

Education; Outreach and Professional Development

Shakila Merchant

**NOAA-Cooperative Remote Sensing Science & Technology (CREST)
The City College of City University of New York, NY**

**CREST–NESDIS/STAR Technical
Meeting
Silver Spring, MD
December 7–8, 2009**

Overview

- ❑ CREST Education and Outreach goals
- ❑ All about students
 - ❑ Education; Outreach
 - ❑ Recruitment & Retention
 - ❑ Professional Development
- ❑ Future Education & Outreach Visions

CREST Mission

The focus of CREST is to increase the number of educated, trained and graduated students especially from underrepresented communities in NOAA related science and technology.

The Center's research and training focuses on all aspects of remote sensing including: sensor development for environmental monitoring, satellite remote sensing of atmosphere and land, ground-based field measurements, data processing and analysis, modeling and forecasting.

CREST Education and Outreach Goals

- ▶ **Recruit, mentor, and train** graduate students in science, engineering, and technology areas of relevance to NOAA, with a special emphasis on traditionally underrepresented groups, to provide a diverse future workforce for NOAA, NOAA contractors and other related federal, state, and industrial stakeholders.
- ▶ **Develop a pipeline of students** from high school through college level to increase the number of students pursuing graduate studies in NOAA related science, engineering, and technology areas by introducing education and outreach programs at CREST institutions and communities that they serve.

EDUCATION

OUTREACH

**RECRUIT;
RETAIN & TRAIN
IN NOAA
SCIENCES**

**DEVELOP MODIFY
COURSES/
PROGRAMS**

**NOAA-CREST Day; NOSB;
REU, Summer Internship;
Weather Camps*; Science
Enrichment Programs**

**Students participate
Seminars/Conferences
Early Career
Development**

**Developed new
programs**

**Website; informational
brochures; newsletter;
flyers and magic globe**

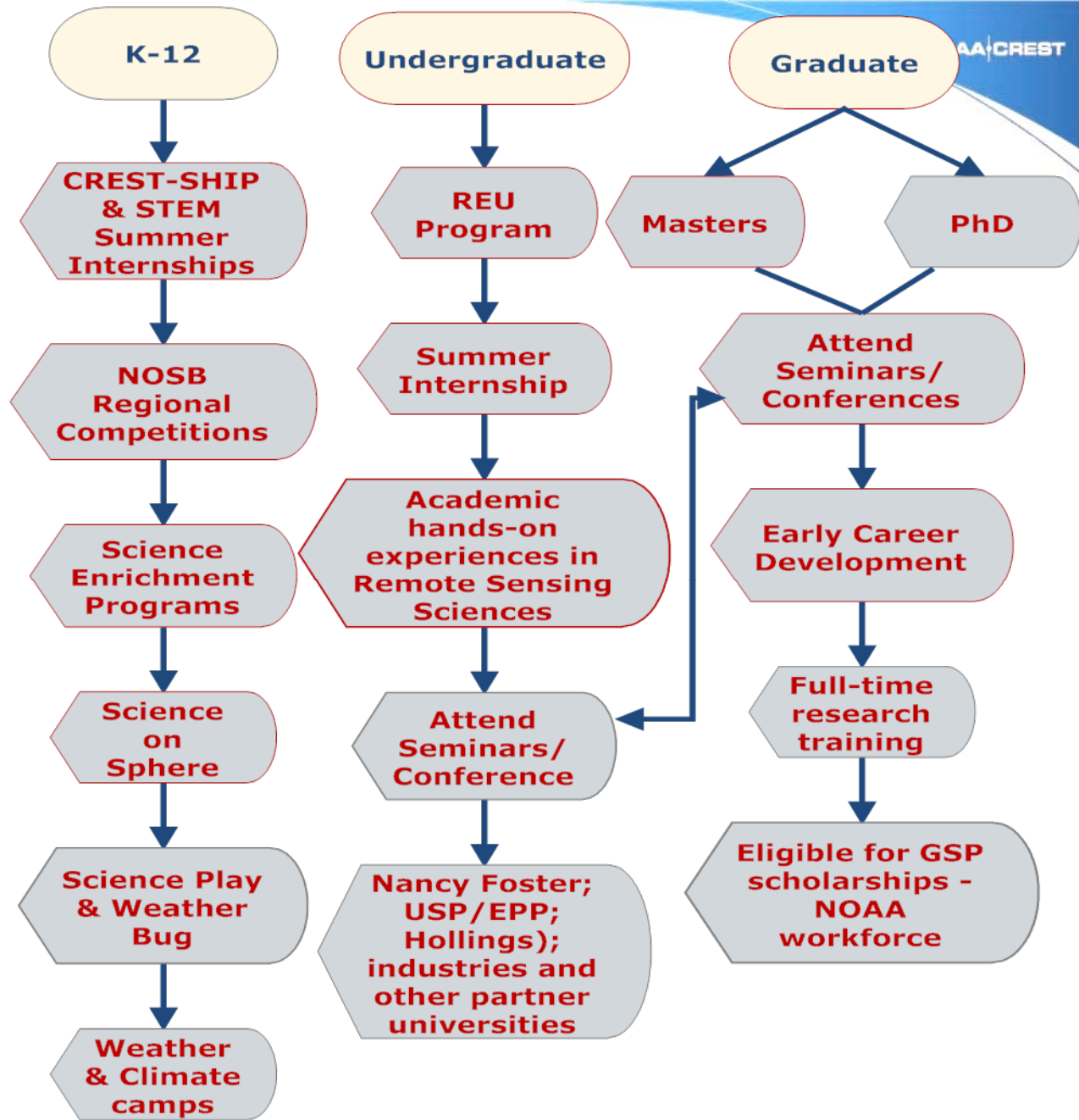
**Evaluate Students
Performances &
Report to
NOAA/EPP**

**Modified
and created
new
courses**

**Reporting
all events**

**Students
Job
placement**

**Joint PhD
program
between CREST
partners**

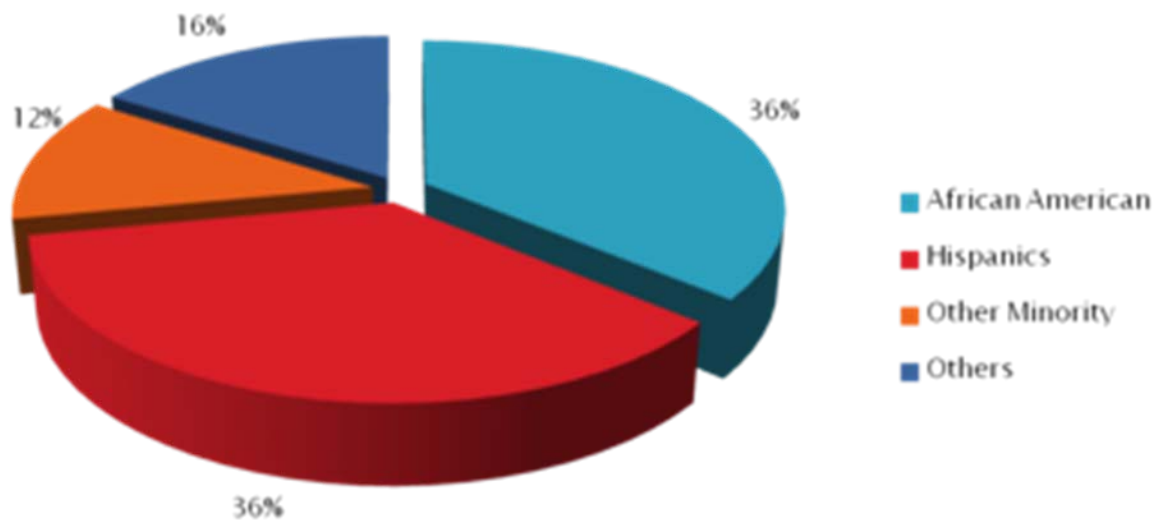


CREST Students Statistics (2001-2009)

