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Acknowledgments

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A special thanks to those from the GLOBE community who are leading sessions throughout the week and to the staff of the Gleneagle Hotel and the Killarney National Park.

Welcome Letters

National Science Foundation
Directorate for Geosciences
July 2018



Message from the Directorate for Geosciences at the National Science Foundation

Dr. Brandon Jones

On behalf of the Assistant Director, Dr. William Easterling, it is my honor to bring greetings and best wishes from Washington, DC, to everyone attending the 2018 GLOBE Learning Expedition in beautiful Killarney, Ireland. We hope you enjoy your visit to this 'vibrant *little town*' and that you take full advantage of the nature, culture and heritage that is Killarney.

As the GLOBE Program moves into 22 years of connecting students, educators and scientists from around the world, its importance as a sustainable model of international collaboration is worthy of much praise. As an effort that provides space for communal networking and global observation, GLOBE offers the world a glimpse into what is possible when cultural differences are celebrated and harnessed for the benefit of all life on this rock we call home. GLOBE also offers the opportunity for participants to connect with each other in a meaningful way and for a meaningful cause. GLOBE is not just about collecting data, it is about a platform that allows for the development of experiences and relationships. As Charles Darwin opined in his last chapter of *The Descent of Man*, [sympathy] 'though gained as an instinct, is also much strengthened by exercise or habit.' GLOBE allows for the exercise of cultural sympathy through scientific exploration.

To this end, GLOBE is a lighthouse in an ever shifting world. By developing, improving and sustaining a two-decade old platform for discovery, data sharing and partnering, GLOBE has opened the way for individuals around the world to *do* science so that knowledge advances, solutions are created and cultural strengths are integrated for sustainable application.

To every student researcher, teacher, scientist, partner or sponsor - best wishes to you all for a successful meeting!

A handwritten signature in cursive script, reading 'M. Brandon Jones', is located below the main text of the letter.

Brandon Jones
Program Director for GEO Education and Diversity

National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001



SMD/Earth Science Division

July 2018

On behalf of NASA's Earth Science Division, I am pleased to welcome you to the 22nd GLOBE Annual Meeting and 6th GLOBE Learning Expedition! I am looking forward to an active week of learning and observation.

This past year brought a variety of engagement between GLOBE and NASA including the 3rd year of the ENSO campaign, a US Air Quality campaign, and a highly successful clouds challenge which also featured a joint event with the World Meteorological Organization for World Meteorological Day, March 23. NASA also continued to support the US regional Student Research Symposia, including hosting the Pacific Region event. The SMAP team continues to analyze data from the earlier GLOBE soil moisture campaign, with some good correlation observed between student and satellite data.

A growing area of collaboration is between GLOBE and the NASA Science Activation awards. Thanks to these projects, two new protocols have been added in the past year: frost tube, which may be of interest to those at higher latitudes, and carbon cycle, which applies everywhere. You can hear about other developments, such as the use of kites to obtain (near) remote sensing data, at this meeting. The GLOBE Observer team will soon release a landcover module which will connect to carbon cycle and is working with the NASA ICESat-2 team to optimize GLOBE biometry protocols in a way that will help us understand the third dimension of our planet's land cover: tree height.

The GLOBE Observer app has enabled a new level of data collection and community engagement, particularly during the North American total solar eclipse last August and the recent GLOBE clouds challenge, but also with a new Department of State supported initiative to bring the Mosquito Habitat Mapper to affected communities around the world. Thanks to these initiatives and your ongoing efforts, GLOBE reached a milestone of over 154 million measurements recently!

Finally, I want to thank our Irish hosts and Killarney National Park, as well as the team who worked hard to plan the program. I hope that all of you will have a safe and informative week and leave with new GLOBE friendships.

Sincerely,

A handwritten signature in blue ink that reads "Lin Chambers".

Lin Chambers, Ph. D.
GLOBE Program Manager



UNITED STATES DEPARTMENT OF COMMERCE
Office of the Under Secretary for
Oceans and Atmosphere
 Washington, D.C. 20230

April 30, 2018

Message from Education at the National Oceanic and Atmospheric Administration (NOAA)

Christos Michalopoulos

On behalf of the Director of NOAA Education, Louisa Koch, I congratulate you on being selected to participate in the 2018 GLOBE Learning Expedition (GLE) in Killarney, Ireland. I wish you a successful GLE, and offer appreciation for your work to advance of understanding of Earth systems.

GLOBE Learning Expeditions are special events that bring remarkable students, such as yourselves, from around the world together to share research with peers, professional scientists, and the greater GLOBE community. Your passion and dedication to discover more about the world around you and your willingness to share this learning with others are admirable and impressive. We congratulate and thank you for your interest and commitment to GLOBE. What makes GLEs truly powerful is that they balance presentations and participation in research with cultural sharing. I believe you will warmly remember things you learn and people you meet this week for many years to come.

The theme of this expedition, "Mountain, Woods, and Water: Developing a Sense of Place", matches up well with the work of our Agency. NOAA manages special places, such as National Marine Sanctuaries and National Estuarine Research Reserves, both of which connect the public with natural and cultural resources. We support GLOBE and the work you do because it aligns well with our mission of science, service and stewardship.

You can find GLOBE materials integrated in the Resource Collections we offer on our education site (<http://www.noaa.gov/education>). GLOBE teachers use our Educator Opportunities, and we encourage you to check out our Student Opportunities on this site. GLOBE activities serve as meaningful components of a number of the projects funded through NOAA's Environmental Literacy Grants and Bay-Watershed Education and Training Programs.

We regret we are not able to join you in person, but we will look forward to learning about the work you share and perform over the course of the expedition.

Sincerely,

Christos Michalopoulos
 Deputy Director of K-12 & Informal Education





United States Department of State

*Bureau of Oceans and International
Environmental and Scientific Affairs*

Washington, D.C. 20520

May 21, 2018

Message from the U.S. Department of State

**Judith G. Garber, Acting Assistant Secretary of State
Bureau of Oceans and International Environmental and Scientific Affairs**

Dear GLOBE Students, Educators, and Partners:

Congratulations on all your hard work that has brought you to the 2018 GLOBE Learning Expedition and Annual Meeting in Killarney, Ireland! GLOBE's power to galvanize the talents and passion of students and citizen scientists globally to study, understand, and, ultimately, protect our environment is truly impressive. I join our colleagues from NASA, the National Science Foundation, and the National Oceanic and Atmospheric Administration in commending GLOBE for keeping the GLOBE community at the forefront of forging knowledge, forming relationships, and shaping solutions to the global challenges we face now and in the future.

The U.S. Department of State is a proud supporter of GLOBE. U.S. embassies help GLOBE expand each year to new countries, new schools, new areas of investigation, and new audiences. In the past year, Seychelles, Liberia, and Togo have joined GLOBE and Ghana, Colombia, Paraguay, Kuwait, and Bolivia have become more engaged. We engage here in Washington too! At the Foreign Service Institute, we have installed a GLOBE instrument shelter on the campus to contribute to the global dataset. Our officers at home and in the field are avid users of the GLOBE Observer app. Four U.S. embassies and consulates applied to become GLOBE Plus Posts to partner with schools and institutions in their host countries. American Spaces are opening their doors to GLOBE. We're arranging virtual and in-person exchanges between GLOBE schools around the world with GLOBE schools and scientists in the United States.

The State Department and GLOBE recently started an initiative for countries affected by the Zika virus that will enlist thousands of students, teachers, and community leaders to crowdsource data on mosquitoes. The two-year project has an ambitious target of hundreds of thousands of new mosquito larvae measurements added to the GLOBE database by 100,000 new citizen scientists. Project participants are being trained to use the GLOBE Observer Mosquito Habitat Mapper app to understand which type of mosquito is breeding in their communities, collect larvae samples safely, upload data into the global map tracker, and eliminate breeding places. The project will encourage STEM studies and build networks with public health officials to better control mosquitoes and reduce mosquito-borne infectious disease. Global data collection on this scale will help international scientists monitor mosquito populations and, along with additional environmental data, predict new, mosquito-borne illness outbreaks. At the same time, it will empower communities to reduce disease in their local region.

This week, you will gain scientific and environmental insights through GLOBE. But just as importantly, through GLOBE, you will make new friends and find new collaborators to help protect our environment for years to come. Enjoy!

Sincerely,

A handwritten signature in blue ink, appearing to read "Judith G. Garber".

Judith G. Garber
Principal Deputy Assistant Secretary



Cead Mile Failte to you all...

Welcome my fellow GLOBE Community Members to the 22nd GLOBE Annual Meeting and the 6th GLOBE Learning Expedition (GLE). I am very excited that you could join us here in Killarney Ireland for what we hope will be an exhilarating experience for you. This has been a very busy year for us at the GLOBE Implementation Office (GIO). One of our major tasks has been planning the GLOBE Learning Expedition with its scientific presentations, field experiences in the beautiful Killarney National Park, cultural nights, guest speakers, and storytelling for over 400 participants, almost half of which are students. I'd like to thank Anthony Purcell, GLOBE Ireland's Country Coordinator from An Taisce along with Sabrina Moore, as well as all the members of the International Organizing Committee and the GIO team for their hard work in this task. This, we hope, will likely be an event you will remember for the rest of your lives.

The area has a rich history with numerous structures dating as far back as the 6th century. Killarney became a destination for tourists from the mid-18th century. And what did tourists come to see? This incredible environment, an area once called 'Heaven's Reflect' by the Irish poet Edmund O' Rourke (1814-1879). In the 1960's the park, the jewel of and first protected area of the national park system in Ireland, was established. When I was growing up, this was my playground; it was where I observed plants and animals in their natural environment, hiked in the last remnants of Irish Oak woodland and saw native Red Deer as I hiked Mangerton Mountain. I played in the soil, learned about calcifuges and calcicoles (google it!), watched clouds as they traversed the sky, waded in streams and rivers, biked and canoed, and I even managed to fall off Torc Waterfall! ... but that's another story. (Well, long story short. I tried climbing the waterfall without a rope; I learned the hard way that slippery surfaces and old sneakers don't work well together!) In school, my teachers would use the park as a teaching and learning environment not just for sciences but other subjects. All these experiences helped shape my interest in the environment and sciences.

As a middle school student, InnisFallen Island in the Lower Lake of the park was the focus of a research project that I submitted to a national science fair. After secondary school, I prepared to become a science teacher and, once graduated, went on to teaching in schools as well as the outdoors. Later, I had the opportunity to be an international intern at an Audubon Center in the U.S. where I tracked wolves and lead wilderness trips. This rich and diverse background ultimately led me to The GLOBE Program. It has been an incredible journey for me, based on a strong foundation from this wonderful natural environment. We all create our own journeys and stories and I hope yours will also take you to many brilliant vantage points along the way.

So welcome again to Killarney, to the town in the park, but more importantly to the national park itself. This, as I hope you will agree, IS a very special place, a place where mountains, woods and water comeingle and give you a taste of, and some may say the best of, Ireland. This week is part of YOUR journey, it's part of all OUR journeys and stories. Finally, as we say in Gaelic 'Tosu maith, leath na hoibre': A Good Start is Half the Work. I hope you agree that we have a good start to this, the 22nd GLOBE Annual Meeting and the 6th GLOBE Learning Expedition.

Tony Murphy
Director, GLOBE Implementation Office



An Taisce

The National Trust for Ireland

Environmental Education Unit

5a Swift's Alley, Francis Street

Dublin 8, Ireland

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Dear GLOBE Community,

On behalf of the Environmental Education Unit of An Taisce, GLOBE Country Coordination for Ireland, it is my pleasure to welcome you to the land of 'Saints and Scholars' for the GLOBE Learning Expedition and 22nd Annual Meeting, Killarney, Ireland.

An Taisce is one of Ireland's oldest and largest environmental charities and the Environmental Education Unit is responsible for developing and operating some of Ireland's most popular and successful environmental and sustainability programmes and campaigns.

We are delighted and honoured to be the host country for this international event, which corresponds with the successful re-launch of the GLOBE programme in Ireland in 2017. Together with our partners in the Environmental Protection Agency Ireland, we are working with schools nationwide to take measurements and investigate local atmospheric conditions through the GLOBE programme.

The exciting and varied agenda designed for the GLE will present you with great opportunities to explore and investigate the varied and unique landscape of Killarney National Park, collaborate with the wider GLOBE community, share your stories and make some new memories.

We are looking forward to learning from your expertise and experiences and anticipate that the GLE in Ireland will leave a lasting impression on the GLOBE programme.

Céad míle fáilte – A hundred thousand welcomes

Mise le Meas,

Michael-John O'Mahony

Director, Environmental Education Unit

An Taisce – The National Trust for Ireland



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2nd May 2018

Dear GLOBE Community

On behalf of the EPA it is my great pleasure to welcome you all to Killarney to the 2018 GLOBE Learning Expedition and to the 22nd Annual GLOBE Meeting. The EPA is delighted to sponsor this international event which provides such an exciting opportunity for students to present their environmental research to their peers and to the wider GLOBE community.

We are very pleased to be working in partnership with Ireland's GLOBE coordinator, An Taisce, to support the rollout of GLOBE in Ireland. We believe that the GLOBE programme will play an important role in our goal to enhance environmental protection through engaging with local communities. This environmental protection by local communities and especially by our school students and their teachers and families will contribute significantly to the overall state of the environment that we all share.

I wish you all a fun and educational week with in the very beautiful surroundings of Killarney National Park and I hope that you will take home many happy memories of your time in Ireland.

A handwritten signature in blue ink, which appears to read 'Laura Burke'.

Laura Burke
Director General





Teach agus Gairdíní
Chill Airne
Killarney House
and Gardens

Killarney House & Gardens
Killarney National Park
Muckcross Road
Killarney
Co. Kerry
Ireland

Dear Students, Teachers and participants,

I am delighted to welcome you to Ireland and to Killarney Town and to offer you a Céad Míle Fáilte, a thousand welcomes, to Killarney National Park. The theme of your GLOBE Learning Expedition is "Mountain, Woods, and Water: Developing a Sense of Place" and there is no better place to experience this first-hand than Ireland's oldest national Park.

National parks as defined by the International Union for Conservation of Nature vary greatly from country to country but common to them all is our primary objective to protect natural biodiversity and to promote education and recreation. As you immerse yourself in our mountains, woods and waters you will be directly contributing to a greater understanding and appreciation of Killarney National Park.

As you build your research skills, face new ideas and develop new friendships during your time in Killarney you will gain new understanding and appreciation for our environment at local, regional, and global levels. You will work alongside national park staff and our hope is that we will all learn from each other and carry these skills with us on our journey of environmental stewardship.

"I hope that Muckcross will be made a real garden of friendship, and that it will be the greatest playground in the world – there is not another in the world like it and I know them all"

Arthur Rose Vincent, last owner and donor of the Muckcross Estate to the Irish Nation

Looking forward to seeing you in July,

Regards,

Pat Dawson

General Manager

Killarney House & Gardens

Killarney National Park



An Roinn
Cultúir, Oidhreacht agus Gaeltachta
Department of
Culture, Heritage and the Gaeltacht



COMHAIRLE CONTAE CHIARRAÍ
KERRY COUNTY COUNCIL

Guthán | Tel 066 7183500 Suíomh | Web www.kerrycoco.ie

GLOBE Learning Expedition

13th June 2016

Dear Sirs/Madam,

I am looking forward to welcoming you to Killarney on your upcoming trip as part of the GLOBE Program. I understand you have a detailed programme of events but I hope during your time here you get to sample the very best Killarney has to offer.

Killarney is world renowned as a tourist town in and we look forward to showcasing the natural beauty that surrounds us.

I look forward to meeting some of you during your time here.

Councillor John Sheahan

Cathaoirleach of Kerry County Council

GAEILGE AGUS FÁILTE

Featured Speakers



Norman McCloskey

Norman McCloskey is a professional photographer based in Kenmare, Co. Kerry. His passion and specialty is landscape photography. He has been making images of the Kerry and West Cork landscape and beyond since 1992, primarily producing monochrome images but lately developing a growing body of colour work. Norman runs a beautiful gallery in Kenmare and has also published a unique collection of Kerry landscapes entitled, 'Parklight'.

“Shedding Light on Killarney National Park”



Jack Murray

Jack is a media innovator with over 20 years' experience at the most senior level in the Irish communications industry. He has worked in marketing, journalism and media relations. He is a former political spokesperson and government advisor, as well as an award-winning PR practitioner.

After purchasing the Irish Media Contacts Directory, in 2006, Jack and his team have transformed the business from a traditional book publisher to a dynamic online business—MediaHQ. MediaHQ is now the leading publisher of media intelligence in Ireland and the biggest organiser of media training events. Since 2012 over 3,000 organisations have attended MediaHQ events.

In 2016, Jack created All Good Tales, after realising that communications was entering a golden age of storytelling, and that those with the best stories succeed. Jack had his eureka moment and made a discovery about how the most successful storytelling organisations operate, and he documented it—The Magic Slice.

