

**REVISED Semi-Annual Performance Report for
Cooperative Agreement #: NA16SEC4810006
Reporting Period: September 1, 2018 to February 28, 2019**

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ATMOSPHERIC SCIENCES and METEOROLOGY
(NCAS-M)**

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Executive Summary

Howard University is pleased to report on the activities and progress against the implementation plan during the first six months of the third 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.

The NCAS-M is a thirteen-member consortium with Howard University as the lead institution. The partnership has nine partners as sub-awardees and four partners related through a non-funded articulation agreement. NCAS-M nine sun-awardee 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 articulated: 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 is making significant progress with respect to the five-listed performance metrics and for the program level outcomes and outputs. The NCAS-M is pleased to announce that Dr. Charles Ichoku was officially onboarded September 17, 2018 as the new NCAS-M Distinguished Research Scientist for the Center. In addition to Dr. Ichoku joining the NCAS-M family, we also welcomed Dr. Neosho Ponder to the Center as the Data and Communication Manager on September 17, 2018. NCAS-M faculty, staff, and students had a busy conference season with a total of 49 presentations given over the course of this performance period. In addition, several faculty and students visited NSSL in Norman, OK in September 2018 in our continued effort to forge new collaborations within NOAA. Despite the government shutdown, NCAS-M had a good turn-out at the AMS annual meeting in Phoenix, AZ. NCAS-M was present at the student conference and hosted another successful Colour of Weather Networking event. Three students participated in NERTOs at two different NOAA locations. Two NCAS-M postdocs continue to work with NOAA mentors at ESRL (Boulder, CO) and NWS (Silver Spring, MD). The Center continues to develop collaborations and partnerships with NOAA personnel in a variety of facilities.

As NCAS-M completes the first half of its third year of this first five-year cycle, we are pleased to report significant achievements in both education and research. Several of the highlights from this reporting period are listed below.

EDUCATIONAL MILESTONES

NCAS-M educational component prioritizes on graduate degree production in key disciplines of Atmospheric Sciences/Meteorology (HU, UAlbany, PSU, JSU, UMD, and SJSU), Marine Sciences (UPRM), and Environmental Sciences (SDSU, FVU, TU, and UTEP). NCAS-M funds

are used to support student training at undergraduate and graduate levels in these and other basic sciences, including chemistry, biology, engineering, and physics. Our efforts have historically produced positive impacts at our MSI partner institutions and we are strengthening efforts to make greater impacts at our majority institutional partners. Some of the educational highlights of this reporting period include:

- Miguel Cortez (Cohort 1) graduated in December 2018 with a M.S. in Physics from University of Texas El Paso under the direction of Dr. Rosa Fitzgerald. Mr. Cortez has accepted a Nuclear Security Analyst Position with the National Nuclear Security Administration.
- Robert McAfee (Cohort 1) graduated in December 2018 with a M.S. in Physics from University of Texas El Paso under the direction of Dr. Rosa Fitzgerald. Mr. McAfee is currently a Staff Scientist at LT Environmental, Inc.
- Ashley McAfee (Cohort 1) graduated in December 2018 with a B.S. in Environmental Science from University of Texas El Paso under the direction of Dr. Rosa Fitzgerald. Ms. McAfee is currently pursuing a M.S. degree in Sociology at the University of Texas el Paso.
- Keon Gibson (Cohort 1) graduated in December 2018 with a B.S. in Meteorology from Jackson State University. Mr. Gibson is taking some time to pursuing his options as to his next career move.
- Ayesha Wilkinson (Cohort 2) received an honorable mention for her presentation titled: “Surveying the Tropical Cyclone Forecast/Advisory with NWS Partners” presented at the AMS 2019: 14th Symposium on Societal Applications: Policy, Research and Practice in Phoenix, AZ.
- Kelly Nunez-Ocasio (Cohort 2) was awarded 1st place for her oral presentation titles: “African Easterly Wave-Mesoscale Convective Coupled Systems that are Potential Candidates for Tropical Cyclogenesis” presented at the AMS 2019: 7th Symposium on the Madden-Julian Oscillation and Sub-Seasonal Monsoon Variability in Phoenix, AZ.

The following semi-annual performance report details the activities conducted during September 1, 2018 – February 28, 2019.

I. Accomplishments

Long Term Goals of NCAS-M: Our goal is to produce technically and environmentally literate professionals, with focus on underrepresented populations, who will directly contribute to the NOAA workforce through science, service, and stewardship in various areas of the Atmospheric sciences and their applications to Meteorology, Air Quality, and Climate. Therefore, we utilize relevant performance measures to track progress in various activities that contribute to the final goal, as outlined in the following tables:

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>The overall numerical goal is to train ALL cohort students in appropriate quantitative and analytical skills to the highest levels of proficiency applicable to their academic levels.</p>	<p><u>JSU:</u> Visits to WFO</p> <p><u>SJSU:</u> Regional Python Workshop</p>	<p><u>JSU:</u> 1 cohort-1 student, 3 cohort-2 students, and 2 non-cohort students</p> <p><u>SJSU:</u> 40+ participants were trained.</p> <p><u>SUNYA:</u> Stephen Solimine and Yanna Chen</p>	<p><u>JSU:</u> The students: 1) Familiarized themselves with AWIPS2 and GR2 2) Submitted conference abstracts/presentations</p> <p><u>SJSU:</u> Students learned to</p> <ul style="list-style-type: none"> • Install Python packages w/Conda • Use Jupyter notebook, Numpy, MetPy • Reading data with Siphon • Upper air data analysis and the Skew-T • Making maps with Cartopy • Working with satellite data • Surface data analysis • Working with Model data • Time-series analysis <p><u>SUNYA:</u> Programming in various software packages</p> <p><u>UMBC:</u> All students were trained in analysis and professional</p>

	<p><u>UMD:</u> GIS, F90, and Python computer programming and analytical skills</p> <p><u>UPRM:</u> Conducted R workshops, November 6 and 8, 2018</p> <p><u>UTEP:</u> All students learning research skills</p> <p><u>HU:</u> AEROSE Cruise</p> <p>Participated in NSSL meetings to support data collection activities in the Testbed</p>	<p><u>UMBC:</u> A total of 6 students: - 2 Cohort-1 (one in graduate school & another employed) - 2 Cohort-2 (active in pollution and lidar instrumentation) - 1 Cohort-1 (one student recruited and working using no-cost from Cohort-1) - 1 Cohort 3 (recruited a graduate student <i>and using other funds until NCAS-M sends the funds to UMBC</i>)</p> <p><u>UMD:</u> Jennifer Kennedy (GIS) Emmanuel Dibia (F90/Python)</p> <p><u>UPRM:</u> Carla Mejias (Cohort 1)</p> <p><u>UTEP:</u> 8 students total were trained. Cohort students were working towards their MS degree.</p> <p><u>HU:</u> 2 students total were trained (Cohort 1);</p> <p>2 students total were trained (Cohort 2 and 3)</p>	<p>presentation (both poster/oral). All trained in Python, R, and Matlab programming. All students were trained in the basics of radio sounding and were able to participate in sounding.</p> <p><u>UMD:</u> The two students were well trained for programming skills that are required for thesis research and necessary for future careers with NOAA and others.</p> <p><u>UPRM:</u> Training of NCAS-M doctoral students in critical skills relevant to NOAA's mission</p> <p><u>UTEP:</u> 2 MS students working under the supervision of R. Fitzgerald earned their MS degree. One undergraduate student working under R. Fitzgerald earned her B.S degree.</p> <p><u>HU:</u> Training of NCAS-M doctoral students in gaining skills in NOAA mission research</p>
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<p>Increased competence in applying STEM to decision making, policy and management</p>	<p><u>JSU:</u> (1) Visits to WFO (2) Individual Research mentorships</p> <p><u>SJSU:</u> Incorporate soft skills in communication, strategies, self-management, and leadership.</p> <p>Redesign class materials with focus on flipped classroom concept.</p> <p><u>UMD:</u> Jennifer Kennedy has developed an algorithm to estimate days suitable for fieldwork (DSFW) from NCEP weather and land surface forecasts to support farmers’ decision in optimizing machinery, labor, and crop choice.</p> <p><u>UPRM:</u> Conducted a workshop on “Coastal Water Quality Remote Sensing Tools for Watershed Managers” at UPRM</p>	<p><u>JSU:</u> (1) 1 cohort-1 student (2) 3 cohort-2 students</p> <p><u>SJSU:</u> 5 students in Dr. Sen Chiao’ class</p> <p><u>UMBC:</u> Initiated a collaboration with UMBC center for public policy and a recruitment session started for policy and management students.</p> <p><u>UMD:</u> This DSFW will be the first of its kind to support farmers making field management decisions based on dynamic prediction rather than long-term mean. USDA is strongly interested, demonstrating the value of how NOAA product can be used for agricultural decisions.</p> <p><u>UPRM:</u> Participation of 12 watershed managers and students from Hawaii, USVI, American Samoa, NOAA, and Puerto Rico.</p>	<p><u>JSU:</u> Students gained: 1) employment in WFO operation role 2) Access and application of GOES 16 datasets</p> <p><u>SJSU:</u> Using NOAA products extensively including Stage IV, Snow cover, hydrological data, etc.</p> <p>No NCAS-M students enrolled in the class.</p> <p><u>UMD:</u> Jennifer just finished a paper on this algorithm and will submit it soon.</p> <p>Jennifer also has submitted a proposal to NSF applying for STEM graduate fellowship to continue her climate/land use change policy related PhD study.</p> <p><u>UPRM:</u> Organized by NOAA-NOS and Drs. William Hernandez and Roy Armstrong during November 7-8, 2018.</p>
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	<p><u>UTEP:</u> Engagement with the Texas Commission on Environmental Quality (TCEQ)</p> <p><u>HU:</u> Participation in Interdisciplinary conference on Building Extreme Weather Resiliency</p>	<p><u>UTEP:</u> Dr. Fitzgerald’s group worked on TCEQ projects which are relevant to applying STEM to decision making.</p> <p><u>HU:</u> 2 NCAS-M students participated in the conference activities</p>	<p><u>UTEP:</u> New policy regulations will be based on this research work.</p> <p><u>HU:</u> NCAS-M students were trained on the intersection of social science research and STEM disciplines as it relates to decision making and resilience</p>
Increased skills to use large data sets, geographical information systems (GIS) and statistical analysis, computer modeling, and algorithm development.	None to report		

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.	<p><u>NCAS-M wide:</u> Graduation</p> <p><u>JSU:</u> Graduation</p> <p><u>SJSU:</u> 10 students including graduate and undergraduates</p>	<p><u>NCAS-M wide:</u> Keon Gibson (C1) - BS (JSU), Miguel Cortez (C1) - MS (UTEP), Robert McAfee (C1) - MS (UTEP)</p> <p><u>JSU:</u> 1 cohort-1 student</p> <p><u>SJSU:</u> Students who graduated from the Department of Meteorology and Climate Science at SJSU are eligible to apply for positions at NWS</p>	<p><u>NCAS-M wide:</u> 3 Cohort 1 students earned degrees in NOAA mission relevant disciplines</p> <p><u>JSU:</u> Graduated cohort-1 student employed in NOAA-related federal position</p> <p><u>SJSU:</u> One student (Catherine Liu) was volunteering at NWS and is applying for pathways positions.</p>

	<p><u>UMBC:</u> 2 Cohort-2 UG 1 Cohort-1 UG 1 Cohort-3 grad</p> <p><u>UMD:</u> Actively engaged NCAS-M students to experience NOAA operational requirements and practices</p>	<p><u>UMBC:</u> 4 students will graduate soon</p> <p><u>UMD:</u> Emmanuel Dibia completed his NERTO with Daryl Kleist at NCWCP</p> <p><u>UTEP:</u> 2 MS students and 1 undergraduate student working under the supervision of Fitzgerald graduated.</p>	<p><u>UMBC:</u> Cohort-1 students (1 in grad school; 1-employed) Cohort-1 student to graduate soon Cohort-1 Student Presented at AMS.</p> <p><u>UMD:</u> Emmanuel Dibia learned how data assimilation is actually made into weather/climate forecasts and currently writing a review paper as the scholar paper requirement for AOSC M.S. This training provided him the advanced knowledge and hands-on experience that are essential for his continuing PhD study and career development.</p> <p><u>UTEP:</u> MS: Miguel Cortez (C1) and Robert McAfee (C1). BS: Ashley McAfee</p>
<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</p>	<p><u>NCAS-M wide:</u> (1) ETSP: Rising sophomores participated in professional development opportunities</p>	<p><u>NCAS-M wide:</u> (1) ETSP: All 6 ETSP students participated in NOAA Scholarship Webinar 2019 conducted on Oct 16, 2016 and hosted by Victoria Dancy and Sandra Sarvis, NOAA Office of Education.</p> <p>Additionally, invitations were sent to all CSCs</p> <p>Approx. 50 students participated in the webinar</p>	<p><u>NCAS-M wide:</u> (1) ETSP: 6 ETSP students participated in NOAA Scholarship Webinar 2019 on October 16, 2018</p> <p>All 6 ETSP students applied for the Hollings UG Scholarship / EPP/MSI UG Scholarship.</p> <ul style="list-style-type: none"> • Yasmine Allen (HU) • Kevin Balaguer-Lebron (UPR) • Ja’Nia Dunbar (JSU) • Miranda H. Miranda (UTEP) • Nohemi Perales (UTEP) • Avaionia Smith (JSU)