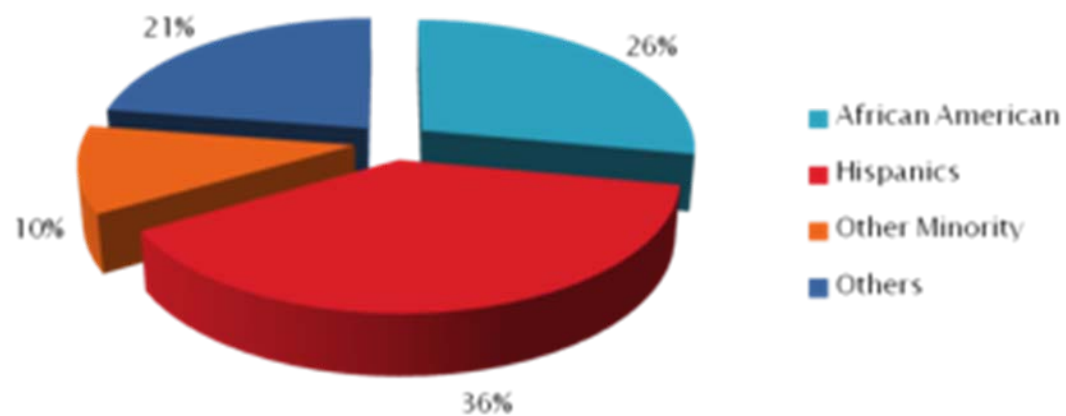
Students	African American		Hispanics		Other Minority		Others		Total	
	A*	P	A	P	A	P	A	P	A	P
PhD	3	7	7	10	6	5	7	11	23	33
Masters	9	11	21	9	6	2	10	4	46	26
BS	51	5	32	17	8	2	10	4	101	28
GIsc. Cert.	0	0	2	0	0	0	0	0	2	0
Total	63	23	62	36	20	9	27	19	172	87

Ethnicity-wise CREST students statistics

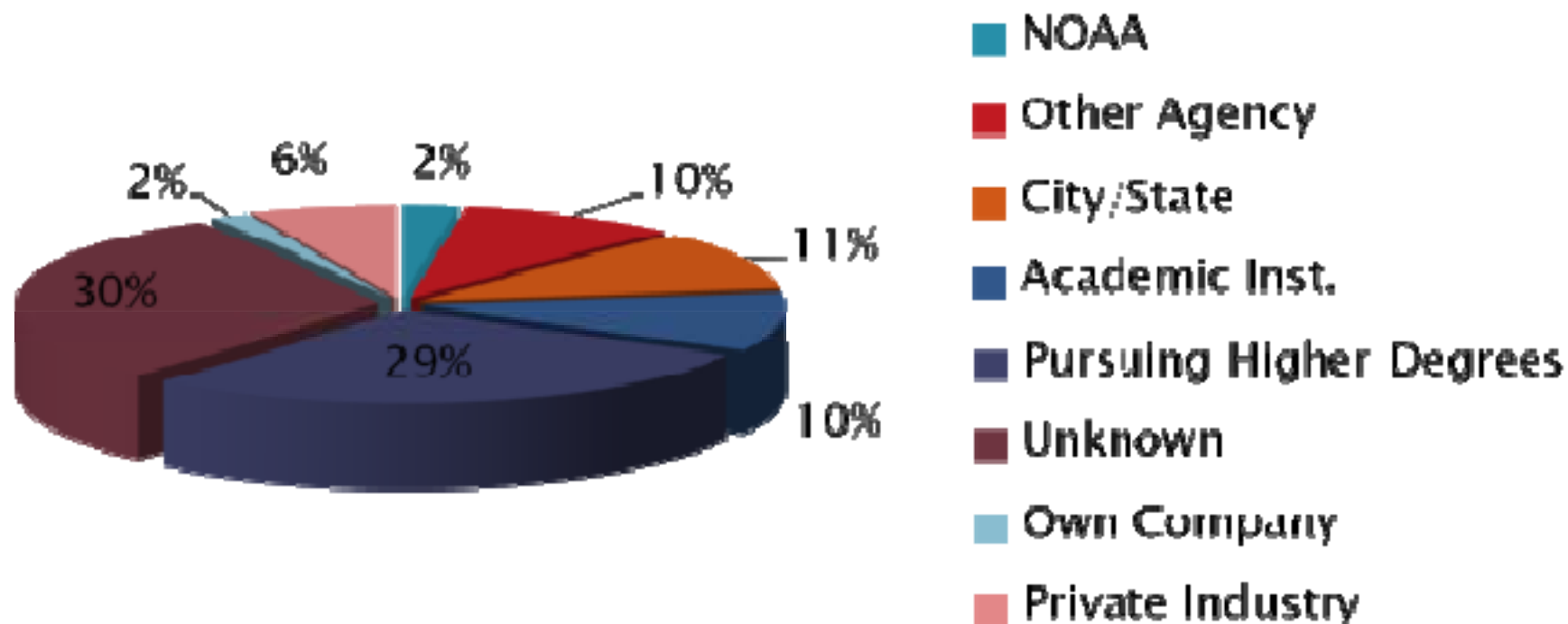
ALUMNI



PIPELINE



Post Graduate Students Statistics



National Ocean Science Bowl

Each year 10 HS students are trained by CREST in Marine and Ocean Sciences to participate in the regional competition organized by the National Ocean Science Bowl.

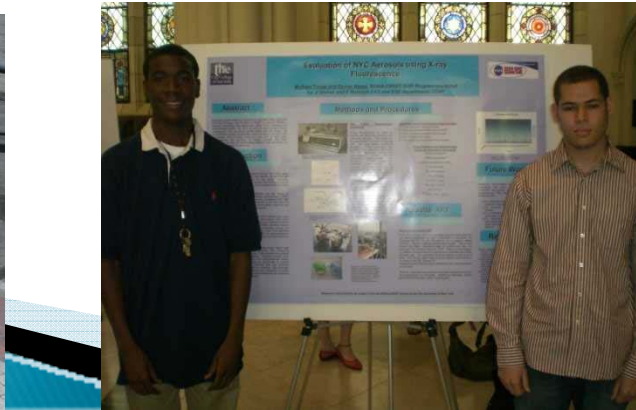
Some of these HS students come back to CREST pursue their higher education.



CREST-SHIP

Each year CREST actively participates in CREST-Summer High School Internship Program (SHIP) where 5-10 HS schools are trained and given hand-on experiences in CREST sciences.

CREST also participates and sponsors the STEM/HS internship organized by the City College of New York.



CCNY STEM Program

A STEM program runs at CCNY every summer as part of the “COLLEGE NOW” program which is a collaboration between CUNY and NYC Department of Education. CREST has partnered in this program for several years. This program consists of collection of ½ day courses that run for 6 weeks:

- 2008 & 2009: CREST sponsored a computer aided analysis course based on Matlab for 20 HS students during the six-weeks July-August (also attended by CREST-SHIP students).
- 2006 & 2007: CREST Sponsored a complete summer enrichment program for 16 HS students for six weeks (July-Aug) offering two college level courses: Introduction to Earth Science and computer aided analysis

NOAA CREST Day

Each year NOAA CREST Day is observed at CUNY and all its Partner Institutions. Several HS and UG students are invited to learn more about CREST program. NOAA /EPP and NESDIS dignitaries speak to the student audience during the event, which ends with a students poster session and lunch.



