ICESat-2: The Mission Continues

September 6, 2018: “NASA is about to launch the agency’s most advanced laser instrument of its kind into space. The Ice, Cloud and land Elevation Satellite-2, or ICESat-2, will provide critical observations of how ice sheets, glaciers and sea ice are changing, leading to insights into how those changes impact people where they live.” From Countdown to ICESat-2 Launch – counting up 10 things you should know about ICESat-2; credits include USRA’s Ryan Fitzgibbons (Lead Producer, Lead Editor), Adriana Manrique Gutierrez (Lead Animator) and Jefferson Beck (Lead Videographer), along with others, including Thomas Neumann and Thorsten Markus (Co-Lead Scientists, NASA GSFC). See https://svs.gsfc.nasa.gov/13065.

Nine days later, ICESat-2 successfully launched from Vandenburg Air Force Base, California, on September 15, 2018 on United Launch Alliance’s Delta II rocket. Signals were received from the spacecraft 75 minutes after the launch and it has been orbiting the globe ever since. The Advanced Topographic Laser Altimeter System (ATLAS) is the single instrument on ICESat-2. The precise data accumulated from ATLAS with its three pairs of two beams will allow scientists to estimate the height of Earth’s ice, particularly the annual changes of the ice sheets in Greenland and Antarctica. “With this mission we continue humankind’s exploration of the remote polar regions of our planet and advance our understanding of how ongoing changes of Earth’s ice cover at the poles and elsewhere will affect lives around the world, now and in the future,” said Thomas Zurbuchen, associate administrator of NASA’s Science Mission Directorate. ICESat-2’s four science objectives are 1) to measure melting ice sheets and investigate how this affects sea level rise, 2) to measure and investigate changes in the mass of ice sheets and glaciers, 3) to estimate and study sea ice thickness, and 4) to measure the height of vegetation in forests and other ecosystems worldwide.

From 2003-2009, the first ICESat mission recorded measurements of ice height; in 2009, Operation IceBridge (OIB) continued the objective of measuring ice heights at the polar ice caps through flights over the Arctic and Antarctic. The launch of ICESat-2 does not signal the immediate end of OIB; on the contrary, ICESat-2 is studying polar ice from space and OIB is surveying it from NASA’s DC-8 airborne science laboratory. On October 3rd, ICESat-2 successfully collected its first height measurements across the Antarctic Ice Sheet. Scientists will compare these measurements with those from OIB, which is flying over Antarctica though October and early November. Another field campaign will occur in the Arctic in March-May 2019; eventually, OIB will have its last flight.

Both IceBridge and ICESat-2 use laser altimeters: “[These] fire pulses of light toward the ground and measure how long it takes for that light to bounce off the ice and return to the instruments’ sensors. Scientists can then calculate the distance between the aircraft or the satellite and the ice surface, which gives them the ice height.” From its Airborne Topographic Mapper (ATM), IceBridge obtains its measurements through two lasers that produce both a wide swath and a narrow swath; two of OIB’s narrow swaths are comparable to one pair of ICESat-2’s six laser beams. The ICESat-2 spacecraft has a design life of 3 years and enough fuel for 7 years; the goal is for data collection to continue even beyond the fuel life span. To learn much more about this mission, visit https://icesat-2.gsfc.nasa.gov/.
Goddard Film Fest 2018

The 9th Goddard Film Festival was held on July 16, 2018 in Building 3’s Goett Auditorium. The festival highlights the center’s achievements across disciplines and showcases recent and upcoming missions and events. A 50-minute screening of the 14 videos was held at 10 a.m., 12 p.m., and 2 p.m. The 2018 NASA Goddard Film Festival playlist is available here: https://www.youtube.com/playlist?list=PL_8hVmWnP_O0wFthEhd6YLd-BjW-pEDX4.

Solar Wind at Martian Moon Could Impact Future Missions, or “Phobos Electric Charging” - Michael Lentz, Lead Animator and Artistic Director; Krystofer Kim, Animator; Dan Gallagher, Producer and Narrator; Ernie Wright, Project Support; and others.

Traversing the South Pole: 14 days, 4 People and 750 Kilometers, or “The 88-South Antarctic Traverse” – Ryan Fitzgibbons, Lead Producer and Lead Editor; Adriana Manrique Gutierrez, Lead Animator; and others.

