<p>PROFESSIONAL DEVELOPMENT ACTIVITIES: List the professional development activities you will participate in this year <i>(All students are required to participate in <u>three</u> professional development activities - <u>two</u> (2) center-wide professional development trainings and <u>one</u> (1) advanced research/skill training annually)</i></p>	
	<p>PUBLICATIONS: List peer-review publications you will be working on during the academic year (fall and spring).</p>	
	<p>PRESENTATIONS AT CONFERENCES: List presentations you will present at professional meetings during the academic year (fall and spring), include dates, locations, and titles.</p>	
	<p>SOCIAL SCIENCES INTEGRATION: Describe how you will integrate social sciences in your research during the academic year.</p>	

Student Signature _____
Faculty Advisor Signature _____
NOAA Mentor Signature _____

Date _____
Date _____
Date _____

NCAS PROGRAM REQUIREMENT CHECKLIST

General:

- You must maintain at least a 3.0 GPA every semester
- Have one faculty member advisor and one NOAA mentor (graduate students)
- Have one faculty advisor (undergraduate students)

One Time Experience:

- Participate in one time NERTO experience (graduate students)

Annual:

- Attend at least one professional meeting (aim to present) or research-related travel annually
- Participate in at least three professional development activities (i.e., two center-wide professional development trainings and one advanced research/skill training)
- Complete SDPs four times a year (planning form, mid-year, end-of-year, and summer)

**MID-YEAR PROGRESS REPORT
EDUCATION AND RESEARCH ACTIVITIES**

ACADEMIC/RESEARCH DEVELOPMENT	RESPONSE	ACCOMPLISHMENTS	CHALLENGES	NEEDS
<p>COURSEWORK: List all courses you enrolled in during the fall semester.</p>				
<p>RESEARCH: List research activities you were involved in during the fall semester <u>and</u> your role. <i>(Students are required to attend one (1) professional meeting <u>or</u> research-related travel one time per academic year)</i></p>				
<p>PROFESSIONAL MEETINGS/CONFERENCES: List all professional meetings you will attend during the fall semester. <i>(Students are required to attend one (1) professional meeting <u>or</u> research-related travel one time per academic year)</i></p>				

<p>NOAA EXPERIENTIAL RESEARCH AND TRAINING OPPORTUNITY (NERTO): List the NERTO research activity for which you applied or participated in during the fall semester and your role. <i>(All <u>graduate students</u> are required to participate in one (1) NERTO experience as a NCAS-M fellow; All <u>undergraduates</u> must attend the applications training workshop for NOAA undergraduate summer programs and all <u>rising sophomores</u> must apply for a NOAA summer internship program)</i></p>				
<p>PROFESSIONAL DEVELOPMENT ACTIVITIES: List professional development activities you participated in during the fall semester. <i>(All students are required to participate in <u>three</u> professional development activities - <u>two</u> (2) center-wide professional development trainings and <u>one</u> (1) advanced research/skill training annually)</i></p>				
<p>PUBLICATIONS: List peer-review publications you worked on during the fall semester.</p>				
<p>PRESENTATIONS AT CONFERENCES: List presentations you will present at professional meetings during the fall semester, include dates, locations, and titles.</p>				
<p>SOCIAL SCIENCES INTEGRATION: Describe how you integrated social sciences in your research during the fall semester.</p>				

Student Signature _____

Date _____

Faculty Advisor Signature _____

Date _____

NOAA Mentor Signature _____

Date _____

NCAS PROGRAM REQUIREMENT CHECKLIST

General:

- You must maintain at least a 3.0 GPA every semester
- Have one faculty member advisor **and** one NOAA mentor (graduate students)
- Have one faculty advisor (undergraduate students)

One Time Experience:

- Participate in one time NERTO experience (graduate students)

Annual:

- Attend at least one professional meeting (aim to present) or research-related travel annually
- Participate in at least three professional development activities (i.e., two center-wide professional development trainings and one advanced research/skill training)
- Complete SDPs four times a year (planning form, mid-year, end-of-year, and summer)

YEAR-END PROGRESS REPORT EDUCATION AND RESEARCH ACTIVITIES

ACADEMIC DEVELOPMENT	RESPONSE	ACCOMPLISHMENTS	CHALLENGES	NEEDS
<p>COURSEWORK: List all courses you enrolled in during the spring semester.</p>				
<p>RESEARCH: List research activities you were involved in during the spring semester <u>and</u> your role. <i>(Students are required to attend one (1) professional meeting <u>or</u> research-related travel one time per academic year)</i></p>				
<p>PROFESSIONAL MEETINGS/CONFERENCES: List all professional meetings you will attend during the spring semester. <i>(Students are required to attend one (1) professional meeting <u>or</u> research-related travel one time per academic year)</i></p>				

<p>NOAA EXPERIENTIAL RESEARCH AND TRAINING OPPORTUNITY (NERTO): List the NERTO research activity for which you applied or participated in during the spring semester and your role.</p> <p><i>(All <u>graduate students</u> are required to participate in one (1) NERTO experience as a NCAS-M fellow; All <u>undergraduates</u> must attend the applications training workshop for NOAA undergraduate summer programs and all <u>rising sophomores</u> must apply for a NOAA summer internship program)</i></p>				
<p>PROFESSIONAL DEVELOPMENT ACTIVITIES: List professional development activities you participated in during the spring semester.</p> <p><i>(All students are required to participate in <u>three</u> professional development activities - <u>two</u> (2) center-wide professional development trainings and <u>one</u> (1) advanced research/skill training annually)</i></p>				
<p>PUBLICATIONS: List peer-review publications you worked on during the spring semester.</p>				
<p>PRESENTATIONS AT CONFERENCES: List presentations you will present at professional meetings during the spring semester, include dates, locations, and titles.</p>				
<p>SOCIAL SCIENCES INTEGRATION: Describe how you integrated social sciences in your research during the spring semester.</p>				

Student Signature _____

Date _____

Faculty Advisor Signature _____

Date _____

NOAA Mentor Signature _____

Date _____

NCAS PROGRAM REQUIREMENT CHECKLIST

General:

- You must maintain at least a 3.0 GPA every semester
- Have one faculty member advisor **and** one NOAA mentor (graduate students)
- Have one faculty advisor (undergraduate students)

One Time Experience:

- Participate in one time NERTO experience (graduate students)

Annual:

- Attend at least one professional meeting (aim to present) or research-related travel annually
- Participate in at least three professional development activities (i.e., two center-wide professional development trainings and one advanced research/skill training)
- Complete SDPs four times a year (planning form, mid-year, end-of-year, and summer)

NCAS-M STUDENT DEVELOPMENT PLAN SUMMER PROGRESS REPORT FORM²

NAME: _____

EMAIL: _____ **PHONE:** _____

FACULTY ADVISOR: _____ **NOAA MENTOR:** _____

ACADEMIC INSTITUTION: _____

DIRECTIONS: Please document your summer activities as it relates to the following areas: a) Academic Development, b) Professional/ Career Development, c) NOAA Experiential Research and Training Opportunity (NERTO).

	AREAS	ACTIVITIES (2017)		
		JUNE	JULY	AUGUST
1	ACADEMIC DEVELOPMENT (e.g., course work, seminars, research, publications)			
2	PROFESSIONAL/CAREER DEVELOPMENT (e.g., workshops, conferences, presentations)			
3	NOAA EXPERIENTIAL RESEARCH AND TRAINING OPPORTUNITY (NERTO): (NERTO research activity for graduate students or NOAA summer internship for undergraduates)			

STUDENT SIGNATURE: _____

DATE: _____

FACULTY ADVISOR SIGNATURE: _____

DATE: _____

NOAA MENTOR SIGNATURE: _____

DATE: _____

² The NCAS Summer Progress Report Form is due by the end of the fiscal year or August 31.
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Appendix C – NCAS-M List of NOAA Mentors

NOAA Center for Atmospheric Sciences and Meteorology (NCAS-M) List of NOAA Mentors (2016-2017)