The NOAA-CREST/NWS Weather Camp 2009



9 NYC High School Campers
2 Undergraduate 'Counselors'

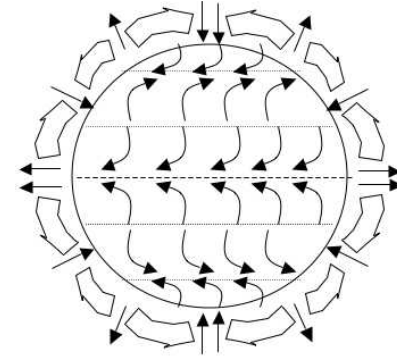
1st week hands-on classroom activities at City College of NY

2nd week daily visits to NWS office with field observations

Full involvement of 2 NWS staff

5 guest lectures, one by video conference with National Hurricane center.

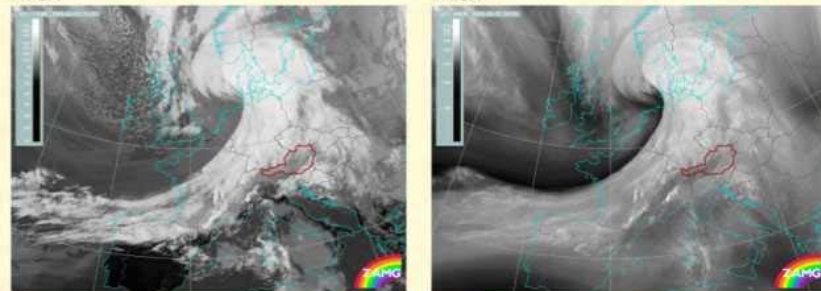
First Week Topics



- Atmospheric forces: pressure, coriolis, buoyancy
- Phase changes and cloud/precipitation formation
- Pressure systems and fronts
- Global Circulation
- Remote Sensing
- Radiation balance and climate
- Numerical Weather Prediction

12 February 2005/12.00 UTC - Meteosat 8 IR 10.8 image

12 February 2005/12.00 UTC - Meteosat 8 WV 6.2 image



Second Week: Camping on Long Island



Who would have guessed: city kids can overcome their fear of bugs!

Morning visits to the NWS office to discuss the day's weather, launch weather balloons, go inside the radar dome, etc.



Afternoon field observations included the urban heat island, sea-breeze, and relationship of cloud-base to relative humidity.

Science Street Fair, NY

More than 100,000 people, attended the World Science Festival Street Fair on June 14, 2009.

Four hands-on experiments, designed to entertain and inspire both children and adults, were continuously being stewarded by a 15 member team of NOAA – CREST students, researchers and faculty.

Attendees were able to experience the Coriolis Effect first hand, make their own personal cloud appear in a bottle and visualize what it is that makes the wind blow.

A NOAA-CREST publicity video ran continuously to complement a series of posters on display that showcased much of the research being done within NOAA-CREST.

The event was extremely successful and the organizers of the event are excited to invite us back next year.



Science Playground at MS 394, Brooklyn, New York

On the advise of Ms. Louisa Koch of OED/NOAA, CREST is involved in the SciencePlay project under the prestigious PlaNYC Initiative by the NYC Mayor Bloomberg.

NOAA-CREST has donated a WeatherBug weather station that students can use to track and broadcast live meteorological readings as part of a national reporting system.

NOAA-CREST is further supporting the school through science education outreach and enrichment, targeted to students in the sixth through eighth grades.

WeatherBug Connects Your School
Bring educational value and technology into the classroom and serve as a valuable community resource.



Education
Award-Winning K-12 Program

- Online interactive tools
- Standards aligned lessons
- Hands-on activities
- Teacher training
- Springboard for learning concepts and skills in:

MATH Science Geography
Blogging Video-casting
Technology

Television
See Your School on TV

Over 100 local meteorologists across the country feature WeatherBug schools during their on-air weather reports.* This is great visibility for your school.

"Schools are the center of our communities and are where we go to get local conditions."
- Doug Hill, Chief Meteorologist, WJLA - Washington DC Area

abc CBS FOX NBC
*Not available in all cities.

Community
Share Your Weather



Safety
Keep Your Students Safe

- Be the weather resource in your neighborhood
- After-school and adult community programs
- Support-recreation leagues
- Provide critical information to first responders
- PTA/PTO-supported program

- Receive immediate weather alerts
- Make accurate transportation and school closing decisions
- Make safe outdoor activity decisions
- Support the National Weather Service and Homeland Security by sharing data with them from your school



Science Seminars at Schools



CREST graduate student Mr. Miguel Bustamante at Columbia Secondary School, NYC – 7th graders, 2008



Professors Steiner and Strieby visiting Senior science class at University Heights High School , 2007



CREST-HU graduate students **Melissa Yesalusky, Chris Spells, Jasper Lewis and Sydney Paul**, served as docents for middle-school field trips to the NOAA Science-on-a Sphere display at the Nauticus museum in Norfolk, Va. These graduate students served as excellent role-models for 6'th graders from the Portsmouth City School system, a high needs school district.

Impacts and examples of SOS Activities

Year-1 (2006-2007), **1104** 6th graders from the Portsmouth City school system were directly impacted by the program.

In Year-2 (2007-2008), **820** students were impacted.

October 25, 2007

- Hampton University and Nauticus partnered to implement a one-day in service teacher workshop for twenty Portsmouth City Public School teachers.
- Participating teachers discovered how they could integrate the PBL, SOS programs and NOAA data into their lessons and curriculum.
- Integral to the sessions was an introduction to the online Problem Based Learning (PBL) module on hurricanes.



NOAA EPP Scholars Visit

Science on Sphere – Magic Planet at NOAA–CREST

The Magic Planet (Science on Sphere) serves as a major recruitment and educational tool to educate student on Earth Sciences using global datasets.

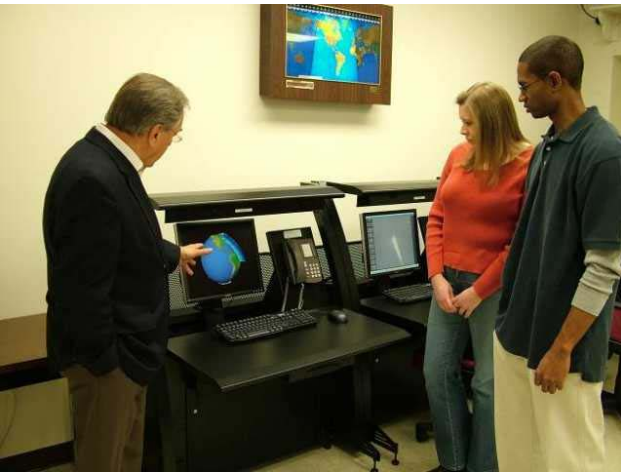
It serves as a true captivating experience for the students/visitors to learn more about NOAA and CREST sciences through real visual displays.



The Science on Sphere
Located in Steinman Hall
Lobby of City College of NY

Summer Science Enrichment Program, HU

All HS participants experience hands-on research with faculty in one of the five state-of-the-art research centers at Hampton University or at the nearby Jefferson National Accelerator Facility



Science Enrichment program at CREST/UPRM

Two-Week Immersion Program (K-12) : A group of 60 students (30 male & 30 female) attend summer internship program where they are introduced to engineering and half a day is used to give seminars on the NOAA projects and NOAA-CREST in particular.

CREST/UPRM also organizes summer internship camps for HS girls where the girls had an opportunity to learn about the NOAA-CREST program.

Students Technical Meetings and NOAA-CREST Annual Day per year are being held where interested students and faculty have participated to know about the UPRM and NOAA-CREST research work

4- Lab tours of facilities such as Lidar Lab



NSF–Research Experience for Undergraduates (REU)



CREST -Research Experience for Undergraduates (REU) - a NSF funded grant recruits ten undergraduates students to gain research experience in NOAA and CREST related Remote Sensing Sciences, and thus prepare themselves to enter into the MS or PhD programs at CREST.