“Scientists Create First-Ever 3-D Model of a Melting Snowflake” – L.K. Ward, Lead Producer; Alex Kekesi, Lead Animator; and others.

“Mission Possible: Women of the Hubble Space Telescope: - Katrina Jackson, Producer; and others.

“2017 Hurricanes and Aerosols Simulation” – Matthew Radcliff, Lead Producer; and others.

“Welcome to the Ionosphere” – Krystofer Kim, Lead Animator; Genna Duberstein, Lead Producer; Ryan Fitzgibbons, Narrator; Robert Garner; Project Support; and others.

“PACE – Skies, Ocean, Life” – others from various contractors.

“What Lurks Beneath NASA’s Chamber A” - Adriana Manrique Gutierrez, Lead Graphic Designer; and others.

“For 15 Years, GRACE Tracked Freshwater Movements Around the World” – Kathryn Mersmann, Lead Producer; Trent Schindler, Lead Visualizer; and others.

“A Total Solar Eclipse Revealed Solar Storms 100 Years Before Satellites” – Joy Ng, Producer and Animator; and others.

“NASA’s Fermi Satellite Celebrates 10 Years of Discoveries” – Scott Wiessinger, Lead Producer and Animator; and others.

“Amazon Canopy Comes to Life through Laser Data” – Alex Kekesi, Lead Visualizer; Jefferson Beck, Lead Producer; and others.

“Hubble Watches Neptune’s Dark Storm Die” – Katrina Jackson, Host, Producer and Editor; and others.

“Tour of the Moon 4K Redux” – Ernie Wright, Lead Visualizer; David Ladd, Lead Producer and Lead Video Editor; and others.

Science Jamboree 2018

On July 25, 2018, the Goddard Sciences and Exploration Directorate hosted the 10th Science Jamboree in the Building 28 atrium. The event provides an opportunity to learn about the amazing variety of science at Goddard. Representatives from the various disciplines engaged attendees with displays and demonstrations. Center Director Chris Scolese, along with Colleen Hartman and Mark Clampin (Director and Deputy Director, SED, respectively), delivered opening remarks, and presentations were featured on the hyperwall in the Dr. Piers J. Sellers Data Visualization Theater. Topics ranged from the Parker Solar Probe mission and the recently launched Transiting Exoplanet Survey Satellite to solving scientific problems on Earth. The Goddard Office of Communications hosted a center-wide scavenger hunt, and food trucks were onsite for lunch and desserts.

(cont’d on page 3)
(Jamboree, cont’d)

Ivona Cetinic (616/USRA) discussing phytoplankton and the PACE mission at the Ocean Ecology Laboratory display. Credit: A. Houghton

Jefferson Beck (130/USRA) perusing the offerings at the Science Jamboree. Credit: A. Houghton

Javier Concha (616/USRA) taking a break from helping out at the Science Jamboree. Credit: A. Houghton.
GESTAR held its 7th anniversary celebration on Thursday, August 2, 2018 at the Barney and Bea Rec Center at NASA Goddard with refreshments and barbeque and other offerings. Part of the festivities included the presentations of the GESTAR Annual Excellence Awards for 2017-2018. GESTAR recognized these awardees for their contributions:

- **Abhishek Chatterjee** (610.1/USRA): For his extraordinary leadership in the Science Team of the NASA Orbiting Carbon Observatory-2 (OCO-2) and his outstanding PI work, which significantly advanced the use of NASA modeling products in satellite missions and field campaigns.
- **Kel Elkins** (606.4/USRA): Under intense deadline pressure during a highly active Atlantic hurricane season, he created relevant, timely, and beautiful visualizations of GPM data that were used by media outlets around the world.
- **Angie Espiritu** (610/USRA): For her extraordinary leadership in the GESTAR Contracts arena, her indefatigable Can-Do spirit, and her calm under fire in the face of overwhelming amounts of proposal submissions.
- **Alex Kekesi** (606.4/GST): Under intense deadline pressure during a highly active Atlantic hurricane season, he revamped the GPM visualization pipeline and led a team creating relevant, timely, and beautiful visualizations that were used by media outlets around the world.
- **Priscilla Mohammed** (555/MSU): A vital member of NASA’s Soil Moisture Active and Passive (SMAP) Mission, she designed and implemented a comprehensive Radio Frequency Interference (RFI) detection and mitigation strategy for calibrated L1B brightness temperature.

