JPSS-SPARKS

Report on
JPSS Summer Internship Training -2016 for
Grooming the Next Generation Cadre of JPSS Scientists
(June 13-August 13, and Beyond)

By

Murty Divakarla and IMSG Team at NOAA/STAR
JPSS-STAR Science Teams Members

Shakila Merchant
City University of New York (CUNY)/CREST

JPSS – Students Professional and
Academic Readiness with Knowledge in Satellites (JPSS-SPARKS)

Many Thanks to Mitch Goldberg for his encouragement.

Inception to Action

JPSS --> CUNY --> IMSG

CUNY/IMSG

- CUNY-IMSG JPSS Education Outreach Collaboration Initiative
  - UMD-Eastern-shore, Princess Anne (2014), AMS (Jan 2015), March 2015.
  - Dr. Shakila Merchant (CUNY); Dr. Murty Divakarla and Dr. Le Jiang (IMSG)

IMSG

- Training/Workshop Design
  - Dr. Murty Divakarla, Dr. Mike Wilson, Tom King, Shanna Sampson, Dr. Valerie Mikles, and Dr. Bigyani Das

IMSG Implementation

- Technical Team Lead: Dr. Mike Wilson
  - Contributors: Dr. Mike Wilson, Tom King, Dr. Anil Kapahi, Claire McCaskill, Dr. Valerie Mikles, Yunhui Zhao, Dr. Murty Divakarla, Dr. Bigyani Das, Zhuo Zhang, and Shanna Sampson

CUNY

- CUNY- Graduate Students – Arrived to IMSG College Park, June 13, 2016.

CUNY/CREST-IMSG Training Program

- CUNY/CREST partnered with IMSG to provide internships to graduate students to become familiar with the JPSS program and research to operations process in STAR. IMSG organized the training program.
  - Phase 1: First 4 weeks.
    - IMSG teams with JPSS Program/STAR scientists to provide student training.
  - Phase 2: Week #5 and beyond.
    - Students focus on their research ideas with mentors.

Phase 1: JPSS Research < -- > R2O

Phase 1: Morning Workshop

Led primarily by

IMSG staff

- R2O Concepts
- Programming Languages, Standards
- Data Formats
- Industry-Govt. Liaison
- Requirements/Verification
- Enterprise Systems
- Configuration Control

- **Focused on the skills needed specifically for research-to-operations (R2O).**
  - How science and programming interact in the R2O environment.
  - How changes are integrated through the review process.
  - Opportunity to be part of a real working environment
  - Improve overall computer programming skills.
  - Show students how to write code to standards.

Phase 1: JPSS Research < -- > R2O

- JPSS Overview
- Suite of Instruments
- Geophysical Retrievals/Products
- Cal/Val Process
- User Applications
- ICVS/Long Term Monitoring
- NWP and (JPSS) data Assimilation

