



33rd

SATELLITES & EDUCATION CONFERENCE

And
19th Concurrent Annual Meeting of M.Y. S.P.A.C.E.
International Collaborative K-12 Research Teachers
July 25, 2020



Conference Program

July 25, 2020



Presented By

SATELLITE EDUCATORS ASSOCIATION

a 501 (c)(3) nonprofit corporation

Hosted on ZOOM by



Charter College of
EDUCATION



SATELLITES & EDUCATION

Conference XXXIII

July 25, 2020



**Charter College of
EDUCATION**

The Satellite Educators Association wishes to express its profound gratitude to our sponsors without whom the Satellites & Education Conference would not be possible:

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**EARTH
SPEAKS**



**WE
LISTEN**

Gathering 8:00 am (Bring Your Own Breakfast)

8:05 am **M.Y. S.P.A.C.E. Description and Discussion**
By M.Y. S.P.A.C.E. Teachers 2002 – 2019

8:40 am **Robert Black, Author Exhibit**

8:45 am **OPENING and WELCOME**

Mark McKay, President of Satellite Educators Association



And Dr. Cheryl Ney, Dean of the Charter College of Education



Cheryl Ney earned her Ph.D. in biochemistry from the University of Chicago, her M.S. in chemistry from Baylor University, and her B.S. in chemistry from Arizona State University. She has served as a professor of chemistry, associate provost, associate vice president, and National Science Foundation Distinguished Visiting Professor of Women in Science in the University of Wisconsin system. January 2017 she was named Dean of the Charter College of Education. Dr. Ney is a strong advocate for STEM education and has been a valuable supporter of this conference.

8:55 – 9:40 am Opening KEYNOTE SPEAKER:

Steven D. Miller, Ph.D.

Senior Research Scientist, Deputy Director

Cooperative Institute for Research in the
Atmosphere

CIRA Fellow, NOAA

Colorado State University



Dr. Steven Miller is a Senior Research Scientist at Colorado State University (CSU), and Deputy Director of the Cooperative Institute for Research in the Atmosphere (CIRA). He received a PhD from CSU Atmospheric Science, with specialization in atmospheric radiation and satellite remote sensing. He worked for seven years at the Naval Research Laboratory, Monterey, where he supported U.S. and Coalition forces in the post-9/11 military responses in southwest Asia—becoming proficient in a broad range of environmental parameters from ocean to sky.

At CIRA, he leads a Meteorological Satellite Applications Team as part of the Regional and Mesoscale Meteorology Branch (RAMMB) of the National Oceanic and Atmospheric Administration (NOAA). His research passion is working with new kinds of measurements, discovering their unforeseen potential to benefit research and operational users, and designing future observing systems for an ever-increasing scope of user needs and scientific challenges.

To escape the ordinary, he lives vicariously through the satellite sensors with which he works—whisking around the globe at 16,000 mph in search of nature’s wonders and mysteries. Through far more capable eyes than our own, he finds new ways to characterize and visualize the complex environment of our planet and its atmosphere for operational forecasters. His core research explores the unique phenomena of the nocturnal environment via “night vision”—using powerful new instruments capable of sensing moonlight, the light produced by our cities, boats, and other sources both natural and man-made.

The tools and techniques Miller uses for his everyday work draw heavily upon all the principal tenets of STEM—the *Science* of understanding our planet and its weather, the *Technology* needed to observe Earth from space with optimized ‘eyes’ far superior to our own, the *Engineering* needed to design, build, deploy, and operate complex satellite systems, and the *Mathematics* and the *Physics* needed to turn the ones and zeros of a digital data stream downlinked from the satellite sensor into meaningful insights about our environment. In this presentation, he will concentrate on some the exciting new capabilities available from the new-generation NOAA satellites that are constantly watching us from above. When it comes to STEM-enabled careers in space-based environmental science, the sky is not the limit; it’s only the beginning!