He lives in Dublin with his wife, two daughters, and a dog called Maxi Lopez.

“The Art of Storytelling”



Laura Burke

Laura Burke is the Director General of the Environmental Protection Agency (EPA), appointed in 2011 and served as a Director within the EPA since 2004. Laura is the Chair of the European Environment Agency (EEA) Management. Prior to joining the EPA, she worked in the private sector. Laura is a graduate chemical engineer of University College Dublin (UCD), holds an MSc from Trinity College, Dublin and is a Chartered Director. In 2016 Laura was awarded the UCD Engineering Graduates Association (EGA) Distinguished Graduate Award.

“The Role of Citizen Science in Supporting Environmental Protection in Ireland”

Mrs. Cauffman currently serves as the Deputy Director of the Earth Science Division, in the Science Mission Directorate at the National Aeronautics and Space Administration (NASA) Headquarters. She provides executive leadership, strategic direction, and overall management for the entire agency's Earth Science portfolio, from technology development, applied science, research, mission implementation and operation.

Prior to joining NASA HQ, Mrs. Cauffman worked at the Goddard Space Flight Center (GSFC) for 25 years serving on a variety of roles. She served as the Deputy Systems Program Director for the Geostationary Operational Environmental Satellite (GOES)-R Series, a multi-billion-dollar operational geostationary weather satellite program developed in partnership with the National Oceanic and Atmospheric Administration (NOAA). Before returning to the GOES program for the third time in her career, Mrs. Cauffman was the Deputy Project Manager for the Mars Atmosphere and Volatile Evolution (MAVEN) Mission, a NASA mission to the red planet, which launched on November 18, 2013, which is providing a comprehensive picture of the present state of the upper atmosphere and ionosphere of Mars and the processes controlling them to determine how loss of volatiles to outer space in the present epoch varies with changing solar conditions.

She served as the Project Manager (PM) for the Gravity and Extreme Magnetism Small Explorer (SMEX) (GEMS). In June 2009, GEMS was one of two missions selected for implementation competing on the 2008 SMEX Announcement of Opportunity (AO). GEMS was an



Sandra Alba Cauffman

**Deputy Director, Earth Science Division
Science Mission Directorate, NASA HQ**

“Following My Dreams”

Astrophysics mission using X-Ray polarimetry to probe the structure and effects of the formidable magnetic field around black holes, magnetars, dead stars. Previously, Mrs. Cauffman was the Assistant Director for the Flight Projects Directorate for almost 5 years. As assistant Director, Mrs. Cauffman helped maintain technical and administrative oversight for the Directorate.

Mrs. Cauffman served as the Deputy Project Manager for the GOES-R Series Program. Before becoming the GOES-R Deputy Project Manager, Mrs. Cauffman served as the Instrument Systems Manager for GOES-R, overseeing the research, development and implementation of multi-million dollar instruments directed toward exploration of the earth's environment, weather prediction, charged particle detection, advanced data collection and search and rescue techniques.

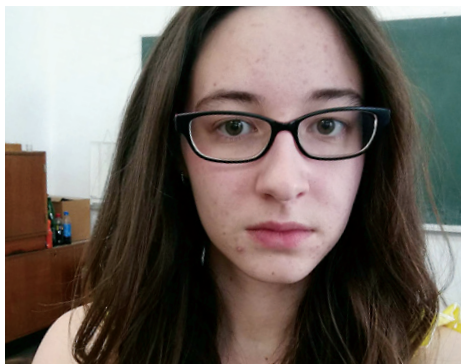
Before joining GOES (again), Mrs. Cauffman served as the Project Formulation Office (PFO) Office Chief, where she was responsible for planning,

implementing, and coordinating all activities related to the development of feasible mission concepts, requirements generation and formulation of new projects to be implemented such as Global Precipitation Mission (GPM), Landsat Data Continuity Mission (LDCM), Solar Dynamic Observatory (SDO), Constellation X, and Laser Interferometer Space Antenna (LISA).

Mrs. Cauffman worked on GOES as an Instrument Manager supporting the design, development, fabrication, test and launch and on-orbit checkout of the GOES-I/M and N/P SXI and SEM instruments. Mrs. Cauffman joined NASA in February 1991, when she started as the Ground Systems Manager for the Satellite Servicing Project, where she supported missions such as Hubble Space Telescope (HST) First Servicing Mission, Upper Atmosphere Research Satellite (UARS), and Explorers Platform (EP)/Extreme Ultraviolet Explorer (EUVE). Before her NASA life, Mrs. Cauffman worked for Engineering and Economics Research (EER).

Mrs. Cauffman has been awarded the NASA Exceptional Achievement Medal and she is a two-time recipient of the NASA Outstanding Leadership Medal. She is also a four times recipient of the NASA Acquisition Improvement Award, and numerous GSFC and HQ awards. She is a Senior Fellow on the Council for Excellence in Government. She is an Honorary Member of the National Academy of Sciences, Costa Rica. She received a B.S. in Physics, a B.S. in Electrical Engineering and a M.S. in Electrical Engineering, all from George Mason University. Mrs. Cauffman was born in Costa Rica and is fluent in Spanish.

Student Speakers



Margareta Kljun

School: Prirodoslovna i grafička škola Rijeka

City and Country: Rijeka, Croatia

Grade: 12th grade

Name of your GLOBE teacher: Marina Pavlič

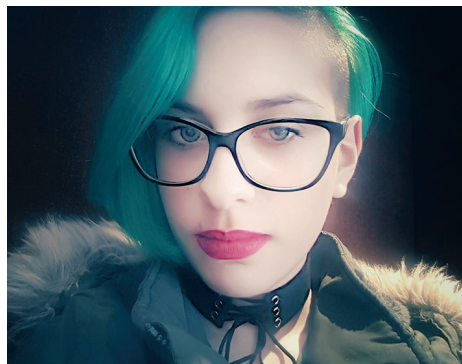
How many years have you been involved with GLOBE: Two years

What have you enjoyed most about doing GLOBE?

I enjoy learning new things about nature and how to monitor the change that happens in nature. To me it's really interesting how nature changes around us. By being a GLOBE student I got the chance to inform the residents of my community about the dangers that the mosquitoes represent. GLOBE inspired me to look for answers and be more confident to do all sorts of research about the things I find interesting.

Where do you see yourself in 10 years?

I don't have a clear vision where I'm going to be in and what I'm going to do in 10 years but my goal would be to finish college and to have a job related in biochemistry.



Patricia Pesic

School: Prirodoslovna i grafička škola Rijeka

City and Country: Rijeka, Croatia

Grade: 10th grade

Name of your GLOBE teacher: Marina Pavlič

How many years have you been involved with GLOBE: One year

How has GLOBE helped you to improve your environment?

GLOBE gave me the necessary knowledge that allowed me to keep expanding upon it and learn more about the ways in which we can save our planet. Our school's GLOBE project focuses on protecting the health of the citizens of our city. While I personally wasn't involved in projects that are beneficial to our environment, I have taken action in my private time and hope I that one day I'll be able to make a bigger contribution.

Where do you see yourself in 10 years?

I hope I'll be able to find work in natural science fields, particularly ecology and biology. I'm aiming for medical or ecological colleges and I hope I'll be able to study abroad. If possible I would like to get employed in a research-related science branch, although I'm still not entirely sure of what kind exactly.



Prangnapas Kongneam

School: Princess Chulabhorn Science High School Trang

City and Country: Trang, Thailand

Grade: 12th grade

Name of your GLOBE teacher: Patchara Pongmanawut

How many years have you been involved with GLOBE: Three years

What have you enjoyed most about doing GLOBE?

I have enjoyed to be a GLOBE student that provides me with an opportunity to collaborate and share the idea with friends, teachers, scientists and local people in my community about global issues such as Dengue fever and water pollution. Doing the GLOBE Mosquito Protocol is the most interesting one. Reason being, I have learned the scientific process not only collecting samples from representative area, but also analyzing the data and drawing important conclusions that are relevant to the local community. I hope that if everyone takes care of their own environment, they will have a big impact to the world.

Where do you see yourself in 10 years?

I would like to study in the medical school and become a scientist or a doctor in the rural area. I always believe that education is a lifetime study. I also love to do activities about the environment. My second dream is to graduate with a PhD in Environmental Studies & Earth Sciences abroad and become a GLOBE scientist. And the most important one: I want to see happy, healthy people and environmental sustainability surrounding me.



Royce Jacobs

School: Medford Memorial Middle School

City and Country: Medford, NJ, USA

Grade: 7th grade

Name of your GLOBE teacher:

Vicky Gorman

How many years have you been involved with GLOBE: One year

What have you enjoyed most about doing GLOBE?

Of all the great things I have enjoyed about doing GLOBE, my favorite was presenting my research. In May, at the GLOBE SRS in Buffalo, New York.

I liked this because I got a chance to show what I have been working on to NASA and NOAA scientists and other kids. Also, this gave me valuable experience on how to present my research in the future. In addition, I think this was a lot more exciting than conducting the research. I love meeting people and talking to people and sharing ideas. GLOBE provides a great opportunity to communicate with a lot of other people who share the same interests as me.

Where do you see yourself in 10 years?

In 10 years, I see myself at college studying a science related field. I see myself working with scientists at a job or internship. The world can change a lot in 10 years, but one thing that I hope will not change is that I will continue to be in contact with the other Junior Scientists that I meet through the GLOBE program. How cool would it be if in 10 years, we are all starting off our careers with a network of other international scientists that we met in Ireland and have already known for 10 years?



JoyAnn Makena Maina

School: St. Scholastica Catholic Primary School

City and Country: Nairobi, Kenya

Grade: 7th grade

Name of your GLOBE teacher:

Eric Nzioka

How many years have you been involved with GLOBE: Three years

What have you enjoyed most about doing GLOBE?

I like GLOBE because it allows me go out of the class and interact with the environment. I started doing GLOBE by regularly identifying different types of clouds in the Clouds protocol, which enabled me to know them even without using the Cloud Chart. GLOBE has also introduced me to many practical learning activities and the exciting field of satellites.

My involvement in GLOBE has enabled me to participate in major events. I made a presentation on clouds during the UN Environment Assembly in May 2016. In July 2017, I was part of the team that participated in RCMRD Space Challenge and we emerged 2nd overall. The challenge required us to analyze weather parameters from a weather station, plot graphs and prepare a research report from which I learned the process of doing research and the impact of our activities on the environment.

Where do you see yourself in 10 years?

In 10 years, hopefully I will have graduated from University with either an Engineering degree or Earth Science related degree. I hope I will be able to continue participating in the GLOBE program activities and possibly mentor the next-generation of scientists.



Mothanna Yousef Abdullatif Al Jabr

School: Jawatha private school

City and Country: AL hasa in KSA

Grade: 3 Secondary

Name of your GLOBE teacher:

Abdullah Farhan Abdullah AL-Farhan

How many years have you been involved with GLOBE: Five years

In what ways has doing GLOBE inspired you?

It has inspired me because it makes me think. It also helps me discover new things about the environment. GLOBE is useful as it brings positive thoughts and ideas to improve our skills.

Where do you see yourself in 10 years?

My dream is to enter medical college, then move on to be a cardiologists, I would like to see myself as a famous doctor in my country while also being helpful and useful in the society I live in.



Lya Aimée Gómez Alma

School: Notre Dame School

City and Country: Santo Domingo,
Dominican Republic

Grade: 11th

Name of your GLOBE teacher:

Roberto Fernandez

**How many years have you been involved
with GLOBE:** 11 years

**In what ways has doing GLOBE
inspired you?**

During my Physical, Earth and Space, and Environmental Science classes with the GLOBE Program as a hands on science part of the school curriculum, I discovered an acute curiosity for geology, meteorology, oceanography, and astronomy. Going outside the classroom or on fieldtrips to do the GLOBE Program protocols, my passion was ignited to be an environmental activist. GLOBE changed the way I perceived the world and inspires me to protect the planet by propagating a consciousness of the Earth as a system, where all our actions have consequences.

Where do you see yourself in 10 years?

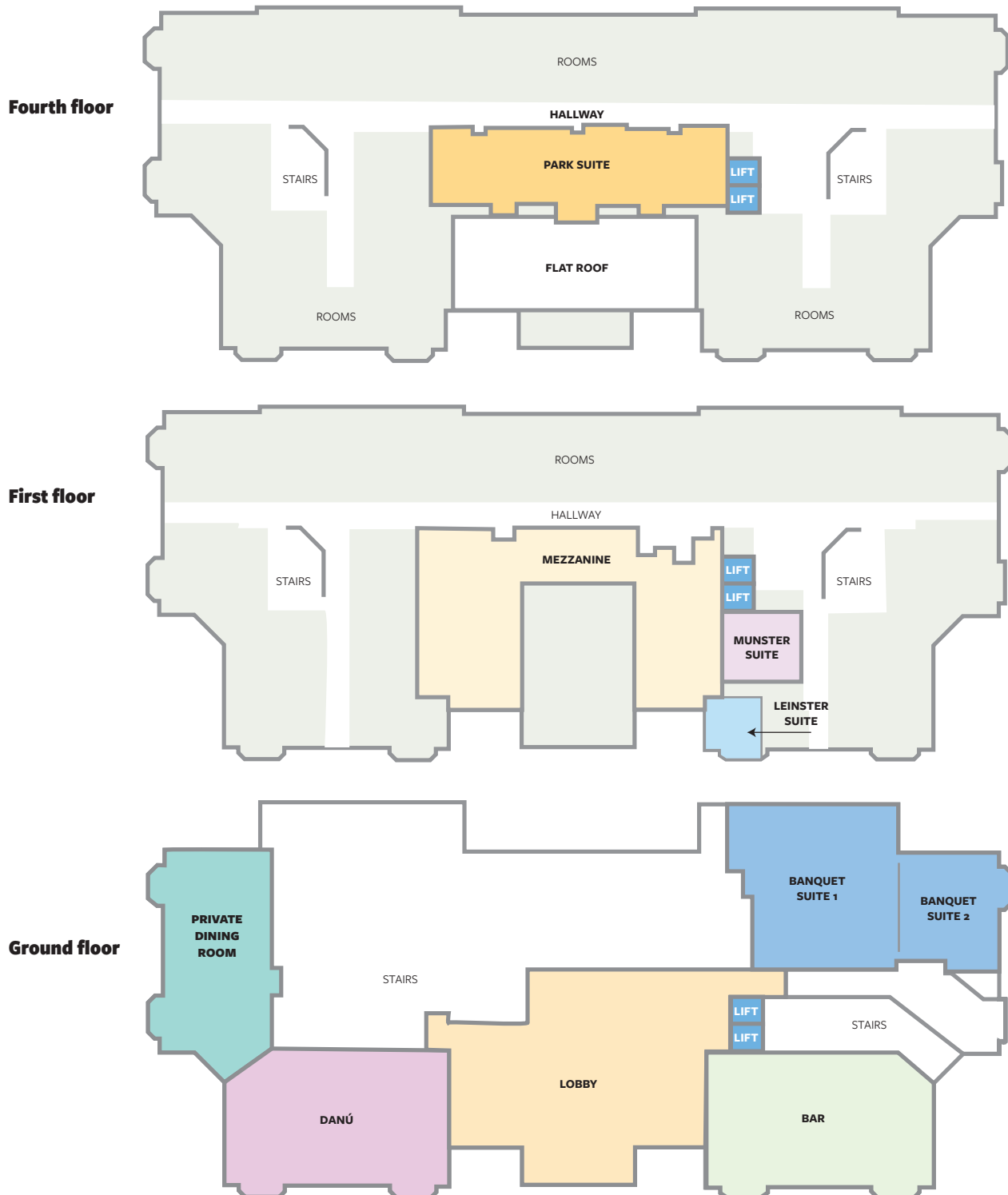
Actually I am working on projects studying water-purifying systems using solar radiation techniques and detecting plant health using data from infrared pictures taken from drones. I can see myself participating in environmental projects in my community, maybe with my country's government to improve the way Dominicans perceive their land and to help them respect the environment, be responsible of their actions on it, and be part of the solution of many issues that affect us locally and globally.





