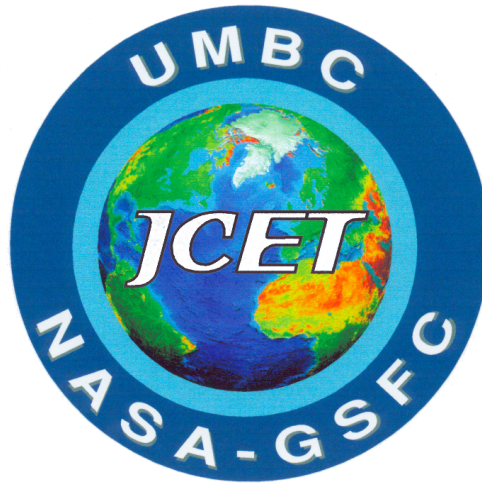


JCET COOPERATIVE AGREEMENT NNX15AT34A

YEAR 3 QUARTERLY REPORT # 2

PERIOD COVERED: JANUARY 1 – MARCH 31, 2087



Dear GSFC Colleagues,

The new JCET cooperative agreement has completed the second quarter of its third year. This report describes the research of the JCET faculty, funding proposals that have been submitted the second quarter of year two, as well as education and outreach efforts of the Center, changes in personnel and upcoming events.

We are delighted to report also on the ever-strengthening partnerships between JCET, Goddard and the UMBC academic departments that relate to JCET's mission. With great pleasure, we submit this quarterly report highlighting our ongoing partnership with NASA Goddard Space Flight Center.

Sincerely,
Belay B. Demoz, JCET Director, and the JCET team.

HIGHLIGHTS: *A SUMMARY OF NEWSWORTHY JCET ACTIVITY.*

AWARDS

AMS Editor's Award

Ali Tokay (612/JCET) received the American Meteorological Society (AMS) Editor's Award for his contribution to the Journal of Applied Meteorology and Climatology. The citation reads, "For frequent and in-depth reviews of manuscripts related to precipitation microphysics and estimation, and remote sensing using radar." The award was presented by Roger Wakimoto, AMS President, during 98th AMS annual meeting in Austin, Texas.

Code 613: Best First Authored Paper Award (1/19/18)

Tamás Várnai (JCET), "For his Journal of Geophysical Research paper providing new insights on aerosol properties in the proximity of clouds."

NOTEWORTHY

Time Magazine coverage of Antarctic research results

Christopher Shuman (JCET) and Nathan Krutz (UMBC Physics PhD 2009, and now at GSFC) both collaborated with *Time Magazine* (January 29, 2018) on the article, "The Great Crack-Up," on the impact of climate change on Antarctica.



JCET Graduate joins GSFC

Reed Espinosa (recent UMBC/Physics/JCET graduate) joined the Dark Target Retrieval group (Code 613) as a NASA Postdoctoral Fellow. He will be advised by Rob Levy (Code 613).

Noteworthy talks/presentations at Goddard:

Valerie Casasanto (610/JCET) supported the first Earth Science EPO EXPO on January 19. It was well attended with close to 40 participants.

Jae N. Lee (613/JCET), Joel Susskind (610), Dong L. Wu (613), and Lena Iredell (610/SAIC), presented a poster entitled "Seasonal Changes in OLR over Arctic as Depicted by AIRS, CERES, and TOVS" at Program for Arctic Regional Climate Assessment (PARCA) 2018 meeting, held at GSFC, January 23.

Valerie Casasanto (610/UMBC) presented a poster at the 11th Annual Sciences & Exploration Directorate New Year's Poster Party on January 30 entitled, "Art as a key tool for engaging the public with ICESat-2." Valerie also demonstrated the ICESat-2 Altimeter Exhibit.

Valerie Casasanto (610/ JCET) participated in the ICESat-2 Friends and Family Day at NASA Goddard, February 3, in anticipation of ATLAS being shipped to Arizona to be integrated with the spacecraft. Casasanto led a variety of hands-on activities including an EO for Kids color by number Greenland ice activity. Over 300 friends, family, and neighbors of the mission attended the event.

Valerie Casasanto (610/JCET) provided a mission overview of ICESat-2 and demonstration under the altimeter exhibit for 49 Frederick County Public School students on February 28 for their Earth System Science Research Course Student Visit to Goddard.

External interactions (HQ, universities, other Gov't organizations, conferences, etc.)