<p>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><u>JSU:</u> 1) Follow-up activities from Summer 2018 research opportunities 2) WFO Internship Program 3) Colour of Weather</p> <p><u>SJSU:</u> One grad student is scheduled to be at NHC for 12 weeks in 2019.</p>	<p>(2) NERTO: 5 cohort students participated in or completed NERTOs during this reporting period</p> <p><u>HU:</u> 2 Cohort 2 graduate students started their NERTO</p> <p><u>JSU:</u> 1) 1 cohort-1 student 2) 2 cohort-2 students 3) 4 non-cohort students</p>	<p>(2) NERTO: 5 cohort students participated in or completed NERTOs during this reporting period which resulted in or will result in an oral or poster presentation to experts, peers and/or other stakeholders.</p> <p>Cohort 1: Miguel Cortez (C1) (completed 9/18/19) - AOML Robert McAfee (C1) (completed 9/18/19) - NSSL</p> <p>Cohort 2: Emmanuel Dibia (C2) – (completed 1/28/19) – NCEP/EMC, Michael Garvey (C2) (in process) – NOAA Silver Spring, MD, Chantal Smith (C2) (in process) – NOAA Silver Spring, MD</p> <p><u>HU:</u> Michael Garvey (C2)– NOAA Silver Spring, MD Chantal Smith (C2) – NOAA Silver Spring, MD</p> <p><u>JSU:</u> 1) preparation of abstracts 2) presentation of student research at AMS Student Conference, AGU, CPAS Symposium, and WFO internal 3) student networking at Colour of Weather</p> <p><u>SJSU:</u> Alrick Green will be going to NHC in late May to August 2019.</p>
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	<p><u>UTEP:</u> Miguel Cortez, working under R. Fitzgerald participated on October 2018- NSF Travel Award ASI RELAMPAGO Field Campaign Argentina</p>	<p><u>UMBC:</u> 2 Cohort-2 undergraduate students</p> <p><u>UTEP:</u> Data acquired at this NOAA field campaign is of vital interest to NOAA.</p>	<p><u>UMBC:</u> 1 student attended a presentation at AMS 2019</p> <p>1 student is organizing a Python training for students and faculty.</p>
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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><u>NCAS-M wide:</u> 2019 NCAS-M Monthly Webinar Series</p>	<p><u>NCAS-M wide:</u> Oct 16, 2018 - NOAA Scholarships Webinar <i>(NOAA Office of Education – NOAA Undergraduate Scholarships—Victoria Dancy and Sandy Sarvis)</i></p> <p>Dec 5, 2018 - Interdisciplinary Research Example: Investigating the Drivers of the Water- Cycle Dynamics in Tropical Sub-Saharan Africa <i>(Dr. Charles Ichoku, NCAS-M Distinguished Scientist)</i></p> <p>Jan 31, 2019 - Social Sciences Research and</p>	<p><u>NCAS-M wide:</u> Oct 16, 2018 ~ 50 participants CSC wide – A webinar for UG and other students to prepare quality applications or NOAA UG scholarship programs and similar opportunities.</p> <p>Dec 5, 2018 ~ 40 participants center-wide – The webinar gave an interdisciplinary research example of NOAA mission related research conducted in tropical Sub-Saharan Africa.</p> <p>Jan 31, 2019 ~ 20 participants center-wide</p>

	<p><u>JSU:</u> Participation in NCAS-M monthly webinars</p> <p><u>SJSU:</u> A new course in Spring 2019</p> <p><u>UPRM:</u> Increase the number of seminars, courses and workshops to develop innovative skills in support of NOAA mission.</p>	<p>Practice - Part 1 (<i>Dr. Terri Adams, NCAS-M Deputy Director, Howard University</i>)</p> <p>Feb 28, 2019 - Findings from the Fourth National Climate Assessment (<i>Dr. Ben DeAngelo, Deputy Director, Climate Program Office</i>)</p> <p><u>JSU:</u> 1) 3 cohort-2 students 2) 3 non-cohort students</p> <p><u>SJSU:</u> Dr. Chiao teaches a new course, hydrometeorology at SJSU</p> <p><u>UPRM:</u> Participation in ASLO Workshops (February 23– March 2, 2019): 1. The Science of Science Communication. 2. Making your Science Communication More Effective. 3. Improv to improve International Collaborations. 4. Interdisciplinary Presentations</p>	<p>- The webinar provided evidence-based information on recognizing and integrating social science in research. Research examples were provided.</p> <p>Feb 28, 2019 ~ 30 participants center-wide - The webinar gave an overview and discussed findings from the <i>National Climate Assessment</i> that summarizes the impact of climate change on the United States, now and in the future.</p> <p><u>JSU:</u> Familiarization with NCAS-M and NOAA mission/science</p> <p><u>SJSU:</u> 5 SJSU Meteorology students enrolled in this new course, although no NCAS-M supported students in this class.</p> <p><u>UPRM:</u> Students trained in skills that will capacitate them to become better and more efficient science communicators.</p> <p>Cohort 2 student Maria Cardona completed a drone pilot training course in order to obtain a FAA drone pilot license.</p>
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	<p><u>UTEP:</u> Dr Fitzgerald taught an Atmospheric Study Physics course in the Fall of 2018 using new curriculum materials.</p> <p>Dr. Gill at UTEP taught Atmospheric Processes GEOP 5306 during this period, with new curriculum materials and learning activities.</p>	<p>Other: Drone Pilot (25 hr course). Preparation to obtain the remote pilot license for UAS. March 2019</p>	<p>Cohort 1 student Carla Mejias participated in the Puerto Rico Science Trust Forward Summit- November 10, 2018.</p>
<p>Total numbers of students supported by the CSCs and degrees awarded that reflect the changing demographics of the nation.</p>	<p><u>JSU:</u> Attendance of Seminars presented by visiting scientists (V. Morris; B. Demoz)</p> <p><u>SJSU:</u> At least 2 URM students per year from SJSU</p>	<p><u>JSU:</u> 4 cohort students (1 cohort-1 student and 3 cohort-2 students) are African-American</p> <p><u>SJSU:</u> Reached the goal.</p> <p><u>UTEP:</u> Dr Fitzgerald: 2 M.S (Miguel Cortez and Robert McAfee, NCAS-M Cohort 1), and 2 under-graduates (Cohort 2).</p> <p>Dr Gill: 1 MS (Julio Cenicerros, NCAS-M Cohort 2)</p>	<p><u>JSU:</u> 1) 1 cohort-1 student graduated in Dec. 2018 2) 3 cohort-2 students expected to graduate in 2019</p> <p><u>SJSU:</u> One student will be doing NERTO at NHC (Alrick Green). The other one is planning to attend grad program at UMBC (Krystal Sanchez).</p> <p><u>UTEP:</u> Both Miguel Cortez and Robert McAfee graduated with their MS degree during this period, and Ashley McAfee graduated with a BS degree</p>

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

Specific Objectives	Major Activities	Significant Results	Key Outcomes/Other Achievements
To increase the 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><u>NCAS-M wide:</u> Completion of Individual Student Development Plans (SDP) – a) Planning and b) Mid-Year Progress Reports</p> <p><u>JSU:</u> Full student participation in: 1) Mentor and alumni interactions 2) Federal programs: Pathways and DoD SMART 3) Alumni scholarship program</p> <p><u>PSU:</u> Active participation in student development activities</p> <p><u>UMBC:</u> (1) Partnering with the graduate studies directors to identify and recruit URM students early during the</p>	<p><u>NCAS-M wide:</u> Completion of Individual Student Development Plans (SDP) – a) Annual Planning Form C 1 = 2 C 2 = 17 C3 = 4</p> <p>b) Mid-Year Progress Reports C1 = 4 C2 =17 C3 = 4</p> <p><u>PSU:</u> Zachary Moon is completing the third academic year, and Kelly M. Nunez-Ocasio is completing the third academic year</p> <p><u>UMBC:</u> (1) Several students were identified and recruited. (2) A total of 10 non-cohort students belong in our group</p>	<p><u>NCAS-M wide:</u> 23 NCAS Cohort students and 25 NCAS-M Cohort 2 students completed SDPs that included the following areas: research, internships at NOAA, core competency attainment, integrative mechanisms of social sciences, publications, and presentations.</p> <p><u>JSU:</u> Undergraduate student retention in Meteorology is reported at 60%, in contrast to 30% in other STEM fields at JSU.</p> <p><u>PSU:</u> Zachary Moon is pursuing dissertation research, and Kelly M. Nunez-Ocasio has confirmed plans to do NERTO at NOAA/Atlantic Oceanographic and Meteorological Laboratory, Hurricane Research Division</p> <p><u>UMBC:</u> (1) 3-URM students visiting UMBC and plan to attend graduate school in atmospheric studies</p>

	<p>application processes was made.</p> <p>(2) Ample training and mentoring opportunities continued; graduate students and undergrad students were partnered to create vertical and horizontal mentoring.</p>	<p>members with 4 of them graduate students. Of these, five (5) students are African American.</p> <p><u>UPRM:</u> Retained and supported two UPRM NCAS-M doctoral students (Carla Mejias and Maria Cardona) using carry over funds until the new subaward, corresponding to September 1, 2018 to August 31, 2019 funding period, is received by UPRM</p>	<p>(2) Two are Cohort-2 students and 1- Cohort-1 student. 2- Cohort-1 students successfully completed their degree in Physics and Chemical Engineering.</p>
<p>To increased number of URM students who select to pursue higher education in NOAA mission fields.</p>	<p><u>JSU:</u> Full student participation in: 1) Outreach programs leveraged through NSF-funded IMAGE project 2) Social media</p>	<p><u>JSU:</u> 1) 85 high school students from 3 schools impacted by outreach 2) 10 JSU Meteorology students involved with outreach</p>	<p><u>JSU:</u> 1) high school students impacted 2) Tweets and Facebook posts about JSU Meteorology accomplishments and related topics</p>

e. Increased NOAA mission-relevant research capacity at MSIs

Specific Objectives	Major Activities	Significant Results	Key Outcomes/Other Achievements
<p>Increase the number of research collaborations with NOAA and CSC faculty, staff and students.</p>	<p><u>JSU:</u> Faculty mentorship</p> <p><u>PSU:</u> Goal is to work closely with NOAA-ATDD and HRD scientists</p> <p><u>SJSU:</u> One or two collaborative projects per year.</p> <p><u>UMD:</u> Continue developing closer collaboration with</p>	<p><u>JSU:</u> 1) 1 cohort-1 student 2) 3 cohort-2 students 3) 4 non-cohort students</p> <p><u>PSU:</u> Zachary Moon has completed NERTO and Kelly Nunez Occasio has confirmed NERTO assignment for 2019 summer</p> <p><u>SJSU:</u> Bi-weekly or monthly zoom meeting with collaborators at NOAA</p> <p><u>UMBC:</u> A collaborative project and grad student training in collaboration with NWS Sterling and UTEP.</p> <p><u>UMD:</u> Jennifer Kennedy (CSC) is collaborating with</p>	<p><u>JSU:</u> Cohort 2:</p> <ul style="list-style-type: none"> • Brianna Ross: Latrice Maxie (NWS), Duanjun Lu (JSU) • Jamiyah Woods: Latrice Maxie (NWS), Loren White (JSU) • MiaNwi Obioha: Latrice Maxie (NWS), Remata Reddy (JSU) <p>Non-cohort: Taylor Black: Latrice Maxie (NWS)</p> <p><u>PSU:</u> Zachary Moon completed the data analyses he started during the 2018 NERTO. Kelly Nunez Ocasio completed a research proposal as part of her dissertation and NERTO research activities</p> <p><u>SJSU:</u> Collaborative research results were presented at AMS annual meeting.</p> <p><u>UMBC:</u> A paper published in JTECH with NWS Sterling scientists</p> <p>Analysis of OWLETS datasets and coordinated presentation at AMS by graduate students and faculty.</p> <p><u>UMD:</u> The developed DSFW product has the great potential for public release to support field operation decisions for farms.</p>

	<p>NOAA for enhancing research to operation capabilities</p> <p><u>UPRM:</u> Goal is to increase the number of NOAA research collaborations by 50%</p>	<p>Youlong Xia for the development of NOAA land data assimilation toward USDA agricultural decision support product.</p> <p><u>UPRM:</u> Coordinating with Jennifer Dover (NWS – Field System Operations Center) to conduct field campaigns in Puerto Rico.</p>	<p><u>UPRM:</u> Conduct 2-3 weeks of on-site experiment to test new generation radiosonde instruments at the Isla Magueyes Field Station in Puerto Rico</p> <p><u>UTEP:</u> Dr Lidia Cucurull has continued mentoring Miguel Cortez after his NERTO experience. Dr Nick Nalli (NOAA) has been working collaboratively with Suhail Mahmud. Dr Michael Hicks (NOAA) has been working collaboratively with Nakul Karle.</p> <p>Dr. Daniel Tong (NOAA ARL Silver Spring) started serving as a mentor for a non-cohort Ph.D. student at UTEP (Iyasu Eibedingil)</p>
<p>Increase the number of NOAA scientists serving as mentors and advisors for student research</p>	<p><u>NCAS-M wide:</u> Increase NOAA mentors</p>	<p><u>NCAS-M wide:</u> Students worked with NOAA mentors for ETSP and NERTO</p>	<p><u>NCAS-M wide:</u> ETSP Mentors: Vankita Brown (NWS) Gina Eosco (NOAA/OAR/OWAQ) Mark Eakin (NESDIS/STAR) William Skirving (NESDIS/STAR) Bill Parker (WFO Jackson) Latrice Maxie (WFO Jackson)</p> <p>NERTO Mentors: Lidia Cururull (AOML) Andrew Kren (AOML) Edward Mansell (NSSL) Robert Rabin (NSSL) Daryl Kleist (NCEP/EMC) Nancy Beller-Simms (NOAA Silver Spring)</p>