*(cont’d on page 5)*
(Party, cont’d)

- Jinzheng Peng (555/MSU): For sustained, major contribution to the calibration and support of the NASA Soil Moisture Active/Passive (SMAP) radiometer system.
- Bridget Seegers (616/USRA): For her role in leading and coordinating the Cyanobacteria Assessment Network (CyAN) project, a multi-agency collaborative effort with the US EPA, NOAA and USGS.
- Yan Soldo (615/USRA): For creating a new satellite data product known as the RFI (Radio Frequency Interference) based on Aquarius radiometers and scatterometers.
- Susan Strahan (614/USRA): For her continued outstanding contributions to our understanding of the processes of Antarctic ozone depletion and recovery.
- Junhua Liu, Zhining Tao and Henry Selkirk (all 614/USRA): For their generous and unstinting efforts as Foreign National escorts for Fei Liu during the past twelve months.

Summer of Science

EXPORTS Sets Sail

The EXport Processes in the Ocean from RemoTe Sensing (EXPORTS) field campaign kicked off when research vessels Sally Ride and Roger Revelle departed for Station P in the northern Pacific Ocean on August 9-10. Scientists aimed to quantify carbon cycle impacts of upper ocean net primary production, among other factors, using satellite observations and state-of-the-art ocean technologies. (Wondering about Station P? Check out this entry from the EXPORTS field blog: https://blogs.nasa.gov/earthexpeditions/2018/11/07/send-me-a-postcard-from-station-p-will-you/.) About 30 institutions and 50 PIs actively collaborated on EXPORTS. On August 9th, Ivona Cetinic (616/USRA), one of the Project Scientists and Program Officers, and Jeremy Werdell (616/GSFC), a Program Officer, participated in a NASA social media event at the University of Washington to support the campaign. Susanna Craig (616/USRA) also is involved as a Data Manager, working along with Lead Scientific Analyst Chris Proctor (616/GSFC). To learn more about EXPORTS, visit http://oceanexports.org/, and check out those Science Trading Cards! See https://earthobservatory.nasa.gov/blogs/earthmatters/2018/08/10/a-boatload-of-scientists-head-out-to-sea/.

Damoh Visits Ghana

In May, Richard Damoah (618/MSU) was awarded funding from the Carnegie African Diaspora Fellowship Program (CADFP) to spend 44 days at All Nations University in Ghana conducting collaborative research. The title of his fellowship was "STEM Research Involving Earth Observation Data and its Analysis for Climate Change Monitoring in West Africa". Among the activities he conducted from mid-June through late July 2018 was providing training on how to retrieve and analyze Earth Observation Climate data through workshops. He also initiated a series of meetings on Ghana’s second satellite (GhanaSat-2) project collaboration, which included visits to the Ghana Meteorological Agency, the Ministry for Communication, the Ghana Space Science and Technology Institute, and the University of Ghana. (GhanaSat-1, Ghana’s first historic satellite, successfully launched from Kennedy Space Center in Florida in 2017.)
Awards & Accolades

In late July, **Ludovic Brucker** (615/USRA) was bestowed with a Cryosphere Early Career Award from AGU. He was one of 21 early-career scientists to receive this award, and he received his in the Cryosphere Sciences section (AGU has 24 sections). Dr. Brucker will be recognized at the upcoming AGU Fall Meeting in December. For more information, see https://eos.org/agu-news/2018-agu-section-awardees-and-named-lecturers.

In late August 2018, **Abhishek Chatterjee** (610.1/USRA) was among several members of the OCO-2 Science Team who were honored with a NASA Group Achievement Award with the citation "For exceptional achievement in processing and using data from the Orbiting Carbon Observatory-2 mission to produce unprecedented insight into the global carbon cycle."

On Thursday, September 6, 2018, at the Hydrosphere, Biosphere and Geophysics Peer Awards Ceremony held at NASA Goddard, six GESTAR members were recognized for their achievements. **Dr. Henry Selkirk** (GESTAR/USRA) was in attendance to present each awardee a certificate from GESTAR and an individual monetary award.

**Ryan Fitzgibbons & Adriana Manrique Gutierrez** (130/USRA) each received an award as part of the ICESat-2 Outreach & Communications Team: “For outstanding accomplishments in support of the ICESat-2 mission.”