Facilities

The Brehon



The Gleneagle Hotel



Map of Killarney



Agenda Snapshot

		SUNDAY, 1 JUL	MONDAY, 2 JUL	TUESDAY, 3 JUL	
AM	7:00				
	7:30		BREAKFAST 7:00–8:30		
	8:00				
	8:30	ANNUAL MEETING 8:30–4:30 in the Brehon Banquet Suite 1	OPENING	ANNOUNCEMENTS	
	9:00		Speakers and Icebreakers	Students: Killarney National Park Field Experience	
	9:30				
	10:00				
	10:30		Adults: Professional Development Opportunities		
	11:00				
	11:30				
	Noon		Safety Meeting 2:45–4:30 (teachers and students) in the Gleneagle Hotel Mangerton Suite	LUNCH 12:00–1:15	LUNCH 12:00–1:15
	12:30				
1:00			STUDENT KEYNOTE	STUDENT KEYNOTE	
1:30		Student Presentations (concurrent sessions)	Student Presentations (concurrent sessions)		
2:00					
2:30					
3:00					
3:30		Adults: Web Sessions	Adults: Web Sessions		
4:00					
4:30					
PM	5:00	Buses Depart Gleneagle for the parade 5:00	FREE TIME for students 5:00–6:30 Country Coordinator Meeting; US Partner Meeting	FREE TIME 5:00–6:30	
	5:30				
	6:00				
	6:30	GLE Welcome Reception with GLOBE ball rolling 6:00–9:30	DINNER 6:30–7:30	DINNER 6:30–7:30	
	7:00				
	7:30		CULTURAL NIGHT 7:30–10	CULTURAL NIGHT 7:30–10	
	8:00				
	8:30				
9:00					
9:30					

		WEDNESDAY, 4 JUL	THURSDAY, 5 JUL	FRIDAY, 6 JUL
AM	7:00			
	7:30		BREAKFAST 7:00-8:30	
	8:00			
	8:30	ADDRESS BY MINISTER GRIFFIN, TD	ANNOUNCEMENTS	ANNOUNCEMENTS
	9:00	Students: Killarney National Park Field Experience	Students: Killarney National Park Field Experience	Story-telling session, reflection on the past week, and wrap up
	9:30			
	10:00			
	10:30			
	11:00			
	11:30		Adults: Professional Development Opportunities	
	Noon			
	NO LUNCH PROVIDED	LUNCH 12:00-1:15	NO LUNCH PROVIDED	
		STUDENT KEYNOTE		
			WORKING GROUP MEETING 1:30-4:30	
		Student Presentations (concurrent sessions)		
		Adults: Web Sessions		
PM	5:00	FREE AFTERNOON AND NIGHT	FREE TIME 5:00-6:00	
	5:30			
	6:00		GROUP PHOTO 6:00-6:45	
	6:30			
	7:00			
	7:30			
	8:00		FINAL BANQUET 7:00-10:00	
	8:30			
	9:00			
	9:30			

Detailed Agenda | Saturday, Sunday and Monday

SATURDAY | 30 JUNE

7:15–9 am GLE Registration Desk Open Box Office Lobby
 Noon–4:30 pm

SUNDAY | 1 JULY

7:15 am–4:45 pm GLE Registration Desk Open Box Office Lobby

8:45 am–4:30 pm **Annual Meeting**
 (see page 25 for Annual Meeting Agenda) Brehon Hotel

2:45–4:30 pm **Safety Meeting**
 (teachers, chaperones, and students) Mangerton Suite

4:30–5 pm Board buses for transport to Killarney House Parking lot between
 Gleneagle and Brehon

5 pm Bus Departs for Killarney House

6–8:45 pm **GLOBE Ball Rolling/Parade** followed by **GLE Welcome Reception**
 Welcomes from GLOBE (Dr. Tony Murphy, Dr. Julie Malmberg, Anthony Purcell); Killarney
 House (Pat Dawson); the US Embassy (Kevin Furey) Downtown Killarney
 and Killarney House

8:45 pm Buses depart for transport to Gleneagle Hotel

MONDAY | 2 JULY

7:30 am–5 pm GLE Registration Desk Open Box Office Lobby

8:45 am–Noon **Opening Remarks and Keynote Speakers**
 (see page 33 for detailed Monday Morning Agenda) INEC

Noon–1:15 pm Lunch Ballroom

1:30–2pm **Video Address:** Natasha Hope (GLE Attendee, 2008)
Student Keynote: JoyAnn Maina, Kenya, Africa
Student Keynote: Royce Jacobs, USA, North America INEC

2–5 pm **Concurrent Sessions: Student Presentations**
 (see page 39 for Student Presentation Agenda) INEC, Mangerton
 and InnisFallen Suites

2–4 pm **Adult Web Sessions: Mobile GLOBE**
 (see page 38 for session information) Torc Suite

3:15–3:30 pm Break INEC Lobby

4–5 pm **Adult Web Sessions: Questions and Answers** Torc Suite

5–6:30 pm **Country Coordinator Meeting** Torc Suite

5–6:30 pm **US Partner Meeting** InnisFallen Suite

6:30–7:30 pm Dinner Ballroom

7:30–9:30 pm **Cultural Showcase** Mangerton Suite

9:30 pm Adjourn

Detailed Agenda | Tuesday and Wednesday

TUESDAY | 3 JULY

7:30 am–5:00 pm	GLE Registration Desk Open	Box Office Lobby
8 am	Field Site Activity Coaches Depart for Field Sites	Parking lot between Gleneagle and Brehon
8:45–9 am	Announcements	INEC
9 am	Students/Chaperones/Bus Leads load buses	Parking lot between Gleneagle and Brehon
9–Noon	Students: Field Experiences	Killarney National Park
9–Noon	Professional Development: Concurrent Sessions (see page 34 for detailed descriptions of these sessions)	Mangerton, Torc and InnisFallen Suites
Noon–1:15 pm	Lunch	Ballroom
1:30–2 pm	Student Keynote: Prangnapas Kongneam, Thailand, Asia and Pacific Student Keynote: Mothanna Yousef Abdullatif Al Jabr, Saudi Arabia, Near East and North Africa	INEC
2–5 pm	Concurrent Sessions: Student Presentations (see page 39 for Student Presentation Agenda)	INEC, Mangerton and InnisFallen Suites
2–4 pm	Adult Web Sessions: Teacher Essentials (see page 38 for session information)	Torc Suite
3:15–3:30 pm	Break	INEC Lobby
4–5 pm	Adult Web Sessions: Questions and Answers	Torc Suite
6:30–7:30 pm	Dinner	Ballroom
7:30–9:30 pm	Cultural Festival	INEC
9:30 pm	Adjourn	

WEDNESDAY | 4 JULY

7:30 am–Noon	GLE Registration Desk Open	Box Office Lobby
8 am	Field Site Activity Coaches Depart for Field Sites	Parking lot between Gleneagle and Brehon
8:45–9 am	Announcements Address: Brendan Griffin , TD, Minister of State at the Department of Transport, Tourism, and Sport	INEC
9 am	Students/Chaperones/Bus Leads load buses	Parking lot between Gleneagle and Brehon
9–Noon	Students: Field Experiences	Killarney National Park
Noon	Adjourn	

Detailed Agenda | Thursday and Friday

THURSDAY 5 JULY		
7:30 am–5 pm	GLE Registration Desk Open	Box Office Lobby
8 am	Field Site Activity Coaches Depart for Field Sites	Parking lot between Gleneagle and Brehon
8:45–9 am	Announcements	INEC
9 am	Students/Chaperones/Bus Leads load buses	Parking lot between Gleneagle and Brehon
9–Noon	Students: Field Experiences	Killarney National Park
9–Noon	Professional Development: Concurrent Sessions (see page 34 for detailed descriptions of these sessions)	Mangerton, Torc and InnisFallen Suites
Noon–1:15 pm	Lunch	Ballroom
1:30–2 pm	Student Keynote: Margareta Kljun and Patricia Pesic, Croatia, Europe Student Keynote: Lya Aimée Gómez Alma, Dominican Republic, Latin America and Caribbean	INEC
2–5 pm	Concurrent Sessions: Student Presentations (see page 39 for Student Presentation Agenda)	INEC, Mangerton and InnisFallen Suites
2–4 pm	Adult Web Sessions: Data Analysis (see page 38 for session information)	Torc Suite
3:15–3:30 pm	Break	INEC Lobby
4–5 pm	Adult Web Sessions: Questions and Answers	Torc Suite
6–6:45 pm	Group Photo	Brehon Hotel
7–8 pm	Banquet Dinner	INEC
8–8:30 pm	Keynote: Sandra Alba Cauffman, Deputy Director, Earth Science Division Science Mission Directorate, NASA Headquarters, “Following My Dreams”	INEC
8:30–9:30 pm	Irish Dancing with the Torc Dancers	INEC
9:30–10 pm	Giveaways and Closing Slideshow	INEC
10 pm	Adjourn	
FRIDAY 6 JULY		
7:30 am–Noon	GLE Registration Desk Open	Box Office Lobby
8:45–9 am	Announcements	INEC
9–11 am	Storytelling with All Good Tales —Jack Murray and the All Good Tales Team <i>Students were invited to submit videos to All Good Tales to take part in an intensive storytelling experience at the GLE. See their videos, Ignite talks, and learn more about effective storytelling.</i>	INEC
11–Noon	Closing	INEC
Noon	Adjourn	

22nd GLOBE Annual Meeting Agenda

In the Brehon Hotel, Sunday, 1 July, 2018

8:30 am **WELCOME** | BANQUET SUITE 1

Dr. Tony Murphy and Dr. Julie Malmberg, GLOBE Implementation Office (GIO)

Dr. Brandon Jones, National Science Foundation (NSF)

Dr. Lin Chambers, National Aeronautics and Space Administration (NASA)

Kia Henry, U.S. Department of State

John McLaughlin, National Oceanic and Atmospheric Administration (NOAA)

8:55 am **GLOBE IMPLEMENTATION OFFICE REPORT** | BANQUET SUITE 1

Dr. Tony Murphy, GIO

9:20 am **SSAI REPORT** | BANQUET SUITE 1

David Overoye, SSAI

9:45 am **WORKING GROUP REPORTS**

EDUCATION: Jessica Taylor

EVALUATION: Dr. Nektaria Adaktilou

SCIENCE: Dr. Mullica Jaroensutasinee

TECHNOLOGY: Elżbieta Wołoszyńska-Wiśniewska

10:45 am **BREAK**

Concurrent Sessions

To align with the GLOBE Strategic plan, sessions will correspond with the following themes:

■ Science (Sc) / ■ Technology (Te) / ■ Education (Ed) / ■ Community (Co) / ■ Communications (Cn)

LOCATION—BREHON				
	Banquet Suite 1	Banquet Suite 2	Park Suite	Munster Suite
THEMES	Technology and Science	Education	Communications and Community	Education
11 AM	AM.Sc.1 How Cool Was the 2017 Eclipse, and What's Next? Lead Presenter: Kristen Weaver	AM.Ed.1 Taking Data to the Next Level: "Water in Our Environment" and H2you Project Lead Presenter: Laura Kubiak	AM.Co.1 Using GLOBE protocols to overcome the 'Not in my backyard' phenomenon Presenter: Francis Wasswa Nsubuga	AM.Ed.8 Helping More Teachers Do GLOBE Through a Five-week Unit About Weather Phenomena Lead Presenter: Becca Hatheway
11:15			AM.Co.2 GLOBE at a US National Estuarine Research Reserve Presenter: Peggy Foletta	
11:30	AM.Sc.2 A new soil moisture probe for the GLOBE program and citizen scientists Lead Presenter: Peter Falcon	AM.Ed. 2 Engaging college students (pre-service, science and engineering) in GLOBE through undergraduate classes Lead Presenter: Kevin Czajkowski	AM.Co.3 GLOBE-Certified Teachers: How to increase their participation? Presenter: Sara Mierzwiak	
11:45	AM.Sc.3 GLOBE Carbon Cycle Presenter: Jennifer Bourgeault		AM.Co.4 Developing a STEM Curriculum of Place for Teacher Candidates Presenter: Kevin O'Connor	
Noon	Lunch	Lunch	Lunch	Lunch
1 PM	AM.Te.1 Acquire-Analyze-Apply (A ³) Lead Presenter: John Moore	AM.Ed.3 Full STEAM Ahead with GLOBE Science Lead Presenter: Jenn Paul Glaser	AM.Cn.1 GLOBE AR—Storytelling with Annotated 360° Images Presenter: Jamie Larsen	AM.Ed.8 Helping More Teachers Do GLOBE Through a Five-week Unit About Weather Phenomena Lead Presenter: Becca Hatheway
1:15				
1:30				
1:45				

LOCATION—BREHON				
	Banquet Suite 1	Banquet Suite 2	Park Suite	Munster Suite
2:00	AM.Te.1 (continued)	AM.Ed.3 (continued)	AM.Cn.1 (continued)	AM.Ed.8 (continued)
2:15				
2:30	Break	Break	Break	Break
2:45	AM.Te.2 Mosquitoes From Space? Lead Presenter: Renée Codsí	AM.Ed.4 A Teacher's Journey from Field Campaign to IVSS Presenter: Angela Rizzi	AM.Cn.2 GLOBE Social Media Presenter: Autumn Burdick	AM.Ed.8 Helping More Teachers Do GLOBE Through a Five-week Unit About Weather Phenomena Lead Presenter: Becca Hatheway
3:00			AM.Co.5 GLOBE Engaging Citizens in the Forecasting and Observation of Mosquito Threats Lead Presenter: Kristin Wegner	
3:15	AM.Te.3 Online Learning: Promoting Technology and Science Learning Experiences for Students Well Beyond the Classroom Presenter: Lucretia Octavia Tripp	AM.Ed.5 GLOBE goes Into the Woods Presenter: Peter Schmidt		AM.Ed.9 Hop Onboard the CSEP train! Presenter: Vicky Gorman
3:30				AM.Ed.10 Experience of Uruguay with the implementation of the online GLOBE learning modules in Spanish Presenter: Andrea Ventoso
3:45	AM.Sc.4 The European Air Quality Campaign Lead Presenter: Danielle de Staerke	AM.Ed.6 Three Phases of the GLOBE ENSO Student Research Campaign Presenter: Brian Campbell		AM.Ed.11 Sustainable GLOBE Program School Implementation: The T&T Experience Presenter: Henry Saunders
4:00	AM.Sc.5 The need to participate in GLOBE student research projects: A way to connect GLOBE data to university research Presenter: Hameed Sulaiman	AM.Ed.7 Incorporating Elementary GLOBE in Your Classroom Presenter: Mikell Lynne Hedley	AM.Co.6 GLOBE Observer Land Cover and Updates Presenter: Holli Kohl	AM.Ed.12 Meteorology in the School. A proposal of teacher training through GLOBE protocols Lead Presenter: Claudia Romagnoli
4:15	AM.Sc.6 Building the next generation of scientists through citizen science partnerships Lead Presenter: Rebecca Boger			AM.Sc.7 The Winter Berry Project Presenter: Terri Mynatt
4:30	End	End	End	End

Session Descriptions

SCIENCE

AM.Sc.1

How Cool Was the 2017 Eclipse, and What's Next?

Where & when: Banquet Suite 1 • 11–11:30 am

Presenters: Krister Weaver (kristen.l.weaver@nasa.gov); SSAI, Inc./NASA Goddard, Greenbelt, Maryland, USA; Kevin Czajkowski, Jessica Taylor

Summary: The panel will report on events surrounding the Total Solar Eclipse in 2017, including data collection via the GLOBE Observer app, outreach activities to the GLOBE community, and data analysis after the fact. Then we will lead a discussion about lessons learned and plans for the next eclipses in 2019 and 2024.

AM.Sc.2

A New Soil Moisture Probe for the GLOBE Program and Citizen Scientists

Where & when: Banquet Suite 1 • 11:30–11:45 am

Presenters: Peter Falcon (pcfalcon@jpl.nasa.gov), NASA, Jet Propulsion Laboratory (JPL), Pasadena, California, USA; Erika Podest, Narendra Das

Summary: A new soil moisture probe is being developed in JPL for citizen scientists. This probe is capable of making instant soil moisture measurements, and will replace the old and tedious soil moisture measurement protocol used for GLOBE. A phone app is also being developed that will operate the soil moisture probe and will upload the measured data to the GLOBE database.

AM.Sc.3

GLOBE Carbon Cycle

Where & when: Banquet Suite 1 • 11:45 am–12:00 pm

Presenter: Jennifer Bourgeault (usglobecc@gmail.com); Leitzel Center, University of New Hampshire, Durham, New Hampshire, USA

Summary: The updated Carbon Cycle materials, correlated to the U.S. Next Generation Science Standards, are posted to the GLOBE website. Earlier this year, the corresponding e-training was developed and tested by teachers. This workshop highlights learning activities, protocols, supporting materials and visualizations for carrying out carbon sequestration and biodiversity index research.

AM.Sc.4

The European Air Quality Campaign

Where & when: Banquet Suite 1 • 3:45–4:00 pm

Presenters: Danielle de Staerke (danielle.destaerke@cnes.fr); CNES, Toulouse, France; Eric Abgrall, Dana Votápková, Sabrina Moore

Summary: Air Quality Campaigns are organized on a European scale in spring and autumn. Measures obtained by schools are posted on the GLOBE database to be shared and used in classroom projects. The presentation will explain what the students can do during the Campaigns and how they can share their findings.