	NOAA MENTOR	EMAIL	NOAA OFFICE	LINE OFFICE
1	Brown, Tyra	tyra.brown@noaa.gov	NOAA - National Weather Service (NWS)	NWS
2	Brown, Vankita	vankita.brown@noaa.gov	NOAA - National Weather Service (NWS)	NWS
3	Carlis, DaNa	dana.carlis@noaa.gov	Office of Atmospheric Research (OAR)	OAR
4	Cortinas, John	john.cortinas@noaa.gov	NOAA - Oceanic and Atmospheric Research (OAR) / Office of Weather and Air Quality (OWAQ)	OAR
5	Hawkins, Michelle	michelle.hawkins@noaa.gov	NOAA - National Weather Service (NWS)	NWS
6	Hicks, Micheal	micheal.m.hicks@noaa.gov	NOAA - National Weather Service (NWS) / Weather Forecasting Office (WFO), Sterling, VA	NWS
7	Knuteson, Thomas	tom.Knuteson@noaa.gov	NOAA - Oceanic and Atmospheric Research (OAR)	OAR
8	Marquis, Melinda	melinda.marquis@noaa.gov	NOAA-Earth System Research Laboratory (ESRL) / Physical Sciences Division/Renewable Energies	OAR
9	Moore III, John	john.moore@noaa.gov	NOAA - National Weather Service (NWS) / Weather Forecasting Office (WFO), Memphis, TN	NWS
10	Parker, William 'Bill'	bill.parker@noaa.gov	NOAA - National Weather Service (NWS) / Weather Forecasting Office (WFO), Jackson, MS	NWS
11	Salem II, Thomas	thomas.salem@noaa.gov	NOAA - National Weather Service (NWS) / Weather Forecasting Office (WFO), Memphis, TN	NWS
12	Sims, Jameese	jameese.sims@noaa.gov	NOAA Satellite and Information Service (NESDIS)	NESDIS
13	Spencer, Albert 'Benjie'	benjie.spencer@noaa.gov	NOAA - National Weather Service (NWS), Chief Engineer	NWS
14	Tallapragada, Vijay	vijay.tallapragada@noaa.gov	NOAA - National Center for Environmental Prediction (NCEP), Environmental Modeling Center (EMC)	NWS
15	Taylor, Jason	jason.taylor@noaa.gov	NOAA - National Environmental Satellite, Data, and Information Service (NESDIS)	NESDIS

16	Yapur, Martin	martin.yapur@noaa.gov	NOAA - National Environmental Satellite, Data, and Information Service (NESDIS)	NESDIS
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**Appendix D: Professional Development Webinar for NCAS-M Cohort Attending 2017 AMS
Washington Policy Forum, Student as Rapporteurs (May 2-4, 2017)**

**NCAS-M
2017 AMS Washington Forum
Student Meeting (*GoToMeeting*³)
April 27, 2017; 1:45 p.m.
Agenda**

- A. Welcome
- B. Overview of 2017 AMS Washington Forum
- C. Logistics
 - a. List of Attendees
 - b. Travel Dates
 - c. Flight Information
 - d. Hotel Information
 - e. Per Diem
 - f. Registration
 - g. Roles and Responsibilities
- D. Q & A

³ 2017 AMS Washington Forum GoToMeeting details:
Please join my meeting from your computer, tablet or smartphone.
<https://global.gotomeeting.com/join/161544533>

You can also dial in using your phone.
United States: +1 (872) 240-3212 | Access Code: 161-544-533

First GoToMeeting? Try a test session: <http://help.citrix.com/getready>

2017 AMS Washington Forum
American Association for the Advancement of Science (AAAS) Building
1200 New York Ave NW
Washington, DC 20005

May 2-4, 2017

Overview

The AMS Washington Forum will be meeting from May 2-4, 2017 at the American Association for the Advancement of Science (AAAS) Building, located at 1200 New York Avenue NW in Washington, DC. In addition to the Forum, attendees are cordially invited to our annual banquet on the evening of May 2nd held at the Washington Marriott Metro Center Hotel. Our student dinner is on May 3rd.

The 2017 AMS Washington Forum theme is: *Evolving our Enterprise: Working Together with the New Administration in a New Collaborative Era*. The annual AMS Washington Forum brings together members of the weather, water, and climate community to meet with senior federal agency and administration officials, congressional staff, international science experts, and other community members to hear about the status of current programs, learn about new initiatives, discuss policy issues of interest to our community, and speak out about data requirements and other needs. Here's the program link from 2017: <https://www.ametsoc.org/ams/index.cfm/meetings-events/ams-meetings/2017-ams-washington-forum>.

The AMS promotes the development and dissemination of information and education on the atmospheric and related oceanic and hydrologic sciences and the advancement of their professional applications. The AMS Washington Forum is organized by the AMS Board on Enterprise Economic Development, a part of the AMS Commission on the Weather, Water and Climate Enterprise.

Additionally, NOAA and AMS sponsor the James Mahoney Annual Lecture on May 1st at 4pm. This year's guest lecturer will be Dr. Richard H. Moss, Senior Scientist at Pacific Northwest National Laboratory's Joint Global Change Research Institute and Adjunct Professor in the Department of Geographical Sciences at the University of Maryland, College Park. The Lecture will also be held at the American Association for the Advancement of Science (AAAS) Building, located at 1200 New York Avenue NW in Washington, DC. Here is the program link: <https://www.ametsoc.org/ams/index.cfm/meetings-events/upcoming-events-and-events-of-interest/the-annual-dr-james-r-mahoney-memorial-lecture>. NCAS-M students are invited to attend.

List of NCAS-M Students Attending

HU

1. Michelle Dovil (Grad) Sociology (michele.dovil@gmail.com)
2. Mussie Kebede (Grad) Atmospheric Sciences (mussie.kebede@bison.howard.edu)
3. Emily Saunders (Grad) Chemistry (saunders1289@gmail.com)**
4. Cassandra Shivers (Grad) Social Psychology (cassandra.shivers@bison.howard.edu)
5. Leticia Williams (Grad) Communication, Culture, and Media Studies (williams.leti@gmail.com)

JSU

6. Keon Gibson (UG, Senior), Meteorology (keon.l.gibson@students.jsu.edu)
7. Janae Elkins (UG, Senior), Meteorology (janae.n.elkins@students.jsu.edu)

UTEP

8. Julio Cenciceros (Grad), Environmental Science (jeceniceros@miners.utep.edu)
9. Miguel Cortez (Grad), Physics (macortez7@miners.utep.edu)
10. Robert McAfee (Grad), Physics (rdmcafee@miners.utep.edu)

**** If you have any questions while at the Forum, please see Dr. Emily Saunders**

Items	Students	Information
Travel Dates	# 6, 7 # 8, 9, 10	May 2 – May 4, 2017 May 1 – May 4, 2017
Meeting Location	All	American Association for the Advancement of Science (AAAS) Building 1200 New York Ave NW Washington, DC 20005 https://www.aaas.org/map-directions#driving
Hotel Information	# 6, 7, 8, 9, 10	Washington Plaza Hotel 10 Thomas Circle NW, Washington, DC 20005 http://www.washingtonplazahotel.com/ 202-842-1300
Per Diem	# 6, 7, 8, 9, 10	\$40 per day (full day); \$20 travel day
Registration	All	Already paid

Duties and Responsibilities – Rapporteur	All	See the following rapporteur description
------------------------------------------	-----	------------------------------------------

Rapporteur Description

What is a rapporteur?

A person appointed by an organization to report on the proceedings of its meetings.

Role of Rapporteur

1. To facilitate discussion and note-taking for the AMS Policy Workshops and synthesize reports.
2. To foster an enjoyable and meaningful experience for program participants.

Responsibilities

1. Record all relevant questions and responses during each session.
2. Distribute notecards (or materials) for audience members with comments or questions to record their comments.
3. Collect notecards after each session.
4. Interact with program participants in a positive and engaging manner.
5. Write one to two solid paragraphs on each panelist — then you will collaborate with the students and Senior Rapporteur to develop a one-two page report on your assigned session. You collaborate / meet during breaks and meal periods.
6. Write down the primary points for each speaker; should be three (3) to four (4) points in general.
7. Assist with the set-up and take down of program materials (If necessary).
Record all notes on the available iPad, tablet, or laptop (will these tools be provided?) Students provide their own devices.

Qualifications & Personal Traits

- Excellent speaking skills
- Comfortable interacting with diverse groups
- Reliable and punctual
- Reasonable note-taking skills
- Ability to work independently

Time Commitment

- Rapporteurs are expected to be available for each of their assigned sessions
- Final submissions/notes due to Tom Fahy (or Session Leader)

Important Notes:

- Student team will coordinate with the Senior Rapporteur on your session report. Together as a team, write up the session report. Session notes should be received by the end of the Forum or a few days after. Students need to be timely. We want students' immediate reaction to the sessions and their immediate taking of the notes.

- The Forum provides each university delegation 15 minutes for the students to talk about the strengths of their educational program at each respective university/what they like, etc.

Wednesday, May 3 at 12:30 pm — NOAA Center for Atmospheric Sciences

- Overall Speaker
- Howard University
- Jackson State University
- University of Texas at El Paso

Rapporteur Sample Reports

Sample Report 1 -- Emily Saunders

Renewable Energy

1:00 PM-2: 30 PM: Wednesday, 13 April 2016

Moderator: Melinda Marquis, NOAA, Boulder, Co

Panelists: Michael Goggin, American Wind Energy Association, Washington, D.C.; John Moore, Natural Resources Defense Council/Sustainable FERC Project, Washington, D.C.; Charlie Smith, Utility Variable-Generation Integration Group, Reston, VA; Christopher T. Clack, University of Colorado, Boulder, Co.