	<p><u>JSU:</u> NOAA mentors for all Cohort-2 students</p> <p><u>PSU:</u> NOAA mentors for all Cohort-2 students</p> <p><u>SJSU:</u> One or two collaborative projects per year</p> <p><u>UMD:</u> Have the NOAA scientists directly involved in supervising CSC students in hands-on research experience and thesis development</p> <p><u>UPRM:</u> UPRM's two NCAS-M graduate students have NOAA mentors</p>	<p><u>JSU:</u> 1) 3 cohort-2 students 2) 5 non-cohort students 3) Visit to NSSL</p> <p><u>PSU:</u> Dr. Sim Aberson, NOAA Atlantic Oceanographic and Meteorological Laboratory in Miami, FL</p> <p><u>SJSU:</u> Daniel Melendez & Ernesto Rodriguez</p> <p><u>UMBC:</u> Engagement with several NOAA mentors</p> <p><u>UMD:</u> Daryl Kleist at NCEP mentors Emmanuel Dibia Michelle Hawkins at NWS mentors Jennifer Kennedy</p> <p><u>UPRM:</u> Libby Jewett Robert Warner</p>	<p>Claudia Nierenberg (NOAA Silver Spring)</p> <p><u>JSU:</u> Cohort: <ul style="list-style-type: none"> Eric Carpenter (NWS) Non-cohort: <ul style="list-style-type: none"> Latrice Maxie (NWS) </p> <p><u>PSU:</u> Dr. Sim Aberson provided advice to advice to Kelly Nunez Ocasio on the NERTO proposal.</p> <p><u>SJSU:</u> Ongoing collaborative research on the subject area.</p> <p><u>UMBC:</u> Drs. N. Nalli; B. Baker; J. McQueen; M. Hicks; M. Lataille; D. Atkinson; J. Fitzgibbons; T. Reale.</p> <p><u>UMD:</u> Emmanuel Dibia has just finished the NERTO training and is now developing a more focused research topic.</p> <p>Jennifer Kennedy has gained knowledge of impacts of weather hazards and will begin her NERTO shortly to gain hands-on experience of how decision is making for mitigating these impacts.</p>
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			<p><u>UTEP:</u> Nakul Karle has been working collaboratively with Drs. Sakai and Morris from Howard University. Suhail Mahmud has been working collaboratively with Duanjun Lu from Jackson State.</p>
<p>Increase the number of intra-institutional collaborative partnerships established and maintained in support of NOAA's mission</p>	<p><u>SJSU:</u> Plan to collaborate with other groups (e.g., El Paso & JSU) within NCAS-M</p> <p><u>JSU:</u> Dr Lu has collaborative research within JSU Emergency Management Program</p> <p><u>UMBC:</u> UMBC collaborates with UTEP on PBL analysis; with HU at Beltsville</p>	<p><u>JSU:</u> 1 non-cohort student</p> <p><u>UMBC:</u> OWLETS-2 coordination and data analysis continues. Several presentations made to AMS. Further information</p>	<p><u>NCAS-M wide:</u> OAR - ARL partnership at UTEP (Gill) involving Daniel Tong and Barry Baker of ARL, as well as UMBC scientists, has been established</p> <p>NESDIS STAR collaboration for determining the utility of NUCAPS Proving Ground Risk Reduction (PGRR) products (with NRL)</p> <p>NESDIS STAR collaboration for obtaining environmental data records (EDRs) in the tropical data void in support of calibration/validation of NOAA satellite data products (water vapor and ozone)</p> <p>NWS/NCEP collaboration for the improvement of NEMS aerosol for the GFS</p> <p><u>JSU:</u> DHS-funded program in emergency management at JSU (Taylor Black; Duanjun Lu)</p> <p><u>UMBC:</u> An adhoc interagency committee on PBL height was formed and has continued exchanging ideas and semi-monthly webinars.</p>

	<p>observation site; with CREST on PBL analysis and EPA/MDE measurements.</p> <p><u>UPRM:</u> Conduct collaborative NCAS-M and CREST workshop on “Coastal Water Quality Remote Sensing Tools for Watershed Managers” at UPRM.</p>	<p>at (http://lidar.umbc.edu)</p> <p><u>UPRM:</u> Participation of 12 watershed managers and students from Hawaii, USVI, American Samoa, and Puerto Rico.</p>	<p>Supplemental grants from EPA on PBL analysis to UMBC; UMBC hosted a visit for NCAS-M and DC department of Environment which has resulted in a potential grant to NCAS-M.</p> <p><u>UPRM:</u> Organized by Robert Warner (NOAA-NOS) and Drs. William Hernandez (CREST) and Roy Armstrong (NCAS-M) during November 7-8, 2018.</p>
<p>Increase the number of uses of NOAA data in research and tool development.</p>	<p><u>JSU:</u> Goal is to increase the use of NOAA observation and modeling datasets</p> <p><u>SJSU:</u> NOAA data from various sources are used for research and teaching purposes.</p> <p><u>UPRM:</u> NOAA data was extensively used in the Watershed Managers workshop (see above).</p>	<p><u>JSU:</u> 1) All students are using NOAA datasets 2) AWIPS2 at JSU 3) Planning for ceilometer at JSU</p> <p><u>SJSU:</u> Hydrometeorology course taught by Dr. Chiao at SJSU used precipitation, snow cover, model and satellite data from NOAA.</p> <p><u>UPRM:</u> 12 watershed managers trained in the use of NOAA data.</p>	<p><u>JSU:</u> Dataset types:</p> <ul style="list-style-type: none"> • Satellite • Radar • Surface observations • Buoy • Radiosonde • Ceilometer <p><u>SJSU:</u> Students are using NOAA data for term projects</p> <p><u>UPRM:</u> This was the first Coastal Water Quality Remote Sensing Tools for Watershed Managers training activity. Sponsored by EPA and NOAA.</p> <p><u>UTEP:</u> NOAA satellite products were used by Dr. Fitzgerald in her research and in her Atmospheric Physics class. NOAA products were used in Dr Gill’s GEOP 5306 (Atmospheric Processes) class</p>

<p>Increase the number of inter-institutional collaborative partnerships established and maintained in support of NOAA's mission.</p>	<p><u>JSU:</u> 1) Presentations 2) Manuscripts 3) Proposals 4) Collaboration visits 5) Collaborative teleconferences</p> <p><u>SJSU:</u> SJSU team plans to work with NCAS-M partners on projects related to wildfires warning, air quality monitoring, hurricanes forecasts, and aerosols long range transport.</p> <p><u>UMBC:</u> (1) Completion and analysis of data from OWLETS-2.</p>	<p><u>JSU:</u></p> <ul style="list-style-type: none"> • Visit to NSSL (L. White) • Visit to Northern Arizona Univ. (L. White) • Visit of B. Demoz from UMBC • CHEESEHEAD teleconferences (L. White, with Univ. of Wisconsin et al.) <p><u>UMBC:</u> (1) Bi-weekly telecons of all parties involved in OWLETS analysis. Several NOAA, NCAS-M, CREST, NASA, EPA, MDE personnel were involved: Jeff McQueen provided air quality forecasts; Pius Lee, Barry Baker, and others at ARL also provided tailored forecasts.</p>	<p><u>JSU:</u></p> <ul style="list-style-type: none"> • Five joint presentations: <ul style="list-style-type: none"> ○ White et al (2019a), AMS. ○ White et al (2019b) AMS. ○ Elkins et al (2019) AMS. ○ Kethireddy et al (2019), Mississippi Academy of Sciences annual meeting, Hattiesburg, MS, Feb. 21-22, 2019. • Submitted proposal: "Sundowner Wind Experiment (SWEX) in Coastal Santa Barbara, California" for \$2.1 million to NSF (PI: L. Carvalho at Univ. of California Santa Barbara; CoPI: L. White) <p><u>UMBC:</u> (1) Ozone Water Land Environmental Transition Study Part 2 (OWLETS-2): Several AMS presentations in AMS2019 were made by students and faculty. Analysis and publication of data continues.</p>
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	<p>(2) Further collaboration on GRUAN continues with NOAA-STAR scientists.</p> <p><u>UPRM:</u> Field campaign in West Maui, Hawaii in December 2018 to support calibration of VIIRS satellite data and obtain baseline optical and water quality measurements.</p>	<p>(2) Planning for GRUAN ICM-11 continues. NOAA participants are Tony Reale; Antonia Gambacorta; N. Nalli, Mike Hicks, Jim Fitzgibbons; Megan Letallie of NWS.</p> <p><u>UMD:</u> Partnering with: Daryl Kleist and Youlong Xia at NCEP and Michelle Hawkins at NWS on Data assimilation, climate prediction, and decision support</p> <p><u>UPRM:</u> In addition to providing an important baseline to validate current VIIRS satellite ocean color products for West Maui, data collected will support ongoing near-shore water quality measurements by local NGOs.</p>	<p>(2) GRUAN operations continue: a training session of preparing and launching Cryogenic Frostpoint Hygristor (CFH) was offered and executed for NOAA NWS-Sterling folks at Beltsville.</p> <p><u>UMD:</u> Applying data assimilation products to develop decision support tools; Develop data assimilation methods to improve subseasonal-to-seasonal climate prediction.</p> <p><u>UPRM:</u> NOAA/NESDIS Ocean Remote Sensing (ORS) Program funded this campaign led by William Hernandez (CUNY-CREST with the collaboration of Roy Armstrong (NCAS-M) and EPP student Suhey Ortiz. POC: Mark Eakin</p>
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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><u>JSU:</u> 1) Presentations with NOAA coauthors 2) Publications with NOAA coauthors</p> <p><u>SJSU:</u> Goal is at least one journal paper, one to two conference presentations per year.</p>	<p><u>JSU:</u> 6 conference presentations with NOAA coauthors</p> <p><u>SJSU:</u> One NCAS-M graduate student at SJSU (Catherine Liu) had submitted a manuscript to Atmosphere</p> <p>Three (3) conference presentations by NCAS-M cohorts at SJSU.</p>	<p><u>NCAS-M wide:</u> Hicks et al. published in 2019 (2 NOAA personal co-author)</p> <p><u>JSU:</u> Presentations with NOAA coauthors (details under Conferences below)</p> <ul style="list-style-type: none"> • White et al (2019a) AMS • White et al (2019b) AMS • Elkins et al (2019) AMS • Black et al (2019) ISRAEHR • Ross et al (2019) AMS • Lu et al (2019) AMS <p><u>SDSU:</u> 4,000 lines of standard Python code written for climate data analysis for the book Climate Mathematics by Shen and Somerville (TBP 2019)</p> <p><u>SJSU:</u> Presentations/publications with NOAA coauthors (details under Conferences below)</p> <ul style="list-style-type: none"> • Liu et al (2019) Atmosphere (accepted with major revisions)

	<p><u>UMD:</u> Goal is to disseminate research findings to the public and engage students to document their key results</p> <p><u>UPRM:</u> The goal is to increase the number of scientific publications.</p>	<p><u>UMD:</u> Jennifer Kennedy made a poster presentation at the AGU 2018 annual meeting.</p> <p>Xin-Zhong Liang made an oral presentation at the AMS 2019 annual meeting.</p> <p><u>UPRM:</u> Three presentations during this reporting period. ASLO Aquatic Sciences Meeting, February 23 – March 2, 2019, San Juan Puerto Rico.</p>	<ul style="list-style-type: none"> • Liu et al (2019) AMS • Zechiel et al (2019) AMS • Green et al (2019) AMS <p><u>UMBC:</u> Presentations/publications with NOAA coauthors (details under Conferences below)</p> <ul style="list-style-type: none"> • Jauhiainen et al (2019) GRUAN doc. • Carroll et al (2019) JGR (submitted). • Flores et al (2019) JAMC (submitted) • Hicks et al (2019) JTECH, 36, 129-137, DOI: 10.1175/JTECH-D-18-0058.1 <p><u>UMD:</u> Presentation titles: Jennifer Kennedy: Simulating Days Suitable for Fieldwork to Support Agricultural Decision-Making under Climate Variability</p> <p>Xin-Zhong Liang: Understanding CWRP Ability to Simulate U.S. Extreme Precipitation Characteristics</p>
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		<p><u>UTEP:</u> 1 peer reviewed publication by Fitzgerald and Stockwell.</p> <p>24 presentations for Drs. Gill, Fitzgerald, and Stockwell.</p> <p>Dr. Gill (UTEP) Invited talk at NOAA-National Weather Service West Texas and Southern New Mexico Integrated Warning Team meeting</p> <p>Dr Fitzgerald Invited talk at Cognizant, Dallas, Texas.</p>	<p><u>UTEP:</u> Devoun et al (2018), JAWMA, DOI: 10.1080/10962247.2018.1531795</p> <p>Session “Earth System Processes and Implications for Geohealth” co-organized with NOAA personnel (Dr Gill UTEP and Dr Daniel Tong NOAA) at AGU Fall Meeting, December 2018 Washington DC</p> <p>Session “Natural Aerosols” co-organized by Dr Gill (UTEP) and Dr Morris (Howard) at AMS Annual Meeting, January 2019 Phoenix</p>
<p>Use of CSC research results and tools by NOAA and other stakeholders.</p>	<p><u>JSU:</u> Mobile and radiosonde datasets</p> <p><u>SJSU:</u> Developing a hybrid tool using NOAA model products and satellite data associated with machine learning approaches to conduct early warning and forecasts of wildfires.</p>	<p><u>JSU:</u></p> <ul style="list-style-type: none"> • Mobile datasets for sensor shield comparison with NSSL • Mobile datasets for heat index variability <p><u>SJSU:</u> A proposal is pending at NOAA CSTAR program</p>	