AM.Sc.5

The Need to Participate in GLOBE Student Research Projects: A Way to Connect GLOBE Data to University Research

Where & when: Banquet Suite 1 • 4–4:15 pm

Presenter: Hameed Sulaiman (hanhameco@gmail.com); Sultan Qaboos University, Muscat, Oman

Summary: This presentation highlights the importance of GLOBE schools, teachers and students in taking initiatives to participate in student research projects. Data collected across the world by GLOBE students provides information on the status of the environmental segments in the local area/environment. It becomes highly meaningful when the students understand the implications of the data they collect. When students begin to realize that there is a connection between the data they collect through GLOBE schools and the data generated by scientists in their country, it creates a big impact and influence on the students in many ways. This presentation brings the evidence of this happening in GLOBE student research projects from case studies (Oman, Saudi Arabia and Thailand), complementing related works carried out by the university researcher's in the respective countries.

AM.Sc.6

Building the Next Generation of Scientists through Citizen Science Partnership

Where & when: Banquet Suite 1 • 4:15–4:30 pm

Presenters: Rebecca Boger (beckyboger@gmail.com); Brooklyn College, City University of New York, Brooklyn, New York, United States; Russanne Low

Summary: Vector-borne diseases provide a compelling way to connect university students, GLOBE students, and citizen scientists. We showcase student research using spatial analysis tools and GO app, and discuss ways to promote interest in science and understanding of community health risks. You will obtain GIS/spatial analysis education materials for student research.

AM.Sc.7

The Winter Berry Project

Where & when: Munster • 4:15–4:30 pm

Presenters: Terri Mynatt (temynatt@gmail.com); Yukon Flats School District, Venetie, Alaska, USA; Katie Spellman

Summary: Collaboration between a Scientist, a Teacher, and a community to create an opportunity for civilian science that provides educational opportunities, traditional cultural knowledge and scientific research, using GLOBE Protocols. We are located in a remote, isolated, rural village above the Arctic Circle in Alaska. We have been experiencing the effects of climate change and are pulling together our native indigenous cultural knowledge, with scientific research and data about Winter Berries. Berries are vital to the Alaska Native diet, and they are changing, we are collaborating to find out what is happening. Young students from the small village school, alongside Community members, a scientist and a teacher all go forward in the journey of collaboration with civilian science.

TECHNOLOGY

AM.Te.1

Acquire-Analyze-Apply (A³)

Where & when: Banquet Suite 1 • 1–2:30 pm

Presenters: John D. Moore (jmoore@bcbridges.org); Institute for Earth Observations at Palmyra Cove, Palmyra, New Jersey, USA; Peter Dorofy

Summary: This workshop will focus on Assessing Data Literacy through satellite, remote sensing and computer visualizations and the use of geospatial technologies. GLOBE field protocols, aerial imagery through the use of drones and AEROKATS are used to “ACQUIRE” data sets. GIS and image analysis will all be used in “ANALYZE” stage. Participants will learn how to “APPLY” these skills in the development new satellite collaboration activities for ICESAT2 and Landsat.

AM.Te.2

Mosquitoes From Space?

Where & when: Banquet Suite 1 • 2:45–3:15 pm

Presenters: Renée Codsí (rcodsi@gmail.com); University of Washington, Seattle, Washington, USA; Becky Boger, Rusty Low

Summary: In this hands-on workshop you'll use the NASA webportals EODIS Worldview and NEO to browse images and data that can be analyzed in conjunction with data collected using GLOBE protocols. We will explore relationships between GLOBE Observer Mosquito Habitat Mapper data and remotely sensed environmental data sets from space.

AM.Te.3

Online Learning: Promoting Technology and Science Learning Experiences for Students Well Beyond the Classroom

Where & when: Banquet Suite 1 • 3:15–3:45 pm

Presenter: Lucretia Octavia Tripp (tripplo@auburn.edu); Auburn University, Auburn, Alabama, USA

Summary: Our presentation will focus on an interactive learning environment to share youth oriented content. The target users will be teachers and students. We developed a student-friendly web application to support the student and the teacher in understanding science content around the world. This project will aim to help develop them to be more citizen science literate.

EDUCATION

AM.Ed.1

Taking Data to the Next Level: “Water in Our Environment” and H2you Project

Where & when: Banquet Suite 2 • 11–11:30 am

Presenters: Laura Kubiak (lauramschetter@gmail.com); Toledo Public Schools and H2you Project, Toledo, Ohio, USA; Brian Campbell

Summary: NASA studies water many ways. The data that GLOBE users collect is vital, helping us to become more informed and engaged stewards for the water in our environment. Through the H2you Project, students and teachers take their data to the next level by sharing and comparing water stories.

AM.Ed.2

Engaging College Students (Pre-service, Science and Engineering) in GLOBE through Undergraduate Classes

Where & when: Banquet Suite 2 • 11:30 am–12:00 pm

Presenters: Kevin Czajkowski (kevin.czajkowski@utoledo.edu); University of Toledo, Toledo, Ohio, USA; Kevin Czajkowski, Janet Struble, Mark Templin, David Padgett

Summary: Educators have been working together to implement GLOBE at the undergraduate level. In this session, an update of undergraduate offerings will be shared. Educators will discuss ways of implementing GLOBE at the undergraduate level especially for pre-service education and science majors. The group will discuss future plans.

AM.Ed.3

Full STEAM Ahead with GLOBE Science

Where & when: Banquet Suite 2 • 1–2:30 pm

Presenters: Jenn Paul Glaser (jennglaser@scribearts.org); Scribe Arts for Our Planet, Oceans and Fisheries/IGES, Boulder, Colorado, USA; Rusty Low

Summary: This hands-on workshop introduces you to STEAM (Science, Technology, Engineering, Art and Mathematics). Newly emerging STEAM pedagogies build creative capacity and divergent thinking in science students. You'll return home with a robust activity that connects students with GLOBE science using the power of art and storytelling.

AM.Ed.4

A Teacher's Journey from Field Campaign to IVSS

Where & when: Banquet Suite 2 • 2:45–3:15 pm

Presenter: Angela Rizzi (arizzi@olmc-school.com); Our Lady of Mount Carmel School and NASA, Newport News, Virginia, USA

Summary: A teacher will share how she guided students through the process of making observations to contributing to a GLOBE field campaign, working with a NASA mentor, and ultimately completing group projects which were submitted to the IVSS. Benefits for students will be discussed as well as lessons learned.

AM.Ed.5

GLOBE Goes Into the Woods

Where & when: Banquet Suite 2 • 3:15–3:45 pm**Presenter:** Peter Schmidt (peter.schmidt@qc.cuny.edu); Queens College, New York, New York, USA**Summary:** A review of a four year NOAA Environmental Literacy grant funded program: “Into the Woods.” The focus of the program was using GLOBE protocols as part of a strategy to get New York City elementary school teachers to integrate use of the outdoors as a regular part of their teaching.**AM.Ed.6**

Three Phases of the GLOBE ENSO Student Research Campaign

Where & when: Banquet Suite 2 • 3:45–4:00 pm**Presenter:** Brian Campbell (Brian.A.Campbell@nasa.gov); NASA Wallops Flight Facility, Wallops Island, Virginia, USA**Summary:** The ENSO Student Research Campaign has been going on since March 2016. During this time, the campaign has gone through phases that increase data collection, data analysis, and collaboration. There are students and educators from across the world that are collecting data and making sense of the data through collaboration.**AM.Ed.7**

Incorporating Elementary GLOBE in your Classroom

Where & when: Banquet Suite 2 • 4–4:30 pm**Presenter:** Mikell Lynne Hedley (mikell.hedley@utoledo.edu); University of Toledo, Toledo, Ohio, USA**Summary:** Bringing Elementary GLOBE into your classroom using GLOBE materials and NASA resources is an easy way to meet your school’s science standards. Building on student’s curiosity and GLOBE protocols turn your young students into active science researchers. Science class becomes the class they look forward to each day.**AM.Ed.8**

Helping More Teachers Do GLOBE Through a Five-week Unit About Weather Phenomena

Where & when: Munster • 11 am–3:15 pm**Presenters:** Becca Hatheway (hatheway@ucar.edu), Lisa Gardiner, John Ristvey; UCAR Center for Science Education; Boulder, Colorado, USA**Summary:** Learn about the GLOBE Weather middle school curriculum that’s currently in development. Get an overview of this phenomena-based curriculum, participate in hands-on and data analysis activities, and provide input on how this curriculum can connect with other aspects of the GLOBE Program.**AM.Ed.9**

Hop Onboard the CSEP Train

Where & when: Munster • 3:15–3:30 pm**Presenter:** Vicky Gorman (vgorman@medford.k12.nj.us); Medford Memorial Middle School, Medford, New Jersey, USA**Summary:** Learn about the latest paradigm shift in United States science education. The Next Generation Science Standards call for a three-dimensional approach to science instruction. Each dimension works with the other two to help students build a cohesive understanding of science over time. Do you think we’re on the right track?**AM.Ed.10**

Experience of Uruguay with the Implementation of the Online GLOBE Learning Modules in Spanish

Where & when: Munster • 3:30–3:45 pm**Presenter:** Andrea Ventoso (andrea.ventoso@mvtoma.gub.uy); Ministry of Housing, Land Planning and Environment. National Directorate of Environment. Participation and Environmental Education Division, Montevideo, Uruguay**Summary:** In 2017 the idea of translating and editing the e-learning modules to Spanish arose facing the fact that is a new and most practical way of training teachers. This allows participants access this scientific methodology easily and without cost. Till this moment, atmosphere and hydrosphere modules have been implemented.**AM.Ed.11**

Sustainable GLOBE Program School Implementation: The T&T Experience

Where & when: Munster • 3:45– 4:00 pm**Presenter:** Henry Henderson Saunders (henrysau@gmail.com); GLOBE Partner Trinidad & Tobago, Trinidad, West Indies, Trinidad and Tobago**Summary:** Learn about the simultaneous training of teachers (min 3) and students (25 with leadership potential) in GP Protocols, Interaction with school management prior to training, determination of mode of implementation (Through an Environment Club or whole school participation), Overseeing of Peer Training, Acquisition of Equipment and Commissioning of GP and Sustainability activities.**AM.Ed.12**

Meteorology in the School: A Proposal of Teacher Training Through GLOBE Protocols

Where & when: Munster • 4–4:15 pm**Presenters:** Claudia Romagnoli (clauromag@gmail.com); GLOBE Argentina, Rosario, Santa Fe, Argentina; Viviana Sebben**Summary:** A training project for primary teachers (1^o–7^ogrades) on topics related to Atmosphere, included in the curricular contents of Natural Sciences is presented. The objective is to train teachers so that they introduce your students (6-13 years) to observation and recording meteorological variables following GLOBE protocols. Finally, students do different school research.

COMMUNITY

AM.Co.1

Using GLOBE Protocols to Overcome the 'Not In My Backyard' Phenomenon

Where & when: Park Suite • 11-11:15 am

Presenter: Francis Wasswa Nsubuga (nwasswa@gmail.com); University of Pretoria, Pretoria RSA, Pretoria, South Africa

Summary: Some of Government projects have been delayed or stopped due to public opposition either directly in the form of local action groups, or indirectly by making the political climate unfavorable. The use of GLOBE protocols can play a pivotal role in public outreach and education pre-, during and post- implementation of such programs. The proposed approach intends to strengthen public involvement by monitoring the perceived effects and empowering the public using the least costs now and in the future while strengthening science. proposed approach will rely on a case study of Pilot Carbon Dioxide Storage Project (PCSP) in South Africa.

AM.Co.2

GLOBE at a US National Estuarine Research Reserve

Where & when: Park Suite • 11:15-11:30 am

Presenter: Peggy Foletta (peggyfoletta@gmail.com); Elkhorn Slough National Estuarine Research Reserve, Watsonville, California, USA

Summary: How one US National Estuarine Research Reserve has implemented the GLOBE Program.

AM.Co.3

GLOBE-Certified Teachers: How to increase their participation?

Where & when: Park Suite • 11:30-11:45 am

Presenter: Sara Mierzwiak (sara.mierzwiak@rockets.utoledo.edu); University of Toledo, Toledo, Ohio, USA

Summary: The University of Toledo has trained over 500 GLOBE teachers in yearly Professional Development institutes since 2001. This study will investigate teacher participation rates and attitudes towards GLOBE. Input from active and inactive teachers will be used to generate a needs assessment. Results will be used to improve our future PDs.

AM.Co.4

Developing a STEM Curriculum of Place for Teacher Candidates

Where & when: Park Suite • 11:45 am-12:00 pm

Presenter: Kevin O'Connor (koconnor@mtroyal.ca); Department of Education, Mount Royal University, Calgary, Alberta, Canada

Summary: Through our relationships with Aboriginal communities, we have a deeply held conviction that sustained deliberations on the connections between Aboriginal knowledge systems and place-based thinking can provide significant opportunities for reframing STEM teacher education. The purpose of our research is to investigate how teacher candidates' experiences in GLOBE environmental field studies with community partners can inform an integrated STEM practicum semester based on a curriculum of place.

AM.Co.5

GLOBE Engaging Citizens in the Forecasting and Observation of Mosquito Threats

Where & when: Park Suite • 3:00-4:00 pm

Presenters: Kristin Wegner (kwegner@ucar.edu); The GLOBE Implementation Office, Boulder, Colorado, USA; Kia Henry, Lyn Wigbels

Summary: Through support from the United States Department of State, the GLOBE Implementation Office (GIO) is working with the GLOBE community on a Zika education and eradication project. In this panel presentation, the GLOBE community will share project updates and future plans.

AM.Co.6

GLOBE Observer Land Cover and Updates

Where & when: Park Suite • 4:00-4:30 pm

Presenter: Holli Kohl (holli.ribeek@nasa.gov); NASA Goddard Space Flight Center (SSAI), Albuquerque, New Mexico, USA

Summary: GLOBE Observer recently released a land cover protocol based on the GLOBE Land Cover Protocol. This presentation will provide an overview of the new land cover component of the GO app. We will also discuss resources that GLOBE schools, partners, and coordinators can use in community outreach.

COMMUNICATIONS

AM.Cn.1

GLOBE AR—Storytelling with Annotated 360° Image

Where & when: Park Suite • 1:00-2:30 pm

Presenters: Jamie Larsen (jamie_larsen@terc.edu); TERC, Cambridge, Massachusetts, USA; Susan Oxnevad

Summary: Reaching out to communicate GLOBE success stories, especially through state-of-the-art 360° authoring tools that let GLOBE students create exhibitions of their learning about the local environment should be a central component of every GLOBE educator's toolkit. Join us to learn how to use Thinglink to tell your GLOBE story. Please bring a laptop or tablet to the workshop.

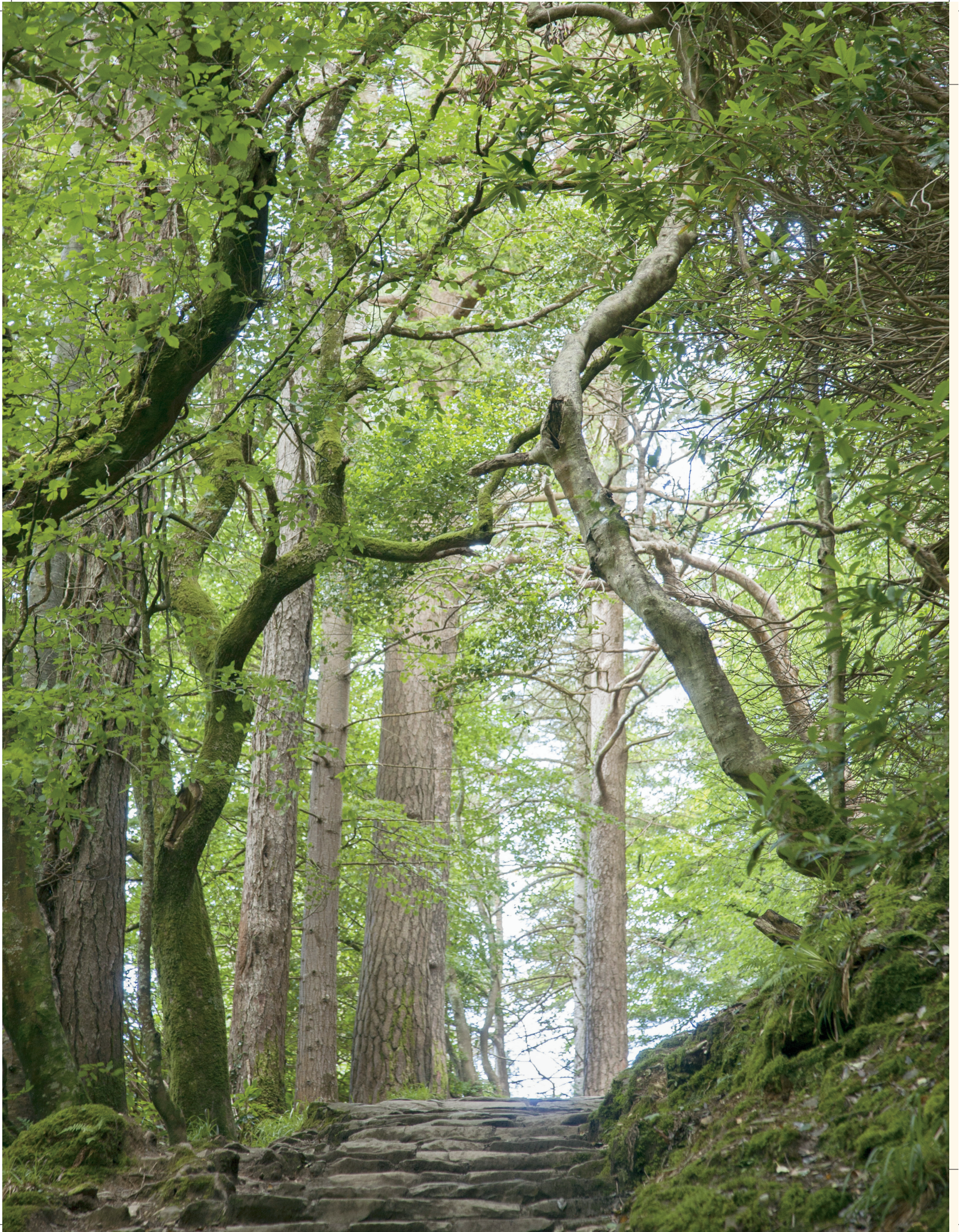
AM.Cn.2

GLOBE Social Media

Where & when: Park Suite • 2:45-3:00 pm

Presenter: Autumn Marie Burdick (autumn.burdick@ssaihq.com); SSAI, Monrovia, California, USA

Summary: Presentation of GLOBE and GLOBE Observer's social media accounts and impact in order to raise awareness, interactions and answer questions.