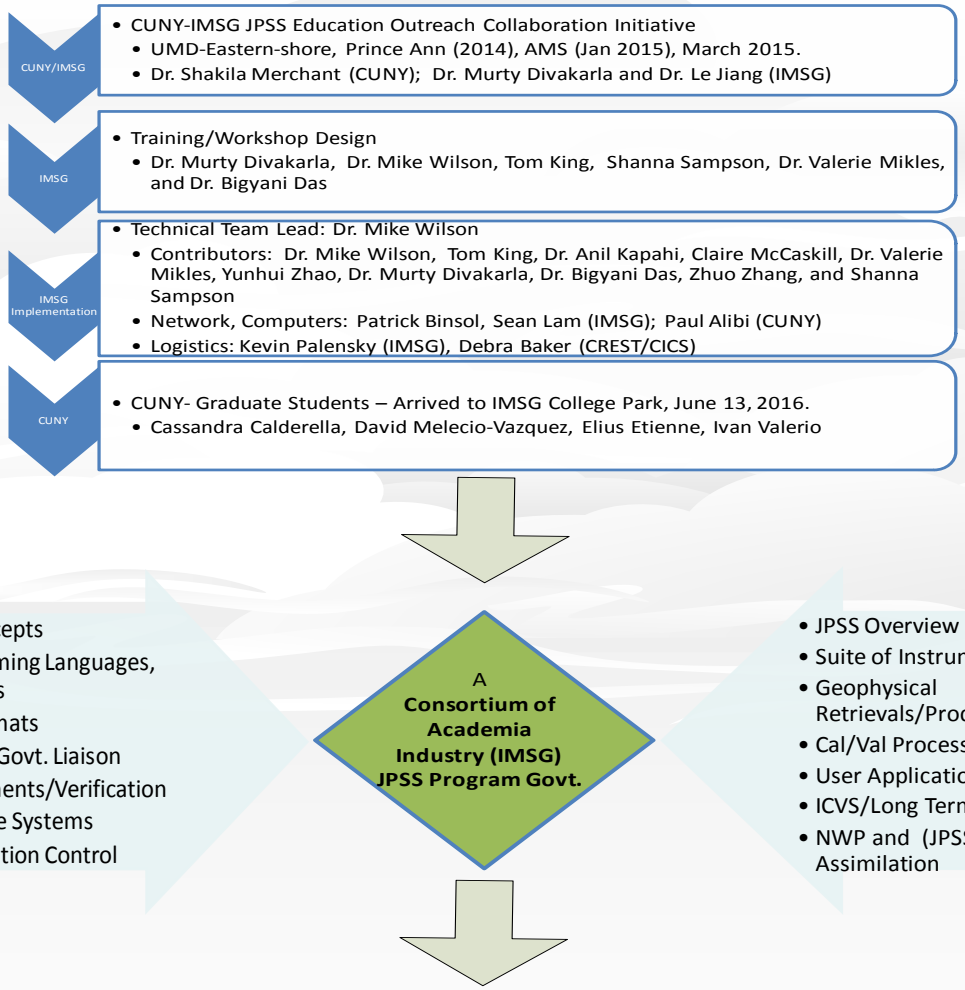
Phase 1: Afternoon Seminars

Led primarily by

NOAA JPSS/STAR Scientists

- Expose students to the JPSS mission, products, and pioneering research from the state-of-the-art instrument complements.
- Thanks to many JPSS STAR science team members and JPSS Program Office for their enthusiastic response and seminar presentations.

Phase 1: JPSS Research < -- > R2O



Phase 1: IMSG-CUNY JPSS Summer 2016 Internship Training/Workshop
Grooming the Next Generation Cadre of JPSS Scientists

Good Luck to You All

IMSG-JPSS Training Participants

- Cassandra Calderella
- David Melecio-Vazquez
- Elius Etienne
- Ivan Valerio

STAR Interns and employees Benefited from the Training

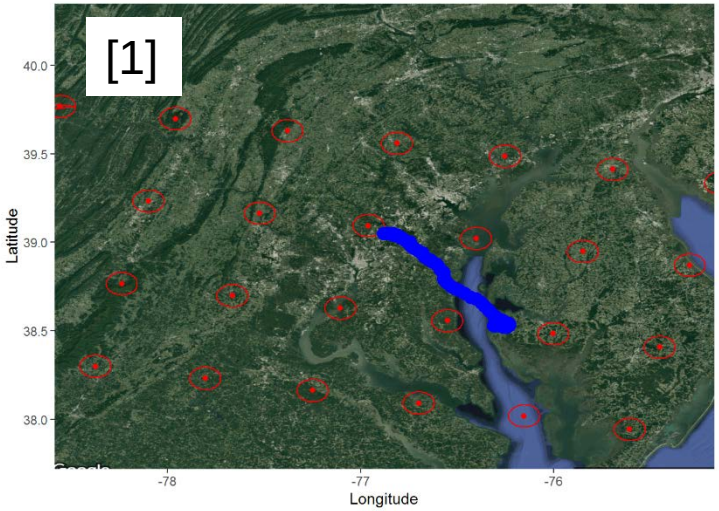
- Steven Buckner
- Equisha Glenn
- Tracey Dorian (IMSG)

STAR Interns part of this presentation

- Carlos Luis Pérez Díaz

Poster Presentation: Tuesday (8/9)
Thermal Boundary Layer Retrievals over the Washington D.C. Metro Area using NUCAPS-EDR