II. 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:

- Degrees Awarded: **4 total** (2 MS, and 2 BS)
 1. Miguel Cortez (C1), M.S. (UTEP)
 2. Robert McAfee (C1), M.S. (UTEP)
 3. Ashley McAfee (C2), B.S. (UTEP)
 4. Keon Gibson (C1), B.S. (JSU)

- Publications in Journals: **3 total**
 1. Hicks, M., D. Atkinson, K. Vermeesch, B. Demoz (2019): “Intercomparison of Mixing Layer Heights from the National Weather Service Ceilometer Test Sites and Collocated Radiosondes" (JTECH-D-18-0058) *Journal of Atmospheric and Oceanic Technology*, **36**, 129-137, DOI: 10.1175/JTECH-D-18-0058.1

 2. Stewart, D. R., E. Saunders, R. A. Perea, R. Fitzgerald, D. E. Campbell, and W. R. Stockwell (2018): “Projected changes in particulate matter concentrations in the South Coast Air Basin due to basin-wide reductions in nitrogen oxides, volatile organic compounds and ammonia emissions”, *Journal of Air & Waste Management*, vol. **69**, number 2, pp 192-208, DOI: 10.1080/10962247.2018.1531795

 3. Jauhiainen, H., F. Masatomo, R. Philipona, R. Dirksen, D. F. Hurst, R. Kivi, H. Vömel, B. B. Demoz, N. Kizu, T. Oakley, K. Shimizu, M. Maturilli, T. Leblanc, F. Madonna, and R. Querel (2019): “Review of Multiple-payload Radiosonde Sounding Configurations for Determining Best-Practice Guidance for GRUAN Site”. Available at <https://www.gruan.org/documentation/gruan/td/gruan-td-7/>

- Books: None to report

- Book Chapters: None to report

- Thesis/Dissertations: None to report

- Conference Papers, Posters and Presentations: **50 total** (NCAS-M faculty is underlined, and students are in bold)
 1. **Anas, A.**, and T. Adams (2019): “Understanding the Public’s Response to Uncertainty Through an Interdisciplinary Analysis,” presentation at the AMS *99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper350091.html>

 2. Black, T., D. Lu, L. Maxie, and H. R. Shih (2019): “Case study of storm surge for Hurricane Irma,” poster presentation at the *15th International Symposium on Recent Advances in Environmental Health Research*, Jackson, MS, Feb. 17-20.

3. Carroll, B. J., B. Demoz, and R. Delgado (2019): “Lidar Observations of Water Vapor Transport via Low-level Jets in PECAN” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper350091.html>
4. **Ceniceros, J.**, and J. Creamean (2018): “Evaluating Possible Linkages Between Marine Chlorophyll-a Concentrations and Cloud Properties Over the Arctic Chukchi Sea” poster presentation at the *American Geophysical Union (AGU) 100 Advancing Earth and Space Science Fall Meeting*, Washington, DC, Dec. 10-14. <https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/413771>
5. **Ceniceros, J. E.**, J. M. Creamean, M. Rhodes, and L. Newman (2019): “Testing the Efficiency of Various Halophilic Archaea as Ice Nucleating Particles,” oral presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10. <https://ams.confex.com/ams/2019Annual/webprogram/Paper351060.html>
6. Colombi, N. K., T. Aydell, **J. Ceniceros**, G. deBoer, and J. Creamean (2018): “Diverse Springtime Variability in Ice Nucleating Particle Properties and Sources in an Alaskan Arctic Oil-field Location” poster presentation at the *American Geophysical Union (AGU) 100 Advancing Earth and Space Science Fall Meeting*, Washington, DC, Dec. 10-14.
<https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/424010>
7. **Cortez, M.**, A. C. Kren, L. Cucurull, G. Alaka, and R. M. Fitzgerald (2019): “The Impact of Global Hawk Dropsonde Data Assimilated in both global and regional weather forecast model on 3 Tropical Cyclone during 2017” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper356293.html>
8. **Cortez, M.**, R. M. Fitzgerald, A. McAfee (2019): “Light Scattering from a Water-Coated Aerosol Particle” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper353294.html>
9. Creamean, J., **J. Ceniceros**, T. Aydell, N. K. Colombi, R. Hanlon, D. G. Schmale, and R. Kirpes (2018): “From the Ocean to the Air: Biological Processes as a Source of Warm Temperature Ice Nucleating Particles in the Arctic.” oral presentation at the *American Geophysical Union (AGU) 100 Advancing Earth and Space Science Fall Meeting*, Washington, DC, Dec. 10-14. <https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/348090>
10. Creamean, J., N. K. Colombi, **J. Ceniceros**, T. Aydell, R. Kirpes, K. Pratt, N. J. Spada, M. Maahn, G. deBoer, R. C. Schnell, and S. China (2018): “Marine and terrestrial influences on ice nucleating particles during continuous springtime measurements in an Arctic oilfield location” oral presentation at the *American Geophysical Union (AGU) 100 Advancing Earth and Space Science Fall Meeting*, Washington, DC, Dec. 10-14.

<https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/408866>

11. Delgado, R., V. Caicedo, J. Posey, I. Kironji, B. B. Demoz, J. Szykman, R. K. Sakai, D. Atkinson, M. Hicks, M. Woodman, and D. Krask (2019): “Ad Hoc Ceilometer Evaluation Study: Mixing Layer Heights Network” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper354420.html>
12. Eibedingil, I., J. Cenicerros, T. E. Gill et al., (2018): “Identification of Surface Endmembers Using Spectral Unmixing in Google Earth Engine” Workshop on Dust Indicators for the National Climate Assessment, Fairfax, VA, December 9.
13. Eibedingil, I. G., D. Tong, R.S. Van Pelt, and T. E. Gill (2018): “Development of Satellite Based Dust Optical Depth from MODIS Deep Blue Product Collection 6.1 in the Western United States” oral presentation at the *American Geophysical Union (AGU) 100 Advancing Earth and Space Science Fall Meeting*, Washington, DC, Dec. 10-14.
<https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/441071>
14. Eibedingil, I. G., D. Tong, R. S. Van Pelt, and T. E. Gill (2019): “Estimation of Ground-Level Fine Particulate Matter Using Remotely Sensed Data Augmenting Air Quality Monitoring Network Data in the Western United States,” oral presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10. <https://ams.confex.com/ams/2019Annual/webprogram/Paper354289.html>
15. Gill, T. E., D. Dubois, I. Eibedingil, J. Fuentes, L. Jin, J. Li, M. Mendez, J. Tatarko, R.S. Van Pelt, N. Webb (2019): “Assessing the Acute Safety Hazard to Highway Transportation from Blowing Dust at Lordsburg Playa, New Mexico” Transportation, Air Quality, and Health Symposium, US Dept of Transportation, Austin, TX, Feb. 18-20.
<https://static.tti.tamu.edu/conferences/carteeh19/presentations/breakout-/gill.pdf>
16. Gill, T. E., J. Lee, T. Kandakji, M. Dominguez, M. Baddock, and I. Eibedingil (2019): “15 Years’ Application of Satellite Imagery to Detection and Impact Assessment of Dust Storms in the Southwest USA” oral presentation at the *Fifth Biannual NASA Health and Air Quality Applied Sciences Team (HAQAST) Meeting*, Phoenix, AZ, Jan. 3-4.
https://haqast.wiscweb.wisc.edu/wp-content/uploads/sites/91/2019/01/3.gill_.pdf
17. **Green, A.**, (2019): “A Modeling Study of Hurricane Maria Rapid Intensification and Eyewall Replacement Cycle over the Eastern Caribbean” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper353711.html>
18. Hand, J., B. A. Schichtel and T. E. Gill (2018): “Comparisons of Urban and Remote Coarse Aerosol Mass across the United States” oral presentation at the *American Geophysical Union (AGU) 100 Advancing Earth and Space Science Fall Meeting*, Washington, DC, Dec. 10-14.

<https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/381991>

19. Hernandez, W., J. Torres-Perez, R. Viqueira, R. Armstrong, and O. Lopez (2019): “Combination of Very High-Resolution (VHR) Satellite and Drone Imagery for Benthic Habitat Mapping: A Case Study for Guanica, Manati, and Vega Baja in Puerto Rico” oral presentation at the *ASLO 2019 Aquatic Sciences Meeting – Planet Water Challenges and Successes*, San Juan, PR, Feb. 23 – Mar. 2.
20. Kandakji, T., T. E. Gill, and J. Lee (2018): “Evaluation of Drought Level and Anthropogenic Land Use Impact on Dust Emission in Southwestern United States: Quantitative and Spatio-Temporal Analysis of Dust Point Sources” poster presentation at the *American Geophysical Union (AGU) 100 Advancing Earth and Space Science Fall Meeting*, Washington, DC, Dec. 10-14.
<https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/363960>
21. Kandakji, T., T. E. Gill and J. Lee (2019): “Evaluation of Drought Level and Anthropogenic Land Use Impact on Dust Emission in Southwestern United States: Quantitative and Spatio-temporal Analysis of Dust Point Sources” poster presentation at the *Fifth Biannual NASA Health and Air Quality Applied Sciences Team (HAQAST) Meeting*, Phoenix, AZ, Jan. 3-4.
<https://haqast.wiscweb.wisc.edu/wpcontent/uploads/sites/91/2019/01/Kandakji.pdf>
22. Karle, N., S. Mahmud, R. M. Fitzgerald, R. K. Sakai, W. R. Stockwell, B. B. Demoz, and V. R. Morris (2019): “Analysis of Regional Meteorology During the Ozone Episodes in the El Paso—Juarez Airshed in the Summer of 2017” oral presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper353413.html>
23. **Kennedy, J.**, X. Z. Liang (2018): “Applying Land Data Assimilation to Simulate Days Suitable for Fieldwork for Agricultural Decision-Making” poster presentation at the *AGU 100 Advancing Earth and Space Science Fall Meeting 2018*, Washington, DC, Jan. 6-10.
<https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/451929>
24. Kethireddy, S., B. Hawkins, T. Misoy, and R. S. Reddy (2019): “Hydrography of Mississippi for Informed Resource Management” oral presentation at the *Mississippi Academy of Sciences 83rd Annual Meeting*, Hattiesburg, MS, Feb. 21-22.
25. **Kholodovsky, V.**, X. Z. Liang (2019): “A Generalized Spatio-Temporal Threshold Selection Method for Identification of Extreme Event Patterns” oral presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper352451.html>

26. **Liu, C. N.**, J. Ryoo, **S. Chiao** (2019): “Long-range Aerosol Transport via Rossby Wave Breaking During Atmospheric River Events on the Western U.S” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper353697.html>
27. **Lu, D.**, P.C. Yuan, H-R Shih, T. Black and D. Jania (2019): “Model Simulation Analysis for Storm Surges in the Gulf of Mexico” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/meetingapp.cgi/Paper/354454>
28. Mahajan, V., and **R. S. Reddy** (2019): “An investigation of air-sea interactions, large-scale heat fluxes, high winds and precipitation variability associated with land falling hurricanes Ida and Nate over the Gulf of Mexico using radar and satellite data” poster presentation at the *Mississippi Academy of Sciences 83rd Annual Meeting*, Hattiesburg, MS, Feb. 21-22.
29. Mahmud, S., N. Karle, **R. Fitzgerald**, **W. R. Stockwell**, **D. Lu** (2019): “Regional Weather modelling for Paso del Norte Region: A sensitivity study for determining the PBL” oral presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper354510.html>
30. **Mejias-Rivera, C.**, **R. Armstrong**, and J. Morell (2019): “Particulate Organic Carbon Temporal and Spatial Variability on Southern Puerto Rico: An Assessment of Sources, Connectivity, Ecological Implications, and Bio-optical Properties” poster presentation at the *ASLO 2019 Aquatic Sciences Meeting – Planet Water Challenges and Successes*, San Juan, PR, Feb. 23 – Mar. 2.
31. **Min, Q.**, B. Yin, Z. Gao, and J. Wang (2018): “The Environmental Sky Imager-Radiometer (eSIR) and its applications in Atmospheric Observation”, oral presentation at the *American Geophysical Union (AGU) 100 Advancing Earth and Space Science Fall Meeting*, Washington, DC, Dec. 10-14.
<https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/439550>
32. **Nunez-Ocasio, K. M.**, and J. Evans (2019): “African Easterly Wave-Mesoscale Convective Coupled Systems that are potential candidates for Tropical Cyclogenesis” oral presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/meetingapp.cgi/Paper/352296>
33. **Nunez-Ocasio, K. M.**, H. L. Hamilton, and J. L. Evans (2019): “Topographic influence on African Easterly Wave energetics and convective Interactions” oral presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/meetingapp.cgi/Paper/354507>
34. **Reddy, R.**, F. Tuluri, **M. Fadavi**, and W.L. Walters (2019): “Climate Change and Global Warming Using Empirical Model” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.