Introduction – The focus of this session was to talk about renewable energy and what needs to be done to sustain renewable energy in local and global communities. The panel was contained a group of scientists whose aim is to make sure the renewable energy project does not become an afterthought to the policy makers. Some of the topics that were discussed during the panel were co-optimization, transmission planning, solutions for a low carbon grid, and using meteorology to optimize deployment of renewable energy (sustainable FERC project). All the topics presented during the talk were used to show the audience that all components of the renewable energy project are needed sustain renewable energy throughout the world.

Topics -

Co-optimization-

The co-optimization initiative aims to simultaneously transform wind energy in order to maximize performance and energy efficiency, minimize environmental impact, and accelerate widespread adoption of innovative combustion strategies. To get 80% renewable energy the co-optimization modeling can allow the quantification of divergence from optimal weather models currently being used. The newest model is looking at the energy from a national standpoint. Due to the fact that weather is such a critical component of the co-optimization model to optimize the data output, it would be best to fly the model through a couple decades and analyze how it formats the physics and other components of the model. Since wind is so variable in the model one can correlate the wind sites to produce a more accurate output of data, without using a continuous time series. Lastly, to help decrease cost in wind energy one can decrease the emissions using the co-optimization model.

Transmission Planning-

The Department of Energy states that today's electric grid needs to be more efficient, reliable, and secure. A modern, smarter electric grid may save consumers money, help our economy run more efficiently, allow rapid growth in renewable energy sources, and enhance energy reliability. The Department's research into a variety of tools that will improve advanced system monitoring, visualization, control, operations, and market structure will ultimately modernize the electricity transmission infrastructure to ease congestion, allow for increases in demand, and provide a greater

degree of security (DOE, 2016). The main goal for transmission and generation planning is that it should be all in cost optimization. The renewable energy output patterns should be factored into the transmission planning. A perfect example of 'if you build it they will come' is that transmission can be used to drive generation. Also the market with the some state regulator role should decide generation planning. Lastly, the market should provide the proper incentives, developers, increasing the amount for congestion cost, curtailment risks, capacity value, and time for production such as utilities since other buyer's haven gotten more sophisticated in signings FFAs. The role that atmospheric scientists play is to start collecting data at higher hubs heights particular in regions that have not traditionally seen large wind deployment.

Solutions for a low carbon grid-

The low carbon grid study is a modeling effort that explores the ability of California's electricity system to cost-effectively support large emission reductions by the year of 2030. To achieve this goal there has been more workable policies the plan, pay for and permit transmission-planning efforts in communities that need these resources. In regards to transmission, it provides access to lower cost renewables, enables greater geographic diversity in renewable output within a region, and it reduces the net load variability and uncertainty among grid operating areas. Another solution the low carbon grids is that the energy, capacity and ancillary service market rules must work for all resources. The way this occurs is by making sure most energy markets now include renewables in dispatch, making sure that capacity markets should reflect system-wide contributions to needs, the markets critical for obtaining ancillary services at lowest possible cost, and the lowest-hanging fruit areas without markets needing them. Lastly, the commission and utility planning process reform will be accomplished when the typically dominated policies are not completely considered because it is poorly suited for energy driven issues such as carbon and fuel price risks.

Questions & Answers-

Q1: What can AMS do to address the gaps of meteorology and wind energy grid?

A: The greatest solution to bridging the gap is to continue to educate the community about the renewable energy topic and the issues regarding the renewable energy project. The more information that is presented to the scientific community it does help them understand the renewable energy project in various ways.

Q2: Have we begun to look at how these changes will affect the petroleum industry?

A: Gas is not used for renewable energy; a lot of these gas companies do not have authority over the transmission lines. There is a need to build a better relationship with gas companies to help build these transmission lines. Also, electricity can put halt on this process and cutting carbon significantly can lead to better energy. Unfortunately the market place does not take the renewable energy process seriously because of the cost.

Conclusion- According to the Department of Energy, the clean energy industry generates hundreds of billions in economic activity, and is expected to continue to grow rapidly in the coming years.

There is tremendous economic opportunity for the countries that invent, manufacture and export clean energy technologies. The sustainability of renewable energy is vital to producing cleaner energy throughout the planet, so the earth can heal from its current environmental issues. The panel discussed several different options in regards to renewable energy and what is being done to build this industry. Also, there was great conversation between the audience and the panelists about the current issues with the renewable energy field and they also discuss possible solutions to these issues. Lastly, this panel was very informative and it helped the scientific community understand this

field a lot better and showed them how they can support the growth of this field.

Sample Report 2 – Shadya Sanders

10:30 a.m. – 12:00 p.m.

Session: THEME SESSION

*Comments may be recorded and/or documented

STUDENT RAPPORTEURS:

Amanda Kopil, Millersville University

Doug Kahn, University of Maryland

Shadya Sanders, Howard University

MODERATOR:

Erica A. Grow, WUSA-TV

Theme Session AMS Washington Forum

Business Education Government and Research

Elijah Hutchinson, Assistant Vice President for Resiliency at New York City Economic Development Corporation; *"Coney Island Creek & Lower Manhattan Resiliency Studies"*

New York City faces a variety of challenges caused by severe weather and changes in climate. These include: sea level rise, exposure to heat waves, and subsidence at a much faster rate compared to other cities. Notably, New York City's 100-year storm event rate is becoming a once per 8 year rate. Post SuperStorm Sandy investments are occurring to improve hazard mitigation (especially from floods), provide open spaces for the community, and benefit the natural ecology in the area. Work is occurring at Coney Island Creek, and in the tidal barrier of Coney Island Creek. The New York City Economic Development Corporation (EDC) used technology produced by the Stormwater Management Model (SWMM) and InfoWorks Technology to model the inundation of Coney Island caused by Sandy to see which areas were most greatly affected. To engage the local residents and receive a larger input on what can be done for the future, a competition was held to see what ideas community members had to save the city they live in. The best ideas highlighted possibilities where the city could take advantage of its natural landscape. For example, parks could be protective, landscaped berms can easily be implemented, and raised cycle paths could help create protection from flood waters. All of the ideas had the capability of improving the area not only for preventing flood damage, but also improving community space aesthetically and functionally. A short video highlighting this vision can be seen using the following link. (vimeo.com/117303273)

Dr. Robert Rauber, University of Illinois at Urbana-Champaign; *"21st Century Academic Curriculum in the Atmospheric Sciences"*

In the 20th century, the goal of weather forecasting was to protect life and property. In the 1990s-2010s, we saw a communication revolution, an introduction and widespread dissemination of cell phones, internet usage, easily accessible data, and more frequently shared data. What do we need to do in the 21st century to mitigate weather related risks? It is not only protection of life and property, but also financial risks. Globally these financial risks can affect a multitude of areas including, but are not limited to: water, agriculture, fire, health, energy, commodities, ground/sea/air transportation, leisure, and military. The time frame of risk has also shifted. In the 20th century, the

greatest amount of attention was given to the 0-14 day forecast. As we progress, our greatest financial risk lies in the 14 day - 2 years time frame. There is also a large need to plan for 10+ year risks. The curriculum must change to properly train students. The University has developed a curriculum that prepares students with tools to graduate in the 21st century to address this change in risks we currently face. They have introduced specific course plans in Atmospheric Science where students gain increased knowledge and advance their computer and coding skills early on with programs like: Python, R, MATLAB, GIS for early undergraduates. The program also takes into consideration risk analysis in Earth Sciences and implements courses to prepare graduates to work with decision support systems, climate variability and prediction, societal impacts, earth systems modeling, climate & social vulnerability, and international weather.

Angela Fritz, Deputy Weather Editor, Capital Weather Gang for The Washington Post

The Capital Weather Gang, with 2 full-time employees and 20 freelancers covers a range of scientific topics ranging from meteorology to space weather to policy and politics. They focus on effective weather communication and recognize the challenges of constantly communicating an uncertain science. They have effectively inserted a confidence interval with each forecast, and create a “Boom or Bust” scenario for each event. They are successful in engaging with their viewership and increasing their credibility by consistently verifying their large event forecasts with a rigorous post-storm self-analysis. Although verification is not uncommon in the forecasting world, it is less common to deal directly with your users on many platforms of social media. Angela described the difficulties of dealing with incorrect information going “viral” across the internet and how it can cause more harm than good. The Capital Weather Gang aims to combat these false forecasts by meeting their audience “on their turf”, where the information is more relatable, and the source can become a trusted location for accurate information. The group relates and connects with users in a memorable way, and tries to have as much fun as possible while still being trustworthy. Since there is such a large presence on social media and throughout the internet, several information sources have struggled to deal with “internet trolls”. At the Capital Weather Gang, they have found that by engaging with as many people as possible, and reading each and every comment posted to their work, it is less likely to have people who are posting just to be “loud”. She described trolls as, “people [who] want to be heard, until they realize someone is listening.”