The following posters and presentations were given by 610 colleagues at the 98th AMS Annual Meeting in Austin, TX, January 7-11, 2018:

Xiaohua Pan (614/UMD), Mian Chin (614), Zhining Tao (614/USRA), Donchul Kim (614/USRA), **Huisheng Bian (614/JCET)**, Tom Kucsera (614/USRA) presented a poster titled "Interactions between Asian air pollution and monsoon system: South Asia (ROSES-2014 ACMAP)".

Jae N. Lee (613/JCET) presented "Climatology and ENSO variation of Outgoing Longwave Radiation as Depicted by TOVS, AIRS, CERES, and MERRA2".

Dan MacMillan (61A/NVI) and Frank Lemoine (61A) were co-authors of the presentation: "Analysis of the DORIS, GNSS, SLR, VLBA and gravimetric time series at the GGOS core sites." Other authors included Guilhem Moreaux (CLS), Vincenza Luceri (E-GEOS), **Erricos Pavlis (JCET)**, Sylvain Bonvalot (IRD) and Jerome Saunier (IGN).

Glenn Wolfe (614/JCET) gave two talks: "Formaldehyde Variability in the Remote Troposphere" and "A New NASA Capability to Quantify Regional CO₂ and CH₄ Surface Exchange and Improve Flux Model Performance."

Kevin Turpie (616/JCET) attended the AGU-ASLO-TOS Ocean Sciences Meeting in Portland, OR from February 11-16. Turpie hosted a Town Hall meeting titled "The Future of Remote Sensing of Coastal, and Inland Waters." He also co-chaired a session titled "From watersheds to the open ocean: advances in remote sensing for monitoring water quality, food security, ecosystems, and change."

Petya Campbell (618/JCET) gave two presentations at the OPTIMISE: 'Innovative Optical Tools for Proximal Sensing of Ecophysiological Processes' Final Conference, held February 21- 23 in Sofia, Bulgaria. The presentation related to Reflectance and fluorescence to better understand plant functioning and eco-physiological processes. Petya presented her work "Comparing the diurnal and seasonal dynamics of chlorophyll fluorescence and xanthophyll cycle, for two vastly different canopies." The work contributes to the research on spectral bioindicators of ecosystem function, led by E. Middleton (618). The poster contributed to Session 3: Unmanned Aerial Vehicles (UAVs) for vegetation monitoring. The title of the poster was: Next Generation UAS Based Spectral Systems for Assessment of Vegetation Function. This work is supported by NASA/ROSES AIST2014 Grant NNH14ZDA0001N, technology lead D. Mandl (581) and Spectral Bio-indicators of Vegetation Function Effort, science lead E. Middleton (618).

Alexander Marshak (613), Dong Wu (613), **Tamás Várnai (613/JCET)**, Nickolay Krotkov (614), **Fred Huemmrich (Code 618/JCET)**, and James Butler (618) attended the Deep Space Gateway (DSG) Science Workshop in Denver CO, February 27 - March 1. The purpose of this workshop was to discuss what science could be leveraged from a DSG. They gave presentations at the Earth Observation session on the instruments that can be used from the DSG to acquire Earth scientific data.
<https://www.hou.usra.edu/meetings/deepspace2018/>

Brian Campbell (610W/GST), **Valerie Casasanto (610/JCET)**, and Mike Taylor (618/SSAI), ran the ICESat-2 altimeter exhibit at the annual Maker Faire at George Mason University in Fairfax, VA, on March 18.

The NASA Applied Remote Sensing Training (ARSET) program conducted a three-session advanced webinar series entitled, "Data Analysis Tools for High Resolution Air Quality Satellite Datasets." Preliminary estimates indicate this training was attended by 424 participants representing over 300 organizations from 66 countries. This course was organized and instructed by Pawan Gupta (614/USRA) and Melanie Follette-Cook (614/MSU) and supported by **Brock Blevins (614/JCET)** and Elizabeth Hook (613/SSAI). High resolution air quality data is helpful for monitoring urban air pollution. In this webinar, participants learned how to map and analyze high resolution Level-2 air quality data through hands-on exercises. The training covered aerosol optical depth (AOD) data from MODIS and NO2 and SO2 data from OMI. The ARSET program is managed by **Ana Prados (614/JCET)**.

NEW TASKS:

None this quarter.