The CREST-REU interns are given enriching summer internships to gain hands-on experience working with CREST mentors on CREST sciences.

The students also visit places like - American Museum of Natural History, NY Botanical Garden, National Weather Service, Regional Office, Upton, NY and Green Roof at Bronx, NY.

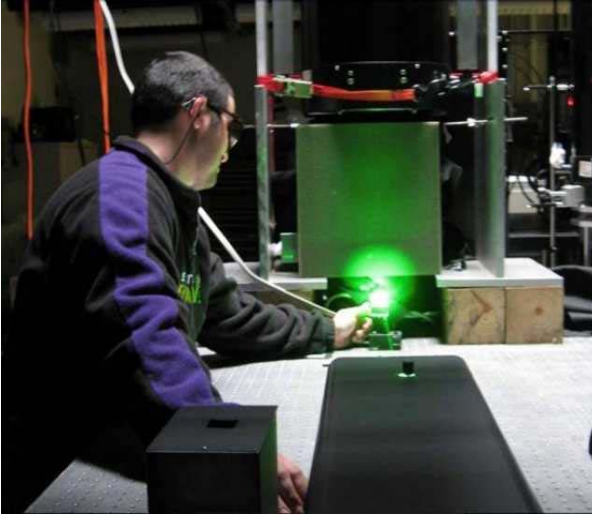
REU summer ends in August each year and continues for 3 weeks each in fall and spring.



UMBC Student Research

1. Joe Comer, MS, Design of ELF Lidar (**Applied Physics Lab**)
2. Jill Engel-Cox, Ph.D. AOD/PM2.5 relationships (**Battelle Scientist**)
3. Ray Rogers, Ph.D., Raman lidar hydration measurements (**Langley HSRL airborne lidar**)
4. Kamonayi Mubenga, MS, Analysis of GASP reflectivities (**Community College**)
5. Nikisa Jordan, MS, MODIS fire emissions in the Midwest (**BSU to UMBC**)
6. Nikisa Jordan, Ph.D. GEOS-5 PBL height verification (**Northrop Grumman**)
7. Ruben Delgado, Ph.D. UPRLP, Mesospheric physics (**Doctorate to Post Doc**)

Intra-CREST Activities



Pipelines [UMBC-Bowie](#) and [UPRM –CCNY](#) connection.

Student Recruitment from Bowie State University (Jordan and Mubenga) and from contacts made through UPRM (Delgado)

UMBC delivering cross campus presentations at NCA&T, Hampton and CCNY and other campus CREST Days

All CREST students participate in EPP Symposia and at AMS Booths at Student days.

Bowie State University Activities

▶ **Streaming Video/NOAA CREST WebCast**

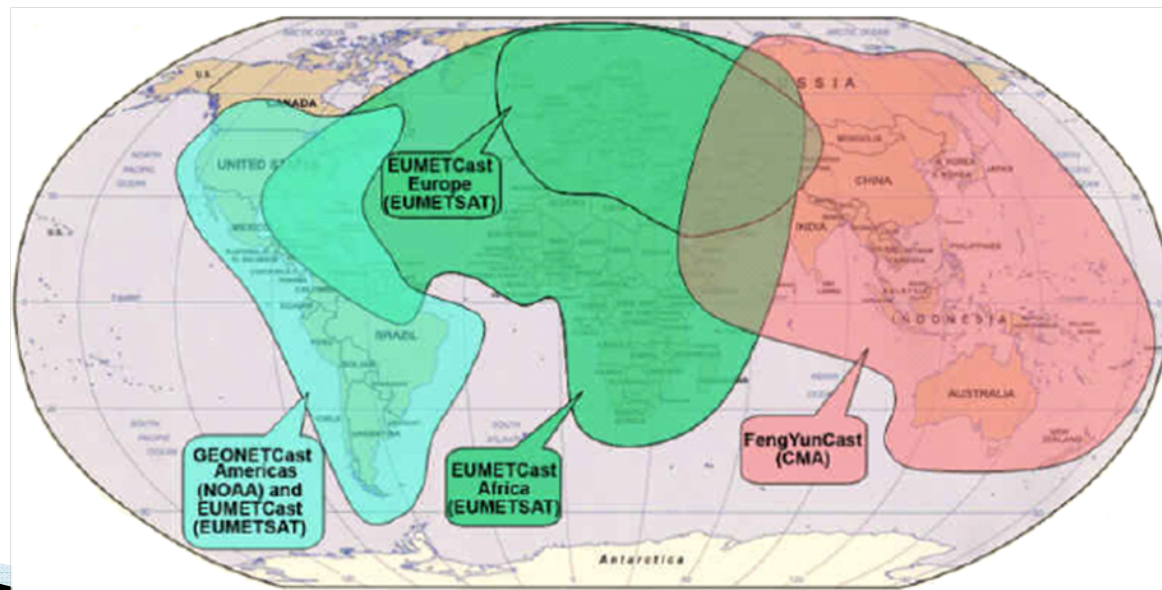
- Windows Media Services based on SUN server
 - Present “live” events & archive NOAA CREST activities
 - Example - NOAA Career Day
http://noaacrest.bowiestate.edu/CREST/noaacareers11_07.html
 - BSU Distance Ed course – BIOL203 -Keynotes NOAA CREST & NOAA EPP support in WebCast credits of 26 episodes of INTELECOM Endless Voyage – marine environment/ oceanography class at BSU
 - Reaches over 200 students per semester – largest course BSU

▶ **Upgrade to support broader-based streaming**

- Microsoft Silverlight and/or QuickTime and/or FLASH
- Will allow reaching “all platforms” online - plus Mac/Linux

▶ GEONETCast – NOAA NESDIS Collaboration

- GEONETCast - an interconnected global network of near real-time regional dissemination systems, linking environmental data providers and users globally [data directly to users w/o satellite receiving station]
- Focus on dissemination and utilization of environmental data sets & products for study of agriculture, energy, health, climate, weather, disaster mitigation, biodiversity, water resources, and ec
- **Ideal addition to NOAA CREST Outreach & Education!** – Web-share across campuses
- *George Jungbluth - contact– NOAA Satellite and Information Services – International & Interagency Affairs, GEOSS Americas Team, GEONETCast Americas*



GEONETCast System to install at Bowie State

- ▶ <http://www.geonetcastamericas.noaa.gov/>
- ▶ NOAA, EUMETSAT, Chinese Meteorological Agency & WHO are data providers
- ▶ Uses inexpensive satellite receiver station based on Digital Video Broadcast C-band transmission
- ▶ NOAA CREST can be data user and data provider! [with research/info from *TeraScan* station]

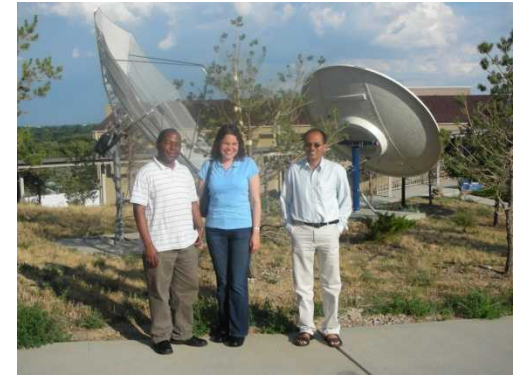


Students Conferences

NOAA-CREST annually organizes its Remote Sensing Symposium – where all students get an opportunity to present their research papers to all CREST scientists and the NOAA collaborators.