Opening to the 6th GLE

In the Gleneagle INEC, Monday, 2 July 2018

- 8:45 am** **WELCOME VIDEO**
- 8:50–9:05 am** **MY STORY OF KILLARNEY**
Dr. Tony Murphy, Director—GLOBE Implementation Office
- 9:05–9:20 am** **GLE GENERAL INFORMATION**
Anthony Purcell, Ireland GLOBE Country Coordinator
Dr. Julie Malmberg, GLOBE Implementation Office
- 9:20–9:30 am** **NAMING OF THE COUNTRIES**
- 9:30–9:35 am** **WELCOME FROM THE MAYOR OF KILLARNEY**
- 9:35–10 am** **WELCOME FROM THE SPONSORS**
Dr. Brandon Jones, NSF
Dr. Lin Chambers, NASA
Kia Henry, US Department of State
Kevin Furey, US Embassy—Dublin
John McLaughlin, NOAA—*video*
- 10–10:10 am** **SOCIAL MEDIA INTRODUCTION**
Autumn Burdick, SSAI
- 10:10–10:30 am** **KEYNOTE SPEAKER**
Jack Murray, Director—All Good Tales
The Art of Storytelling
- 10:30–10:45 am** **BREAK | INEC LOBBY**
- 10:45–10:55 am** **DR. MICHAEL JOHN O'MAHONY**
Director at Environmental Education Unit—An Taisce
- 10:55–11:10 am** **KEYNOTE SPEAKER**
Laura Burke, Director General—Irish Environmental Protection Agency
The Role of Citizen Science in Supporting Environmental Protection in Ireland
- 11:10–11:25 am** **SOCIAL MEDIA CONTINUED**
Autumn Burdick, SSAI
- 11:25–11:55 am** **KEYNOTE SPEAKER**
Norman McCloskey, Professional Photographer
Shedding Light on Killarney National Park
- 11:55–Noon** **LUNCHTIME INSTRUCTIONS**

Professional Development Agenda

TUESDAY | 03 JULY 2018

The GLOBE International Organizing Committee has designed a diverse and exciting professional development program for all GLE participants who won't be carrying out fieldwork with the students on Tuesday and Thursday mornings. Each morning there are three session strands from which to choose.

On Tuesday, **Session 1** is a three-hour workshop specifically for middle school teachers. We ask that those who attend Session 1 participate for the entire morning.

Session 2 has two presentations focused on GLOBE in primary/elementary classes, two presentations focused on GLOBE in middle/

secondary classes, short presentations from International Virtual Science Symposium teachers, and a general session. Session 2 is tailored for teachers, country coordinators, GLOBE partners and other GLOBE community members. Participants are encouraged to attend any/all of these sessions that are relevant to your needs and use time set aside for open-ended discussions with fellow participants and presenters. This is a great opportunity to learn about what's happening in GLOBE around the world, exchange best practices and get ideas for what you can do!

Session 3 is a 90-minute session on school-based measurements and citizen science with the ICESat-2 Mission.

TUESDAY AT A GLANCE:

LOCATION—GLENEAGLE			
	Mangerton Suite	InnisFallen Suite	Torc Suite
THEMES	Curriculum	GLOBE Implementation Best Practices	Mission Science
9 AM	PD.1 Helping More Teachers Do GLOBE Through a Five-week Unit About Weather Phenomena Presenters: Becca Hatheway, Lisa Gardiner, John Ristvey	PD.2 Primary/Elementary: GLOBE Goes Into the Woods Presenter: Peter Schmidt	PD.8 Height Matters: School-based Measurements and Citizen Science with the ICESat-2 Mission Presenter: Brian Campbell
9:20		PD.3 Primary/Elementary: Incorporating Elementary GLOBE in your Classroom Presenter: Mikell Lynne Hedley	
9:40		PD.4 Middle, Junior/Secondary: Hop Onboard the CSEP Train Presenter: Vicky Gorman	
10:00		PD.5 Middle, Junior/Secondary: A Teacher's Journey from Field Campaign to IVSS Presenter: Angela Rizzi	
10:20		PD.6 IVSS Teacher Presentations IVSS Teacher: Joris ten Barge	
10:40		IVSS Teacher: Diana Johns	
11:00		IVSS Teacher: Amy Woods	
11:20		Discussion	
11:40		PD.7 GLOBE Digital Games and the GLOBE MOOC in Israel Presenter: Farid Hamdan	
Noon	Lunch	Lunch	Lunch

PD.1

Helping More Teachers Do GLOBE Through a Five-week Unit About Weather Phenomena

Where & when: Mangerton Suite • 9-12:00 pm**Presenters:** Becca Hatheway (hatheway@ucar.edu), Lisa Gardiner, John Ristvey; UCAR Center for Science Education; Boulder, Colorado, USA**Summary:** Learn about the GLOBE Weather middle school curriculum that's currently in development. Get an overview of this phenomena-based curriculum, participate in hands-on and data analysis activities, and provide input on how this curriculum can connect with other aspects of the GLOBE Program.**PD.2**

GLOBE Goes Into the Woods

Where & when: InnisFallen Suite • 9-9:20 am**Presenter:** Peter Schmidt (peter.schmidt@qc.cuny.edu); Queens College, New York, New York, USA**Summary:** A review of a four year NOAA Environmental Literacy grant funded program: "Into the Woods." The focus of the program was using GLOBE protocols as part of a strategy to get New York City elementary school teachers to integrate use of the outdoors as a regular part of their teaching.**PD.3**

Incorporating Elementary GLOBE in your Classroom

Where & when: InnisFallen Suite • 9:20-9:40 am**Presenter:** Mikell Lynne Hedley (mikell.hedley@utoledo.edu); University of Toledo, Toledo, Ohio, USA**Summary:** Bringing Elementary GLOBE into your classroom using GLOBE materials and NASA resources is an easy way to meet your school's science standards. Building on student's curiosity and GLOBE protocols turn your young students into active science researchers. Science class becomes the class they look forward to each day.**PD.4**

Hop Onboard the CSEP Train

Where & when: InnisFallen Suite • 9:40-10 am**Presenter:** Vicky Gorman (vgorman@medford.k12.nj.us); Medford Memorial Middle School, Medford, New Jersey, USA**Summary:** Learn about the latest paradigm shift in United States science education. The Next Generation Science Standards call for a three-dimensional approach to science instruction. Each dimension works with the other two to help students build a cohesive understanding of science over time. Do you think we're on the right track?**PD.5**

A Teacher's Journey from Field Campaign to IVSS

Where & when: InnisFallen Suite • 10-10:20 am**Presenter:** Angela Rizzi (arizzi@olmc-school.com); Our Lady of Mount Carmel School and NASA, Newport News, Virginia, USA**Summary:** A teacher will share how she guided students through the process of making observations to contributing to a GLOBE field campaign, working with a NASA mentor, and ultimately completing group projects which were submitted to the IVSS. Benefits for students will be discussed as well as lessons learned.**PD.6**

IVSS Teacher Presentations

Where & when: InnisFallen Suite • 10:20-11:40 am**Presenters:** Joris ten Barge (j.tenbarge@helenparkhurst.asg.nl); Helen Parkhurst School, Almere, Netherlands; Diana Johns (drjohns@cscdm.k12.mi.us); Crestwood High School, Dearborn Heights, Michigan, USA; Amy Woods (awoods@sfxcs-pa.org); St. Francis Xavier Catholic School, Gettysburg, Pennsylvania, USA**Summary:** Teachers of the drawing winners for the 2018 GLOBE International Virtual Science Symposium (IVSS) will discuss how their students chose their research topics, successes and pitfalls in the research process, and advice for other teachers interested in taking part in the IVSS.**PD.7**

GLOBE Digital Games and the GLOBE MOOC in Israel

Where & when: InnisFallen Suite • 11:40 am-12 pm**Presenter:** Farid Hamdan (yusra@inter.net.il); GLOBE National Coordinator, Tel-Aviv, Israel**Summary:** EurekaWorld is designed to enable students and teachers to dream, experience, develop and create their own Edu 3D3C regions. The creation in EurekaWorld combines traditional 3D tools, working in VR, 3D printing, Arduino controller and other peripherals devices. EurekaWorld enables the GLOBE Program several gamifications and creation processes.**PD.8**

Height Matters: School-based Measurements and Citizen Science with the ICESat-2 Mission

Where & when: Torc • 9-10:30 am**Presenter:** Brian Campbell (Brian.A.Campbell@nasa.gov); NASA Wallops Flight Facility, Wallops Island, Virginia USA**Summary:** As ICESat-2 measures height from space, NASA is calling on students and citizen scientists to take measurements from the ground to help validate the satellite data. These students and citizen scientists will measure heights of trees to aid in NASA's investigations of a changing Earth.

THURSDAY | 05 JULY 2018

On Thursday, **Session 1** is designed to reveal some GLOBE ‘hidden gems.’ Join Lynne Hehr in two one- hour long workshops on GLOBE Data Explorations and GLOBE Weather and Climate learning resources. Following these workshops, learn about the European Air Quality Campaign, Meteorology in Schools, and Online Learning.

Session 2 has two 90-minute sessions focused on GLOBE in Engineering and Science, Technology, Engineering, Arts, and Mathematics (STEAM).

Session 3 is an adult field experience (including a 7 km/4.35 mi walk— NO TRANSPORT PROVIDED) with Brid Colhoun from Killarney National Park to explore local ecology. This session is limited to 20 adults. Tickets will be available at the registration table. Please pick up your ticket early in order to reserve a spot. One ticket per person.

THURSDAY AT A GLANCE:

LOCATION—GLENEAGLE			
	Mangerton Suite	InnisFallen Suite	Walking Tour
THEMES	Curriculum and Campaigns	Engineering and STEAM	Field Experience
9 AM	PD.9 GLOBE Data Explorations Presenter: Lynne Hehr	PD.14 Establishing an Engineering Focus for GLOBE Presenters: Kevin Czajkowski, Janet Struble, Glenn Lipscomb, Caleb Farny, David Bydlowski	PD.16 Exploring Ireland’s Ecology Presenter: Brid Colhoun (meet outside of the Ballroom)
10:00	Break		
10:15	PD.10 From Weather to Climate & Climate Classification Presenters: Lynne Hehr, John Hehr		
10:30		PD.15 Full STEAM Ahead with GLOBE Science Presenters: Jenn Paul Glaser and Rusty Low	
11:15	PD.11 The European Air Quality Campaign Presenter: Danielle de Staerke		
11:30	PD.12 Meteorology in the School Presenter: Claudia Romagnoli		
11:45	PD.13 Online Learning: Promoting Technology and Science Learning Experiences for Students Well Beyond the Classroom Presenter: Lucretia Octavia Tripp		
Noon	Lunch	Lunch	Lunch

PD.9

GLOBE Data Explorations

Where & when: Mangerton Suite • 9–10 am**Presenter:** Lynne Hehr (lhehr@uark.edu); University of Arkansas Center for Math and Science Education, Fayetteville, Arkansas, USA**Summary:** Need activities to help middle to high school students (and teachers) learn how to analyze GLOBE environmental data while also learning atmospheric science concepts and geography? Join this session to discover two of the nine GLOBE Data Explorations developed by UCAR Center for Science Education for GLOBE. The lessons to be explored are 1) Make a Climograph, learn how to construct, read, and analyze climographs & understand how climate differs from weather, and 2) Rainfall and Health, learn about the relationship between three infectious diseases & rainfall in the country of Benin. PowerPoints and other resources will be provided to attendees.**PD.10**

From Weather to Climate & Climate Classification

Where & when: Mangerton Suite • 10:15 am–11:15 am**Presenter:** Lynne Hehr (lhehr@uark.edu), John Hehr; University of Arkansas Center for Math and Science Education, Fayetteville, Arkansas, USA**Summary:** Explore two GLOBE activities designed for middle/high school students and teachers to: 1) work with short- and long term air temperature data to better understand the differences between weather and climate; 2) understand that climates can be broadly classified using a system that is based upon specific variables: air temperature and precipitation; and 3) become familiar with the Köppen-Geiger Climate Classification system. PowerPoints and other resources will be provided to attendees.**PD.11**

The European Air Quality Campaign

Where & when: Mangerton Suite • 11:15 am–11:30 am**Presenter:** Danielle de Staerke (danielle.destaerke@cnes.fr); CNES, Toulouse, France; Eric Abgrall, Dana Votápková, Sabrina Moore**Summary:** Air Quality Campaigns are organized on a European scale in spring and autumn. Measures obtained by schools are posted on the GLOBE database to be shared and used in classroom projects. The presentation will explain what the students can do during the Campaigns and how they can share their findings.**PD.12**

Meteorology in the School

Where & when: Mangerton Suite • 11:30 am–11:45 am**Presenter:** Claudia Romagnoli (clauromag@gmail.com); GLOBE Argentina, Rosario, Santa Fe, Argentina; Viviana Sebben**Summary:** A training project for primary teachers (1^o–7^o grades) on topics related to Atmosphere, included in the curricular contents of Natural Sciences is presented. The objective is to train teachers so that they introduce their students (6–13 years) to observation and recording meteorological variables following GLOBE protocols. Finally, students do different school researches.**PD.13**

Online Learning: Promoting Technology and Science Learning Experiences for Students Well Beyond the Classroom

Where & when: Mangerton Suite • 11:45 am–12 pm**Presenter:** Lucretia Octavia Tripp (tripplo@auburn.edu); Auburn University, Auburn, Alabama, USA**Summary:** Our presentation will focus on an interactive learning environment to share youth oriented content. The target users will be teachers and students. We developed a student-friendly web application to support the student and the teacher in understanding science content around the world. This project will aim to help develop them to be more citizen science literate.**PD.14**

Establishing an Engineering Focus for GLOBE

Where & when: InnisFallen Suite • 9–10:30 am**Presenters:** Kevin Czajkowski (kevin.czajkowski@utoledo.edu); University of Toledo, Toledo, Ohio, USA; Janet Struble, Glenn Lipscomb, Caleb Farny, David Bydlowski**Summary:** GLOBE has the potential to engage students in engineering projects. In this session, we will share examples of students projects using the Arduino and Raspberry Pi programming and processors to build instrumentation piloted by GLOBE Mission EARTH universities. Also, we will share the use of kites and rovers through the AREN Project.**PD.15**

Full STEAM Ahead with GLOBE Science

Where & when: InnisFallen Suite • 10:30 am–12 pm**Presenters:** Jenn Paul Glaser (jennglaser@scribearts.org); Scribe Arts for Our Planet, Oceans and Fisheries/IGES, Boulder, Colorado, USA; Rusty Low**Summary:** This hands-on workshop introduces you to STEAM (Science, Technology, Engineering, Art and Mathematics). Newly emerging STEAM pedagogies build creative capacity and divergent thinking in science students. You'll return home with a robust activity that connects students with GLOBE science using the power of art and storytelling.**PD.16**

Exploring Ireland's Ecology—Walking Tour

Where & when: Meet outside of the Ballroom • 9 am–12 pm**Presenter:** Brid Colhoun (Brid.Colhoun@chg.gov.ie); Killarney House & Gardens/Killarney National Park, Killarney, Ireland**Summary:** This walking tour will take 20 participants on a 7 km (4.35 mile) walk through Muckross Abbey—Old Irish Monastery and Modern Irish Graveyard. Explore this early Christian settlement through discussion on land-use changes and discover the dramatic past of the Abbey which lies close to the shoreline of Lough Leane—the Lake of Learning. From here we discuss freshwater ecosystems in the region and how Ireland monitors and protects its watercourses. Be prepared to walk and come dressed for the weather! Make sure to get your ticket in advance.