Arthur Charo, National Research Council; "*Charting the Course for the Next Decade of Earth Observations*" nas.edu

The on-going Decadal Survey is designed to provide recommendations for future direction in the field. It is a community led assessment of the state of knowledge in the field. It will:

- Identify and prioritize questions for the next decade;
- Provide recommendations for programmatic directions and government investments;

- Provide a forum to address issues; and
- Meet the requirements of the 2005 & 2008 NASA Authorization Acts.

As a process this survey is less prone to single-point failure, and is much more successful for building a consensus. The 2007 ESAS survey, Scientific and Societal Challenges (2007 ESAS survey) identified topics including: ice sheets, shifts in precipitation, air pollution, climate change and ecosystems as well as human health. As a result there were recommendations for renewed investment of satellite Earth observing systems.

The ongoing ESAS 2017 will assess progress made, develop objectives, identify gaps and opportunities and ultimately recommend approaches to continue Earth observations from space. Compared to the 2007 survey, ESAS 2017 is more science-based than mission-based. It will also have an improved consideration of its international partners. Additionally, the survey will provide cost appraisals and technical evaluations (CATE) for large items; this is being done in cooperation with Aerospace Inc. The decadal survey will have five different study panels for 2017- Hydrology, Water/ Air Quality, Ecosystems, Climate Variability and Change, and Earth Surface and Interior. This time around, the goal is to have more realistic and executable items that focus on measurements.

Appendix E: 2017 AMS Washington Policy Forum (May 2-4, 2017)

2017 AMS Washington Forum

*Evolving our Enterprise: Working Together
with the New Administration
in a New Collaborative Era.*

May 2-4, 2017 • Washington, DC

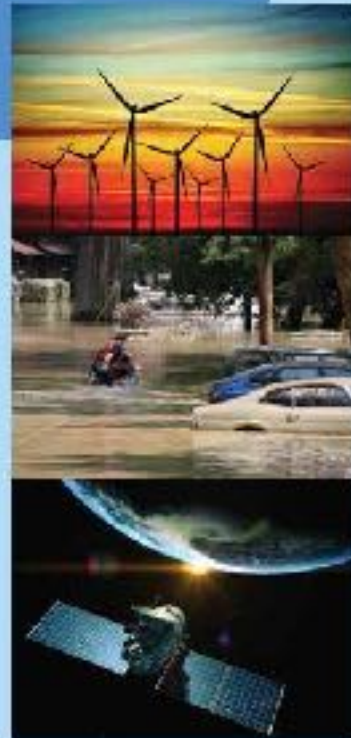
The 2017 AMS Washington Forum is a must-attend event to learn more about weather, water, and climate public policy.

Attendees will meet with senior federal agency officials, congressional staff, representatives from America's Weather and Climate Industry, and other community members to hear about the status of current programs, identify business opportunities, learn about new initiatives, and discuss issues of interest to our community.

2017 Themed Sessions Include:

- New Administration Issues
- Congressional Staffers
- Spectrum Issues for Weather Satellites
- Renewable Energy and Policy Implications
- Federal Agency Leases
- Emergency Management Responsibilities
- Financial Services for Weather and Climate Risk
- Transportation and the National Mesonet
- Commercial Satellites, Open Data, and Data Sharing
- Weather Bloggers

Learn more at
ametsoc.org/WashForum



Hot Topic



*Join our important discussion
on the new Administration.*

Appendix F - NCAS-M One-Day Professional Development (R. Garret, JSU; May 31, 2017)

**NOAA Center for Atmospheric Sciences and Meteorology (NCAS-M)
Professional Development *R. Garrett*
May 31, 2017
Agenda**

- 10:00 AM **Welcome/Introductions/Overview of Day**
Jo-Anne Manswell Butty, PhD, NCAS-M Education Lead
Tierra Ellis, PhD Candidate, NCAS-M Fellow
- 10:30 AM **Professionalism in the Workplace**
Jo-Anne Manswell Butty, PhD, NCAS-M Education Lead
- **Email Etiquette**
 - **Phone Etiquette**
 - **Task Completion**
 - **Attire**
 - **Punctuality**
 - **Brief Resume Review**
- 11:30 AM **Public Speaking Activities**
Tierra Ellis, PhD Candidate, NCAS-M Fellow
- 11:55 AM **Evaluation / Wrap-up**
Jo-Anne Manswell Butty, PhD, NCAS – M Education Lead
- 12:00 AM **Release**

Afternoon Session

Visit to NOAA Headquarters, Silver Spring, MD

Appendix G - NCAS-M Two-Day Professional Development (M. Feaster, JSU; June 8-9, 2017)

NOAA Center for Atmospheric Sciences and Meteorology (NCAS-M) Professional Development *M. Feaster* June 8-9, 2017

Agenda

June 8th

- 10:00 AM **Welcome/Introductions/Overview of Day**
Jo-Anne Manswell Butty, PhD, NCAS-M Education Lead
Tierra Ellis, PhD Candidate, NCAS-M Fellow
- 10:30 AM **Professionalism in the Workplace**
Jo-Anne Manswell Butty, PhD, NCAS-M Education Lead
- **Email Etiquette**
 - **Phone Etiquette**
 - **Task Completion**
 - **Attire**
 - **Punctuality**
 - **Brief Resume Review**
- 11:30 AM **PUBLIC SPEAKING ACTIVITIES**
Tierra Ellis, PhD Candidate, NCAS-M Fellow
- 12:00 PM **Lunch**
- 1:00 PM **Social Skills Activities**
Tierra Ellis, PhD Candidate, NCAS-M Fellow
- 1:45 PM **How to Effectively Network**
Tierra Ellis, PhD Candidate, NCAS-M Fellow
- 2:15 PM **Break**
- 2:20 PM **Elevator Speech / Pitching Self**
Tierra Ellis, PhD Candidate, NCAS-M Fellow
Jo-Anne Manswell Butty, PhD, NCAS-M Education Lead
- 2:50 PM **Evaluation**
Jo-Anne Manswell Butty, PhD, NCAS-M Education Lead

3:00 PM **Wrap-up**

June 9th

10:00 AM – 3:00 PM **NASA Visit (All Day PD with Dr. James Simms)**

Appendix H - ASM Webinar – NERTO (June 16, 2017)

NOAA EPP: COOPERATIVE SCIENCE CENTER (CSC) STUDENT NOAA EXPERIENTIAL RESEARCH AND TRAINING OPPORTUNITIES (NERTO)

**NOAA Office of Education
Educational Partnership Program
www.epp.noaa.gov**

Outline

- What is an EPP student internship opportunity?
- Mentoring for a future diverse and inclusive NOAA workforce
- Benefits
- Who are the students?
- Hosting an intern
- The SSIO internship online system
- Developing a project
- Submission and selection
- At-A-Glance

What is a NOAA EPP Student Internship Opportunity?

- NOAA scientific or technical project with a NOAA mentor that is:
 - Discrete;
 - Can be successfully completed in 12 weeks to 1 year;
 - Occurs at a NOAA facility: office, lab, vessel, etc.
- Is this a hire? No.
- Is an FTE used? No.
- After the internship - is the host office obligated to hire the student? No.

Mentoring for a Diverse & Inclusive Future Workforce

- Set clear expectations
 - Identify start and end dates
- Have defined products and outcomes
- Mentors use the mentor training modules in Commerce Learning Center
- Value of NOAA Internships for EPP CSC Students
- Value of NOAA EPP Internships for Hosting Office

Win-Win

- Student's participation is supported through an existing NOAA award
- Mentor's participation is supported by NOAA and LO Leadership
- Discrete projects concluded with presentation, publication or thesis/dissertation

Who are the students?

Sources of students for NOAA graduate internships are: **NOAA Cooperative Science Centers**

Student funding provided by NOAA Educational Partnership Program (EPP) Cooperative Science Center (CSC) Award

Hosting a NOAA EPP Intern

- Mentor must be a Federal NOAA employee
- NOAA contractors or partners may serve as co-mentor
- Host office provides NOAA badge and access to facility, workspace, and network
- EPP award provides student stipends and some funds for research or travel
- Additional funding for research or travel may be provided by host office
- Project must be entered online using the Student Scholarship Internship Opportunities (SSIO) system

The SSIO Database

Internship Project Development – SSIO Process for NOAA Mentor

- NOAA Mentor Creates and SSIO Account and Generates the Opportunity ***including "for Graduate student" in the title***, and Submits for Approval in the **SSIO**.
- Complete Applications Package for Interested CSC applicants Must be Submitted to NOAA via the NOAA EPP CSC Program using oed.epp10@noaa.gov.
- Applications Submission Date to oed.epp10@noaa.gov: No later than 11:59 pm (Eastern) on <<Provide Date>>.
- NOAA EPP Completes an Administrative Review: No later than <<Provide Date>>.
- Eligible Applications: Forwarded to NOAA Mentor for Review: <<Provide Date>>..
- Interviews Completed by NOAA Mentor (optional): << Provide Date>>.
- Successful Applicant Offer Letter Prepared by NOAA Mentor and Sent to EPP: << Provide Date>>.
- Successful Applicant Notified by EPP: <<Provide Date>>.
- Applicant for Internship – Sends Acceptance Letter << Provide Doe Date>>.