<https://ams.confex.com/ams/2019Annual/webprogram/Paper353985.html>

35. Reddy, R. S., F. Tuluri, and M. Fadavi (2019): “Climate Change and Global Warming Using Empirical Model” oral presentation at the *Mississippi Academy of Science 83rd Annual Meeting*, Hattiesburg, MS, Feb. 21-22.
36. **Ross, B.**, and D. Lu (2019): Influence of local meteorology conditions on ground-level ozone concentrations in Jackson, MS” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper356322.html>
37. Sakai, R. K.; A. Flores, B. B. Demoz, M. K. Lataille, M. Hicks, J. Fitzgibbon, B. Sun, T. Reale, N. Nalli, and H. J. Diamond (2019): “Toward Site Atmospheric State Best Estimate (SASBE) over Maryland Using Radiosonde and Remote Sensing Measurements” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper354426.html>
38. Sakai, R., V. R. Morris, A. Flores, B. J. Carroll, V. Caicedo, R. Delgado, B. B. Demoz, O. Parker, M. Tzortziou, J. T. Sullivan, and J. Dreessen (2019): “Air Quality during Heatwave Periods over Land and Water during the OWLETS-2 Campaign” oral presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper354325.html>
39. Smith, A., and R. S. Reddy (2019): “Air-Sea Interactions, High Winds and Precipitation Variability Associated with Land Falling Hurricanes Ida and Nate Over the Gulf of Mexico Using Radar and Satellite Data” poster presentation at the *Mississippi Academy of Sciences 83rd Annual Meeting*, Hattiesburg, MS, Feb. 21-22.
40. Stockwell, W.R., E. Saunders and R. Fitzgerald (2018): “Review of the SAPRC-16 Chemical Mechanism and Comparison with the Regional Atmospheric Chemistry Mechanism, Version-2”, poster presentation at the *University of California, Davis Atmospheric Chemical Mechanisms Conference*, Davis, CA, Dec. 5-7.
41. Sullivan, J. T., T. Berkoff, J. Dreessen, R. Delgado, G. Gronoff, L. Nino, B. J. Carroll, V. Caicedo, L. Judd, J. Al-Saadi, M. Tzortziou, V. R. Morris, S. F. J. De Wekker, C. Hennigan, R. K. Sakai, A. Flores, X. Ren, R. R. Dickerson, P. Stratton, W. Luke, P. Kelley, S. Flynn, R. A. Hannun, G. Sumnicht, L. Twigg, N. Dacic, J. Anderson, R. Swap, and T. J. McGee (2019): “Direct Observations of Pollution Gradients within the Chesapeake Bay Watershed: Overview of the Ozone Water–Land Environmental Transition Study-2 (OWLETS-2)” oral presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper354318.html>

42. Tong, D., B. Baker, J. Wang, T. E. Gill, R. S. Van Pelt, B. Wang, P. Ginoux, B. Pu, H. Lei, Z. Liu, D. Kim, and M. Chin (2019): “Rising Dust Storm Activity in the Southwestern United States: Evidence from Long-Term Multiplatform Observations,” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper351853.html>
43. Tong, D., B. Baker, J. Wang, T. E. Gill, I Eibedingil, S. Van Pelt, H. Lei, Z. Liu, B. Wang, P. Ginoux, B. Pu, M. Huang, D. Kim, and M. Chin (2019): “Observing and Forecasting Dust Storms” poster presentation at the *Fifth Biannual NASA Health and Air Quality Applied Sciences Team (HAQAST) Meeting*, Phoenix, AZ, Jan. 3-4.
https://haqast.wiscweb.wisc.edu/wp-content/uploads/sites/91/2019/01/1.Tong_.pdf
44. Tong, D., B. Baker, J. X. L. Wang, T. E. Gill, I. G. Eibedingil, R. S. Van Pelt, H. Lei, Z. Liu, B. Wang, P.A. Ginoux, B. Pu, M. Huang, D. Kim, and M. Chin (2018): “Multi-Platform Observations of Dust Storm Activity Over Southwestern United States: Long-Term Trend, Climate Drivers and Societal Impacts” oral presentation at the *American Geophysical Union (AGU) 100 Advancing Earth and Space Science Fall Meeting*, Washington, DC, Dec. 10-14. <https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/435595>
45. Tong, D. and T. E. Gill (2018): “Earth System Interactions and Implications for Geohealth I” session chairs at the *American Geophysical Union (AGU) 100 Advancing Earth and Space Science Fall Meeting*, Washington, DC, Dec. 10-14. <https://agu.confex.com/agu/fm18/meetingapp.cgi/Session/60074>
46. Torres-Perez, J., Y. Detres, R. Armstrong, C. Aragonés-Fred, J. Cruz Motta (2019): “CORALBASICS: A Multi-Level Citizen Science Approach for Coral Reef Assessment in Southwest Puerto Rico” poster presentation at the *ASLO 2019 Aquatic Sciences Meeting – Planet Water Challenges and Successes*, San Juan, PR, Feb. 23 – Mar. 2.
47. **Wambugu K.**, (2019): “Ceilometer Comparisons and what their data says about Backscatter and PBL in Baltimore, Maryland and Beltsville, Maryland” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper356196.html>
48. White, L., and A. Tardy (2019): “Mobile sampling the North American monsoon”, oral presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10. <https://ams.confex.com/ams/2019Annual/webprogram/Paper354441.html>
49. White, L., and S. Waugh (2019): “Comparison of thermodynamic variables measured from mobile platform with U-Tube and Gill shields” poster presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper354378.html>

50. **Yeager, D.**, and **V. R. Morris** (2019): “Radiative Forcing Properties of Aging Saharan Dust Storms Entering the North Atlantic” oral presentation at the *AMS 99th Annual Meeting*, Phoenix, AZ, Jan. 6-10.
<https://ams.confex.com/ams/2019Annual/webprogram/Paper354791.html>

- Seminars: **2 total**

1. **Nunez-Ocasio, K.M.** (2018): Do the MCSs coupled from the early stages of an AEW play an important role in Tropical Cyclogenesis? Seminar presented to the Pennsylvania State University Earth System Science Center, October 10.
2. **Stockwell, W.R.** (2019): The Application of Physics to Improve Public Health and the Fundamental Understanding of Biophysical Systems seminar presented at the University of Texas El Paso Physics Department, El Paso, TX, Feb. 12.

- News or trade articles – **2 total**

1. AccuWeather interviewed **K.M. Nunez-Ocasio**
<https://www.facebook.com/AccuWeatherEnEspanol/videos/1768321416585524/>
2. <https://news.psu.edu/story/559108/2019/02/14/academics/graduate-student-receives-award-hurricane-research>

- Reports – **1 total**

1. **Stockwell, W.R.** and Y. Zhang, Chapter 3.1.4 – “Atmospheric Chemistry,” Contribution to World Meteorological Association Report on Air Quality Forecasting, *Revised, September 2018*.

- Technologies or Techniques: None to report
- Patents: None to report
- Inventions: None to report
- Licenses: None to report
- Websites: None to report
- Other Products: None to report

III. 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
Vernon Morris	Director	100
Terri Adams	Deputy Director	48
Kimberly Smith	Assistant Director	160+
Jo-Anne Manswell Butty	Education Lead	160+
Charles Ichoku	Distinguished Scientist	160
Neosho Ponder	Data and Communication Lead	80
Rosa M. Fitzgerald	UTEP lead investigator	20
William Stockwell	UTEP participating faculty	20
Thomas Gill	UTEP Participating Faculty	20
Mehri Fadavi	JSU Lead Investigator	12
Roy Armstrong	UPRM Lead Investigator	40
Xin-Zhong Liang	UMD Lead Investigator	20
Qilong Min	SUNY Lead Investigator	20
Jose D. Fuentes	PSU Lead Investigator	25
Belay Demoz	UMBC Lead Investigator	32
Sen Chiao	SJSU Lead Investigator	16
Souleymane Fall	TU Lead Investigator	5
Samuel Shen	SDSU Lead Investigator	5
Hari P. Singh	FVSU Lead Investigator	5
Juan Arratia	UMET Lead Investigator	5

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

Type of Organization	Name	Location	Contribution to Project
University Research Center	Center for Applied Atmospheric Research and Education	San Jose State University	Scientific discussions on atmospheric rivers project, machine learning for wildfires.
Educational	University of Maryland, Baltimore County	1000 hilltop Circle, Baltimore, MD	GRUAN; OWLETS, AEROSE, PBL and Beltsville Coordination
NOAA Facility	WFO Jackson	Jackson, MS	Mentorship of JSU undergraduate students

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

Roberto Viqueira (Protectores de Cuencas NGO); Tova Callender (West Maui Watershed Coordinator); James Strickland (Hui O Ka Wai Ola- Association of The Living Waters); Dr. Jerry Gao (Computer Engineering, SJSU); Dr. Sherry Palacios (Researcher, BEARI);

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

Victoria Dancy and Sandy Sarvis (OED/EPP); Ben DeAngelo (CPO); Sim Aberson (AOML/HRD); Robert Warner (NOS); Mark Eakin (NESDIS/STAR); Sara Thompson (NOAA Corps); Allen B. White (ESRL); Jim Fitzgibbon, Daniel Brewer, Jennifer Dover, Michael Hicks and Megan Lataille (NWS-Sterling Field Support Center); Nicholas R. Nalli, Bomin Sun, and Tony Reale (NOAA-STAR); Allen White and Jessie Creamean (former NOAA ESRL); Daniel Tong (NOAA Air Resources Lab); Lidia Cucurull (NOAA ESRL); Bill Parker (WFO Jackson)

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 continues to engage in several activities related to training and development/professional development of Cohort 1, 2 and other students to impact the development of NOAA future enterprise candidates for Atmospheric Sciences and Meteorology during this reporting period. Activities include a) experiential training opportunities for undergraduate and graduate fellows, b) completion of development plans by students and postdoctoral fellows, c) student attendance and participation in professional meetings, d) advanced research and skill development, and e) center-wide webinars.

Supported JSU undergraduate students have been exposed to observational and analytical research environments through summer programs and site visits; resulting in an increase in JSU students' interest in the meteorology program and JSU ability to retain qualified meteorology major students.

UTEP students are graduating in fields relevant to NOAA's thrusts areas.

SJSU students (Catherine Liu, Krystal Sanchez and Alrick Green) are either looking for positions at NWS or preparing for graduate programs.

UPRM has formed a new collaboration with NOAA NWS personnel from the Field Systems Operations Center in Virginia to test new generation radiosonde instruments at the Isla Magueyes Field Station in Puerto Rico. Jennifer Dover (Program Manager) and her team are scheduling a sampling campaign in the summer 2019 in collaboration with NCAS-M PI Roy Armstrong from UPRM.

UMBC is the only GRUAN site for coordinated satellite validation; funded through a NOAA supplement. Six (6) African American students trained NOAA aligned areas. ASOS lidar profile archiving reports outlines a guide for NOAA-FAA plan

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

The award made possible the participation of NCAS-M graduate students at UPRM to be trained at sea in field sampling and data collection, laboratory analysis, use of bio optical instrumentation, and satellite data analysis.

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

Nothing to report during this performance period.

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

The NOAA award has provided resources to hire Dr. Neosho Ponder to manage the data and communication activities for the project. The Center has shared information about the Center's accomplishments on the Center's website as well as through various social media outlets (i.e., Instagram, Facebook, Twitter).

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

Dr. Belay Demoz, UMBC lead investigator, wrote a report on NRC recommendation to NOAA – bringing technology to data use and demonstrating use of data. See Hicks et al (2019) paper for detail. HU Beltsville Research Campus is the only university site coordinating and supplying NOAA upper air data for satellite Validation – GRUAN objectives.

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

UTEP

- Dr. Fitzgerald was invited to make a presentation at Cognizant Company, Dallas, February 2019.
- Dr. Fitzgerald organized and delivered teacher's training on STEM fields during her Physics 2303 class.
- Dr. Gill (UTEP) invited to present on "Dust in the Wind" at the National Weather Service West Texas and Southern New Mexico Integrated Warning Team Workshop, November 8, 2018.
- Dr. Gill (UTEP) invited to give one of the opening addresses "The Dirt on Dust" to the Science Teachers Association of Texas Conference, October 19, 2018, El Paso TX
- Dr. Gill (UTEP) featured on social media by American Geophysical Union in its "100 for 100" campaign featuring 100 of its members for the AGU's 100th Anniversary

UPRM

- Conduct collaborative NCAS-M and CREST workshop on "Coastal Water Quality Remote Sensing Tools for Watershed Managers" at UPRM.
 - Participation of 12 watershed managers and students from Hawaii, USVI, American Samoa, and Puerto Rico.
 - Organized by Robert Warner (NOAA-NOS) and Drs. William Hernandez (CREST) and Roy Armstrong (NCAS-M) during November 7-8, 2018.
- Field campaign in West Maui, Hawaii in December 2018 to support calibration of VIIRS satellite data and obtain baseline optical and water quality measurements.
 - In addition to providing an important baseline to validate current VIIRS satellite ocean color products for West Maui, data collected will support ongoing near-shore water quality measurements by local NGOs.