Besides this CREST students also attend several other conferences including AMS, AGU, IEEE, SPIE, IGARS, AAG. .. More than 100 papers have been presented by the Students during 2006-08.

CREST students also attend NOAA-EPP Forum



NOAA-CREST symposiums

Hosted by CREST/HU in **2004**

By CREST/UPRM in **2006 & 2008**

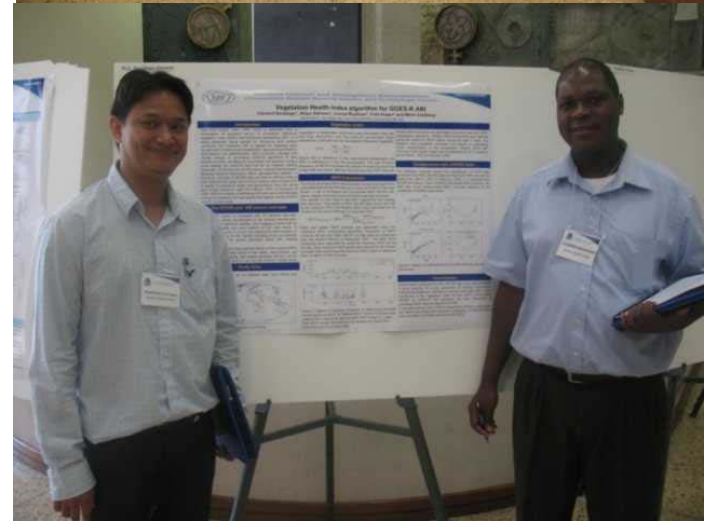
More than 100 participants (including Students+ Faculty+ scientists) each year.



2008 NOAA CREST Symposium at UPRM

Annual NESDIS/STAR/CoRP Symposium Hosted by CREST/UMBC (June, 2004) and CREST/CCNY (August, 2009)

The Annual CoRP Symposium provides a multi-disciplinary platform for discussions on issues related to Remote Sensing Science and Technology with its applications to various issues related to Climate, Water & Weather and Ecosystems and it directly addresses the NOAA's Missions and Goals.



Water Sampling and Field Campaigns

CREST students also gain hands-on experience through field sampling – they have so far **explored Sapola Islands, Long Island Sound; Chesapeake Bay and Mayaguez Bay** to measure optical properties and reflectance spectra in the waters; adjacent rivers; and harbors using state-of-the-art instruments and custom-designed probes.



Recruitment Events

Each year CREST participates in 4-5 recruitments activities like:

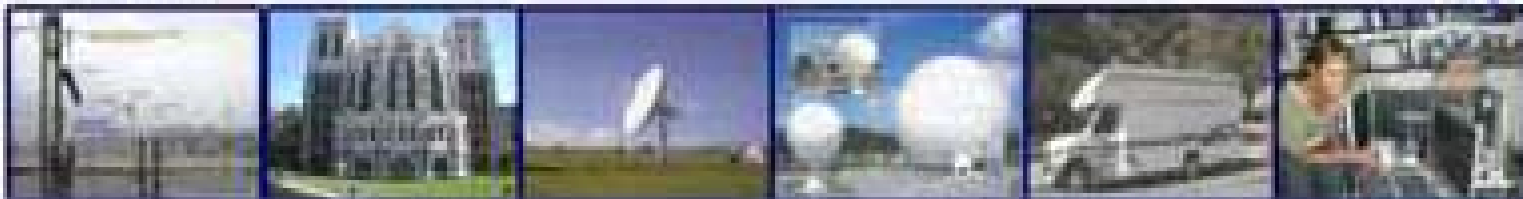
- University Career Fair
- AMS conference
- National Historically Black University
- Hispanic Society events
- AMP conference





NOAA-COOPERATIVE REMOTE SENSING SCIENCE AND TECHNOLOGY CENTER

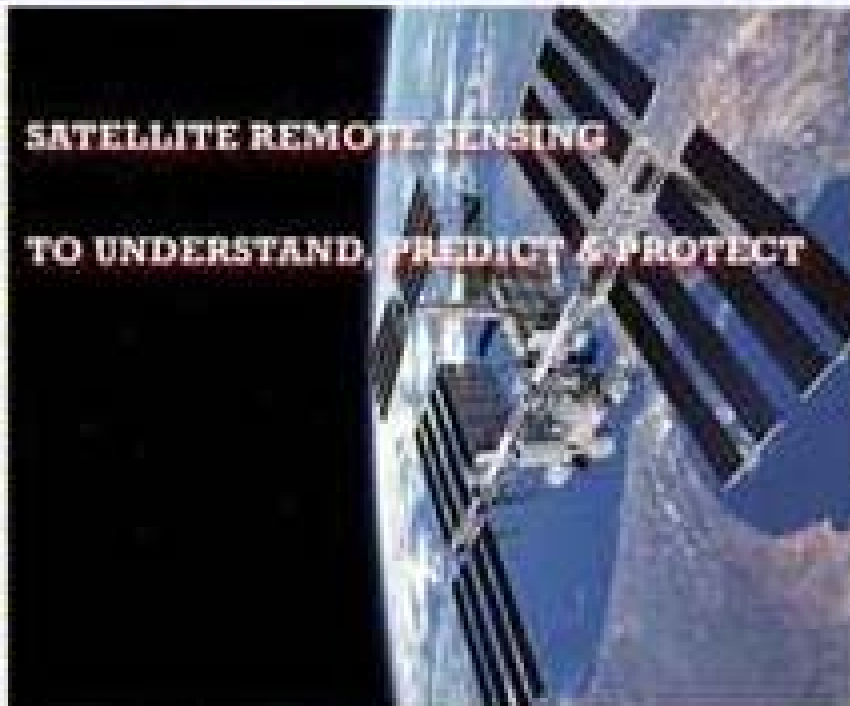
NOAA-CREST



CENTER OF EXCELLENCE IN REMOTE SENSING

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[CREST NEWS](#)

CREST Semi-Annual Digest

A Publication of Cooperative Remote Sensing Science and Technology (CREST) Center

Volume 6 Issue 2

December '08

NEWSLETTERS



Dr. Reza Khanbilvardi

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For more information on the CREST program please contact:
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merchant@ce.cuny.cuny.edu

Directors' Message...

As a national center for excellence in Remote Sensing, CREST is striving to align itself towards issues of global and national importance like Climate Change and Global Warming. Given the research directions set by the new US administration, CREST is also moving towards Satellite Climate studies. World experts like William Rossow and Charles Vörösmarty have joined CREST in recent years, complementing the existing senior and junior scientists. As its research capabilities continue to expand, CREST is committed towards applying Remote Sensing to Climate and Water related issues.

CREST is also strengthening international research collaborations with NOAA/NESDIS/STAR (Center for Satellite Applications and Research) and the Ukrainian government to help address global issues like crop productivity and food security. CREST continues to work towards NOAA's goals and mission while recruiting and training students in NOAA missions & sciences. The recent appointment of CREST alumni Dr. Viviana Vladutescu and Dr. Ummy Ali as Faculty Members at the New York City College of Technology (NYCCT) exemplifies CREST's commitments towards these goals.

- Reza Khanbilvardi, PhD, PE,
Director, NOAA-CREST

Ghassem Asrar joins the NOAA-CREST team

Dr. Ghassem R. Asrar, who recently assumed his duties as Director of the World Climate Research Program of World Meteorological Office (WMO), has been appointed as "Distinguished Adjunct Professor" in the Grove School of Engineering in The City University of New York and its Cooperative Remote Sensing Science and Technology Center (NOAA-CREST Center). Dr. Asrar had an outstanding career at NASA as Associate Administrator, Office of Earth Science from 1998 to 2004 and until January 2005 he served as Deputy Associate Administrator for the NASA Science Directorate where he was responsible for a broad range of earth observation satellites. From 2006-2008, Dr. Asrar served as Deputy Administrator for Natural Resources and Agricultural Systems with the Agricultural Research Service, of the U.S. Department of Agriculture. Over the years, he has distinguished himself in the field of satellite remote sensing, climate research, and environmental development at national and international levels. He has received many scientific, educational, and senior executive awards.