Internship Submission and Selection Actions

- NOAA Mentor submits project in SSIO identifying contents required for a complete application package
- NOAA EPP reviews proposed project
- NOAA EPP CSC students, working with their CSC academic advisor, submit complete application packages through their NOAA EPP CSC Director to oed.epp10@noaa.gov.
- Administrative review of application is completed by EPP
- Eligible applications forwarded to NOAA mentor for review, interview and selection
- Mentor notifies EPP of selected applicant and prepares an offer letter
- Successful NOAA EPP CSC applicants notified by EPP

- Applicant responds with acceptance letter

Questions?

Please Contact EPP CSC at:

oad.epp10@noaa.gov

Ph. 301-628-2902 or 301-628-2905

SSIO URL, <https://oadwebapps.iso.noaa.gov/ssio/>

Appendix I – NCAS-M ESTP at Howard University (July16-29, 2017)

Week of July 17 – 23, 2017

Mon, July 17, 2017

TIME	TOPIC	FACILITATORS	LOCATION
10am - 1pm	<ul style="list-style-type: none"> • Opening and Introductions - Morris • NOAA Relevance - Morris • The Power of the Abstract - Morris • Professional Formats and Styles - Morris • Writing Exercise - Morris • Poster Presentations - Williams • PowerPoint and other ways to Construct and Format a Research Poster - Williams 	Dr. Vernon Morris Dr. Leticia Williams	Howard University Interdisciplinary Research Building (IDRB) 2 nd Floor Conference Room
1pm - 2pm	<ul style="list-style-type: none"> • Lunch 		
2pm - 4pm	<ul style="list-style-type: none"> • Afternoon Poster Preparation 	Dr. Leticia Williams Dr. Jo-Anne M. Butty	IDRB 2nd FI Conf Rm

Tue, July 18, 2017

TIME	TOPIC	FACILITATORS	LOCATION
10am - 1pm	<ul style="list-style-type: none"> • <i>Stage Presence and the Basics of Oral Technical Presentations - Washington</i> • <i>Prezi vs PowerPoint – Selecting Your Medium - Harkless</i> • <i>Speaking on Camera - Harkless</i> • <i>Perfecting the Elevator Speech - Adams</i> • <i>Extemporaneous Speaking – Morris/Searles</i> 	Dr. Talitha Washington Dr. Terri Adams, Dr. John Harkless Dr. Vernon Morris Dr. Thomas Searles	IDRBR 2nd FI Conf Rm
1pm - 2pm	<ul style="list-style-type: none"> • Lunch 		
2pm - 4pm	<ul style="list-style-type: none"> • Poster Preparation 	Dr. Leticia Williams Dr. Jo-Anne M. Butty	IDRBR 2nd FI Conf Rm

Wed, July 19, 2017

TIME	TOPIC	FACILITATORS	LOCATION
10am - 4pm	<ul style="list-style-type: none"> • A Day at Beltsville (site tour, demonstrations, panel discussions, balloon launches) 	Program alumni, Private Sector and Academe presenters	Howard University, Beltsville Campus

Thu, July 20, 2017⁴

Time	Topic	Facilitators	LOCATION
10am - 1pm	<ul style="list-style-type: none"> Responsible Conduct of Research - Brown-Walthall Mock Poster Presentations - Williams 	Marline Brown-Walthall Dr. Leticia Williams	IDRB 2nd FI Conf Rm
1pm - 2pm	<ul style="list-style-type: none"> Lunch 		
2pm - 4pm	<ul style="list-style-type: none"> Poster Preparation 	Dr. Leticia Williams Dr. Jo-Anne M. Butty	IDRB 2nd FI Conf Rm

Fri, July 21, 2017

TIME	TOPIC	FACILITATORS	LOCATION
10am - 1 pm	<ul style="list-style-type: none"> Final Feedback on Research Posters & Printing - Williams Howard University Campus Tour - HU Admissions 	Dr. Leticia Williams HU Office of Admissions	IDRB
1pm - 2pm	<ul style="list-style-type: none"> Lunch 		

⁴ You are welcome to attend Dr. Morris' weekly workshop for the Undergraduate Summer Internship Program from 6:30 pm - 7:30 pm in IDR B

2pm -	<ul style="list-style-type: none">• Visit to College Park Aviation Museum	TBD	
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Sat, July 22, 2017 & Sun, 23 July 2017

A list of activities will be provided.

Week of July 24 – 29, 2017

Beginning on the **23rd of July**, with a dinner in the evening, the activities and workshops will be at the Kellogg Conference Center <http://kelloggconferencehotel.com/index.php>, where you will be staying. During the **Week of July 16**, you will be staying at Howard University College Hall South.

Monday, 24th of July through Wednesday, 26th of July, we will have Center-wide Professional Development for all our programs, and the ETSP program is included in the PD.

The days will begin with breakfast, from 8 – 9 AM, lunch, and dinners will be after the PD around 6 PM.

On Thursday, 27th July, all programs (including ETSP) will attend the Summer Research Colloquium, where the ETSP Rising Sophomores will present posters from their summer research.

Friday, 28th of July will be a day spent at NOAA in Silver Spring for the NCAS Annual Meeting, and details will follow.

Saturday, 29th of July, will be a travel day.

Appendix J - NCAS-M Center-wide Professional Development (July 24-26, 2017)

DAY 2

Workshop 1: An overview of the NOAA program will be provided, along with an overview and discussion of workplace and workforce expectations, etiquette and best practices. Participants will also receive goal-setting prompts to help them think intentionally about their individual professional and workforce goals, and expected takeaways from the training workshops.

Workshop 2: This workshop will teach each participant proven strategies for successful social media and online branding as a STEM subject-matter expert (SME). Participants will also engage in interactive activities for understanding their personal brand, and identify their target market within and outside of the industry. All participants will be required to actively think about and document their personal branding goals, to be explored in workshop 8—Goal-setting.

Workshop 3: This workshop explores the value of networking as it relates to mobility in the workforce. Participants will get a comprehensive review of norms and practices in professional settings, including the value of effective communication with peers, contacts, prospective collaborators, and employers. Participants will engage in activities to learn how to perfect their personal or elevator pitch.

Workshop 4: This workshop explores cultural biases, and how employees from minority populations can tactfully deal with prejudice and microaggression in the workplace. Participants will learn how to communicate grievances effectively, and how to contribute to maintaining an inclusive culture in the workplace.

09:00 AM Welcome/Team Building Activity
 09:30 AM Workshop 3—Branding & Networking: Taking Your Brand Offline
 11:00 AM Break
 11:15 AM Workshop 4—Inclusion & Diversity: Dealing with Cultural Prejudices in the Workplace
 12:45 PM Lunch
 01:30 PM Workshop 5—Career Development- Effective Communication for Professionals (Part 1)
 03:00 PM Break
 03:15 PM Workshop 5 (cont'd)—Career Development- Effective Communication for Professionals (Part 2)
 04:45 PM Summary and Wrap-up
 04:50 PM Evaluations

Workshop 5: This workshop will explore the value of effective communication and persuasive speaking, with an emphasis on communication styles and approaches in the workplace. Participants will engage in activities that give them the opportunity to do a self-assessment of their communication competence and personal tendencies. Participants will learn strategies for enhancing their abilities to become more effective communicators in professional settings. All participants will be required to actively think about and document current communication challenges and goals, to be explored in Workshop 8: Goal-setting.

Workshop 6: This workshop, conducted by Howard University research personnel, explores multiple aspects of research ethics.

Workshop 7: This workshop is designed to help participants develop the skills needed to meet various leadership challenges they encounter in their professional pursuits, and to help aspiring and accomplished leaders achieve their personal best and improve effectiveness in their respective leadership roles.

DAY 3

Workshop 6: This workshop explores the value of networking as it relates to mobility in the workforce. Participants will get a comprehensive review of norms and practices in professional settings, including the value of effective communication with peers, contacts, prospective collaborators, and employers. Participants will engage in activities to learn how to perfect their personal or elevator pitch.