David Melecio-Vazquez
Mentor(s): Dr. Mark Liu, STAR & Dr. Nicholas Nalli, IMSG
Affiliation: IMSG-CUNY Student Training Program
dmeleci00@citymail.cuny.edu

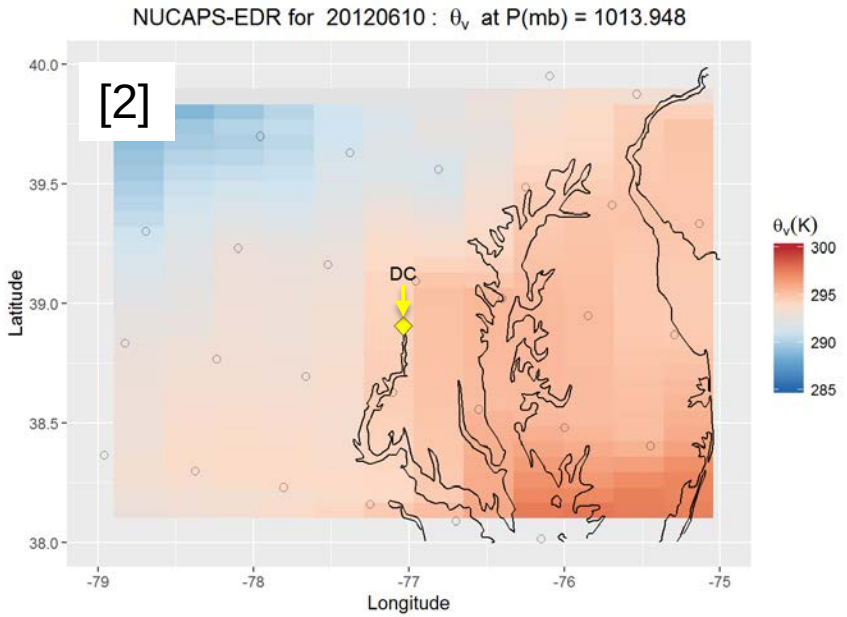


Objectives of this poster:

- Evaluation of Boundary Layer Retrievals.
- Observation of Vertical Profiles During Convective Boundary Layer Conditions.

Future/Ongoing Work:

- Observe urban-rural temperature differences in space: horizontal and vertical using NUCAPS-EDR profiles.



[1] NUCAPS-EDR Field-of-Views (red) and the RAOB launch path (blue) over the Washington D.C. Metro Area.

[2] Surface virtual potential temperature, θ_v, interpolated over the Washington D.C. metro area.

Poster Presentation: Tuesday (8/9)
Validation of Suomi NPP OMPS-LP Ozone Measurements

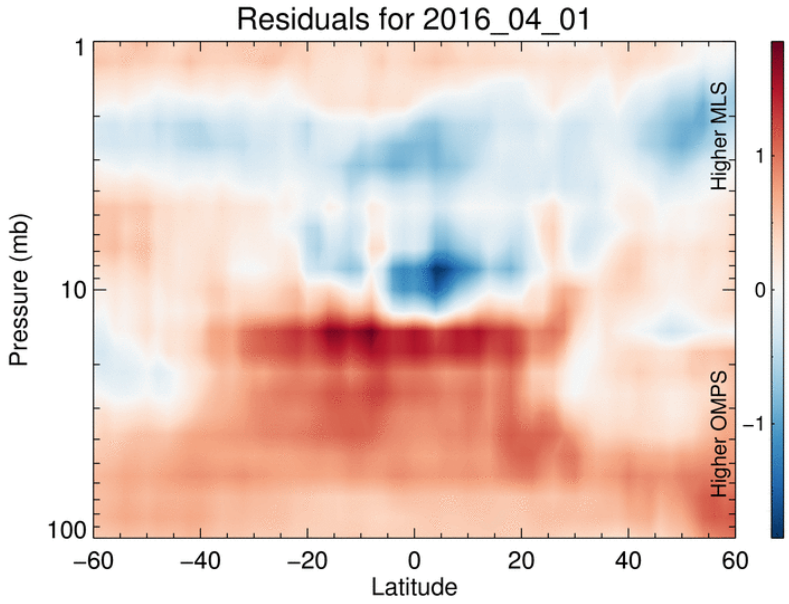
Steven Buckner
Mentor: Dr. Larry Flynn, STAR
Affiliation: NOAA-CREST/Hampton University SSIO
stevenb1@umbc.edu