WEB SESSIONS

MONDAY | 02 JULY 2018

2-5 pm

Torc Suite

David Overoye (SSAI), Travis Andersen (GIO),
Eslam Khair (GIO)

2-4 pm

Mobile GLOBE

Learn about all of GLOBE's mobile options and apps. This session will include information about the GLOBE Data Entry App and the GLOBE Observer app including the Clouds and Mosquito Habitat Mapper protocols and the new Land Cover protocol.

4-5 pm

Question and Answer

Have a question about anything technology related? The DIS (Data Information Science) team will be available to answer your questions.

TUESDAY | 03 JULY 2018

2-5 pm

Torc Suite

David Overoye (SSAI), Eslam Khair (GIO)

2-4 pm

Teacher Essentials

Come learn about tips and tricks for GLOBE teachers. This session will cover many topics including data entry basics, collaboration, student accounts, managing school information, manage/edit account information, MyPage, School page and blogging.

4-5 pm

Question and Answer

Have a question about anything technology related? The DIS (Data Information Science) team will be available to answer your questions.

THURSDAY | 05 JULY 2018

2-5 pm

Torc Suite

David Overoye (SSAI), Travis Andersen (GIO)

2-4 pm

Data Analysis

This session will cover the Visualization system and the Advanced Data Access Tool (ADAT). Additionally, other ways to view data including ArcGIS, Tableau, and Google Maps will be shared.

4-5 pm

Question and Answer

Have a question about anything technology related? The DIS (Data Information Science) team will be available to answer your questions.



Student Presentation Abstracts (Concurrent Sessions)

THEMES

- Environmental Problems and Solutions
- Developing a Sense of Connections Between Observations and Measurements Across Spheres
- New Technologies and GLOBE

MONDAY | 2 JULY

LOCATION			
	INEC	Mangerton Suite	InnisFallen Suite
2 PM	SPM1 Occurrence of Malaria in Kenya Based on Climatic Zones School/Country: St. Scholastica Catholic Primary School, Kenya	SPM2 The Effect of Precipitation on Malaria Prevalence in Guinea School/Country: Lycée Francais Albert Camus de Conakry, Guinea	SPM3 Free Artificial Containers X Captivity Traps: What is the Famous Villain's Favorite Deposit? School/Country: Escola Municipal Minas Gerais, Brazil
2:10	SPM4 Mosquito Larvae and Water Qualities in Chiangrai Province, Thailand School/Country: Samsenwittayalai School, Thailand	SPM5 The Effect of ENSO on Dengue Cases in Muang Nakhon Si Thammarat, Thailand School/Country: Princess Chulabhorn Science High School Nakhon Si Thammarat, Thailand	SPM6 Relation of Mosquito-Borne Diseases and Malaria School/Country: George High School, South Africa
2:20	SPM7 Is there a Correlation Between Aerosol Levels and the Level of Industrial Development in a Region? School/Country: St. Joseph's Secondary School, Ireland	SPM8 Cadmium-Removing Water Filter School/Country: Triamudomsuksa School, Thailand	SPM9 The Sustainable Exploitation of Forest Products in Mfoundi Division, Yaounde, Cameroon School/Country: Government Bilingual High School Etoug Ebe, Cameroon
2:30	Questions	Questions	Questions
2:40	SPM10 GLOBE Data Used in Mosquito Investigation School/Country: Pan American International School, Puerto Rico, USA	SPM11 The Effect of Distance From the Center's Curve on Water Quality & Heavy Metals in Chien Yai River School/Country: Princess Chulabhorn Science High School Nakhon Si Thammarat, Thailand	SPM12 Doggos Drink Water: Water Quality Around Boulder, Colorado School/Country: Boulder High School, Centennial Middle School, Mackintosh Academy, United States
2:50	★ SPM13 Analysis of the 2017 Solar Eclipse at 80% Totality School/Country: Crestwood High School, United States	SPM14 Why Do Students Absent? School/Country: Skola za Medicinske Sestre Vrapce, Croatia	SPM15 Phenology on Differently Oriented Branches School/Country: Kantonsschule Olten, Switzerland
3:00	★ SPM16 The Influence of Fireworks During New Year's Eve on the Amount of Aerosols School/Country: Helen Parkhurst, The Netherlands	SPM17 What are the Effects of Atmospheric Rivers on the Precipitation in Medford, NJ, USA? School/Country: Medford Memorial Middle School, United States	SPM18 Hydrology at Very Different Locations of a Stream School/Country: Kantonsschule Olten, Switzerland
3:10	Questions	Questions	Questions
3:20	Break	Break	Break
3:40	SPM19 Physico-Chemical Pollution Indicators in Freshwater Systems School/Country: Goodwood Secondary School, Trinidad and Tobago	SPM20 New SMAP Soil Moisture Protocol to Improve Volumetric Water Content Data School/Country: Medford Memorial Middle School, United States	★ SPM21 Surface Ozone School/Country: St. Francis Xavier Catholic School, United States
3:50	SPM22 The Effect of (i) Rainfall, (ii) Light Intensity and (iii) Temperature on the Sugar Content of the Nectar of the Ixora Flower School/Country: Brazil Secondary School, Trinidad and Tobago	SPM23 Can Plants Remove Heavy Metals from Soil? School/Country: Thirkell, United States	SPM24 How Did the Average Atmospheric Optical Thickness (AOT) at our Site Compare to Other Regions of the World This Spring? School/Country: Portlaoise College, Ireland

★ Drawing Winners of the 2018 International Virtual Science Symposium (randomly chosen from eligible 2018 IVSS participants)

LOCATION			
	INEC	Mangerton Suite	InnisFallen Suite
4:00	SPM25 The Relationship Between Clouds and Precipitation School/Country: St. Francis Xavier Catholic School, United States	SPM26 The Effects of Nitrate, pH, and Temperature on Dissolved Oxygen School/Country: St. Francis Xavier Catholic School, United States	SPM27 Air Quality in our Parking Lot School/Country: Our Lady of Mount Carmel School, United States
4:10	SPM28 Source Water and Corrosivity in Urban Waters School/Country: Cass Tech, United States	SPM29 Cloud and Ground Temperature Observation Data School/Country: Hot Springs High School, United States	SPM30 The Water Quality of Hirase River School/Country: Kanagawa Prefectural Ikuta High School, Japan
4:20	Questions	Questions	Questions

SPM1

Occurrence of Malaria in Kenya Based on Climatic Zones

Team: JoyAnn Maina, Age 12, Grade 7

Teacher: Charles Maina

Abstract: Malaria is one of the main killers in the world, more so in the developing countries. Kenya has many cases of Malaria reported and treated. However, many unreported cases result in death. This is partly because Kenya has different climatic zones and the occurrence of Malaria differs for each region.

Country: Kenya

SPM2

The Effect of Precipitation on Malaria Prevalence in Guinea

Team: Gouyombia Kongba Zeze Charles Philippe Melvin, Age 11, Grade 6

Teacher: Ylliass Lawani

Abstract: This research studies the effect of precipitation on malaria prevalence in Guinea. Our research question: "Does precipitation affect mosquito proliferation?" We analyzed data from Guinean meteorology center and from Hospital in Conakry to confirm that there is relation between precipitation and malaria prevalence and conversely with mosquito larvae hatching.

Country: Guinea

SPM3

Free Artificial Containers X Captivity Traps: What is the Famous Villain's Favorite Deposit?

Team: Juliana Karina Garcia Vilella, Age 12, Grade 8

Teacher: Inês Mauad

Abstract: The study investigated the Aedes aegypti breeding sites preference in the surroundings of the school. The presence of Aedes aegypti, mosquito that transmits diseases, in an urban area represents potential risk to the population. The Mosquito larvae collected showed that black artificial deposits breeding sites, were preferred for this species.

Country: Brazil

SPM4

Mosquito Larvae and Water Qualities in Chiangrai Province, Thailand

Team: Krittiyakorn Pochai, Age 16, Grade 11; Pitchayapak Pakongsir, Age 16, Grade 11; Pakamon Chaiyamol, Age 16, Grade 11

Teacher: Wanwipa Sutthakiet

Abstract: This study investigated the differences in container types, mosquito types, water qualities, altitudes and their numbers between seven temples and two gardens in Chiangrai province, Thailand in February 2018. We found that container types and numbers differed significantly among the sites. Water qualities and elevation were different among sites.

Country: Thailand

SPM5

The Effect of ENSO on Dengue Cases in Muang Nakhon Si Thammarat, Thailand.

Team: Kasima Theangtum, Age 17, Grade 11; Nichakan Chanprasit, Age 17, Grade 11

Teacher: Kanokrat Singnui

Abstract: We investigated ENSO affecting dengue cases and HI in Mueang NST, Thailand. Randomly selected 32 households, collected mosquito larvae, identified Aedes larvae and compared dengue cases between ENSO group during 2011-2017. The results showed that Dengue cases in Muang NST between groups were different ($F_{2,36}=9.422, P<0.05$) and HI showed for dengue risk area.

Country: Thailand

SPM6

Relation of Mosquito-Borne Diseases and Malaria

Team: Nikita Orange, Age 16, Grade 10; Bronwyn Apollis, Age 17, Grade 11

Teacher: Charles Orange

Abstract: Mosquitoes are responsible for the transmission of several harmful diseases, infecting masses of people and are the source of 1 million deaths each year. The mosquito is the deadliest animal, and the disease is spread biologically (through mosquito bite) globally, due to climate change and global development status.

Country: South Africa

SPM7

Is There a Correlation Between Aerosol Levels and the Level of Industrial Development in a Region?

Team: Abbie Duffy, Eimear O'Brien, Aoife Hessessy

Teacher: Caroline McGrath

Abstract: We identified four GLOBE schools in regions with varying levels of industry. Although the results surprised us, we shared some suggestions on what future research could look like.

Country: Ireland

SPM8

Cadmium-Removing Water Filter

Team: Kamolsom Trakultritung, Age 19, Grade 12; Weeraya Prukatanakul, Age 17, Grade: 12; Sakhila Teerakidpisan, Age 18, Grade 12

Teacher: Thiparpa Sirvarakul

Abstract: This research introduces a cadmium-removing water filter using phytoremediation and biosorbition. We study the cadmium uptake potential of fresh and dried water lettuce and hydrilla, in which dried hydrilla has the best potential. Then, we invent a cadmium-removing filter using multiple weights of dried hydrilla. The result shows dried hydrilla's weight's an influence on cadmium uptake potential.

Country: Thailand

SPM9

The Sustainable Exploitation of Forest Products in Mfoundi Division, Yaounde, Cameroon

Team: Bawe Bilanyuh Mutap, Age 15, Form 4 Bil; Abongujung Fru William Blake Carington Guemuh, Age 15, Lower Sixth Science

Teacher: Ateghang Epse Nkwenti

Abstract: Forest products have been destroyed due to climatic change: temperature, rainfall, drought and deforestation. Most of them have been extinct and thereby putting the population in scarcity. We encouraged domestication of forest products for maintenance, sustainability and availability. These wildlife and food products among others are endangered, requiring salvation.

Country: Cameroon

SPM10

GLOBE Data Used in Mosquitoes Investigation.

Team: Melanie Koops Isasi, Age 15, Grade 9; Alejandro Martínez López, Age 15, Grade 9; Caia Dejesus Cibils Daher, Age 15, Grade 9

Teacher: Agatha Boveda

Abstract: This exploratory research will later be related with the larvae and mosquito protocol results that we are carrying out. We tested the hypothesis that it was possible to show positive correlation among the factors that affect a mosquito's life cycle with available data in GPADAT.

Country: United States

SPM11

The Effect of Distance from the Center's Curve on Water Quality & Heavy Metals in Chien Yai River

Team: Satayawan Khwanmaung, Age 16, Grade 10, Poomin Chumpoo, Age 16, Grade 10

Teacher: Thapanawat Chooklin

Abstract: We investigated the effect of river's curve distances on water quality and heavy metals in Chien Yai river, NST, Thailand. Sample were collected at 50m, 100m, 150m and 200m, The result showed the value of DO, Transparency and the Iron content were positively correlated with the distance. (DO; = 0.13, P<0.01, Transparency; = 0.17, P<0.05; Fe; =0.09, P<0.05)

Country: Thailand

SPM12

Doggos Drink Water: Water Quality Around Boulder, Colorado

Team: Olivia Malmberg, Age 15, Grade 10; Aspen Malmberg, Age 13, Grade 8; Eleanor Malmberg, Age 10, Grade 4

Teacher: Jason Malmberg

Abstract: This research assesses water quality at various locations in Boulder, Colorado, USA. We checked the water quality of spots where our dogs like to drink water. Using Vernier probes, we measured water temperature, pH, and dissolved oxygen. We also talked to a vet about what is ideal for keeping dogs healthy and happy.

Country: United States

SPM13 ✨

Analysis of the 2017 Solar Eclipse at 80% Totality

Team: Maysam Aidibi, Age 17; Leanne Alawieh, Age 17; Ali Eter, Age 16; Sara Komaiha, Age 16; Hana Salami, Age 16

Teacher: Diana Johns

Abstract: A total solar eclipse recently occurred on August 21st, 2017. A group took surface temperature, air temperature, light intensity, and cloud observation measurements on grass and asphalt sites every ten minutes from 12:27 P.M. to 4:27 P.M. with totality being at 2:27 P.M.

Country: United States

SPM14

Why do Students Absent?

Team: Estera Opačak, Age 17, Grade 2; Luka Bakonji, Age 16, Grade 1; Josip Novosel, Age 6, Grade 1

Teacher: Ira Beck, Marinela Labas, Jelka Skoton

Abstract: Are absences connected with meteorological changes, quality of sleep, student obligations? Respiratory or digestive system respond to damp and warm closed areas; pressure and air humidity values cause fatigue, dizziness, lower concentration, headache, poorer mood; stress and reduced sleep quality reduce the activity of the immune system.

Country: Croatia

SPM15

Phenology on Differently Oriented Branches

Team: Larissa Stebler, Age 17; Lou Keller, Age 17

Teacher: Andreas Schmid

Abstract: Is there a connection between the development of buds and leaves and the direction in which the branches on which they grow point? We want to answer that question by observing a birch, two lime trees and three cherry trees, collecting data twice a week.

Country: Switzerland

SPM16 🌟

The Influence of Fireworks During New Year's Eve on the Amount of Aerosols

Team: Sanne Streekstra, Age 15; Eva Janssen, Age 16; Sander de Beet, Age 15; Rozemarijn van den Born, Age 16

Teacher: Maaïke Vollebregt

Abstract: Do the fireworks during New Year's Eve affect the amount of aerosols? We did a background study on aerosols. We measured the amount of aerosols via two methods and collaborated with another school. Our conclusion was that the fireworks during new Year does not affect the amount of aerosols

Country: The Netherlands

SPM17

What are the Effects of Atmospheric Rivers on the Precipitation in Medford, NJ, USA?

Team: Alexander Cappello, Age 14, Grade 8; Brett Peterson, Age 14, Grade 8; Royce Jacobs, Age 13, Grade 7

Teacher: Vicky Gorman

Abstract: NASA JPL scientists analyzed data from the Global Precipitation Measurement mission to identify Atmospheric Rivers (AR). An AR is a long, thin plume of water vapor stretching from the tropics into higher latitudes. After consulting with JPL, we decided to research the effect of AR on precipitation in our area.

Country: United States

SPM18

Hydrology at Very Different Locations of a Stream

Team: Diana von Arx, Age 17; Jasmin Baumgartner, Age 17; Silas Schibli, Age 18

Teacher: Andreas Schmid

Abstract: In our project, it's all about hydrology. We try to find out if there is a difference between the water quality of a canalized and a renaturated part of a stream. For collecting the data, we use bioindication and analyzing the water at to different places about the chemical composition.

Country: Switzerland

SPM19

Physico-Chemical Pollution Indicators in Freshwater Systems

Team: Darnell Fredrick, Age 13, Grade 7; Tristan Grant, Age 13, Grade 7; Jelanie Ross, Age 13 Grade 7; Antoinette Lewis, Age 13, Grade 7; Faith Hope, Age 13, Grade 6

Teacher: Karen Jones

Abstract: The health of freshwater systems on the island of Tobago is being threatened by unsustainable human practices, particularly in agriculture and urban development/spontaneous settlements. A comparative assessment of the physio-chemical pollution indicators in a rural and an urban river system was the focus of this study.