As a CREST-Distinguished Adjunct Professor, he will help CUNY and CREST in the development of broader application of earth's climate system information and knowledge. This includes development of mitigation strategies and adaptation approaches for managing the risk associated with climate variability and change. He has been recognized for his keen interest in training and education of young scientists as future leaders who must lead and conduct the 21st Century environmental research to serve our generation and those that will follow.

B U L L E T I N

NOAA-CREST

Cooperative Remote Sensing Science and Technology Center



"In the 21st Century, we cannot ignore the role of satellite technology and observation in understanding and predicting change in the Earth's environment. The NOAA-CREST Center, a leader in applied scientific research, has established a team of scientific experts and high-tech infrastructure for a comprehensive study of the atmosphere, biosphere, coastal zone waters, hydro climate, and water resources as part of the global environment."

Rosa Khanbilvardi, Director of the NOAA-CREST Center
NOAA Chair Professor of Civil Engineering

Satellite remote sensing, ground-based field measurements, data processing and analysis, modeling and forecasting, satellite algorithm development, and calibration and validation of satellite products. These are areas where NOAA-CREST is doing ground-breaking research.

NOAA-CREST Center
The Gross School of Engineering
Sixth Floor, # 107
140th Street and Convent Avenue
New York, NY 10031
www.crest.cuny.edu/noaa-crest



FLYER & BANNER



Are you looking for a career in cutting-edge science and technology?

Then your academic records may earn you a fellowship at the National Oceanic & Atmospheric Administrations Cooperative Remote Sensing Science & Technology (NOAA-CREST) Center at City University of New York in the heart of New York City.

Your Benefits as a CREST Fellow:

- Work at CREST facilities
- Attend Seminars, Conferences
- Visit various NOAA facilities across the nation
- Work with NOAA Scientists
- NOAA funded scholarship programs
- Opportunities for professional careers at NOAA or other Federal, State and Local Agencies and Industries alike ...

Work with our experienced faculty members on innovative research in Remote Sensing applications on:

- Climate & Air Quality
- Coastal Water Quality
- Precipitation and Water Resources
- Land & Hydrology
- Data Compression

Eligibility/Requirements:

US Citizen
GPA 3.0 and above
Matriculated Student (undergraduate, graduate) at City University of New York (CUNY) or other CREST partners.

How to contact us:

Visit us at : www.ccny.cuny.edu/noaa-crest
Call us at : 212-650-8099
Email us : noaa-crest@ccny.cuny.edu

Does the oceanic mystery and the earth's ever-changing environment fascinate you, then CREST could be your GATEWAY to an exciting professional career....Come join us and explore it...

Fellowship Package

(Includes Tuition Fees)

- \$8,000 to \$10,000 per year for Undergraduates
- \$18,000 to \$30,000 per year for MS and PhD
- \$2,000 to \$3,000 for Summer Internships

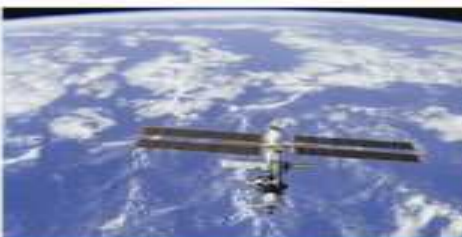
Crest Partners

University

- The City University of New York
- Hampton University
- University of Maryland, Baltimore County
- University of Puerto Rico, Mayaguez
- Bowie State University

Industries

- Raytheon
- Northrop Grumman



ABOUT NOAA-CREST

- The Federal Oceanic and Atmospheric Administration's Office for Remote Sensing, Oceanic and Technology, Computer and Information Systems, and NOAA's programs of environmental assessment, and NOAA's environmental monitoring.
- CREST's focus of activities focus on all aspects of remote sensing including remote sensing, satellite remote sensing, ground based remote sensing, data processing and data modeling and modeling.
- The research focus is to provide a national and international network of graduate students worldwide, from under-represented communities to professional opportunities.

A NETWORK OF PARTNERS

- Industry**
The City University of New York
Raytheon Systems
University of Maryland, Baltimore County
University of North Carolina
Booz Allen Hamilton
- Academy**
Raytheon, Lockheed Martin
- Government Agencies**
NOAA
NASA
NSA

REMOTE SENSING IN CLIMATE AND AIR QUALITY

Climate Applications and Remote Sensing (CARS)

- Global atmospheric remote sensing
- Integrated analysis of global observations to search for causes of climate variations
- Hyperspectral remote sensing with sounding spectrometers
- Hyperspectral data compression algorithms

Tropospheric Remote Sensing and Air Quality Monitoring (TRAQ)

- Satellite algorithm development and validation
- Ground based remote sensing network
- Ground based in-situ measurements, sampling and sample analysis and operations
- Modeling and validation
- Health impacts (asthma and cardiovascular impacts)

COASTAL WATER REMOTE SENSING

- Evolution of measurements approaches for coastal water parameters
- Development of suite of field measurement capabilities for ground testing and satellite validation in coastal waters
- Improvement/development of algorithm for remote sensing of coastal waters



REMOTE SENSING APPLICATIONS IN WATER RESOURCES AND HYDROLOGY

Hydro Climatology

- Satellite multi-sensor (IR-MW) precipitation retrieval algorithms
- Short precipitation forecasting/nowcasting using satellite information
- Validation of recently sensed rainfall retrieval algorithms
- Multi-Sensor QPE products for radar gap areas
- Climate change study for improving long term precipitation forecasting

Land Hydrology

- Reduce effect of vegetation on soil moisture retrieval from microwave satellite data and develop algorithm for soil moisture
- Estimation of vegetation characteristics from geostationary satellite data
- Develop advance techniques for monitoring snow cover and depth properties from passive and active microwave satellite observations
- Drought management and monitoring health issues (i.e. malaria)

CREST research thrusts



FELLOWSHIPS: THE GATEWAY TO AN EXCITING CAREER

- Year Fellowship as a CREST Fellow**
\$10,000 stipend
Research assistant, graduate student
Post-Doctoral Fellow, research assistant
Grad and post-grad research with NOAA scientist
NOAA funded fellowship programs
Opportunities for research at NOAA, other federal agencies, and state agencies and industry
- Fellowship Packages**
\$2,000 to \$10,000 per year for undergraduate
\$10,000 to \$20,000 per year for grad and post-grad
\$2,000 to \$3,000 for research stipend
Other opportunities in development
- Eligibility**
US citizen
Researcher, scientist or undergraduate graduate at a NOAA-CREST partner university
- Contact us**
CREST: 211 200-2020, www.noaa.gov/crest, www.noaa.gov/remote_sensing, www.noaa.gov/oceanic_and_technology, www.noaa.gov/computer_and_information_systems, www.noaa.gov/environmental_assessment, www.noaa.gov/environmental_monitoring, www.noaa.gov/education_outreach_services, www.noaa.gov/office_of_public_affairs, www.noaa.gov/office_of_policy, www.noaa.gov/office_of_program_evaluation, www.noaa.gov/office_of_public_involvement, www.noaa.gov/office_of_public_inquiry, www.noaa.gov/office_of_publications, www.noaa.gov/office_of_special_inquiries, www.noaa.gov/office_of_the_inspector_general, www.noaa.gov/office_of_the_scientific_coordinator, www.noaa.gov/office_of_the_scientific_coordinator, www.noaa.gov/office_of_the_scientific_coordinator

CUTTING-EDGE RESEARCH

- With access to the best people in the field and the most current data, research is conducted at NOAA-CREST's facilities for studying NOAA data
- Department of Climate Variability and Change
Satellite Data Center for Weather and Climate Information
Modeling, Analysis and Storage for the United States and Global Resources
- CREST's research focus is supported through the research of:
Climate Applications and Remote Sensing (CARS)
Tropospheric Remote Sensing and Air Quality Monitoring (TRAQ)
Coastal Water Remote Sensing
Public Climate
Land Hydrology

WORLD-CLASS TEACHING

- The NOAA-CREST facility is dedicated to teaching undergraduate and graduate students and researchers about remote sensing. It is a unique environment for graduate students, post-graduate students, and researchers. They are not just students, they are researchers. They are not just students, they are researchers. They are not just students, they are researchers.