Objectives of this poster:

- Show validation of OMPS Limb Profiler ozone volume mixing ratio measurements by comparing them to MLS
  - Daily Global Averages
  - Collocation Comparisons

Future/Ongoing Work:

- Long-term comparisons and statistics
- Using OMPS/MLS validation to later validate SAGE III ISS when it launches in November, 2016



Daily global average residual measurements for April, 2016

Validation of SMAP Soil Moisture Data using Field Measurements in New York

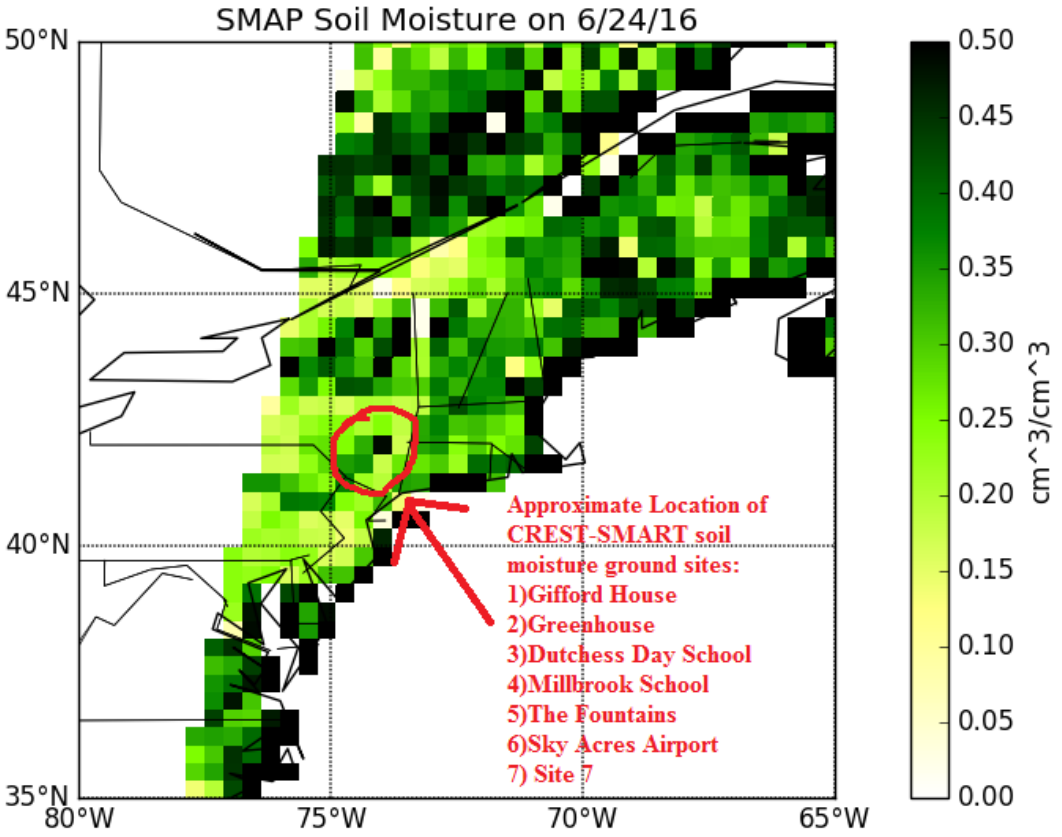
Cassandra Calderella
Mentor: Dr. Xiwu Zhan, STAR
Affiliation: IMSG-CUNY Student Training Program
ccalder001@citymail.cuny.edu

Objectives of this poster:

- Collect in situ data from CREST-SMART ground stations.
- Collect soil moisture data from SMAP for the same latitudes and longitudes as the ground stations.
- Perform statistical analysis for data validation.

Future/Ongoing Work:

- Apply the same validation technique using field measurements in Puerto Rico (NRCS' SCAN Network)
- Repeat the process with other satellite instruments such as SMOS and GCOM-W1.



SMAP Level 3 Soil Moisture in the Northeast, showing the location of the CREST-SMART ground stations.