Country: Trinidad and Tobago

SPM20

New SMAP Soil Moisture Protocol to Improve Volumetric Water Content Data

Team: Alessandro Garistina, Age 14, Grade 8; Sidney Bernhardt, Age 13, Grade 7

Teacher: Vicky Gorman

Abstract: Last year, Medford Memorial Middle School students conducted soil moisture research using the GLOBE SMAP protocol. However, the hypothesized results were not seen. This was partly attributed to a need for a change in the soil collection technique. This year, we implemented a new technique with very good results.

Country: United States

SPM21 🌟

Surface Ozone

Team: Anna Willard, Age 12, Grade 7

Teacher: Amy Woods

Abstract: If there are more clouds, then higher levels of bad ozone will be present in the troposphere, because the clouds will prevent the ozone molecules from escaping higher up. In conclusion, the data showed the more clouds observed, the less ozone, and the fewer clouds observed, the more ozone present.

Country: United States

SPM22

The Effect of (i) Rainfall, (ii) Light intensity and (iii) Temperature on the Sugar Content of the Nectar of the Ixora Flower

Team: Aaliyah Ashton, Jessica Isaac, Monique Reid, Dariana Seeram

Teacher: Kameel Mohammed-Ali

Abstract: none submitted

Country: Trinidad and Tobago

SPM23

Can Plants Remove Heavy Metals From Soil?

Team: Nia Patton, Age 14, Grade 8

Teacher: Connie Atkisson

Abstract: This project's purpose was to determine if Raphanus sativus can remove lead from water used to nurture plant growth. Raphanus sativus (Common radish) plants will be watered daily and tested at different times to determine if the plants have absorbed the lead from the water used to grow them.

Country: United States

SPM24

How Did the Average Atmospheric Optical Thickness (AOT) at Our Site Compare to Other Regions of the World this Spring?

Team: Katarzyna Polak, Alisha Zambra Delaney, Karyna Tehza

Teacher: Katherine Kinsella

Abstract: We first researched what caused and influenced AOT levels. Then, we picked two other GLOBE schools, compared the data and made some hypotheses to be tested in future research.

Country: Ireland

SPM25

The Relationship between Clouds and Precipitation

Team: Gabriel Woods, Age 11, Grade 5; Sophia Willard, Age 11, Grade 5; Molly Fleming, Age 11, Grade 5 (not attending)

Teacher: Amy Woods

Abstract: What is the connection between clouds and precipitation? If cumulonimbus/nimbostratus clouds are observed during the day, there will be measurable rain in the next 48 hours because those are the clouds that produce precipitation. It seemed that cirrus clouds were more popular with high and low measurements of precipitation.

Country: United States

SPM26

The Effects of Nitrate, pH, and Temperature on Dissolved Oxygen

Team: Lily Shriner, Age 13, Grade 7

Teacher: Amy Woods

Abstract: The hypothesis states when the nitrate levels are high, the dissolved oxygen levels will be low, and pH and temperature will not affect the DO as much as the nitrate level will. The nitrate did appear to be the main contributor to the lack of dissolved oxygen in Lake Heritage.

Country: United States

SPM27

Air Quality in our Parking Lot

Team: Eliza Baddar, Age 13, Grade 7; Zachary Runyan, Age 12, Grade 6 (not attending)

Teacher: Angela Rizzi

Abstract: Handheld Calitoo instruments were used to measure AOT (aerosol optical thickness) before, during and after carpool at our school to determine if the cars idling the parking lot had a significant impact on AOT.

Country: United States

SPM28

Source Water and Corrosivity in Urban Waters

Team: Kyan Wilson

Teacher: Connie Atkisson

Abstract: With the challenges urban cities are facing with their waters, water samples from five cities were tested for three years and compared to determine the healthiest residential drinking water. Historical data was also gathered to examine raw water quality and determine if it had an effect of drinking water corrosivity.

Country: United States

SPM29

Cloud and Ground Temperature Observation Data

Team: Jenny Scrivner, Age 16, Grade 10; Sage Jackson, Age 15, Grade 10; Sydney Jackson, Age 15, Grade 10; Laci Lien, Age 15, Grade 10; EmmaRae Rasmussen, Age 15, Grade 9

Teacher: Beau Herman

Abstract: The relationship of cloud type and cover to surface temperature was closely analyzed based on data collected at solar noon in Hot Springs, Montana. Data suggested increased cloud cover and cirrostratus clouds were associated with warmer temperatures. Though elevation, climate type, and latitude should be considered when analyzing surface temperature.

Country: United States

SPM30

The Water Quality of Hirase River

Team: Chihiro Nishimura, Age 16, Grade 2 High School; Shuji Kawahara, Age 16, Grade 2 High School; Rino Hashimoto, Age 16, Grade 2 High School; Daiki Iwasaki, Age 16, Grade 2 High School; Sota Yanagi, Age 16, Grade 2 High School

Teacher: Reiko NEZU

Abstract: We're doing water survey on Hirase river, which is near our school, once a week. We are checking about the following items: pH, COD, NH₄⁺, NO₂⁻, NO₃⁻, PO₄³⁻, the water temperature and the muddy condition. We are going to tell you about the findings based on the data.

Country: Japan

TUESDAY | 3 JULY

LOCATION			
	INEC	Mangerton Suite	InnisFallen Suite
2 PM	SPT1 Garonne, a River Under Surveillance. School/Country: Middle School Jules Valles, France	SPT2 Diesel and Aerosols in Paderborn School/Country: Gymnasium Schloß Neuhaus, Germany	SPT3 A Vanishing Future: Erosion Along the Kwethluk River and Subsequent Loss of Indigenous Heritage School/Country: Ket'acik & Apalluk Memorial School, United States
2:10	SPT4 The Effects of Predators on Mosquito Larva Numbers in Trang Province, Thailand School/Country: Princess Chulabhorn Science High School, Thailand	SPT5 Macroinvertebrates as Water Quality Bioindicators School/Country: Science Club Huechulafquen, Argentina	SPT6 GLOBE vs climatic data, evidence of global warming School/Country: Lycée Palissy, France
2:20	SPT7 Status of Mosquito Larvae and Water Qualities in Shrimp Ponds in Trang Province, Thailand School/Country: Princess Chulabhorn Science High School Trang, Thailand	SPT8 Substrate Evaluation for Horticultural use School/Country: CEI San Ignacio, Argentina	SPT9 The Quality of Potable Water in Mvomeka'a School/Country: Lycee Classique et Moderne Mvomekaa, Cameroon
2:30	Questions	Questions	Questions
2:40	SPT10 Water Quality in Thale Noi, Thailand School/Country: Papayompitthayakom School, Thailand	SPT11 Bud Burst—Measuring Climatic Conditions in Clem's Garden at Connect Charter School-Calgary, Canada School/Country: Connect Charter School, Canada	SPT12 Who Do Mosquito Like? School/Country: Prirodoslovna I Graficka Skola Rijeka, Croatia
2:50	SPT13 The Comparison of Soil Benthos Diversity and Latex Products Rubber Plantations Type School/Country: Papayompitthayakom School, Thailand	SPT14 Range of Visibility School/Country: Základní škola TG. Masaryka Moravské Budějovice, Czech Republic	SPT15 Soil Moisture Memory after a Precipitation Event School/Country: Medford Memorial Middle School, United States
3:00	SPT16 Impact of Environmental Factor to Firefly Density School/Country: Jatukamwittayacom School, Thailand	SPT17 European Trees within European Weather School/Country: ZS Trebec, ul.kps.Jarose 836, Czech Republic	SPT18 Cloud Observations and Weather Prediction School/Country: Medford Memorial Middle School, United States
3:10	Questions	Questions	Questions
3:20	Break	Break	Break
3:40	SPT19 Factors Effecting Concentration of PM2.5 in Phayathai, Bangkok, Thailand School/Country: Samsenwittayalai School, Thailand	SPT20 Monitoring Plant Growth With Near-IR Photography and Drones. School/Country: Notre Dame School, Dominican Republic	SPT21 Artificial Lakes as Sources of Pollution School/Country: Miina Härma Gymnasium, Estonia
3:50	SPT22 A Comparative Study of SMAP Satellite Soil Moisture Data and Student Soil Moisture Data School/Country: Jennings CLC, United States	SPT23 Long Term Phenology: Green Up & Green Down 2001-2016 School/Country: Palmer High School, United States	SPT24 The Variability of the Functional Diversity of the Phytoplankton the Lakes in Võrumaa School/Country: Kääpa Basic School, Estonia
4:00	SPT25 The Effects of K and D.O. On Freshwater Ecosystems School/Country: Garfield High School, United States	SPT26 Comparative Water Quality Index in Restored Waterways School/Country: Toledo Natural Science Technology Center, United States	SPT27 Peatland vegetation in relationship with water and peat conditions School/Country: Tartu Katoliku School, Estonia
4:10	Questions	Questions	Questions

SPT1

Garonne, a River Under Surveillance

Team: Aurelie Larrieu-Lacoste, Age 14, Grade 9; Julie Larrieu-Lacoste, Age 12, Grade 6

Teacher: Sandrine Larrieu-Lacoste

Abstract: This year, we studied the problem of climate change on the hydrological cycle of the Garonne river. First, we statistically studied the climate GLOBE data. Then, to monitor the river level, and to check the satellite in-situ data, we construct a water level sensor with the arduino microcontroller.

Country: France

SPT2

Diesel and Aerosols in Paderborn

Team: Florian Schmidtman, Age 15, Grade 9; Lenny Korsch, Age 14, Grade 8

Teacher: Anna Heyne-Mudrich

Abstract: Westphalia and Ghana : Climate Change and the Development of Data

Country: Germany

SPT3

A Vanishing Future: Erosion Along the Kwethluk River and Subsequent Loss of Indigenous Heritage

Team: Tristan Chimegalrea, Age 19, Grade 12; Jessie Nicholas, Age 19, Grade 12; Amber Alexie, Age 19, Grade 12; Janna Pavilla, Age 19, Grade 12

Teacher: Whitney Spiehler and Pauline Morris

Abstract: Land loss due to human and environmental influence led us to utilize GLOBE protocols for gravimetric soil water measurements to study erosion and soil moisture along our riverbank. Losing land will mean losing history; we want to preserve the land of our elders and their way of life.

Country: United States

SPT4

The Effects of Predators on Mosquito Larva Numbers in Trang Province, Thailand

Team: Suleeporn Saingam, Age 17, Grade 12; Phiramon Srisuk, Age 17, Grade 12

Teacher: Patchara Pongmanawut and Jaruwan Chootan

Abstract: This study investigated the effects of predators on mosquito larvae numbers in Trang province. We randomly sampled 120 houses and collected mosquito larvae and predators from containers based on the GLOBE mosquito protocols. The results showed that there were 11 species of predators in containers with and without mosquito larvae.

Country: Thailand

SPT5

Macroinvertebrates as Water Quality Bioindicators

Team: Marianela Pepe, Age 16, Grade 10

Teacher: Ana Beatriz Prieto

Abstract: In 2015, before the eruption of the Calbuco Volcano, an investigation of macroinvertebrates was carried out in the Chimehuín River. Sampling was continued in the summers of 2016 and 2017 to study the impact caused by the disturbance of the fallen ashes and the anthropic impact.

Country: Argentina

SPT6

GLOBE vs Climatic Data, Evidence of Global Warming

Team: Camilia Tritah, Age 16, Grade 10; Mathilde Gouget, Age 16, Grade 10

Teacher: Michel Pedurand

Abstract: We want to quantify the global warming. We search all stations with data in Europe and USA. We collect temperature data's for the different stations (year 2017) and climatic data's for the same stations. We have 70% of 2017 values upper than climatic values.

Country: France

SPT7

Status of Mosquito Larvae and Water Qualities in Shrimp Ponds in Trang Province, Thailand

Team: Prangnapas Kongneam, Age 17, Grade 12; Annop Sangkhamanee, Age 18, Grade 12

Teacher: Patchara Pongmanawut and Jaruwan Chootan

Abstract: This research aimed to study the mosquito larvae and water qualities in shrimp ponds of Trang province. We collected mosquito larvae based on the GLOBE mosquito protocols. We found only Culex spp. were present only in nine ponds and Culex spp. larvae numbers did not differ among these nine ponds.

Country: Thailand

SPT8

Substrate Evaluation for Horticultural Use

Team: Félix Aliaga, Age 19, Grade 12

Teacher: Ana Prieto

Abstract: The objective of this work was to evaluate volcanic ash and yerba as a substrate for the growth of radishes. Water retention and growth in the orchard were compared to the greenhouse using the following substrates: volcanic ash, volcanic ash and soil mix, vermicompost, yerba and control soil.

Country: Argentina

SPT9

The Quality of Potable Water in Mvomeka'a

Team: Beti Abate Martin Dupont, Age 16, Grade Seconde C; Mendomo Larissa, Age 15, Grade Seconde A4 ALL

Teacher: Medjo Jerome

Abstract: We took data for six weeks and observed that the best form of potable water is the modern well with neutral pH and high turbidity. Water should be properly treated and many more modern wells constructed for the population of Mvomekaa since the pipe born water source is not reliable.

Country: Cameroon

SPT10

Water Quality in Thale Noi, Thailand

Team: Khwankhao Voranetiwardt, Age 13, Grade 7

Teacher: Paninee Voranetivudti

Abstract: This study investigated the water quality of five areas (buffalo, purple swamphen, lotus, big Chinese net, and water area) and to test the differences in water qualities among these areas. The result shows that the water quality in five areas were in the standard range of aquaculture. Keyword: water quality, Thale Noi, Thailand

Country: Thailand

SPT11

Bud Burst—Measuring Climatic Conditions in Clem’s Garden at Connect Charter School-Calgary, Canada

Team: Patrick O’Connor, Age 10, Grade 5

Teacher: Erin Piper

Abstract: Using GLOBE Budburst Protocol- I, with my Grade 5 class at Connect Charter School in Calgary, Alberta, Canada, are looking at the buds every day on two different poplar trees in our school garden. We marked the trees and monitor them until the buds become leaves. I am sharing my results with a local scientist and we discuss the changes seen in our location and over the past years.

Country: Canada

SPT12

Who Do Mosquito Like?

Team: Margareta Kljun, Grade 12; Patricia Pesic, Grade 10

Teacher: Marina Pavlic

Abstract: New environmental problem in our County are mosquitoes. Inhabitants and students got strong allergic reactions after mosquito bites, they think it’s just a nuisance. They use a lot of repellents that pollute the environment. GLOBE students found natural repellents and anti itching compounds environmentally friendly. We used GLOBE protocols for study.

Country: Croatia

SPT13

The Comparison of Soil Benthos Diversity and Latex Products Rubber Plantations Type

Team: Nathan Chumkhot, Age 17, Grade 11; Phatcharee Nu-aek, Age 17, Grade 11

Teacher: Paninee Voranetivudti

Abstract: This study found that benthos diversity and soil quality as pH, soil temperature, and soil humidity of the organic plantation higher than the chemical plantation. While the latex products of the chemical is higher than the chemical plantation. However, the organic plantation has net income higher than the chemical plantation.

Country: Thailand

SPT14

Range of Visibility

Team: Adam Zima, Age 14, Grade 7; Martin Kosmák, Age 15, Grade 9

Teacher: Romana Průšová

Abstract: Students of Eco School Club at elementary school of TomÁiÁi Garrigue Masaryk dealt with a task last year: How far can you see from the school windows? Afterwards they investigated the factors influencing the visibility.

Country: Czech Republic

SPT15

Soil Moisture Memory after a Precipitation Event

Team: Maggie Bowman, Age 14, Grade 8; Nate Levas, Age 14, Grade 8

Teacher: Vicky Gorman

Abstract: Using data from the SMAP satellite, scientists from MIT and NASA’s JPL have determined there can be a five-day soil moisture memory after a precipitation event. Our research used in situ soil samples before and after rain events to see if there was a similar moisture memory.

Country: United States

SPT16

Impact of Environmental Factor to Firefly Density

Team: Nubtong Wanniyom, Age 10, Grade 4; Prawnapa Arunsot, Kanyarat Puddon, Age 11, Grade 5

Teacher: Jintana Motong

Abstract: Firefly is an indicator of the abundance of the environment. The colleagues interested in studying some factor of environmental impact on firefly density at Ban Phrao, Tambon Don, Amphoe Pak Thong Chai, Nakhon Ratchasima, Thailand in November 2016 to January 2017. The firefly density depended on trees, soil property, air quality and water quality near the Lam Phra Pleang canal.