- NOAA/NESDIS Ocean Remote Sensing (ORS) Program funded this campaign led by William Hernandez (CUNY-CREST with the collaboration of Roy Armstrong (NCAS-M) and EPP student Suhey Ortiz. POC: Mark Eakin
- NOAA has identified land-based sources of pollution (LBSP) as a key threat to coral reef ecosystems. The U.S. Coral Reef Task Force has designated West Maui, Hawaii as a priority watershed of concern, for implementation of best management practices to reduce LBSP. Efforts are underway, with NOAA funding, to identify in near real-time and quantify the LBSP being discharged into the coastal areas of West Maui that ultimately impact adjacent coral reefs.

HU

- Tia Tyree and Neosho Ponder, manage the NCAS-M social media. This includes sending information about NCAS-M, NCAS-M activities, NOAA related programs and activities and STEM related activities to the public via three main social media platforms, which are Twitter, Facebook and Instagram. During this period, posts on Twitter and Facebook alone garnered more about 45,000 impressions, and most importantly, helped increase awareness of center's accomplishments.
- Tia Tyree is a professor in the School of Communications within Howard University. Each spring she teaches a Capstone course with public relations and advertising majors, and NCAS-M or NOAA is a client. In January 2019, she, her students and NCAS-M administrators worked to create a full-scale communications plan. The plan is not only created but implemented and evaluated throughout the semester. More specifically, the students will work to rebrand the center, increase social media engagement and activities and develop a lobbying toolkit for NCAS-M staff to use in government relations meetings to help share the center's accomplishments with those on the House Committee on Energy and Commerce and others.

VI. Changes/Challenges

- a. [Changes in performance of the award objectives – approach and reasons\(s\) for change:](#)

UMBC

- Flexibility in use of funds is paramount in effective and maximal use of funds.
- Cohort-based fund administration at UMBC is becoming a challenge.
- Expiration of partner subawards should be aligned to expire with the 5-year grant.

- b. [Actual or anticipated problems of delays and actions or plans to resolve them:](#)

Subaward delays continue to be a problem. This is due to the lack of understanding on how this new award is to be implemented. Howard University, Lead Institution, has initiated a one-to-one teleconference for all partners to discuss exactly how the subaward is to be implemented and to answer all questions. This is an ongoing process.

- c. [Changes that have a significant impact on expenditures:](#)

Nothing to report during this performance period.

d. **Other**

Nothing to report during this performance period.

VII. **Special Award Conditions**

This section details the progress made during this reporting period (September 1, 2018 – February 28, 2019) for the specified special award conditions written below.

a. **Multi-Year Special Award Condition**

NCAS-M is in receipt of \$9,842,004.00 total for the first three (3) years of this 5-year period. Year one funding was in the amount of \$2, 975,000.00. Year one funding represents a shortfall of \$125,000 from the proposed amount. 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. Award file three (3) combines four revenues of funding - \$3,415,000.00 for AMS Center activities, \$100,000.00 from NOAA OAR OWAQ for Estimating the Value of Economic Resiliency Created by Weather Forecasts led by Haydar Kurban, \$87,004.00 from OAR for Communicating Uncertainty During Severe Weather Events led by Terri Adams, and \$75,000.00 from NWS for Generating Unpiloted Aerial Vehicles for Atmospheric Sensing led by Sonya Smith.

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**

During this performance period NCAS-M has shared data with the following collaborators:

1. GRUAN lead center (Lindenberg, GER) - Upper air data: traditional radiosonde, ozonesonde, cryogenic frost-point hygrometer data. Data is sent through the internet using the GRUAN launch software. Point of contact: Michael Sommer.
2. NOAA STAR (College Park, MD) - Upper air data: radiosonde data, and ozonesonde data. Data is collected through dropbox. Point of contact: Tony Reale/Nick Nalli.
3. Maryland Department of Environment - MDE (Baltimore, MD) - Upper air: radiosonde, and ozonesonde data. Data is collected through dropbox. Point of contact: Joel Dreessen.
4. MDE air quality monitor site at HUBC. Trace gases, aerosols, surface meteorological data, and wind and temperature profiles. Point of contact: Ryan Auvil.
5. DC lightning network detection. Lightning counter. Maintained by NASA-Huntsville and UMD, College Park. Point of contact: Scott Rudlovsky (UMD, NOAA).
6. NASA Pandora. Profiles of trace gases using passive instrument. Point of contact: Robert Swap.
7. UMD small sensors - SENSE project. Meteorological and CO2 data. Point of contact: Ning Zeng,

Data requested by scientists:

1. Israel Coto Lopez (NIST) - micrometeorological data. Data was sent by email.

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

NCAS-M has expended a total of \$68,500.00 on SmartStart Evaluation and Research during this performance period.

Specifically, \$34,250.00 for the following deliverables from September 1, 2018 to November 30, 2018:

Project management:

- Communicated with Executive Management Team (EMT) via e-mail and phone.
- Coordinated interview scheduling with Education Lead.
- Conducted internal meetings to discussing changes to the data collection plan and updated program information collected at the annual meeting.
- Reviewed documents (notes, updated implementation plan, etc.) collected at the annual meeting to plan changes to evaluation activities.
- Updated data collection plan based on feedback from the annual meeting and the updated implementation plan.
- Developed education, research, and administration logic models based on feedback from the annual meeting and the updated implementation plan.
- Requested updated implementation plan and latest semi-annual report submitted by the EMT in September.

Instrument development:

- Revised faculty and student interview protocols and incorporated EMT feedback.
- Reviewed updated interview protocols

Data collection:

- Conducted two of three phone interviews with NCAS-M postdoctoral fellows.
- Emailed postdoctoral fellows to schedule interviews.
- Discussed initial findings from interviews internally to plan next steps for evaluation activities.

An additional \$34,250.00 for the following deliverables from December 1, 2018 to February 28, 2018:

Project management:

- Communicated with Executive Management Team (EMT) via e-mail and phone.
- Coordinated interview and site visit scheduling.
- Conducted internal meetings to plan data collection.
- Reviewed documents (notes, updated implementation plan, semi-annual reports, etc.) to plan evaluation activities.
- Collated tracking information for semi-annual reports for future evaluation reports.
- Revised education, research, and administration logic models based on feedback from the EMT.
- Attended site visit to Jackson State University for project management meetings and to conduct evaluation activities.

Instrument development:

- Revised faculty and student interview protocols and incorporated EMT feedback.
- Revised student survey.

Data collection:

- Conducted three of three phone interviews with NCAS-M postdoctoral fellows.
- Conducted student interviews and focus group at Jackson State University for annual reporting.
- Conducted PI interviews for annual reporting.

e. **EPP/MSI CSC Evaluation Plan and Activities for Center**

The NCAS-M Evaluators SmartStart did not start its data collection process for Year 3 until February 2019, hence the evaluation was not prepared in concert with the reporting period. Data collection was delayed due to the IRB application not being approved until 10/12/18. After the IRB was approved, the evaluators and EMT developed data collection instruments and implemented them starting in February 2019. The external evaluators submitted evaluation findings via a discussion with NCAS-M Leadership (April 2019) presentation (delivered in June 2019) regarding formative evaluation results based on data collected from February to April 2019. The data collected focused on activity implementation and feedback, and did not include summative evaluation results which measure Center goal progress and achievement. The annual report to be submitted August 31, 2019 will focus on summative evaluation results. The evaluators will work with program leaders and administrators to update evaluation reporting timelines to match Center performance report timelines in project years 4 and 5. As a result, the evaluators will submit the midterm report at the end of February each year so that evaluation results can be incorporated in the mid-year progress reports. Findings and recommendations from the summative evaluation reports will be included in Fall performance reports submitted by the Center.

While no formal evaluation plan was submitted that matched the timeline of this performance report, the NCAS-M has implemented the core recommendations from the performance evaluation received in April 2019. These changes include:

- Development and distribution of a calendar to fellows and faculty notifying them of upcoming NCAS-M activities including webinars, seminars, ETSP, Center-wide PD, EPP forum, and SDP deadlines; and
- Reinstate monthly partner PI teleconferences to ensure all partner PIs are brought up to date on special award conditions, and provide an opportunity to discuss successes and challenges in the program.

The Center is now in the process of instituting some of the additional recommendations to include:

- Dedicate time during webinars to provide Center updates such as SDP deadlines and upcoming PD activities;
- Recording the webinars and sending a download link to all fellows and faculty to ensure those who can't attend can still access relevant information. Also, hosting webinar recordings on the NCAS-M website; and

- Continue to have regular monthly PI calls led by the Distinguished Scientist who can help facilitate conversations on potential ways to collaborate in research across partner institutions.

NOAA requested changes to SmartStart's evaluation plan, and a revised plan has been submitted to Grantsoline.

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

NCAS-M financially supported 36 full-time students across the Center in cohort 1, 2 and 3 who are US citizens with a minimum GPA of 3.0 during this performance period. The level of support provided for the students met the minimum amounts outlined in the original FFO during this performance period. At present, Cohort 3 students are still being onboarded due to the late issuance of sub awards. NCAS-M executive staff is diligently working with our partners to ensure that all students are being paid the minimum direct funding as outlined in the FFO for this award. Table 1 below identifies the direct student support funding amount each active NCAS-M student received during this performance period. Additionally, in Appendix A, a supported student list is presented classifying each supported student by cohort, degree level, race/ethnicity, NCAS-M member institution and major.

Table 1: NCAS-M DIRECT STUDENT SUPPORT

	Name	Cohort	Tuition	Stipend	Travel	One-time Research Support	NERTO
1	Chen, Yanna	1	\$8,316.00	\$17,527.00	\$0.00	\$0.00	\$0.00
2	Ellis, Tierra	1	\$0.00	\$1,153.85	\$0.00	\$0.00	\$0.00
3	Gibson, Keon	1	\$0.00	\$6,000.00	\$0.00	\$0.00	\$0.00
4	Kebede, Mussie	1	\$0.00	\$961.54	\$0.00	\$0.00	\$0.00
5	Liu, Catherine	1	\$918.98	\$25,221.66	\$0.00	\$0.00	\$0.00
6	Mejias, Carla	1	\$0.00	\$12,000.00	\$0.00	\$0.00	\$0.00
7	Moon, Zachary	1	\$7,336.00	\$9,268.00	\$787.47	\$0.00	\$2,673.39
8	Olayinka, Kafayat	1	\$0.00	\$1,153.85	\$0.00	\$0.00	\$0.00
9	Sanders, Shadya	1	\$0.00	\$1,153.85	\$0.00	\$0.00	\$0.00
10	Solimine, Stephen	1	\$8,316.00	\$17,527.00	\$0.00	\$0.00	\$0.00
11	Yeager, Daniel	1	\$0.00	\$1,153.85	\$0.00	\$0.00	\$0.00
12	Cardona-Maldonado, Maria	2	\$0.00	\$6,000.00	\$0.00	\$0.00	\$0.00
13	Ceniceros, Julio E.	2	\$0.00	\$18,749.97	\$1,012.34	\$0.00	\$0.00
14	Dibia, Emmanuel	2	\$22,931.00	\$25,000.04	\$0.00	\$0.00	\$0.00
15	Garvey, Michael	2	\$33,099.00	\$23,077.57	\$0.00	\$0.00	\$0.00
16	Gibson, Keon	2	\$0.00	\$6,000.00	\$0.00	\$0.00	\$0.00
17	Green, Alrick	2	\$0.00	\$17,500.00	\$1,718.83	\$0.00	\$0.00
18	Jean, Cassandra	2	\$33,099.00	\$23,076.80	\$2,077.05	\$0.00	\$3,506.04
19	Kennedy, Jennifer Anne	2	\$20,185.00	\$31,018.68	\$389.20	\$0.00	\$0.00
20	Kironji, Wambugu	2	\$11,778.00	\$13,468.00	\$2,665.10	\$0.00	\$0.00
21	McAfee, Ashley	2	\$0.00	\$4,000.00	\$0.00	\$0.00	\$0.00
22	Nuñez Ocasio, Kelly	2	-\$1,834.00	\$9,666.00	\$0.00	\$0.00	\$2,357.94
23	Obioha, MiaNwi	2	\$11,304.00	\$4,453.50	\$0.00	\$0.00	\$0.00
24	Ross, Brianna	2	\$0.00	\$19,000.00	\$0.00	\$0.00	\$0.00
25	Sanchez, Krystal	2	\$4,000.00	\$14,507.88	\$1,492.09	\$0.00	\$0.00
26	Smith, Chantal	2	\$33,099.00	\$23,077.03	\$1,901.55	\$0.00	\$0.00
27	Tallapragada, Lasya	2	\$5,939.00	\$6,839.00	\$0.00	\$0.00	\$0.00
28	Wilkinson, Ayesha	2	\$33,099.00	\$18,269.19	\$1,539.05	\$0.00	\$0.00
29	Woods, Jamiyah	2	\$2,356.50	\$7,500.00	\$0.00	\$0.00	\$0.00
30	Wright, Mi'Chael Noel	2	\$33,099.00	\$18,269.26	\$0.00	\$0.00	\$0.00
31	Askar, Anas	3	\$33,099.00	\$23,077.00	\$0.00	\$0.00	\$0.00
32	Brooks, Corbin	3	\$33,099.00	\$19,230.60	\$2,073.54	\$0.00	\$1,067.31
33	Jordan, Arianna	3	\$33,099.00	\$19,230.60	\$1,988.06	\$0.00	\$0.00
34	Lewis, Brandon	3	\$16,549.50	\$10,576.83	\$0.00	\$0.00	\$0.00
35	Reliford, Anaiya	3	\$16,549.50	\$0.00	\$0.00	\$0.00	\$0.00
36	Smith, Thomas	3	\$16,549.50	\$12,692.24	\$0.00	\$0.00	\$0.00

Post-Doctoral Program

There are two (2) post-doctoral fellows during this reporting period – Dr. Keren Rosado and Dr. Leticia Williams.