9:40 am SatED.org – Using Satellites in Education

9:45 am – 10:25 am Plenary Session 2

John Moore, Executive Director, Institute for Earth Observations, New Jersey

Using Augmented Reality to Access Satellite Data: HoloGLOBE

HoloGLOBE is an AR app that uses the Merge Cube. It allows users to view global satellite datasets in 3D. HoloGLOBE is essentially a hand held version of NOAA's Science on a Sphere (SOS). It is available free of charge and has over 10,000 downloads around the world. This session will provide a demonstration, examples of applications, and lessons. *Special Instructions: It would be beneficial for participants to download the HoloGLOBE app prior to the presentation from a website to be provided by Mr. Moore.*

10:25 am (Ken Lui, Sherry Stukes, Casey Moninghoff) Live with AIAA

10:30 – 11:10 am Plenary Session 3

Dominique Evans-Bye, Educator, Clark Magnet High School, California

Madlen Jalalyan, Co-Presenter, Student, Clark Magnet High School

Mars Student Imaging Project: Remote Sensing of the Red Planet

The Mars Student Imaging Project through Arizona State University guides students through the process of acquiring remotely sensed data and imagery from Mars, then analyzing and interpreting their findings. Students learn to identify geologic features and compare and contrast the formation of these features on Mars to how they form on Earth. Emphasis is placed on how to make scientific observations and ask scientific questions. Students collaborate on determining a big picture question, writing focused research questions and forming hypotheses. Students use the products of NASA's Thermal Emission Imaging System (THEMIS) carried by NASA's Mars Odyssey spacecraft and the High Resolution Imaging Experiment (HiRISE) onboard the Mars Reconnaissance Orbiter. NASA's JMARS, a GIS tool for Mars, was used to analyze study areas designated by a THEMIS stamp chosen by students. This session will give an overview of the MSIP, resources available to educators, and showcase student Final Presentations from the project.

Special Note: The Mars Student Imaging Project is implemented as a fourth quarter unit in the Honors GIS & Remote Sensing Class at Clark Magnet High School. This year, the MSIP was conducted entirely through distance education due to school closure. Students collaborated through Zoom and Google to successfully conduct their projects.

11:10 am SEA Teacher Library and Resources

11:15 – 11:55 am Plenary Session 4

Anthony Armbrister, Teacher, John F. Kennedy High School, Maryland

Quadratics: It is a Matter of Rocket Science

Introduction to quadratics using the science of rocket trajectory as a precursor to deepening understanding of the quadratic equation. Using graphing technology we will model rocket trajectory in a series of recently launched Space X rockets. *Special Note: Being a mathematics educator for over twenty-five years, I have noticed that students often find that quadratics are a difficult concept to grasp when taught in an abstract only method. Using manipulation of the components of a quadratic equation, students learn how this ancient equation is used in modern science.*

11:55 am – 12:35 pm Plenary Session 5

Robert A. Black, Author, Royal Fireworks Publishing Co., New York

Victorian Ladies of Mathematics

Author Robert Black returns with a closer look at two of the books in his “Mathematical Lives” biography series from Royal Fireworks Press. Ada Lovelace and Florence Nightingale were both born into the upper classes of 19th Century England, where proper ladies were expected to learn sewing, art, and music, and where doctors worried that studying too much mathematics could damage the fragile female mind. Lovelace was the daughter of notorious poet Lord Byron, and like the children of celebrities today, she grew up under the gaze of a gossip-hungry public. Nightingale became famous as “The Lady with the Lamp” for her work leading a team of nurses during the Crimean War, but found her public image frozen in time later in life. But despite the obstacles, both women had a passion for mathematics, and both made advances that still affect us today.

Ada Lovelace: Programming the Future describes Lovelace’s work with Charles Babbage on his idea for an Analytical Engine, a steam-powered clockwork machine that would have been the first computer. His descriptions of how a computer could work and what it might be capable of doing helped shape the course of computer science.

Florence Nightingale: The Lady with the Diagrams describes Nightingale’s work after Crimea, as a social reformer who used statistical charts and diagrams to make her case in ways the general public had never seen before. In this presentation, we’ll look at both stories and what they can teach us in math classes today.

12:35 – 12:55 pm Annual Satellite Educators Association Members Meeting

All are invited. Only Paid Up-To-Date Members may vote.