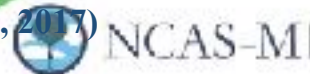
Workshop 7: This workshop explores cultural biases, and how employees from minority populations can tactfully deal with prejudice and microaggression in the workplace. Participants will learn how to communicate grievances effectively, and how to contribute to maintaining an inclusive culture in the workplace.

09:00 AM Welcome/Team Building Activity
 09:30 AM Workshop 6—Responsible Conduct in Research
 10:30 AM Workshop 7—Career Development- Next-level Leadership
 12:30 AM Lunch
 01:15 PM Workshop 8—Goal-setting
 03:15 PM NOAA Activities: Pitch Your Presentation
 04:45 PM Summary and Wrap-up
 04:50 PM Evaluations

Workshop 8: This final workshop is a culminating session designed to help participants identify and create strategies for accomplishing their professional goals identified in the previous sessions. Participants will engage in an interactive session to learn the importance of setting goals, aligning resources, and creating an accountability system for moving from goal to execution using the S.M.A.R.T. method.

Presence Matters (Part 2)
 04:45 PM Summary and Wrap-up
 04:50 PM Evaluations

Appendix K - NCAS-M ETSP Research Colloquium/ Poster Presentations (July 27, 2017)



Name	Institution	Poster Presentation Title
Mr. Ephraim Alfa	UMBC	<i>Data Analysis of Temperature and Relative Humidity in Beltsville and Sterling</i>
Ms. Esmerode Milagros	SDSU	<i>Stories told by Climate Data Through Visual Aids</i>

Ms. Gyselle Garcia	HU	<i>Concerning Optimism</i>
Mr. Bryan Hayes	SDSU	<i>Global Climate Watchboard</i>
Ms. Arianna Jordan	SJSU	<i>Lightning and Wildfire Correlations, and their Implications for Human Health in Florida,</i>
Mr. Eduardo Figueroa Martinez	UMET	<i>Drones and Sensors in Atmospheric Sciences</i>
Mr. Robert McAfee Mr. Miguel Cortez	UTEP	<i>Light Scattering for Aerosol Particles under the Presence of Humidity</i>
Mr. Anthony Salome Ortiz	UNE (UMET)	<i>Assessment of the Functionality of Unmanned Aerial Vehicles (UAVs) in Atmospheric Sciences</i>
Mr. Jonathan Solomon	UMD	<i>Comparing Cost Efficiency of Upper Air Measurement Systems</i>
Mr. Anthony Thornton	JSU	<i>Beating the Heat: An Analysis of the Heat Indices</i>

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<p>NCA Deve Kell</p>	
<p>NCA</p>	

Thiero, on whom we have relied to keep the cogs of the NCAS-enterprise lubricated and rolling, in order to support all of the education and outreach programs. Additionally, we also wish to recognize that the NCAS - M programs would not be possible without

Research Colloquium



2017

SUMMER INTERN



Kellogg Conference
30 AM



Hotel

AGENDA
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RESEARCH C

JULY 2

Appendix L - NCAS-M Calendar of Events

NCAS-M Calendar of Events

March

- 23 NCWCP Open House - NCAS Collaboration (September 17) Call - Teleconference
31 ECU Visit to Howard University - Research Collaboration - Dr. Morris Panelist

April

- 10 - 14 Howard University Research Week - 13 April - Presentations
20 2nd Annual Environmental Justice Screening & Panel for Earth Day - HU
25 "*Climate Variability, Public Health & the Atmospheric Microbiome in the Ethiopian Highlands*" presentation by Vernon Morris, PhD -
[Scholar on Campus Geophysics Lecture Series](#) at New York City Tech
27 Professional Development -Webinar for NCAS students attending AMS Washington Policy Forum, to include student role as rapporteurs
28 UNIBE (Ecuadorian University Delegation) Visit to Howard University - Research Collaboration Discussion

May

- 2 - 4 AMS Washington Policy Forum NCAS-M Center-wide participation
3 AMS Washington Forum Dinner
9 NWS Sterling Field Office - Hurricane Hunters Visit to DCA
23 AMS Climate Studies Diversity Project Faculty - HBCUs & AMS Staff - Tour HUB

June

- 1 Jun - 28 Jul NCAS-M Experiential Training Summer Program for Rising Sophomores:
12 - 14 UMET and UPRM Data Analysis Workshop - San Juan, Puerto Rico
15, 16 NOAA OAR Forum - Atmospheric Chemistry and Ecosystem Modeling, SS, MD
16 ASM Webinar - NERTOs – Center-wide
20 June 2017 CSCs Directors Teleconference

July

- 13 CSCs Director Meeting with NOAA Chief Economist - Teleconference
17 NOAA Brown Bag Seminar - **Ena Keys**, JSU - July 17, 2017
"The Historic Tornadoes of 2011: A Case Study on how to Improve Weather Preparedness"
24 - 26 NCAS-M Center-wide Professional Development - Howard University
27 - 29 NCAS-M - Annual Meeting - Howard University

August

- 10 NCEP Summer Students Presentations and Workshop, NCWCP
15 Teleconference with ProTech (Sandy Mestre) 11:00AM
15 Meeting with UMET (Juan Arratia), Rosslyn, VA
16 Teleconference with Craig McLean (OAR) 1:00PM
20 St. Martin's Church – Community Science Fest, DC 1:30 – 3:30PM

- 20 – 28 Peru International Workshop NSF/UMET AMISR-14 - Lima, Peru.
- 22, 23 NOAA Workshop on Emerging Technologies for Observation - College Park, MD
- 24 CSCs Directors Teleconference with EPP Program
- 24 NOAA Value of Information Community of Practice call/meeting
- 31 Meeting with Ariel Stein NOAA/ARL
- 31 ASM Center-wide Webinar on Student Awards 4:00PM

September

- TBD Monthly PI Meetings (POC: Smith)
- 5 Center Champions Working Group Meeting 9:30AM Silver Spring, MD
- 5 CCWG Debrief with Louisa Koch 11:30AM Silver Spring, MD
- 16 NCEP Open House, College Park, MD
- 17 – 19 2017 HBCU Week Conference, Alexandria, VA
- 20 – 22 NTA National Annual Conference - Morgan State - Baltimore, MD
- 20 – 21 AISES Conference/ESRL Workshop on Tribal Colleges, Denver, CO
- 23 First Love Community Collaborative - Community Science Fest, DC 12:00 – 4:00PM
- 26 NOAA ESRL Visit to UTEP, El Paso. TX (POC: Fitzgerald)
- 26 ASM Center-wide Webinar on ESRL Opportunities - 4:00 PM

October

- TBD Monthly PI Meetings (POC: Smith)
- 2 – 3 HU Visit to Capitol Hill (Advocacy for STEM Programs)
- 19 – 21 SACNAS, Salt Lake City, UT
- 23 – 27 ASM CSC Visit to Water Center, Tuscaloosa, AL
- 26 ASM Center-wide Webinar on NOAA OED Student Scholarships Workshop (POC: Butty)
- 30 – Nov 3 Annual NOBCCChE Meeting Minneapolis, MN
- TBD NWS Day at JSU, Jackson, MS (POC: Woods)

November

- TBD Monthly PI Meetings (POC: Smith)
- TBD ASM CSC Visit to NOAA ATDD (POC: Jose Fuentes)
- 30 ASM Center-wide Webinar and OAR Town Hall at HU

December

- TBD Monthly PI Meetings (POC: Smith)
- 11 – 15 AGU Fall Meeting, New Orleans, LA
- 16 – Jan 23 PNE-AEROSE Cruise

January 2018

- TBD Monthly PI Meetings (POC: Smith)

6 – 11 98th Annual AMS Annual Meeting - Austin, TX
6 – 8 AMS Career Fair
7 AMS WxFest
7 *Colour of Weather* Networking Reception @ AMS
25 ASM Center-wide Webinar on Professional Development (Topic: TBD)

February

TBD Monthly PI Meetings (POC: Smith)
TBD Community Science Fest (POC: Morris)
27 ASM Center-wide Webinar on ASM Science (Topic: TBD)

March

TBD Monthly PI Meetings (POC: Smith)
18 – 21 9th Biennial EPP Forum - Hosted by, NCAS - M @ Howard University
30 SAR Due

April

TBD Monthly PI Meetings (POC: Smith)
TBD ASM Visit to NSSL (POC: Adams)
26 ASM Center-wide Webinar on Professional Development (Topic: TBD)

May

TBD Monthly PI Meetings (POC: Smith)
TBD ASM Annual Meeting (NSSL or NCWCP/ESSIC)
22 ASM Center-wide Webinar on ASM Science (Topic: TBD)

June

TBD Monthly PI Meetings (POC: Smith)
TBD USIP and/or NCEP Summer Program
TBD ETSP Begins
TBD ASM Summer Internships Begin
28 ASM Center-wide Webinar on Professional Development (Topic: TBD)