Poster Presentation: Thursday (8/11)

Detecting spatiotemporal changes in vegetation using polar orbiting satellite data for the past 35 years - Case study: Haiti.

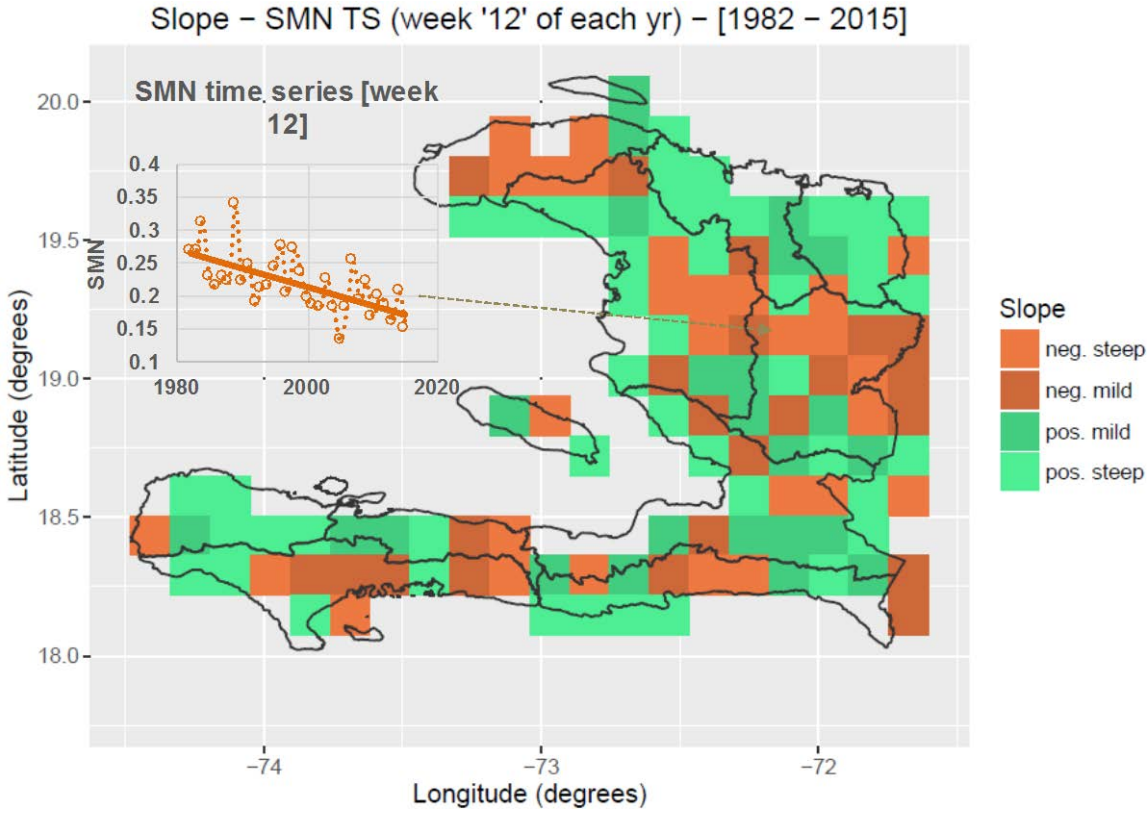
Elius Etienne
Mentor: Dr. Felix Kogan, STAR
Affiliation: IMSG-CUNY Student Training Program
eetienn000@citymail.cuny.edu

Objectives of this poster:

- Detecting the trend in vegetation for different period of the year
- Validate the findings with ground based data

Future/Ongoing Work:

- Expand the work to larger regions/countries and detect the trend in vegetation across latitudes (north-south transect).