PROPOSALS: *LISTING OF PROPOSALS AWARDED AND SUBMITTED*

AWARDED

Solicitation/ Funding Agency	UMBC Role	Name	Sponsor	Title
Los Alamos National Laboratory (LANL)	PI	Stephen Guimond	LANL	The dynamics of turbulent buoyant plumes
NASA	Co-I	Pengwang Zhai	NASA	Atmospheric correction for complex scenes using co-located polarimetric and ocean color observations
NASA	PI	Petya Campbell	NASA	Prototyping MuSLI canopy chlorophyll content for assessment of vegetation function and productivity
NASA	Co-I	Fred Huemmrich	NASA	Prototyping MuSLI canopy chlorophyll content for assessment of vegetation function and productivity
NASA	Co-I	Petya Campbell	University of Wisconsin - Madison	Vegetation functional amplitudes along a rainfall gradient in Indian ecosystems using AVIRIS-NG
NASA	PI	Ruben Delgado	SSAI	Mixing Layer Height Algorithm for Environmental Protection Agency Photochemical Assessment Monitoring Sites
NASA	PI	Larrabee Strow	NASA	AIRS Plus CrIS/IASI Multi-Decadal Trends and Anomalies

SUBMITTED

Solicitation/ Funding Agency	UMBC Role	Name	Sponsor	Title
Maryland Department of the Environment	PI	Ruben Delgado	Maryland Department of the Environment	The UMBC Monitoring of Atmospheric Pollution: Tropospheric Profiling of Aerosol and Gases in Baltimore- Washington Metropolitan Area for Air Quality Applications
NASA/GSFC	PI	Larrabee Strow	NASA/GSFC	The AIRS Radiative Transfer Algorithm
NASA	PI	Larrabee Strow	JPL	AIRS Climate and calibration Algorithms
LANL	PI	Stephen Guimond	LANL	The dynamics of turbulent buoyant plumes
NASA	Mentor/ Student	Belay Demoz / Zhifeng Yang	NASA	Improving Air Quality Forecasts of Ozone and Particulate Matter: Modeling- Observation Integrated Study
NASA	Mentor/ Student	Pengwang Zhai / Lipi Mukherjee	NASA	Development of a consummate semi- analytical model for polarized ocean reflectance
NASA	Co-I	Valerie Casasanto	Minnesota - Duluth	Earth Mars Connections Collaborative (EMC2): Preparing Next Generation Indigenous Astronomers
NASA	PI	Fred Huemrich	NASA	Cubesat Validation of a SWIR Imaging Spectrometer: Towards a Constellation for High Temporal Environmental Monitoring

MEETINGS AND FIELD WORK ATTENDED: *LISTING OF MEETINGS, TRAVEL*

January

Traveler	Destination	Travel Begin	Travel End	Trip Purpose
Wolfe, Glenn	MD to Austin, TX	1/6/2018	1/11/2018	Attend AMS Annual Mtg.
Tokay, Ali	MD to Austin, TX	1/6/2018	1/11/2018	Present AMS Annual Mtg.
Delgado, Ruben	MD to Austin, TX	1/6/2018	1/11/2018	Attend AMS Annual Mtg.
Carroll, Brian	MD to Austin, TX	1/6/2018	1/12/2018	Attend/present AMS Annual Mtg.
Demoz, Belay	MD to Austin, TX	1/6/2018	1/12/2018	Attend/present/awarded AMS Annual Mtg.

Nicholls, Stephen	DC to Austin, TX	1/7/2018	1/11/2018	Attend/present AMS Annual Mtg.
Lee, Jae	MD to Austin, TX	1/7/2018	1/11/2018	Attend/present AMS Annual Mtg.
Bian, Huisheng	MD to Austin, TX	1/7/2018	1/12/2018	Attend AMS Annual Mtg.
Zhang, Zhibo	MD to Austin, TX	1/7/2018	1/12/2018	Attend AMS Annual Mtg.
Turpie, Kevin	MD to Miami, FL	1/8/2018	1/11/2018	ABC LOBO Workshop Support as Proj. Co-I.
Prados, Ana	Springfield, VA to Bethesda, MD	1/9/2018	1/11/2018	Attend/present 2018 ESIP Mtg.
Evans, Keith	Local-Bethesda, MD	1/9/2018	1/11/2018	Attend 2018 ESIP Mtg.
Borda, Roberto F.	MD to Salt Lake City, UT	1/9/2018	1/12/2018	HARP support final SC integration effort.
Townsend, Hamilton	MD to Salt Lake City, UT	1/9/2018	1/12/2018	HARP final SC integration effort.
Remer, Lorraine	MD to Fort Pierce, FL	1/15/2018	1/18/2018	Lead/attend 4th PACE Science Team Mtg.
Zhang, Zhibo	MD to Orlando, FL	1/15/2018	1/18/2018	Attend 4th PACE Science Team Mtg.
Martins, J. Vanderlei	MD to Florida	1/15/2018	1/18/2018	Participation in the 4th PACE Science Team Mtg.
Huemmrich, Karl	MD to Seattle, WA	1/18/2018	1/27/2018	Attend/present NASA ABoVE Science Team Mtg.
Robinson, Joseph	MD to NASA LaRC-Hampton, VA	1/30/2018	1/31/2018	Meet with collaborators at NASA LaRC and instrument exchange at VCU Rice Ctr.
Delgado, Ruben	MD to El Paso, TX	1/31/2018	2/2/2018	CREST recruitment at University of Texas, El Paso Career Fair.