July

TBD Monthly PI Meetings (POC: Smith)
TBD CAREERS Weather Camp
TBD Summer Student Colloquium

August

TBD Monthly PI Meetings (POC: Smith)

September

TBD Monthly PI Meetings (POC: Smith)
TBD SAR Due

October

TBD Monthly PI Meetings (POC: Smith)

November

TBD Monthly PI Meetings (POC: Smith)
TBD 8th INAT in Benin

December

TBD Monthly PI Meetings (POC: Smith)

Appendix M - NCAS-M ACRONYMS

3DVAR	Three-Dimensional Variation
AAAR	American Association for Aerosol Research
ACARS	Aircraft Communications Addressing and Reporting System
ACS	American Chemical Society
ADP	Automated Data Processing
AERADNET	AERosols and RADiation Observing NETwork
AEROSE	AERosols and Oceanographic Science Expedition
AFWA	Air Force Weather Agency
AG	Access Grid
AGL	Above Ground Level
AGU	American Geophysical Union
AHPCRC	Army High Performance Computing Research Center
AIRS	Atmospheric Infrared Sounder
AL	Alabama
AMMA	African Monsoon Multidisciplinary Analysis
AMS	American Meteorological Society
AMSU	Advanced Microwave Sounding Unit
AOML	Atlantic Oceanographic and Meteorological Laboratory
AOT	Aerosol Optical Thickness
ARL	Air Resources Laboratory
ARM	Atmospheric Radiation Measurement
ARW	Advanced Research WRF
AQS	Air Quality System
ASL	Atmospheric Surface Layer
ASLO	American Society of Limnology and Oceanography
ASOS	Automated Surface Observing System
AUV	Autonomous Underwater Vehicle
AVHRR	Advanced Very High Resolution Radiometer
AWIPS	Advanced Weather Interactive Prediction System
AWOS	Automated Weather Observing System
BAMP	Howard University Beltsville Atmospheric Measurement Program
BBSS	Balloon Borne Sounding System
BLH	Boundary Layer Heights
BSRN	Baseline Surface Radiation Network
CAFAS	Careers in Fisheries, Aquatics, and Atmospheric Sciences
CAMx	Comprehensive Air Quality Model with Extensions
CAREERS	Channeling Atmospheric Research into Educational Experiences Reaching Students
CAPE	Convective Available Potential Energy
CASTNET	Clean Air Status and Trends Network
CB4	Carbon Bond IV model
CBIV	Carbon Bond 4 mechanism
CB05	Carbon Bond 2005 mechanism
CBL	Convective Boundary Layer
CCBay	Corpus Christi Bay
CCN	Cloud Condensation Nuclei
CE-CERT Riverside)	Center for Environmental Research and Technology (University of California Riverside)
CFH	Cryogenic Frostpoint Hygrometer
CGD	Climate and Global Dynamics
CGU	Canadian Geophysical Union

CICS	Cooperative Institute for Climate and Satellites
CISM	Center for Integrated Space Weather Modeling
CLM	Common Land Model
CM3	Coordinated Mesoscale Measurements in Mississippi
CMAQ	Community Multi-scale Air Quality model
CMM5	Climate MM5 Model
CMP	Conference Mentorship Program
COAMPS	Coupled Ocean-Atmosphere Mesoscale Prediction System
COASTB	Coastal Monitoring and Assessment Group B Reefs
CONFRRM	Cooperative Network for Renewable Resource Measurements
CoZOBs	Coastal Marine Zone Observations
CPAS	Cooperative Program in Atmospheric Sciences (UPRM)
CPC	Climate Prediction Center
CPS	Cumulous Parameterization Schemes
CPU	Central Processing Unit
CREST	Cooperative Remote Sensing Science and Technology Centers
CREWS	Coral Reef Early Warning System
CRTM	Community Radiative Transfer Model
CSC	Cooperative Science Center
CSWR	Center for Severe Weather Research
CTD	Conductivity/Temperature/Depth Instrument
CUNY	City University of New York
CV	Curriculum Vitae
CVS	Concurrent Version Systems
CRW	Coral Reef Watch
CWRF	Climate WRF
D	Democrat
DC	District of Columbia
DCPS	District of Columbia Public Schools
DDR	Direct to Diffuse Irradiance Ratio
DEQ	Department of Environmental Quality
DISORT	Discrete Ordinate Radiative Transfer
DCRM	Detailed Cloud Resolving Model
DIAR-BAR	Differential O2 Absorption Barometric Pressure Radar
DMR	Division of Marine Resources
DOD SMART	Department of Defense Science Mathematics & Research for Transformation
	Scholarship
DOE	Department of Energy
DOW	Doppler-on-Wheels
DRI	Desert Research Institute
ECSU	Elizabeth City State University
EF	Enhanced Fujita scale
EMC	Environmental Modeling Group
ENSO	El Nino/Southern Oscillation
EOC	Expanding Opportunities Conference
EOS	Earth Observing System
EPA	Environmental Protection Agency
EPIC	Equatorial Processes including the Coupling
EPP	Educational Partnership Program (NOAA)
EPPMSI	Educational Partnership Program (NOAA) with Minority Serving Institutions
EPIRM	Environmental Physics Inverse Reconstruction Model
EQB	Environmental Quality Board
ERDC	Engineering Research and Development Center

ESA	European Space Agency
ESE	Environmental Sciences and Engineering
ESRL	Earth System Research Laboratory
EWX	Austin/San Antonio Region code for the Weather Forecast Office
FAMU	Florida A & M University
FGSEE	Future Geoscientists for a Sustainable Earth Environment
FL	Florida
FSOC	Field Systems Operations Center
FRRF	Fast Repetition Rate Fluorometry
FSIRP	Faculty and Student Internship Program
FTE	Full Time Employee
GCOS	Global Climate Observing System
GDAS	Global Data Assimilation
GFDL	Geographical Fluid Dynamics Laboratory
GIS	Geographic Information Systems
GLAS	Global Laser Altimeter S
GOCART	Georgia Tech/Goddard Global Ozone Chemistry Aerosol Radiation Transport Model
GOESPO	GOES Program Office
GOES	Geostationary Operational Environmental Satellites
GoHFAS	Goddard Howard University Fellowship in Atmospheric Sciences
GFS	Global Forecasting System
GLOW	Goddard Lidar Observatory for Winds
GMD	Ground-based Midcourse Defense
GPCP	Global Precipitation Climatology Project
GPA	Grade Point Average
GPI	Global Precipitation Index
GPS	Global Positioning System
GRUAN	GCOS Reference Upper-Air Network
GSFC	Goddard Space Flight Center (NASA)
GSM	Global Spectrum Model
GSPD	GOES Program Data
GUFMEX	Gulf of Mexico EXperiment
HBCU	Historically Black Colleges and Universities
HF	High Frequency
HU	Howard University
HUBRF	Howard University Beltsville Research Facility
HU IRB	Howard University Institutional Review Board
HURL	Howard University Roman Lidar
HUPAS	Howard University Program in Atmospheric Sciences
HYSPLIT	Hybrid Single-Particle Lagrangian Integrated
IAMA	International Aerosol Modeling Algorithms Conference
IAMAS	International Association of Meteorology and Atmospheric Sciences
ICCM	Canary Institute of Marine Sciences
ICE	Informal Science Education
IC-FAIM	Institutional Change through Faculty Advancement in Instruction and Mentoring
ICodEM	Icod Environmental Model
ICON	Integrated Coral Observing Network
IDAS-RAP	Diversity in Atmospheric Science through Research Application and Partnership
IPDDP	Individual Post-Doctoral Development Plan
IDV	Integrated Data Viewer
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IEO	Spanish Institute of Oceanography