Poster Presentation: Thursday (8/11)

An evaluation of the VIIRS radiative signal from the Fort McMurray fire

Ivan F. Valerio

Mentor: Dr. Ivan Csiszar, STAR

Affiliation: IMSG-CUNY Student Training Program

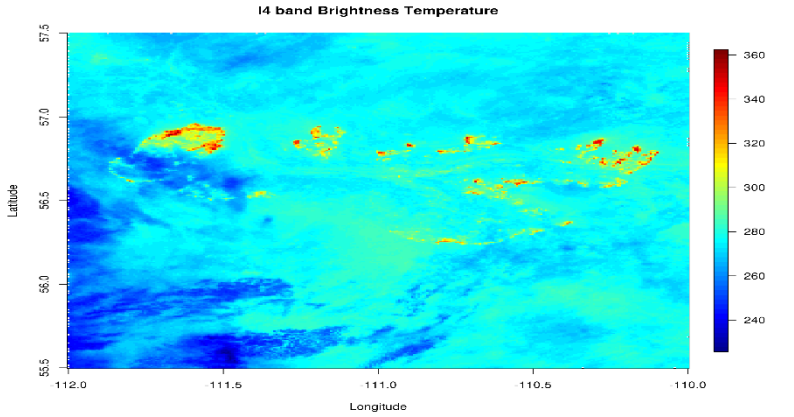
valerioif@gmail.com

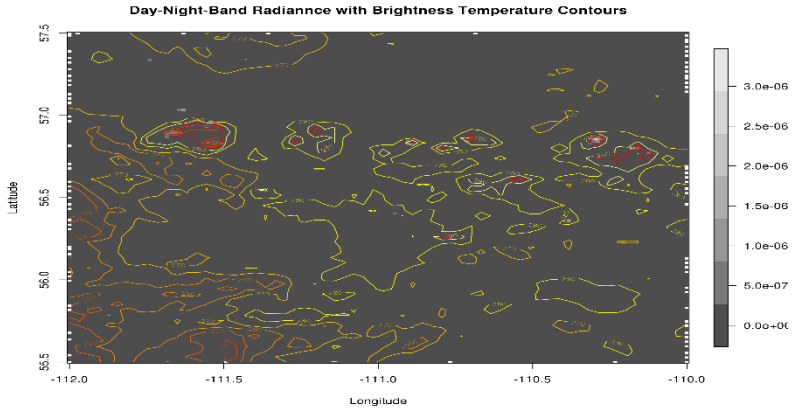
Objectives of this poster:

- Observe signals detected by VIIRS SDR
- Determine pixels with saturation
- Apply statistical analysis
- Comparison of various bands observing the same event

Future/Ongoing Work:

- Observe other possible cases of pixel saturation
- Generate more statistics to a wider set of events, and determine saturation level





Figures on brightness Temperature distribution on McMurray fire site

Poster Presentation: Thursday (8/11)
MiRS and HUT Snow Microwave Emissivity Comparison with In Situ Microwave Emissivity from CREST-SAFE and SSMIS retrievals

Carlos Luis Pérez Díaz

Mentors: Quanhua "Mark" Liu and Christopher Grassotti (STAR)

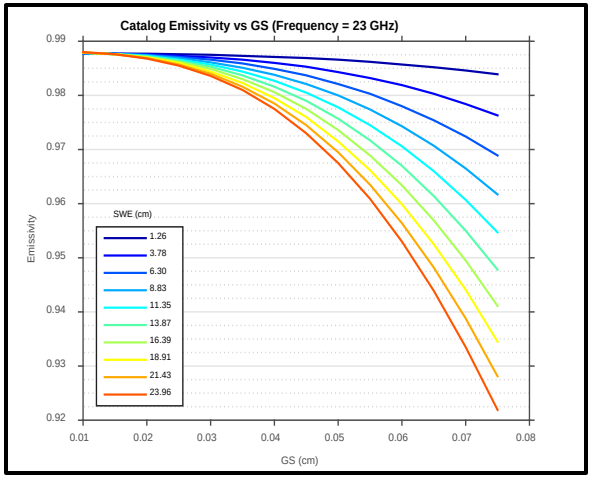
Graduate Research and Training Scholarship Program