February

Traveler	Destination	Travel Begin	Travel End	Trip Purpose
Borda, Roberto F.	MD to Salt Lake City, UT	2/5/2018	2/7/2018	Research support for HARP CubeSat satellite calibration.
McBride, Brent	MD to Salt Lake City, UT	2/5/2018	2/10/2018	Research support for HARP CubeSat satellite calibration.
Turpie, Kevin	MD to Portland, OR	2/11/2018	2/19/2018	To chair and co-chair sessions at Ocean

				Science Meeting 2018 Town Hall.
Campbell, Petya	Alexandria, VA to Sofia, Bulgaria	2/19/2018	3/2/2018	Present/Participation in OPTIMIZE Workshop.
Varnai, Tamas	MD to Denver, CO	2/26/2018	3/1/2018	Attend/present at NASA Deep Space Gateway workshop.
Huemmrich, Karl	MD to Denver, CO	2/26/2018	3/1/2018	Attend/present at NASA Deep Space Gateway workshop.

March

Traveler	Destination	Travel Begin	Travel End	Trip Purpose
Abuhassan, Nader	MD to Innsbruck, Austria	3/3/2018	3/10/2018	Attend Pandora Global Network Mtg.
Cieslak, Dominik	MD to Logan, Utah	3/11/18	3/31/18	Pre-launch calibration on HARP CubeSat satellite instrument.
McBride, Brent	MD to Logan, Utah	3/11/18	3/31/18	Pre-launch calibration on HARP CubeSat satellite instrument.
Hannun, Reem	MD to Palmdale, CA	3/18/18	3/23/18	NASA ATOM Instrument upload.
Lee, Jae	MD to Ontario, CA	3/15/2018	3/24/2018	Attend the Mission Acceptance Review and Sun Climate Symposium.
St. Clair, Jason	MD to Palmdale, CA	3/16/2018	3/23/2018	Install formaldehyde and NO2 instruments on the NASA DC-8 aircraft for the ATom-4 project.
Delgado, Ruben	Local to Wash.,DC	3/18/18	3/21/18	Attend 9th Biennial NOAA EPP-MSI Forum.
Demoz, Belay	Local to Wash., DC	3/18/18	3/21/18	Attend/Present/Session Chair 9th Biennial NOAA EPP-MSI Forum.
Nicholls, Stephen	DC to Seattle, WA	3/19/2018	3/23/2018	Attend and participate in High Mountain Asia Science Team Mtg.
Abuhassan, Nader	MD to NASA LaRC-Hampton, VA	3/27/18	3/30/18	Support-Pandora spectrometer science & deployment activities.
Robinson,	MD to NASA	3/28/18	3/30/18	2 Pandora Project talks at VCU. Deliver

Joseph	LaRC-Hampton, VA			instruments to and update EPA/NASA colleagues at LaRC on Pandora developments.
Shalaby, Lena	MD to NASA LaRC-Hampton, VA	3/28/18	3/30/18	2 Pandora Project talks at VCU. Deliver instruments to and update EPA/NASA colleagues at LaRC on Pandora developments.

EDUCATION AND OUTREACH: *LISTING OF OUTREACH, GRADUATE SEMINAR, COURSES TAUGHT AND ADVISEMENT, AND STUDENT ACCOMPLISHMENTS.*

Recent Affiliations: Steven Guimond is now affiliated with the UMBC Physics Department.