**Ivona Cetinic** (616/USRA) for Scientific Achievement: “For keeping the EXPORTS ships afloat: for exceptional leadership in shepherding a major NASA field campaign in the north Pacific Ocean.”

**Thomas Eck** (618/USRA) for Scientific Achievement: “As part of the AERONET Team, for outstanding work on remotely-sensed and ground-based measurement and validation of aerosols.”

**Yan Soldo** (615/USRA) for Scientific Achievement: “For outstanding achievement in support of Aquarius and SMAP.”

**Thomas Stanley** (617/USRA) for Scientific Achievement: “For advancing the global modeling and nowcasting of landslide hazards through in-depth investigation on a national and international scale, supporting exploration by scientists and citizen scientists alike.”

On Friday, September 28, 2018, the Earth Sciences Division - Atmospheres (Code 610AT) held its annual awards ceremony. Among the awards was the Noteworthy Contribution Group Award given to the MAIAC Group, which consists of Alexei Lyapustin (613/GSFC), Yujie Wang (613/UMBC), and **Sergey Korkin** (613/USRA): “For the development of code MAIAC and the release of MODIS Collection 6 operational data product MCD19.” Dr. Korkin received a plaque from NASA Goddard, and **Dr. Ludovic Brucker** (GESTAR/USRA) presented him with a certificate.
Richard Damoah (618/MSU) received the 2018 Instructional Innovator of the Year Award from Morgan State University. This is Morgan’s first Annual Innovation of the Year Award Ceremony, which was held on September 25, 2018 by the Division of Research and Economic Development Office of Technology Transfer. He was recognized for his contribution to innovation which has helped further economic development and entrepreneurship at Morgan. Dr. Damoah was nominated by his colleagues at the MSU physics department.

On October 24, 2018, the NASA Agency Honors Awards Ceremony was held at NASA Goddard. Four members of the Global Modeling and Assimilation Office (GMAO), Abhishek Chatterjee (610.1/USRA), Austin Conaty, Marangelly Fuentes, and Gary Partyka, were recognized for their contribution in the 2017 ABoVE Airborne Campaign by receiving a NASA-wide Group Achievement Award. The citation reads: “For delivering new and critical scientific observations of environmental change for the vast North American Arctic-Boreal region, their superb international teamwork and their determination to overcome the obstacles associated with a large, multi-faceted investigation, the ABoVE Airborne Science Campaign Team is highly deserving of NASA's Group Achievement Award.” On behalf of the team, Peter Griffith (618/GSFC) accepted the award, which was presented by Center Director Chris Scolese.

The USRA Management Awards recognize managers who demonstrate excellence in leading a team, managing the work, and positively affecting staff – all while demonstrating USRA Values – Passion, Partnerships, Professionalism. 2018 marked the first year for these annual awards. Twelve nominations were reviewed by a selection committee and 5 managers were selected for recognition this year. Among those selected was GESTAR’s Oreste Reale (610.1/USRA). More than half of Oreste’s large team nominated him for this award. They noted his passion about research, learning, and service, that he treats everyone with equal respect and recognition, and that he sets a strong ethical example by his own actions. He is always approachable and available as a mentor to his team. He possesses strong interpersonal and communication skills and expresses himself clearly and politely – all of which has a positive impact on his group. They believe his skills and talents as a supervisor are of great value to both USRA and NASA, and he is truly worthy of recognition through this award.

New Hires

GESTAR welcomes the following members:
Bhaskar Bishnoi – Software Engineer
Douglas Bennett – Senior Outreach Specialist
Dirk Aurin – Visiting Associate Scientist, Earth Sciences
Rhae Sung Kim - Visiting Associate Scientist, Earth Sciences
Bryan Karpowicz – Scientist III
Bailee DesRocher - Science Animation Fellow (Computer Media Specialist I).

Maniac Talks

This past summer, no Maniac Talks were held in July or August. GESTAR thanks Dr. Gerald North (Distinguished Professor, Texas A&M University) who presented a talk in September. While no talks were scheduled for October, two will be held in November. Dr. North’s talk is available online at the NASA Goddard Atmospheric Sciences page: http://atmospheres.gsfc.nasa.gov/ext/maniacs/.

Kudos to Charles Gatebe and Bill Hyrbyk for keeping this popular series going strong!