NOAA, NESDIS AND CREST

The mission of the National Oceanic and Atmospheric Administration (NOAA) is to understand and predict our changing planet, its climate, and its resources. To meet this mission, NOAA is committed to research, monitoring, and service. NOAA-CREST is a key element of this mission. It is a unique environment for graduate students, post-graduate students, and researchers. They are not just students, they are researchers. They are not just students, they are researchers.



NOAA-CREST



Are you looking for a career in cutting-edge science and technology?

Then your academic records may earn you a fellowship at the National Oceanic & Atmospheric Administrations Cooperative Remote Sensing Science & Technology (NOAA-CREST) Center at City University of New York in the heart of New York City.

Your Benefits as a CREST Fellow:

- Work at CREST facilities
- Attend Seminars, Conferences
- Visit various NOAA facilities across the nation
- Work with NOAA Scientists
- NOAA funded scholarship programs
- Opportunities for professional careers at NOAA or other Federal, State and Local Agencies and Industries alike...

Work with our experienced faculty members on innovative research in Remote Sensing applications on:

- Climate & Air Quality
- Coastal Water Quality
- Precipitation and Water Resources
- Land & Hydrology
- Data Compression

Eligibility/Requirements:

US Citizen
 GPA 3.0 and above
 Matriculated Student (undergraduate, graduate) at City University of New York (CUNY) or other CREST partners.

How to contact us:

Visit us at: www.cuny.edu/noaa-crest
 Call us at: 212-650-8099
 Email us: noaa-crest@cuny.edu

Does the oceanic mystery and the earth's ever-changing environment fascinate you, then CREST could be your GATEWAY to an exciting professional career....Come join us and explore it...

Fellowship Package

(Includes Tuition Fees)

- \$8,000 to \$10,000 per year for Undergraduates
- \$18,000 to \$30,000 per year for MS and PhD
- \$2,000 to \$3,000 for Summer Internships

Crest Partners

University

- The City University of New York
- Hampton University
- University of Maryland, Baltimore County
- University of Puerto Rico, Mayaguez
- Bowie State University

Industries

- Raytheon
- Northrop Grumman

National Oceanic and Atmospheric Administration- Cooperative Remote Sensing Science & Technology Center (NOAA-CREST Center)

NOAA|CREST

The City University of New York
www.cuny.edu/noaa-crest
 212-650-8099



Hispanic Association of Colleges and University (HACU) Conference, Colorado, October 11-13, 2008

RETENTION MODEL CASE

HS-Higher degrees

HS-UG-MS



**Eaton Chad
Oliver**

HS-UG-Northrop Grumman



Ankur Agarwala

MS- to-PhD (joint CCNY-UPRM program)



Ana Picon

MS- to-PhD-to-Post Doc



**Yajaira
Mejia**

UG-to-Grad and Intra-CREST Student Exchange

UG-MS-PhD-Northrop Grumman



Nikisa Jordan

UG-MS-School Teacher



Kamonayi Mubenga

MS- to-PhD-to-Northrop
Grumman



Leona Charles

Seminars Series

CREST featured more than 135 seminars during 2006-08 and more than 300 since 2001-02. More than 40 invited speakers from NOAA

Student Exchange Programs within CREST – BSU; UPRM; UMBC and Cooperative Institutes – CIMSS; CICS; CIRA.



Training & Mentoring

- Students gain hands-on experience
- Attend National and Local Conferences & Workshops
- Attend CREST Monthly Seminar Series
- Tracking students performances each semester
- Students Technical Seminar Series to enhance their presentation skills and track their research performance.



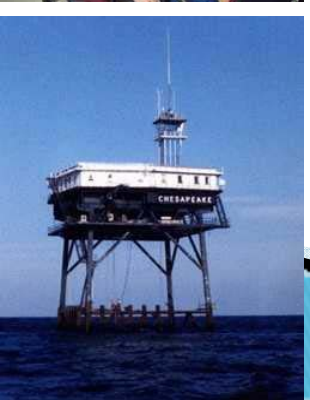
Student Early Career Development

Summer Student Exchange Program at NESDIS/CoRP (2006-08)

Each year since 2006, several students from CREST had the opportunity to visit NESDIS' Cooperative Institutes (CIs) as a part of their Early Career Development program.

This program helps CREST graduate (MS and PhD) students to obtain hands-on experience on software and techniques relevant to their research projects

This program which is funded by CREST Technical Monitor & Director of NESDIS/STAR Dr. Al Powell, has proven extremely beneficial to our students and has also helped strengthened CREST research collaborations with NOAA/NESDIS scientists.



Student Early Career Development

S.	Name of Student/Level	CREST Affiliation	NOAA lab/CI	NOAA Scientist
2006 August 21-25, 2006				
1.	Yajaira Mejia, PhD	CUNY	CICS, MD	Ralph Ferraro
2.	Nasim Nourozi, MS-PhD	CUNY	NESDIS/CICS	Bob Kuligowski
3.	Chris Spells, Masters	HU	CIMSS, WI	McIDAS/Dee Wade
4.	Melissa Yesalusky, Masters	HU	CIMSS, WI	McIDAS/Dee Wade
5.	Sydney Paul, Masters	HU	CIMSS, WI	McIDAS/Dee Wade
6.	Eduardo Hernandez, PhD	CUNY	CIMSS, WI	McIDAS/Dee Wade
7.	Bernard Mhando, MS-PhD	CUNY	CIMSS, WI	McIDAS/Dee Wade
8.	Cecilia Hernandez, PhD	CUNY	CIMSS, WI	McIDAS/Dee Wade
9.	Rouzbeh Nazari, PhD	CUNY	CIRA, CO	Mark DeMaria
10.	Andrew Maroko, PhD	CUNY	CICS, MD	Bruce Ramsey

	August-September 2007	Affiliation	NESDIS/CI lab	NESDIS/CI Scientists
1.	Melissa Yesalusky, PhD	HU	CIMSS, WI	Bob Holtz
2.	Christopher Spells, PhD	HU	CIMSS, WI	Tim Olander; Chris Velden Jason Dunion
3.	Cecilia Hernandez-Aldarondo, PhD	CUNY	CICS, MD	Ralph Ferraro
4.	Bernard Mhando, MS-PhD	CUNY	CICS, MD	Bob Kuligowski
5.	Heather Glickman, PhD	CUNY	CICS, MD	Shobha Kondragunta, Ingrid Guch
6.	Ali Amirrezwani, MS	CUNY	CIRA, Fort Collins	Steve Goodman; <u>Rutledge</u>
7.	Nasim Nourozi, PhD	CUNY	CIMSS, WI	Ralph Petersen; Bob Aune Tim Schmidt; Kris Bedka Wayne Feltz