Courses taught by JCET Faculty & Staff in Spring 2018:

GES 481/681: Remote Sensing, **P. Campbell** (3 credits)

PHYS 335: Physics and Chemistry of the Atmosphere, **R. Delgado/S. de Souza-Machado** (3 credits)

PHYS 622: Cloud Physics, **B. Demoz** (3 credits)

SOCY 101Y: Basic Concepts in Sociology, **K. Evans** (1 credit)

PHYS 650: JCET Seminar: Precipitation Science, **W. Olson** (1 credit)

HONR 300: Climate Change Policy, **A. Prados** (3 credits)

JCET Seminar:

The 2017-18 cohort of eight JCET graduate students participated in the JCET Seminar listed as graduate course PHYS 650, "Precipitation Science." This semester's seminar is delivered by Bill Olson (JCET). The JCET Seminar has become an important component in the professional development of these young scientists. The seminar series is open to the public and is coordinated by Dr. Susan Hoban, Associate Director of JCET.

Link to [Seminar schedule](#)

Link to [Seminar Website](#)

JCET Student Activities:

The JCET graduate students are planning the second annual Earth Day Symposium to be held at UMBC on Friday, April 20th. The symposium will be held in the Physics Building from 9 AM to 4 PM. The program will include speakers from Goddard, UMBC, the University of Maryland, George Mason University and Howard University. The Symposium is open to the public.

JCET GRA Minority University Outreach

The JCET graduate students are planning the second annual Earth Day Symposium to be held at UMBC on Friday, April 20th. The Howard University students participating in the MUREP MOO project will participate in the event.

REPORTED PUBLICATIONS : *LISTING OF REPORTS AND ARTICLES*

- Borovoi, A., Konoshonkin, A., Kustova, N., **Veselovskii, I.** (2018). Contribution of corner reflections from oriented ice crystals to backscattering and depolarization characteristics for off-zenith lidar profiling. *Journal of Quantitative Spectroscopy & Radiative Transfer*. In press.
- Campbell, J. R., Peterson, D. A., Marquis, J. W., Fochesatto, G. J., Vaughan, M. A., Stewart, S. A., Tackett, J. L., Lolli, S., **Lewis, J. R.**, Oyola, M. I., Welton, E. J. (2018). Unusually deep wintertime cirrus clouds observed over the Alaskan subarctic. *Bull. Amer. Meteor. Soc.*, 99, 27-32. doi.org/10.1175/BAMS-D-17-0084.1
- D'Adderio, L. P., Porcu, F., **Tokay, A.** (2018). Evolution of drop size distribution in natural rain. *Atmospheric Research*. doi.org/10.1016/j.atmosres.2017.10.003
- DeSouza-Machado, S., Strow, L., Tangborn, A.** (2018). *Single Footprint Retrievals using A Fast TwoSlab CCloud Representation Model*. AMT. In press.
- Lee, J. N.** (2018). Solar Cycle Variations in Mesospheric Carbon Monoxide. *JASTP, ATP* 4789. S1364-6826(17)30560-6
- Tangborn, A. V.**, Kuang, W. (2018). Impact of archeomagnetic field model data on modern era geomagnetic forecasts. *Physics of Earth and Planetary Interiors*, 276, 2-9. doi.org/10.1016/j.pepi.2017.11.002
- Veselovskii, I.**, Goloub, P., Podvin, T., Tanre, D., da Silva, A., Colarco, P., Castellanos, P., Korenskiy, M. (2018). Characterization of smoke/dust episode over West Africa: comparison of MERRA-2 modeling with multiwavelength Mie-Raman lidar observations. *Atmospheric measurements technique*, 11, 949–969.
- Werner, F., Zhang, Z.** (2018). Quantifying the impacts of subpixel reflectance variability on cloud optical thickness and effective radius retrievals based on high-resolution ASTER observations. *Journal of Geophysical Research - Atmospheres*. In press.
- Whiteman, D., Perez-Ramirez, D., **Veselovskii, I.**, Colarco, P., Buchard, V. (2018). Simulations of spaceborne multiwavelength lidar measurements and retrievals of aerosol microphysics. *Journal of Quantitative Spectroscopy & Radiative Transfer*, 205, 27-39.
- Yang, W., Marshak, A., **Varnai, T.**, Knyazikhin, Y. (2018). EPIC spectral observations of variability in Earth's global reflectance. *Remote Sensing*, 10, doi:10.3390/rs10020254.
- Yuan, T.** (2018). On the global character of overlap between low and high clouds. *JGR*. In press.

PERSONNEL:

LISTING OF PROMOTIONS:

Dr. Huisheng Bian - Senior Research Scientist

HIRES:

None this quarter.

DEPARTURES:

None this quarter.