12:55 – 1:30 pm Plenary Session 6

Ron Gird, Meteorologist, PLAN!T NOW, Virginia and California

The Young Meteorologist Program

PLAN!T NOW (P!N) advocates educating our children on severe weather and safety principles. The Young Meteorologist Program of P!N is an interactive game focused on teaching the science of severe weather and preparedness activities. This fun, educational game is highly interactive, and follows the National Weather Service (NWS) mascot, Owlie Skywarn, through a series of weather adventures. There are five modules on severe weather. P!N recommends students complete the entire game. A student and family might go on a trip or vacation to an area of the country experiencing severe weather. Having learned about both the hazard and the safety measures to take could save lives. After completing all of the modules, including quizzes, students will be able to print their own Young Meteorologist Certificate. Preparedness for students, families and communities are accomplished through community based public outreach events. These “weatherfest” events are free to the public and held at a popular community location such as a library or a health facility. There are three main elements for a successful “weatherfest” event: P!N, the local NWS Weather Forecast Office, and a local TV Meteorologist. P!N or the NWS provides the Owlie Skywarn mascot and the Young Meteorologist Program (YMP). Other organizations, mostly local community-based, are added depending upon the city where the “weatherfest” is being held. The goal of “weatherfest” is to ensure families learn about severe weather and protect their families and communities when severe weather strikes.

1:30 – 1:40 pm (Monica Maynard) Aerospace Corp Teacher Resources

1:40 – 2:20 pm Plenary Session 7

Joan Harper-Neely, STEM Education Specialist, National Institute of Aerospace

Sharon Bowers, Co-Presenter/Teacher, NIA, Hampton, Virginia

Betsy McAllister, Co-Presenter/Teacher, NIA, Hampton, Virginia

Earth-Sun-Moon STEM Activities with NASA Resources

Lesson Demonstration: NASA has many resources to support STEM integration in the science classroom. During this session, presenters will demonstrate hands-on activities involving Earth science standards for grades 3 – 8. These STEM activities explore the unique characteristics of Sun, Earth, and Moon, as well as their relationships. Learn how NASA’s heliophysics and planetary science divisions study Sun, Earth, and Moon from space and how information is collected, analyzed, and shared with the public. Participants will learn about the variety of citizen science campaigns in which their students can participate.

2:20 – 2:30 pm (Joan Horvath & Rich Cameron) Nonscriptum Teacher Resources

2:30 – 3:10 pm Plenary Session 8

Edward Murashie, President, ProEngineered Solutions, California

Live! From Santa Ana! Weather Satellite Image Reception

Lesson Demonstration: A survey of weather satellite stations at my home which students can build and operate. They include polar satellite stations both high and low resolution which can receive the United States NOAA and GOES, the European Metop, Russian Meteor, and Chinese Feng Yung satellites' data. There is a satellite station for every skill level! Some can be built in a day, others in a week.

3:10 – 3:15 pm (Ken, Sherry, & Casey) AIAA Resources for Teachers

3:15 – 3: 55 pm Closing KEYNOTE SPEAKER

Joshua K. Willis, Ph.D., Oceanographer, PI, OMG!



Josh Willis is a climate scientist at NASA's Jet Propulsion Laboratory, where he studies global sea level rise and melting ice in Greenland. He's the lead scientist for the NASA Mission Oceans Melting Greenland (OMG, for short).

Every Trick in the Book:

Lessons on making science fun from NASA's funniest climate scientist

I hate talk descriptions that start with “now more than ever,” but I honestly can't think of a time in the last 40 years when it was more important to teach people critical thinking and get them excited about science. How do we get kids out of their seats and into the world, discovering it? How do we restore confidence in science? I don't have the answers, but I'll tell you what I've been doing the last few years. Talks, tweets, jokes, videos and even Elvis impersonations. All of it helps. I hope, anyway. Let's make science cool again.

Bio: When he's not flying around in a tiny plane dropping instruments in the ocean, he can sometimes be found on the internet wearing an Elvis costume and singing the “Climate Rock”. A student of comedy as much as he is a student of climate, Willis also loves to use comedy to communicate about climate change. Tho' he dreams of a life of comedy, he has no plans to quit his day job.

3:55 pm Mark McKay, Final CLOSING REMARKS

SPECIAL THANKS TO OUR EXHIBITORS

Satellite Educators Association

Contact: Mark McKay (mmckay95376@gmail.com)

The Satellite Educators Association was established in 1989 as a professional society to promote the innovative use of satellite technology in education and disseminate information internationally to all members. Membership includes master educators who are orchestrating the learning process for their students. We have the ability to connect teachers with the appropriate discipline. We can teach the technology skills needed to study practical questions and problems. The Satellite Educators Association contributes to the perspective and expertise of our membership in K-16 education to help students understand Earth Systems and space science. Teacher resources, curriculum and hands-on activities are developed in accordance with the current national standards. Services to educators include providing resources and materials, offering support, training, networking and continuously updating curriculum. The Satellite Educators Association presents the annual Satellites & Education Conference. **Staffing the booth is Duane Laursen, founding member of SEA.**