Dr. Leticia Williams is scheduled at NOAA headquarters in Downtown Silver Spring. Here activities during this performance period are as follows:

Conferences

- A Multicultural Mentoring Model: Best Practices for Mentoring Underrepresented Atmospheric Science Students. January 2019. American Meteorological Society (Phoenix, AZ). Oral panel presentation.
- Enhancing Geoscience Diversity Programs through Communication Strategies for Multicultural Mentoring of Underrepresented Students. December 2018. American Geophysical Union (Washington, DC). Oral panel presentation.

Research

- National Weather Service Hurricane Florence Service Assessment (Team leads: Karl Winters, Suzanne Van Cooten)
- Risk/threat Consistency (Team lead: Gregory Schoor)
- Social Science 301 training course (Team lead: Mathew Kelsch)

NOAA Site-Based Research

- IDSS External Partner Survey: National Weather Service; Silver Spring, MD; September 2018-present (Vankita Brown, Doug Young)
- Experimental Products 10-102 Survey redesign: National Weather Service; Silver Spring, MD; September 2018-present (Doug Young)
- Customer Satisfaction Survey: National Weather Service; Silver Spring, MD; September 2018-present (Cindy Woods, Michael Scotten)
- NRAP IDSS Social Media Best Practices Guide: National Weather Service; Silver Spring, MD; September 2018-December 2018 (Ernie Ostuno)

Publications

- Weathering Work: Black Women Scientists Negotiating Their Work Environments: Journal; Women's Studies in Communication; working on revisions after initial submission; Vankita Brown and Leticia Williams (authors)
- Communication Strategies for STEM Mentors: A Multicultural Mentoring Model: Journal; Journal of Communication; submitting March 2019; Leticia Williams (author)
- Developing a Relationship with Underrepresented STEM Protege's: A Multicultural Mentoring Approach: Journal; Journal for STEM Education; submitting May 2019; Leticia Williams (author)

Technical Skill Development

- Technical writing (hurricane Florence Service Assessment: 10/2018-1/2019)
- Quantitative SPSS data analysis (Howard University summer workshop: 5/2019)

Collaborative Activities

- NOAA Social Science Committee: Interim executive secretary; November-present; assist with coordinating meetings/guest speakers, increasing awareness of NOAA social science projects among NOAA social scientists (Team leads: Monica Grasso, Ayeisha Brinson)

Dr. Keren Rosado is currently stationed at NOAA Earth System Research Laboratory – Global Systems Division in Boulder, CO. Her activities during this reporting period are as follows:

Conferences

- Evaluating the Impact of Grell-Freitas Convective Parameterization into 2017 Atlantic Hurricane Season Simulations using FV3GFS (oral presentation), American Meteorological Society 99th Annual Meeting: Ninth Conference on the Transition of Research to Operations, 6-10 January 2019, Phoenix, Arizona

Research

- Evaluating the Impact of Grell-Freitas Convective Parameterization into 2017 Atlantic and Eastern Pacific Hurricane Season Simulations using FV3GFS.
- Evaluating the Impact of Grell-Freitas Convective Parameterization using CCPP framework.

NOAA Site-Based Research

- NOAA ESRL Boulder, CO - Start date September 1, 2018; End date: September 30, 2019. NOAA mentor: Dr. Georg Grell.
- Evaluating the Impact of Grell-Freitas Convective Parameterization into 2017 Atlantic and Eastern Pacific Hurricane Season Simulations using FV3GFS.
- Evaluating the Impact of Grell-Freitas Convective Parameterization using CCPP framework.

Publications

- Publication under preparation: "Evaluating the Impact of Grell-Freitas Convective Parameterization into 2017 Atlantic Hurricane Season Simulations using FV3GFS" Authors: Keren Rosado, Georg Grell, Ligia Bernardet, and Evan Kalina.
- Rosado, K. V., Tallapragada, L. Zhu, V. Morris, G. Jenkins, 2018: Spatial and Temporal Evolution of a Lightning Diagnostic in HWRF.

Technical Skill Development

- Global model evaluation using statistics
- Common Community Physics Package (CCPP) workflow

Collaborative Activities

- Testing and evaluation of the Grell-Freitas convective parameterization as one of the physics suits candidates to be used in upcoming operational implementations of the FV3-based Global Forecast System (FV3GFS)

Pre-Publication Manuscript Submission: None to report

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.

h. **Center Implementation Plan is Required**

NCAS-M is in receipt of the revised implementation plan submitted to the NOAA program office. NCAS-M has reviewed the comments and resubmitted a second revised NCAS-M implementation plan addressing all the concerns outlined in the returned version.

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 **31** and graduate **4** in NOAA-mission sciences.
- Total number of EPP-funded post-secondary students who are trained **34** and graduate **4** 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 **2**, 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. Keren Rosado, and Dr. Leticia Williams).
- Total new funds leveraged with NOAA EPP award (including post-secondary student support) \$2,454,087.00

j. **Professional Development (activities)**

NCAS-M hosted four (4) Center-wide Professional Development and Science Webinar Series during this performance period. The webinars held were as follows:

1. Oct 16, 2018 - NOAA Scholarships Webinar (*NOAA Office of Education – NOAA Undergraduate Scholarships—Victoria Dancy & Sandy Sarvis*)
2. Dec 5, 2018 - Interdisciplinary Research Example: Investigating the Drivers of the Water-Cycle Dynamics in Tropical Sub-Saharan Africa (*Dr. Charles Ichoku, NCAS-M Distinguished Scientist*)
3. Jan 31, 2019 - Social Sciences Research and Practice - Part 1 (*Dr. Terri Adams, NCAS-M Deputy Director, Howard University*)

4. Feb 28, 2019 - Findings from the Fourth National Climate Assessment (*Dr. Ben DeAngelo, Deputy Director, Climate Program Office*)

NCAS-M had three (3) students actively engaged in NERTOs during this performance period.

The NERTO details for the students are as follows:

Institution Name	Graduate Student Name	Degree Level	Cohort	Graduate Student Academic Advisor	NERTO Project Title	NERTO NOAA Mentor	NERTO Start Date - End Date	NERTO Location
HU	Dibia, Emmanuel	MS	2	Vernon Morris	An evaluation of subseasonal prediction with the FV3-GEFS and prototype FV3-MOM6-CICE5 coupled forecast system	Daryl Kleist	June 1, 2018 - Jan 28, 2019	College Park, MD - NCEP/EMC
HU	Garvey, Michael	PhD	2	Haydar Kurban	The Rising Cost of Urban Heat Islands	Nancy Beller-Simms & Claudia Nierenberg	Jan 2019 - April 2019	Silver Spring, MD - NOAA
HU	Smith, Chantal	PhD	2	Haydar Kurban	Extreme Weather Events: Measuring the Economic Impact of Improving Small Business Resilience	Nancy Beller-Simms & Claudia Nierenberg	Jan 2019 - April 2019	Silver Spring, MD - NOAA

VIII. Financial Information

a. Total NOAA Funding Breakout

Budget Category	Funds Budgeted	Funds Used	Funds Encumbered	Funds Remaining
Salary	\$1,312,338.00	\$440,971.66	\$0.00	\$871,366.34
Fringe Benefits	\$333,797.00	\$121,407.69	\$0.00	\$212,389.31
Supplies	\$595,553.00	\$280,102.32	\$91,098.35	\$222,352.33
Travel	\$113,959.00	\$95,775.31	\$0.00	\$18,183.69
Participant (student) cost	\$3,026,436.00	\$1,556,657.94	\$1416.12	\$1,468,361.94
Sub-Awards	\$3,371,505.00	\$734,190.29	\$1,426,811.71	\$1,210,503.00
Equipment	\$0.00	\$0.00	\$0.00	\$0.00
F&A	\$638,412.00	\$0.00	\$0.00	\$638,412.00

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

b. Total Leveraged Funding Breakout:

AGENCY	AMOUNT	NCAS-M AWARDEE
NOAA OAR OWAQ	\$100,000.00	Dr. Haydar Kurban
NOAA OAR	\$87,004.00	Dr. Terri Adams
NOAA NWS	\$75,000.00	Dr. Sonya Smith
NOAA JPSS	\$75,000.00	Dr. Belay Demoz
TCEQ	\$100,000.00	Dr. Rosa Fitzgerald
NASA	\$17,083.00	Dr. Thomas Gill
NSF	\$2,000,000.00	Dr. Mehri Fadavi

IX. Appendices

a. Active NCAS-M Fellows during this Performance Period

	Name	Level (BS, MS, PhD)	Race/Ethnicity	Cohort (C)	Institution	Degree Program
1	Chen, Yanna	PhD	A	1	SUNYA	Atmospheric Sciences
2	Ellis, Tierra	PhD	AA	1	HU	School Psychology
3	Gibson, Keon	BS	AA	1	JSU	Meteorology
4	Kebede, Mussie	MS	AA	1	HU	Atmospheric Sciences
5	Liu, Catherine	MS	A	1	SJSU	Meteorology
6	Mejias, Carla	PhD	H	1	UPRM	Marine Sciences
7	Moon, Zachary	PhD	W	1	PSU	Atmospheric Sciences
8	Olayinka, Kafayat	PhD	AA	1	HU	Atmospheric Sciences
9	Sanders, Shadya	PhD	AA	1	HU	Atmospheric Sciences
10	Solimine, Stephen	PhD	W	1	SUNYA	Atmospheric Sciences
11	Yeager, Daniel	PhD	AA	1	HU	Atmospheric Sciences
12	Cardona-Maldonado, Maria	PhD	H	2	UPRM	Marine Sciences
13	Ceniceros, Julio E.	MS	H	2	UTEP	Environmental Science
14	Dibia, Emmanuel	MS	AA	2	HU/UMD	Atmospheric & Oceanic Sciences
15	Garvey, Michael	PhD	AA	2	HU	Economics
16	Green, Alrick	MS	AA	2	SJSU	Meteorology and Climate Science
17	Jean, Cassandra	PhD	AA	2	HU	Sociology
18	Kennedy, Jennifer Anne	PhD	W	2	UMD	Geographical Sciences
19	Kironji, Wambugu	BS	AA	2	UMBC	Computer Science
20	McAfee, Ashley	BS	H	2	UTEP	Environmental Science
21	Nuñez Ocasio, Kelly	PhD	H	2	PSU	Atmospheric Sciences
22	Obioha, MiaNwi	BS	AA	2	JSU	Physics
23	Ross, Brianna	BS	AA	2	JSU	Chemistry
24	Sanchez, Krystal	BS	H	2	SJSU	Meteorology and Climate Science
25	Smith, Chantal	PhD	AA	2	HU	Economics
26	Tallapragada, Lasya	BS	Not disclosed	2	UMBC	Biochemistry and Molecular Biology
27	Villalobos, Claudia	BS	H	2	UTEP	Environmental Science
28	Wilkinson, Ayesha	MS	AA	2	HU	Atmospheric Sciences
29	Woods, Jamiyah	BS	AA	2	JSU	Chemistry

30	Wright, Mi'Chael Noel	MS	AA	2	HU	Sociology
31	Askar, Anas	PhD	AA	3	HU	Sociology
32	Brooks, Corbin	MS	AA	3	HU	Atmospheric Sciences
33	Jordan, Arianna	MS	AA	3	HU	Atmospheric Sciences
34	Lewis, Brandon	MS	AA	3	HU	Atmospheric Sciences
35	Reliford, Anaiya	MS	AA	3	HU	Engineering
36	Smith, Thomas	PhD	AA	3	HU	Atmospheric Sciences

Key: AA= African American
 H = Hispanic
 W = White
 A = Asian

b. CALENDAR

September

- 9-11 NCAS-M visits NSSL – Norman, Oklahoma
13-15 NCAS-M attends/participates in 2018 GEO REU PI Workshop
26-28 NCAS-M Director attends 90th National Technical Association Annual Conference – Norfolk, VA

October

- 16 Center-wide Webinar Series: NOAA Scholarships Webinar (NOAA Office of Education – NOAA Undergraduate Scholarships—Victoria Dancy & Sandy Sarvis)
19-20 NCAS-M Director attends Bill Anderson Fund (BAF) workshop – Newark, DE
20 UTEP's Earth Science Day public outreach event
23-27 NCAS-M Distinguished Scientist attends NOAA/NASA FIREX-AQ Science Team Meeting – Boulder, CO

November

Nothing to report

December

- 5 Center-wide Webinar Series: Interdisciplinary Research Example: Investigating the Drivers of the Water-Cycle Dynamics in Tropical Sub-Saharan Africa (Dr. Charles Ichoku, NCAS-M Distinguished Scientist)
10-14 NCAS-M attends AGU Fall Meeting – Washington, DC

January

- 5-6 NCAS-M attends American Meteorology Society (AMS) Student Conference – Phoenix, AZ
6 Colour of Weather Networking Reception – Phoenix, AZ
6-10 NCAS-M attends American Meteorology Society (AMS) 99th Annual Meeting – Phoenix, AZ
11 NCAS-M Faculty member, Loren White, visits Northern Arizona Univ. (Flagstaff, AZ)
18 Center-wide Focus Group
25 CPAS Symposium (Jackson, MS)
31 Center-wide Webinar Series: Social Sciences Research and Practice - Part 1 (Dr. Terri Adams, NCAS-M Deputy Director, Howard University)