IGARSS	International Geosciences & Remote Sensing Symposium IGRA Infrared Gas Analyzer
IHOP	International H2O Project
INTEX	Intercontinental Chemical Transport Experiment
IOAS-AOLS	Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface
IOPs	Intensive Observational Periods
IR	Infrared
ISCS	International Solar Cycle Studies
ISO	International Standards Organization
ISWS	Illinois State Water Survey
IUGG	International Union of Geodesy and Geophysics
JAN	Jackson, Mississippi - I Region code for the Weather Forecast Office
JCET	Joint Center for Earth Systems Technology
JCSDA	Joint Center for Satellite Data Assimilation
JISAO	Joint Institute for the Study of the Atmosphere and Ocean
JPL	NASA/Jet Propulsion Laboratory
JSU	Jackson State University
JSU-MET	Jackson State University Meteorology Program
JPSS	Joint Polar Satellite System
LA	Louisiana
LA-MS	Louisiana/Mississippi
LAPS	Local Analysis and Prediction System
LEAD	Linked Environment for Atmospheric Discovery Lidar
LIDAR	Light detection and ranging
LISA-QED	Laboratory for Interdisciplinary Statistical Analysis and Mathematics Learning through Quantitative Exploration of Data
LIX	New Orleans/Baton Rouge Region code for the Weather Forecast Office
LSD	Light Stress Damage (algorithm)
LSM	Land Surface Model
LST	Local Solar Time
LPASF	Laboratory of Atmospheric Physics Siméon Fongang
LW	Longwave
LWS	Living With a Star
MADIS	NOAA's Meteorological Assimilation Data Ingest System
MAS	Mississippi Academy of Sciences
MAST	Mississippi Academy for Science Teaching
MCC	Mesoscale Convective Complex
MECB	Marine Ecosystems and Climate Branch
MEMA	Mississippi Emergency Management Agency
Met	Meteorological
MD	Maryland
MDE	Maryland Department of the Environment
MDEQ	Mississippi Department of Environmental Quality
MEA	Malt Extract Agar
MFRSR	Multi-Filter Rotating Shadowband Radiometer
MHD	Magneto Hydro Dynamics
MISR	Multi-angle Imaging Spectro Radiometer
MMB	Office of Management and Budget
MMCR	Millimeter Cloud Radar
MM5	Mesoscale Model 5
MODIS	Moderate Resolution Imaging Spectroradiometer

MODTRAN	Moderate resolution atmospheric Transmission
MP	Micro Physics
MPL	Micro-Pulse Lidar
MS	Mississippi
MS DMR	Mississippi Division of Marine Resources
MSI	Minority Serving Institution
MWR	Microwave Radiometer
NAAPS	Navy Automated Aerosol Prediction System
NAAQS	National Ambient Air Quality Standards
NAM	North American Model
NAME	North America Monsoon Experiment
NAQFS	National Air Quality Forecast System
NARR	North American Regional Reanalysis
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NAVO	Naval Oceanographic Office
NCAR	National Center for Atmospheric Research
NCAS	NOAA Center for Atmospheric Sciences
NCAS-M	NOAA Cooperative Science Center in Atmospheric Science and Meteorology
NCCOS	National Centers for Coastal Ocean Science
NCDC	National Climatic Data Center
NCDDC	National Coastal Data Development Center
NCEP	National Center for Environmental Prediction
NCO	NOAA Computing Office
NCUR	National Center on Undergraduate Research
NCWCP	NOAA Centers for Weather & Climate Prediction
NDBC	National Data Buoy Center
NESDIS	National Environmental Satellite, Data & Information Service
NGIA	National Geospatial Intelligence Agency
NHC	National Hurricane Center
NIS	Network Infrastructure & Administrations
NMM	Non-hydrostatic Mesoscale Model
NOAA	National Oceanic and Atmospheric Administration
NOBCCHE	National Organization of Black Chemists & Chemical Engineers
NoN	Nationwide Network of Networks
NOS	National Ocean Service
NRCS	National Resources Conservation Service
NREL	National Renewable Energy Lab
NRL	Naval Research Laboratory
NSF	National Science Foundation
NSSL	National Severe Storms Laboratory
NSTA	National Science Teachers Association
NWA	National Weather Association
NWS	National Weather Service
OAR	Office of Atmospheric Research
OCWWS	Office of Climate, Water, and Weather Services
OD	Optical Depth
OES	Oceanic Engineering Society
OGP	Office of Global Programs
OLR	Outgoing Longwave Radiation
OMB	Office of Management and Budget
OOS	Office of Operational Service

OPDB	Operational Products Development Branch
ORA	Howard University Office of Research Administration
ORA	Office of Research & Applications (NESDIS)
ORAD	Office of Research Applications and Development
ORISE	Oak Ridge Institute for Science and Education Optical Depth
OSB	Ocean Surface Bundle
OS&T	Office of Science and Technology
PAR	Photosynthetically Active Radiation
PASCoR	Partnership for Spatial and Computational Research
PBL	Planetary Boundary Layer
PCR	Polymerase Chain Reaction
PDAS-RAP	Promoting Diversity in Atmospheric Sciences through Research Applications Partnership
PdN	Paseo del Norte Pegin
PI	Principal Investigator
PIERS	Progress in Electromagnetics Research Symposium
PM	Particulate Matter
PNE	PIRATA Northeast Extension
PPM	Piecewise Parabolic Method
PRWC	Puerto Rico Weather Camp
PSM	Ponce School of Medicine (Puerto Rico)
PSU	Pennsylvania State University
PPD	Planning and Programming Division
QBO	Quasi-Biennial Oscillation
QEM	Quality Education for Minorities
QPF	Quantitative Precipitation Forecasts
RAC	Research Advisory Council
RAD	Radar
RACM2	Regional Atmospheric Chemistry Mechanism, Version 2
RAS	Research Administration Services
RASS	Radio Acoustic Sounding System
RAAS	Reference Ambient Air Sampler
RAMS	Regional Atmospheric Modeling System
RCC	Riverside Community College
REBS	Radiation and Energy Balance Systems
Rep.	Representative
RFC	River Forecast Center
RHB	Ronald H. Brown
Rn	Net radiation
RMS	Root Mean Square
RS	Remote Sensing
RSM	Regional Spectrum Model
RSMS	University of Miami Rosenstiel School of Marine and Atmospheric Science
RSS	Rotating Shadowband Spectrometer
RTMA	Real-Time Mesoscale Analysis
SAR	Semi-Annual Report
SACS	Southern Association of Colleges and Schools
SACNAS	Society of Associated Chicanos, Native Americans in Science
SAHRA	Center for Sustainability of Semiarid Hydrology and Riparian Areas (University of Arizona)
SAL	Saharan Aerosol Layer
SAQM	SARMAP Air Quality Model

SARMAP	SJVAQS/AUSPEX Regional Modeling Adaptation Project
SCDAB	Satellite Calibration and Data Assimilation Branch
SCEP	Student Career Experience Program
SDP	Student Development Plan
SeaWiFS	Sea-viewing Wide Field-of-View Sensor
SEC	Space Environment Center
SGP	Southern Great Plains
SJSU	San Jose State University
SLP	Sea Level Pressure
SMCD	Satellite Meteorology and Climatology Division
SMOKE	Sparse Matrix Operator Kernel Emissions model
SOARS	Significant Opportunities in Atmospheric Research & Science
SOSVRT	Successive Order of Scattering Vector Radiative Transfer model
SOW	Statement of Work
SPB	Science Plans Branch
SPC	Storm Prediction Center
SR	Southern Region
SRL	Scanning Raman Lidar
SSM/I	Special Sensor Microwave Imager
SSRB	Solar Surface Radiation Branch
SST	Sea Surface Temperature
STAR	Satellite Applications and Research
STC	Science and Technology Center
STEM	Science, Technology, Engineering and Mathematics
STP-M	Solar-Terrestrial Physics and Meteorology
SUW	Subtropical Underwater
SURFRAD	Surface Radiation Budget Network
SUNYA	State University of New York at Albany
SW	Shortwave
TCEQ	Texas Commission for Environmental Quality
TDL	Techniques Development Laboratory
TNRCC	Texas National Resource Conservation Commission
TOA	Top of the Atmosphere
TPIOP	Television and Infrared Observation Satellite
TRMM	Tropical Rainfall Measuring Mission
TRMM PR	Tropical Rainfall Measuring Mission Precipitation Radar
TUV	Tropospheric Ultraviolet and Visible model
TX	Texas
UCAR	University Corporation for Atmospheric Research
UIUC	University of Illinois Urbana-Champaign
UMBC	University of Maryland Baltimore County
UMCP	University of Maryland College Park
UMES	University of Maryland Eastern Shore
UMET	Universidad Metropolitana de San Juan
UND	University of North Dakota
UPRH	University of Puerto Rico Humacao
UPRM	University of Puerto Rico at Mayaguez
URC	University Research Center
US	United States
USA	United States of America
USDA	United States Department of Agriculture
USDA SCAN	United States Department of Agriculture Soil Climate Analysis Network
UTC	Coordinated Universal Time

UTEP	University of Texas at El Paso
UV	Ultraviolet
UW/APL	University of Washington Applied Physics Laboratory
VAMD	Vice Admiral
VALIDAR	Validation LIDAR
Vis5d	Visualization of Large 5-d Grided Data Sheets
VIIRS	Visible Infrared Imaging Radiometer Suite
VOC	Volatile Organic Compounds
VRS	Visible Reflectance Spectroscopy
WBTP	Weather Broadcast Training Program
WFO	Weather Forecast Office
WMO	World Meteorological Organization
WRF	Weather Research and Forecast model
WSU	Washington State University
WTA	Western Tropical Atlantic
XBT	Expendable Bathythermographs