National Oceanic and Atmospheric Administration (NOAA)

NESDIS, NWS, and Education Coordinated by NESDIS

Contact: Ron Gird (rsgird@gmail.com)

The National Oceanic and Atmospheric Administration's (NOAA's) mission is to understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social, and environmental needs. **NESDIS:** National Environmental Satellite, Data and Information Service is dedicated to providing timely access to global environmental data from satellites and other sources to promote, protect, and enhance the nation's economy, security, environment and quality of life. To fulfill its responsibilities, NESDIS acquires and manages the nation's operational environmental satellites, provides data and informational services and conducts related research. **NWS:** The National Weather Service is the primary source of weather data, forecasts and warnings for the United States. Television weathercasters and private meteorology companies prepare their forecasts using this information. The NWS is the sole United States official voice for issuing warnings during life-threatening weather situations.

The Aerospace Corporation

Contact: Monica Maynard (Monica.I.Maynard@aero.org)

The Aerospace Corporation has a longstanding dedication to education. Aerospace is committed to inspiring the next generation. Since 2013, we have supported K-12 education by hosting summer educational programs for teachers and high school students. Free of charge, these events expose participants to the research, state-of-the-art facilities, and 21st century skills needed to succeed in the STEM fields and provide real-world examples of problems and solutions. Aerospace is committed to sharing our passion for the Science, Technology, Engineering, and Math (STEM) disciplines to inspire the next generation – shaping and securing the future of our nation.

American Institute of Aeronautics & Astronautics

Contact: Ken Lui (kcons2014@kensconsulting.net)

Our purpose is to ignite and celebrate aerospace ingenuity and collaboration, and its importance to our way of life. Our promise is to be your vital lifelong link to the aerospace community and a champion for its achievements. One Remarkable Fact Says It All: Since 1963, members from a single professional society have achieved virtually every milestone in modern American flight. That society is the American Institute of Aeronautics and Astronautics. With nearly 30,000 individual members from 91 countries, and 95 corporate members, AIAA is the world's largest technical society dedicated to the global aerospace profession. AIAA carries forth a proud tradition of more than 80 years of aerospace leadership. The Los Angeles – Las Vegas Section is a community of 6,000+ Aerospace Professionals, providing services to the communities from Los Angeles to Las Vegas, including San Bernardino and Riverside. Southern California and Las Vegas area has lots of aerospace organizations and activities and is the center of American aerospace.

Robert A. Black, Author

Contact: Bob Black (rblackauthor@att.net)

Author Robert Black returns with the first two volumes in the “Mathematical Lives” series, profiling mathematicians and the problems they solved. The first book, *Pascal and Fermat: The Probability Pen Pals*, describes the development of probability theory, while the second, *Florence Nightingale: The Lady with the Diagrams*, relates the lesser-known mathematical story of the famous nursing pioneer. Each book includes an appendix called “Doing the Math,” in which readers can work through the math problems themselves. Robert Black previously wrote for the Nickelodeon cable series, *You Can't Do That On Television*, has a degree in mechanical engineering and mathematics from Vanderbilt University, and has spent 20 years in manufacturing as a lab test engineer, project manager, engineering manager and quality assurance manager. Copies of his *Mathematical Nights* fiction series are available from <https://www.rfwp.com/series/mathematical-lives-biographical-novels-by-robert-black>.

Nonscriptum LLC

Contact: Joan Horvath (joan@nonscriptum.com)

Contact: Rich Cameron (rich@nonscriptum.com)

Nonscriptum LLC is a Pasadena-based consulting and training firm, founded in early 2015 by Joan Horvath and Rich Cameron. We focus on teaching educators and scientists how to use 3D printing, open-source electronics, and other maker tech. We have experience teaching both online and live. Joan is an MIT alumna, recovering rocket scientist and educator. Rich is an open-source 3D printer hacker who designed the RepRap Wallace and Bukito 3D printers. They have co-authored seven books for the Apress imprint of Springer-Nature, and on a variety of additive manufacturing courses for LinkedIn Learning. We run three meetup groups (Pasadena 3D Printing, 3D Printing LA and Remote Robotics Coaches and Mentors) and often support other community endeavors.

Our deepest gratitude to our many supporters!

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Although Raytheon, NASA, and the CCOE do not have an exhibits, they are very supportive of the community, education, and specifically our conference. To all at Raytheon, Cal State LA CCOE, and NASA we say

Thank you!!