February

- 5-6 JSU Site Visit
8 Center-wide Focus Group webinar
17-18 AAAS Family Science Day
21-29 NCAS-M attended the Mississippi Academy of Sciences 83rd Annual Meeting – Hattiesburg, MS
21- March 30 13th AERosols and Ocean Science (AEROSE) Expedition
28 Center-wide Webinar Series: Findings from the Fourth National Climate Assessment (Dr. Ben DeAngelo, Deputy Director, Climate Program Office)

c. PHOTOS

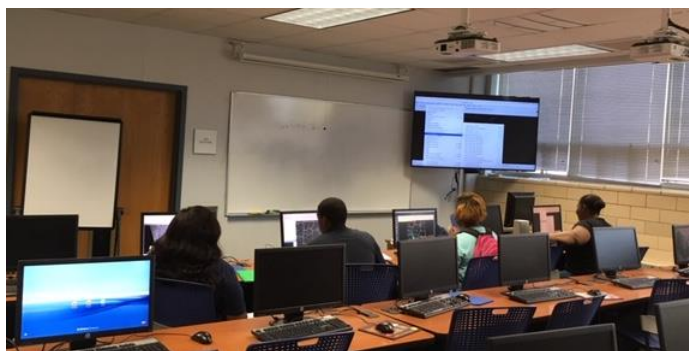


Figure 2: JSU Meteorology students had a class of using AWIPS2

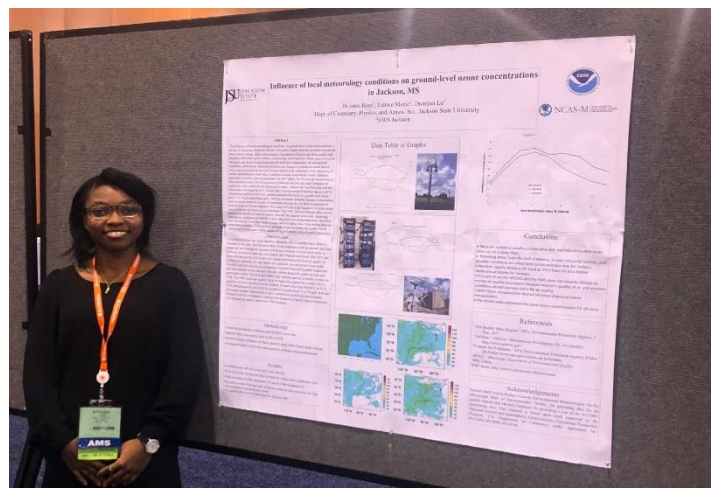


Figure 1: Cohort 2 student Brianna Ross at AMS Student Conference



Figure 3: JSU undergraduate students at AMS Student Conference (Phoenix, AZ)

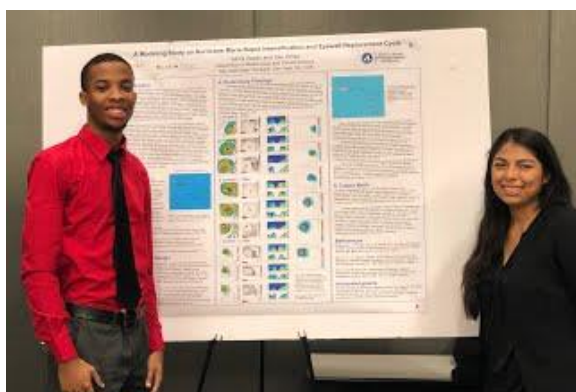


Figure 5: Cohort 2: Alrick Green and Krystal Sanchez @ Student poster presentation at SJSU Center for Applied Atmospheric Research and Education (Feb 27, 2019)

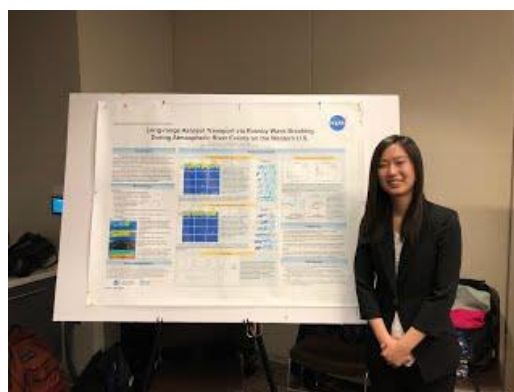


Figure 4: Cohort 1: Catherine Liu @ Student poster presentation at SJSU Center for Applied Atmospheric Research and Education



Figure 8: JSU student poster presentations to high school students at CPAS Symposium



Figure 7: Julio Cenicerros (NCAS-M Fellow Cohort 2) coordinated a Weather Balloon Launch at UTEP's Earth Science Day public outreach event on October 20, 2018, explaining how balloons are used to help understand the atmosphere and forecast the weather. Earth Science Day attracts hundreds of local families and a large number of children to the UTEP campus every October to participate in fun activities and learn about the earth sciences.



Figure 6: Miguel Cortez (NCAS-M Fellow Cohort 1) is building instrumentation as part of his NSF Travel Award ASI RELAMPAGO Field Campaign Argentina, October 2018.

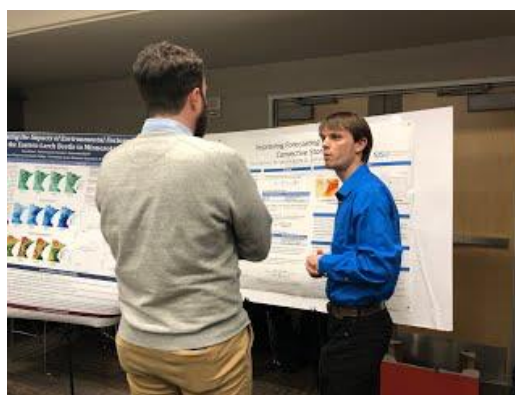


Figure 9: Cohort 3: Paul Zechiel @ Student poster presentation at SJSU Center for Applied Atmospheric Research and Education



Figure 10: NCAS-M SJSU PI, Sen Chiao (blue suit, backward facing) @ Student poster presentation at SJSU Center for Applied Atmospheric Research and Education



Figure 11: AMS Annual meeting, Cohort 1, Catherine Liu

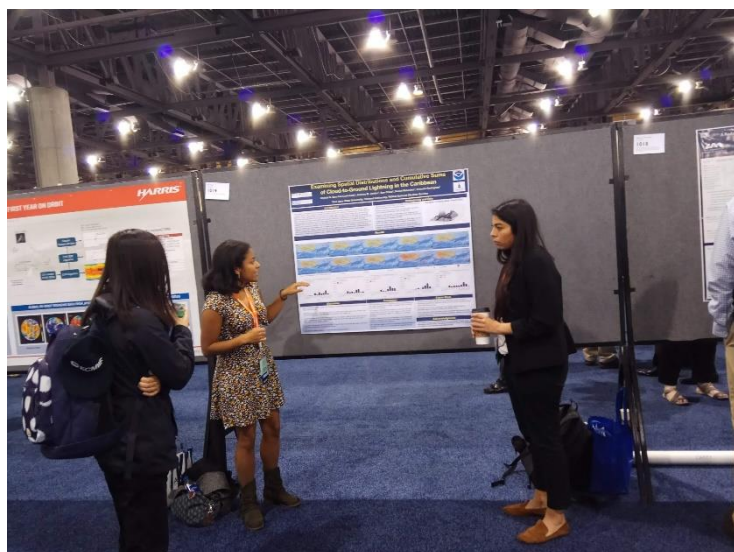


Figure 13: AMS annual meeting, Cohort 3, Arianna Jordan and Cohort 2, Krystal Sanchez

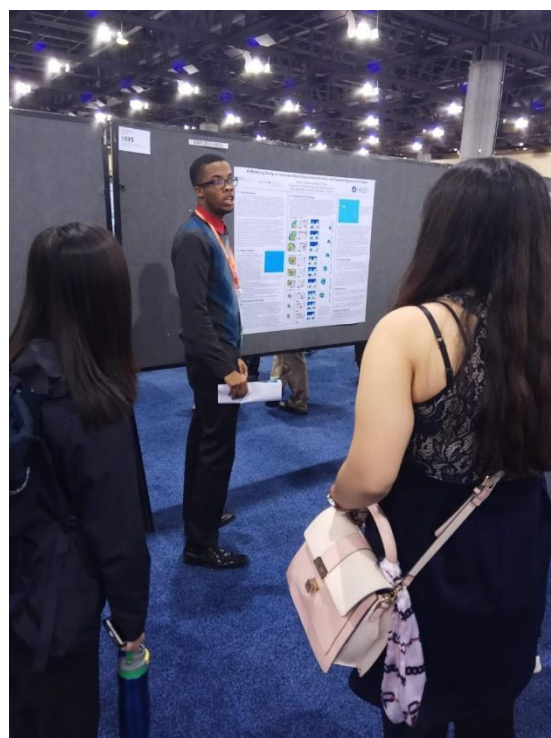


Figure 12: AMS annual meeting, Cohort 2, Alrick Green

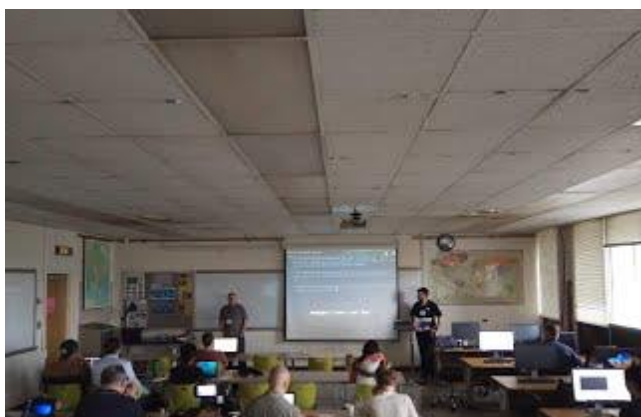


Figure 14: Regional Python workshop, NCAS-M, SJSU PI Chiao hosted and organized the workshop. (Oct 2018)

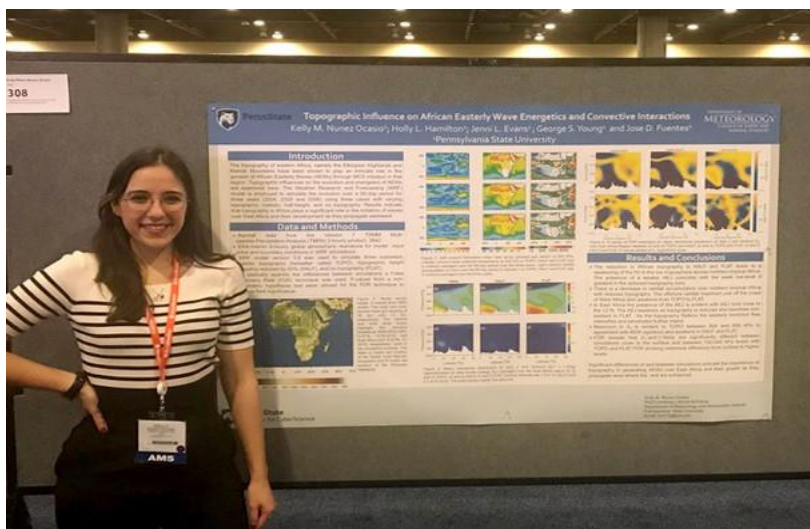


Figure 15: Kelly Nunez-Ocasio, who studies how hurricanes form at Penn State, presented her award-winning talk at the Seventh Symposium on the Madden-Julian Oscillation and Sub-Seasonal Monsoon Variability, which was held recently in Phoenix.

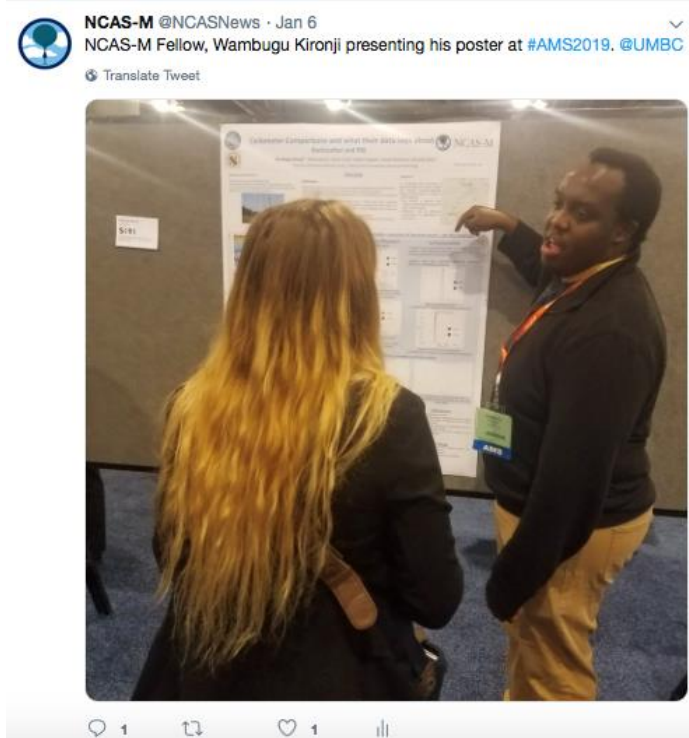


Figure 16: NCAS-M Social Media Posts



Figure 17: More NCAS-M Social Media Posts

d. ACRONOYMS

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	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	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
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
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 Region
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
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