Moving On

Sandeep Chittimalli       Yuni Lee
Pawan Gupta              Brian Monroe
Rikke Jepsen

(Awards, cont’d)
Science Highlights

2018 – Atmospheric Sciences
July: “Exploring systematic offsets between aerosol products from the two MODIS sensors,” R. Levy (613/GSFC), S. Mattoo (613/SSAI), V. Sawyer (613/SSAI), Yingxi Shi (613/USRA), P. Colarco (614/GSFC), A. Lyapustin (613/GSFC), Y. Wang (613/UMBC) and L. Remer (J CET/UMBC).


"Extending EOS-era aerosol records backward and forward in time with AVHRR and VIIRS", Andrew Sayer (613/USRA), N. C. Hsu (613/GSFC), J. Lee (613/UMD), W. V. Kim (613/UMD).

"Crop Production, Residue Fires, and Air Quality over Northern India: An Intriguing Link,” Hiren Jethva (614/USRA), O. Torres (614/GSFC).

2018 – Hydrosphere, Biosphere, and Geophysics
August: "Snowmelt runoff in High Mountain Asia,” B. Osmanoglu (618/GSFC), R. Hock (Univ. of Alaska), R. Lammers (Univ. of New Hampshire), S. Nicholls (612/UMBC), P. Montesano (618/SSAI), A. Prusevich (Univ. of New Hampshire), D. Grogan (Univ. of New Hampshire), D. Rounce (Univ. of Alaska), M. J. Jo (618/USRA), S. Fro lking (Univ. of New Hampshire), C. Neigh (618/GSFC).


In The Press


In late July, Ernie Wright (606.4/USRA) and the Lunar Reconnaissance Orbiter (LRO) were featured in a NASA article: “To celebrate NASA’s 60th anniversary this year, the agency partnered with the National Symphony Orchestra to present a concert in Washington entitled “NSO Pops: Space, the Next Frontier.” NASA mission images complemented performances of space-inspired music in the Kennedy Center’s concert hall, including Claude Debussy’s “Clair de Lune” (“Moonlight”), with a video of the Moon created by NASA science visualizer Ernie Wright.” To read more, visit https://www.nasa.gov/feature/goddard/2018/60-years-of-nasa-celebrating-where-art-and-science-meet.

On September 4th, a Conversations with Goddard profile of Jie Gong (613/USRA) titled "Studies Atmospheric Ice Clouds and Floating Snow" was published online: https://www.nasa.gov/feature/goddard/2018/jie-gong-studies-atmospheric-ice-clouds.

On October 10th, Hiren Jethva (614/USRA) took part in a panel discussion on this year’s crop burning season over northern India on NDTV, a national-level news media in India. The full video can be accessed at https://www.ndtv.com/video/shows/trending-10/farm-fires-pollution-may-almost-double-by-2050-claims-new-study-496107.


Recent Publications


Levy, R. C., S. Mattoo, V. Sawyer, Y. Shi, P. Colarco, A. Lyapustin, Y. Wang, and L. Remer (2018), Exploring systematic offsets between aerosol products from the two MODIS (cont’d, page 14)


Editor’s Note:

Since 2011, Bill was our GESTAR director, our go-to person, our guide, our mentor, our friend. His voice could range from quiet to booming, which he used to encourage, explain or emphasize, depending on the scenario. He had a warm smile and a subtle laugh, plus a choice selection of favorite sayings and words ("just peachy", "gets all hinky"); Bill was well-read, intelligent, and knew so much about so much, ranging from science to photography to world travel - a seemingly infinite variety of topics. At our GESTAR All-Hands meetings, he often closed with "You're doing great work, important work. Keep it up." We certainly will.

Cheers to you, Bill.

One of Bill's favorites: a margarita, with salt & on the rocks.
Both photos: A. Houghton.

The GESTAR Team:

Universities Space Research Association (USRA), Morgan State University (MSU),
I.M. Systems Group (IMSG), Johns Hopkins University (JHU), Global Science & Technology, Inc.(GST),
and Science and Technology Corporation (STC).

Visit us at https://gestar.usra.edu/.

The GESTAR Newsletter is published by GESTAR/USRA. Any comments/suggestions/ideas can be forwarded to Amy Houghton, Editor at ahoughton@usra.edu.