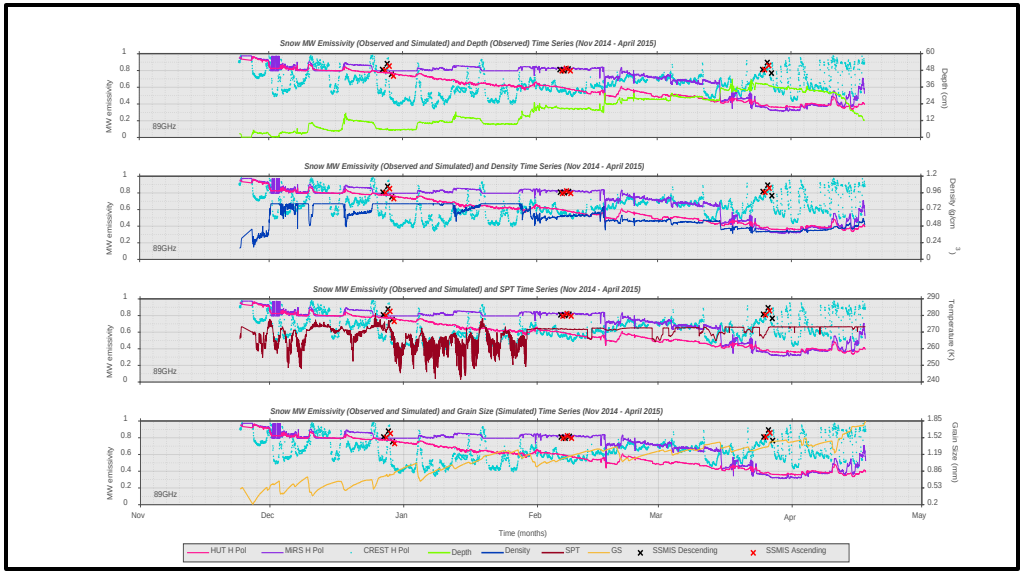
Objectives of this poster:

- Compare MiRS and HUT snow MW emission retrievals with in situ derived snow MW emission at CREST-SAFE for winter 2015
- Validate SSMIS analytic MW emission retrievals with in situ derived snow MW emission at CREST-SAFE for selected cases of the 2015 time series

Future/Ongoing work:

- Quantitative comparison between MiRS and HUT for winter 2015
- Integrating snow wetness onto MiRS for snow MW emission simulations





Evaluation Metrics

- Metrics were given during Week #1 and Week #5.
- Week #1 served as a baseline to adjust planned lectures, and Week #5 tested knowledge immediately after workshops ended.
- Students already showed knowledge of Linux and Python Programming
- We were able to build from the basic understanding to language-specific skills

Performance on the IMSG-CUNY Pre-Test & Post-Test

	Topics Covered	Week 1	Week 5
1	General Program Knowledge of the JPSS Mission	10%	100%
2	Coding in Fortran 90, C++, and PERL.	10%	75%
3	Coding Standards/Configuration Management	0	50%
4	Algorithm Change Process	0	25%

Knowledge increased across the board, especially in JPSS Program and coding ability.

Summary

- IMSG-CUNY put their best foot forward to strengthen the ability of the young generation towards
  - State-of-the art JPSS instruments, algorithms for Sensor and Environmental Data Records (SDR/EDRs) and product applications.
  - Programming languages used operationally and steps involved in putting research into operations.
- At the end of the program you will see how a small additional investment in time at the beginning of their career path provides enormous amount of returns in terms of time saving in learning required research and technical skills.
- We hope to include students from other universities next year; Explore similar outreach activity/training for other satellite programs (GOES-R), global modeling (NCEP/GFS), and Radiative Transfer.
- A website with links to presentations is in preparation

JPSS-SPARKS 2016

JPSS Program Office, NCWCP Scientists who delivered talks on JPSS Science and Data Products, and Valuable Advice to Students	
Mitch Goldberg, JPSS Program	Fuzhong Weng, STAR
Arron Layns, JPSS Program	Denis Tremblay, (SDPI)
Lihang Zhou, STAR	Larry Flynn, STAR
Walter Wolf, STAR	Shobha Kondragunta, STAR
Jaime Daniels, STAR	Ivan Csizar, STAR
Corey Guastini, EMC	Jeff Key, STAR
Wesley Ebisuzaki, NCEP	Ralph Ferraro, STAR
Changyong Cao, STAR	Lori Brown, (SCI)
Many IMSG Scientists on Programming, Research, CM	Ninghai Sun, (STAR)

IMSG www.imsg.com

CUNY The City University of New York

NOAA CREST

Thank You

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