August 13-16, 2008

1.	Ruhul Amin, Ms-PhD	CUNY	CIOSS, OR	Pete Strutton
2.	Julia He, PhD	CUNY	CIRA, Fort Collins	Dr. John Forsythe Dan Bikos and Dr. Doug Braun Dr. Fletcher and Dr. Zupanski Prof. Kummerow Stan Kidder
3.	Hamed Reza Nourozi, PhD	CUNY	CIRA, Fort Collins	
4.	Marzieh Azarderakhsh, PhD	CUNY	CIRA, Fort Collins	
5.	Javier Mandez, PhD	UPRM	CIRA, Fort Collins	
6.	Melvin Cardona, PhD	UPRM	CIRA, Fort Collins	

August-September 2009

	Name of the Student	Affiliation	NESDIS/CI labs	NESDIS/CI Scientists
1.	Ana Picon, PhD	CUNY	CIMSS, WI	Dr. Andrew Heidinger
2.	Julia He	CUNY	CIMSS, WI	Dr. Andrew Heidinger
3.	Lina Cordero	CUNY	CIMSS, WI	Dr. Dave Turner
4.	Kibre K.	CUNY	CICS, MD	Dr. Bob Kuligowski
5.	Alvaro Gonzalez	CUNY	CIRA, CO	Dr. Andy Jones

Other Early Career Development Program at CREST

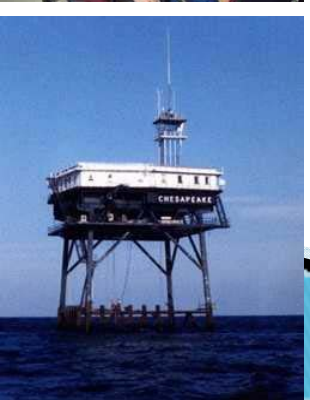
USGS internships

CREST Undergraduates - **Ankur Agarwala**, **Lin Lin**, and a number of ESE program students were offered USGS internship during 2006-08.

Northrop Grumman Internships and Jobs

Dr. Leona Charles, a CREST graduate (2008) was hired as Space Systems Engineer.

In addition **Moran Dagan** and **Ankur Agarwala** were offered NG internships and they are continuing their internships.



Other Early Career Development Program at CREST

Corry Ip, a CREST-ESE (Earth System Science and Environmental Engineering) graduate continues her higher studies at MIT

Other internships offered to CREST graduates are:

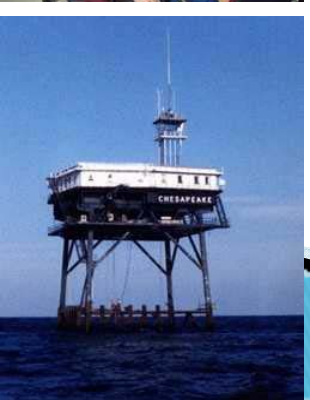
ConEd Gold Program

GE internships

MTA Environmental Internships

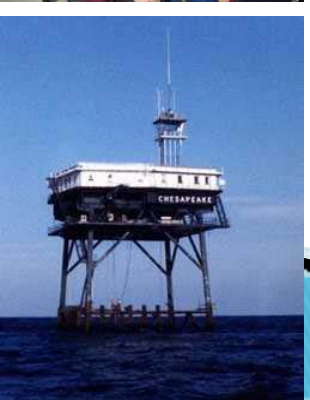
NYC DEP

Internship Offers are underway from NYS/DEC but was not filled last year.



Other Early Career Development Program at CREST

Mr. Ruhul Amin, who just graduated as CREST doctoral students (defended his thesis in September 2009) and did internship (summer 2009) at Naval Research Laboratory at Stennis Mr. Amin has been offered a Post Doctoral Scientist job in the NRL lab.



CREST GRADUATES – Success stories

Federal Job – NOAA



Martin Yapur (2002)



Michael Edwards (2004)



Kwan-yin Kong (2006)



Marco Vargas (2006)

Industries



Leona Charles (2008) – Northrop Grumman



Juan Arevalo (2006) – Michael Baker, Inc. NY

Academia



**M. Z. Rahman, Faculty at LaGuardia
Community College, CUNY**



**Viviana Vladutescu, faculty at New
York City College of Tech, CUNY**



**Yasser Hassebo, Faculty at
LaGCC, CUNY**

NOAA/NESDIS Cooperative Institute



Min Min Oo, CREST doctorate graduate, is currently working as Research Associate at SSEC (Space Science & Engineering Center at the University of Wisconsin-Madison).

International Research Institutions



Dr. Ben Herman, a CREST graduate and currently a CREST Post Doctorate, won a NSF International Fellowship at [University of Helsinki \(Finland\)](#) to continue his work



Dr. Mathias Jerg, a CREST Post Doctorate, took a position with **ESA (European Space Agency)** in Canada

CREST Students Association (City College Student Club Chapter with an exec. board)

Mission – to develop and evolve as Leaders in field of Science & Technology

Educational

- On campus students technical seminars aimed at increasing knowledge base
- Workshops to encourage peer mentoring and support.
- Museum Trips to engage students in science inquiry.

Social Activities

- Picnics, dinners, party's that include games.
- Volunteer work – Visit a High School and conduct science workshops

Communication

- Own Website; Facebook; twitter to connect with all other peers and fellow CREST students.

SLOGAN

Analyzing + Creating = Achieving a Rising Future



NOAA's Education Mission:

To advance environmental literacy and promote a diverse workforce in ocean, coastal, Great Lakes, weather, and climate sciences encouraging stewardship and increasing informed decision making for the Nation.

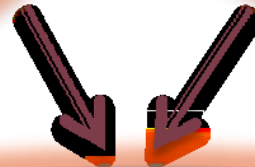
NOAA's 20 years (2009-29) **Education Strategic Plan** has two primary goals:

Goal 1: Environmental Literacy

An environmentally literate public supported by a continuum of lifelong formal and informal education and outreach opportunities in ocean, coastal, Great Lakes, weather, and climate sciences.

Goal 2: Workforce Development

A future workforce, reflecting the diversity of the Nation, skilled in science, technology, engineering, mathematics, and other disciplines critical to NOAA's mission



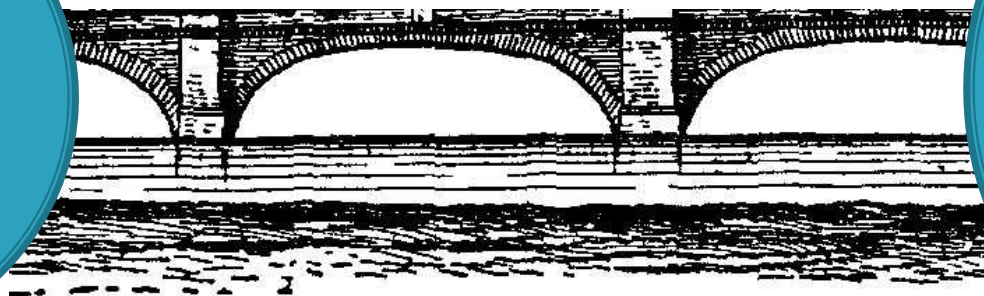
CREST Goals and Missions
To train students in NOAA (STEM) sciences to join NOAA's workforce

More extensive “educational” collaboration with NOAA/NESDIS

- Seminar/Webinar Series (for students, post docs, junior scientists, faculty members) – STAR-CREST seminar series??
- School level partnering/internship – for e.g. NOAA’s Educational Opportunities for Students
<http://www.magazine.noaa.gov/stories/mag201.htm>
- Students mentoring by NOAA/NESDIS Scientists (esp. PhD level)
- NESDIS Scientists be on PhD students Doctoral committee.
- Expand Teachers training program at CREST



CREST
Graduates
Trained in
NOAA
Sciences



NOAA
Workforce