Country: Thailand

SPT17

European Trees within European Weather

Team: Inka Veverkova, Age 14, Grade 8; Tereza Konecna, Age 14, Grade 8; Iva Kucharikova, Age 14, Grade 8; Jan Vavrinek, Age 14; Grade 8; Karolina Dennerova, Age 13, Grade 7

Teacher: Vera Keselicova

Abstract: Project is focused on the phenology and meteorology reseach. Students from our school, Latvian and Croatian school observe two trees: birch and oak and do meteorology measurements. They process the measured values and results of observations and make conclusions about climate and its influence to trees.

Country: Czech Republic

SPT18

Cloud Observations and Weather Prediction

Team: Andrew Carr, Age 14, Grade 8; Bhavan Dhulipalla, Age 14, Grade 8

Teacher: EHEH Vicky Gorman

Abstract: Research indicates cloud observations can be used to help predict the weather. But... “How accurately can we predict weather events by direct cloud observation?” “Are there ways to make clouds more relevant to a person’s daily routine?” “Can we, as junior scientists, excite the public to look skyward more often?”

Country: United States

SPT19

Factors Effecting Concentration of PM_{2.5} in Phayathai, Bangkok, Thailand

Team: Pannaporn Kalkoljuck, Age 16, Grade 11; Kanokpron Prechatrammaruch, Age 17, Grade 11; Puttipong Chaichotkulchai, Age 17, Grade 11

Teacher: Wanwipa Sutthakiet

Abstract: The researchers conduct the research about PM_{2.5} in Phayathai District. Researchers collect the daily data of PM_{2.5} concentration in 2016 and 2017. The researchers applied the linear regression technique to see factors affecting PM_{2.5} concentration. Those factors are amount of NO_x, PM₁₀, wind speed, and relative humidity.

Country: Thailand

SPT20

Monitoring Plant Growth with near-IR Photography and Drones

Team: Lya Gómze Alma, Age 15; Melanie Trimpín, Age 15; Alexia Lugo, Age 15; Gabriela Arias, Age 14

Teacher: Roberto Fernandez

Abstract: Agricultural products are important in the GDP of the Dominican Republic. Using drones, infrared cameras and imaging software we analyzed agricultural areas for differences in soil moisture, crop damages, texture, green up and green down and MUC identification. Other factors will be considered as the investigation ends in June 2018.

Country: Dominican Republic

SPT21

Artificial Lakes as Sources of Pollution

Team: Uku Andreas Reigo, Age 14, Grade 8

Teacher: Ronald Laarmaa, Helgi Muoni

Abstract: Artificial water reservoirs are subject to human influence and require regular surveillance to prevent eutrophication. This investigation evaluated some physical-chemical parameters of lake water, partly using GLOBE protocols, and was carried out on two reservoirs. A negative, though not severe effect of the dam on the water quality was detected.

Country: Estonia

SPT22

A Comparative Study of SMAP Satellite Soil Moisture Data and Student Soil Moisture Data

Team: Zack Shumway, Age 14, Grade 9

Teacher: Steven Frantz

Abstract: The purpose of this project is to use the GLOBE Block pattern protocol to find out if the SMAP satellite takes correct soil moisture data. Soil moisture samples were taken when SMAP was overhead for comparison. It is easy to say that the SMAP satellite is taking correct data.

Country: United States

SPT23

Long Term Phenology: Green Up & Green Down 2001–2016

Team: Marna Ziegler, Sapphira Flint, and Blainey Dunyon, Age 16-7, Grade 11

Teacher: Cheryl Williams

Abstract: Our objective was to find out if there were any significant changes in the growing seasons over the years, using green up and green down data. Our group used GLOBE data from both Palmer and Wasilla High School. The schools are located ten miles apart.

Country: United States

SPT24

The Variability of the Functional Diversity of the Phytoplankton the Lakes in Võrumaa

Team: Kerstin Rätt, Age 15, Grade 9

Teacher: Aiki Jõgeva, (Elli Altin)

Abstract: The aim of this research was to find out if the phytoplankton of 14 water bodies in Võrumaa (Estonia) is rather similar or different. The diversity (size distribution and shape variation) was studied. Both functional attributes are ecologically important and it is considered to be an indicator of ecosystem health.

Country: Estonia

SPT25

The Effects of K and DO on Freshwater Ecosystems

Team: Leah Stanevich, Age 17, Grade 12

Teacher: Steven Frantz

Abstract: Water quality is important for healthy environments. Studies show increased phosphorus from runoff into waterways has increased the risk for toxic algal blooms due to lack of dissolved oxygen. The hypothesis was ecosystems with high phosphorus contained lower D.O., promoting harmful anaerobic bacteria. The data does not support the hypothesis.

Country: United States

SPT26

Comparative Water Quality Index in Restored Waterways

Team: Toy Stewart, Age 19, College Freshman

Teacher: Laura Kubiak

Abstract: A non-restored and eroded section of Hill Ditch Creek's water quality was compared to a restored section of the creek. Results showed that both sites had similar overall water quality scores, other than counts of fecal coliform. All waterways connect and are affected by sites upstream.

Country: United States

SPT27

Peatland Vegetation in Relationship with Water and Peat Conditions

Team: Roosi Ahas, Age 13, Grade 6

Teacher: Jaan Pärn, Elli Altin

Abstract: To the dependence of peatland vegetation on soil physical factors, I use the Land Cover Sample Site Protocol and measure peat temperature at different depths, water level, water pH, and oxygen level in peatland sites in southeastern Estonia. I distinguish characteristic plant species for specific water and soil conditions.

Country: Estonia

THURSDAY | 5 JULY

	LOCATION		
	INEC	Mangerton Suite	InnisFallen Suite
2 PM	SPT_{h1} Evaluating Bacteria Levels in Filtered Water after Hurricane Maria Devastated Puerto Rico School/Country: Ramey High School, United States	SPT_{h2} Aerosols and Air Quality School/Country: Lycee Honore D'Estienne D'orves, France	SPT_{h3} Does Traffic Influence the Level of Particles in the Air? School/Country: St. Clair's Primary School, Ireland
2:10	SPT_{h4} Water and Land Pollution in Accra School/Country: University of Ghana Basic School, Ghana	SPT_{h5} Smells and Atmospheres Particles in Biganos School/Country: Lycée de la Mer de Biganos, France	SPT_{h6} The Effect of Drainage on Water Quality School/Country: Bibó Istaván Gimnázium, Hungary
2:20	SPT_{h7} Urban Rivers-Urban Waters School/Country: Henry Ford Academy, United States	SPT_{h8} Tracking the Size of Aérosol School/Country: Collège Marguerite de Navarre, France	SPT_{h9} Improper Land Management Due to Urbanization School/Country: Winfield High School, Khammam, Telangana State, India
2:30	Questions	Questions	Questions
2:40	SPT_{h10} How to Treat Chlorides Soil for Palm Trees School/Country: Prince Sultan Complex, Saudi Arabia	SPT_{h11} The Effect of Gray Water on Soil Properties and Plant Growth School/Country: Ibri, Oman	SPT_{h12} Use of Filters to Clean and Purify the Rain Water that Enters the Dams During the Floods School/Country: Empangeni High School, South Africa
2:50	SPT_{h13} Recycling Cigarette Butts School/Country: 1st Middle Girls School in Samta, Jazan, Saudi Arabia	SPT_{h14} ★ Investigating the Effectiveness of Using Common Reed (Phragmites australis) in Fertilizing Plants and its Impact on Water and Soil School/Country: Um Hani, Oman	SPT_{h15} Water Extraction, Filtration and Defluoridation: The Future of African Water School/Country: Empangeni High School, South Africa
3:00	SPT_{h16} Water and Animals Ground Zero for the Next Plague Part 2 School/Country: Harmony High School, United States	SPT_{h17} Study of Mango Trees Non-flowering Reasons in Village Area of Al-Mazarei, Qurayat School/Country: Um Al-Hakam Bint Al Zuber School, Oman	SPT_{h18} Extraction of Fresh Water from the Sea Bed Aquifers School/Country: Empangeni High School, South Africa
3:10	Questions	Questions	Questions
3:20	Break	Break	Break
3:40	SPT_{h19} Toxic Waters School/Country: Hawkins High School, United States	SPT_{h20} Effect of Sewage Water (in Hadri Belad Village) on Water of Wells School/Country: AlRefa Basic School, Oman	SPT_{h21} Create Clean and Pure Water for Human Use and Consumption in Ezimbeni Area School/Country: Empangeni High School, South Africa
3:50	SPT_{h22} Improving Water Quality after Hurricane Maria School/Country: Ramey Unit School, Puerto Rico, United States	SPT_{h23} Study About the Water Quality And Validity In Sa'ara Falaj After A break of 16 Years School/Country: Al-Khwarizmi Primary School, Oman	SPT_{h24} Starting Long-Term Project On Insect Emergence In Spring School/Country: Ida High School, United States
4:00	SPT_{h25} Can Modifying the Soil with Erosion Control Techniques Lower the Risk of Erosion? School/Country: Gesu, United States	SPT_{h26} The Effect of Alansab Wetland on the Environmental Diversity School/Country: Choueifat School, Oman	SPT_{h27} Are Increased Aerosol Levels in Spring Related to the Burning of Solid Fuels? School/Country: Coláiste Muire, Ireland
4:10	SPT_{h28} The Effect of Indoor and Outdoor Humidity on PM _{2.5} School/Country: Taichung Municipal Taichung Girl's Senior High School, Taiwan	SPT_{h29} The Effect of Eco-Friendly Embankments School/Country: Het Goese Lyceum, The Netherlands	SPT_{h30} GLOBE Clouds & Aerosols Protocols, Innercity Collaboration & Peer Education School/Country: Larkin Community College, Ireland
4:20	Questions	Questions	Questions

★ Drawing Winners of the 2018 International Virtual Science Symposium (randomly chosen from eligible 2018 IVSS participants)

SPTh1

Evaluating Bacteria Levels in Filtered Water after Hurricane Maria Devastated Puerto Rico

Team: Giovanishka Gonzalez, Age 15 Grade 10; Kaymarie Jimenez, Age 14, Grade 9; Elisa Torres-Yeckley, Age 15, Grade 9 (not attending)

Teacher: Richard Roettger

Abstract: Hurricane Maria devastated Puerto Rico, leaving the people without potable water and electricity for months. Various water filters were donated throughout the island. Our team decided to test the bacterial levels of unfiltered and filtered water to ensure safe drinking water for the people of Puerto Rico.

Country: United States

SPTh2

Aerosols and Air Quality

Team: Emma Parente, Age 15; Fanny Sola, Age 15

Teacher: Mrs. Lacour

Abstract: Aerosols, small particles in the atmosphere, play an essential part on our air quality. In this project, based on the GLOBE program, we will discover what those aerosols are, how they affect air quality, how to measure them with the CALITOO (AOT-meter) and how satellites survey them to control air quality.

Country: France

SPTh3

Does Traffic Influence the Level of Particles in the Air?

Team: Isabel Kelly, Aisling McKeever, Matilda Murray

Teacher: Maria Spring

Abstract: We complemented our AOT measurements with the capture of solid particles near our school using a home-made system. Unsurprisingly areas more exposed to traffic showed higher levels of particles.

Country: Ireland

SPTh4

Water and Land Pollution in Accra

Team: Kojo Nyamekye Ansah, Age 13, Grade 8

Teacher: Berthy Buah

Abstract: This project describes land and water pollution in Ghana and suggests possible ways to solve this problem. Information was gathered from online news reports that focused on land and water pollution as well as my personal observation of the problem in the city of Accra.

Country: Ghana

SPTh5

Smells and Atmosphere's Particles in Biganos

Team: Delannoy Mathilde, Age 17, Grade 1S; Isenbaert Lauryn, Age 17, Grade 1S; Bertrand Lou, Age 16, Grade 1S

Teacher: Annie Carrasset

Abstract: There are some disgusting smells in our town coming from the neighboring plant. So, we wonder if it affects air quality. Is the Calitoo able to answer such a question analyzing the fine particles ?

Country: France

SPTh6

The Effect of Drainage on Water Quality

Team: Borbála Szőnyi, Age 17; Izabella Kertész, Age 17

Teacher: Piroska Tóth

Abstract: As part of our work with GLOBE we have been examining the water of the Dongér Canal. We wanted to know how improvements to the municipal sewerage system (2015) has influenced the quality of the water. After analyzing all the information, we found out the water quality has improved considerably.

Country: Hungary

SPTh7

Urban Rivers-Urban Waters

Team: Takyra Jones, Age 15, Grade 9

Teacher: Connie Atkinson

Abstract: Declining health of urban rivers led to research being conducted using historic and current primary data to determine if the Flint and Detroit Rivers showed improvement over time. Three years of data was collected, examined, and compared to a control model to determine if the hypothesis was valid or null.

Country: United States

SPTh8

Tracking the Size of Aérosol

Team: Carbonnière Lucie, Age 13; Suzan Brito, Age 15

Teacher: Puig Jean Noel

Abstract: How does the size of aerosols change the amount of light which goes through? Aérosols circulate in a closed pipe: the transmission of the different light wavelengths depends on the size of particles. The Calitoo measure both the AOT and the a factor. That informs us about their origin.

Country: France

SPTh9

Improper Land Management Due to Urbanization

Team: Vemuri Giri Sai Tej, Age 14, Grade Secondary X class

Teacher: Gadde Pulla Rao

Abstract: Urbanization is phenomenon which is observed all over the world weather nation is developed or developing. Main cause being migration and increase in population, it has various impacts on the city structure. This study analyses the urbanization trends in Khammam, Telangana State, India causes of urbanization and its impacts on housing sector.

Country: India

SPTh10

How to Treat Chlorides Soil for Palm Trees

Team: Nawaf Ahmed Altujari, Age 17, Grade 12; Read Bader AlBuryidi, Age 17, Grade 12

Teacher: Mansour Bin Badi Almutari

Abstract: 2016 Palms tree suffered and marked a deterioration in crops in Northern Buraidah, whereas this decline was not noticed in the West Buraidah. an increase in chlorides in groundwater which was harmful to the palm trees. The researcher recommended adding some chemicals which will reduce the salinity of the soil.

Country: Saudi Arabia

SPTh11

The Effect of Gray Water on Soil Properties and Plant Growth

Team: Baraa Salim Said AlAbri, Age 14

Teacher: Shaikha Mubarak Alsawafi-AlAnood Batti Alyaqoobi

Abstract: The Effect of gray water on soil properties and plant growth .The purpose was indicated above, plus, weather this water is suitable to answer this question ,researchers used tools including water , soil , land cover protocols and interviews .The results revealed this water wasn't suitable for irrigation without treatment.

Country: Oman

SPTh12

Use of Filters to Clean and Purify the Rain Water than Enters the Dams During the Floods

Team: Sisanda Mahlobo, Age 14, Grade 8

Teacher: Helena Joubert

Abstract: Floodwater becomes detrimental to the environment as it washes away the soil and destroy habitats. Building underground water tunnels to store the floodwater that was purified using specialised filters would maximising availability of fresh water during the droughts while barriers along the river banks would minimise damage to the environment.

Country: South Africa

SPTh13

Recycling Cigarette Butts

Team: Faii Ahmed Al Omar, Age 15, Grade 9; Wijdan Hasan Hazazi, Age 15, Grade 9

Teacher: Saliha Abkar Abass

Abstract: Water is very important for all living creatures; therefore, any pollution will affect all living creatures in it. An experiment was conducted by gradually adding (1-4) butts in an aquarium. Change of watercolor, the death of fish and increasing water acidity resulted. It recommended recycling cigarette butts as a solution.

Country: Saudi Arabia

SPTh14 ☆

Investigating the Effectiveness of Using Common Reed (Phragmites australis)in Fertilizing Plants and its Impact on Water and Soil

Team: Arwa Nasser Said ALJuldani, Age 15, Grade 9

Teacher: Nawar

Abstract: This study investigated the effectiveness of using common reed in fertilizing plants and its effect on the water and the soil on which it grows.

Country: Oman

SPTh15

Water Extraction, Filtration and Defluoridation: The future of African water

Team: Thobeka Mlambo, Age 17, Grade 12; Andiswa Dunge, Age 17, Grade 12

Teacher: Helena Joubert

Abstract: Many African countries experience problems of excessive fluoride in drinking water. Household treatment units do not completely remove the concentration level of fluoride in drinking water. In combining well-known extraction, filtration and de-fluoridation methods, this project intends to create a 3-stationed system, to provide clean water for human consumption.

Country: South Africa

SPTh16

Water and Animals Ground Zero for the Next Plague Part 2

Team: Isaac Edwards, Age 16, Grade 11; Shane Sewell, Age 16, Grade 11; Brandon Mc Neil, Age 16, Grade 11; Matthew Scott, Age 16, Grade 11

Teacher: Audra Edwards

Abstract: The group's aim is to test the likelihood of waterborne diseases occurring in regions around the world due to improper agricultural activities. They hope to raise awareness about the importance of cleanliness around water, and aims to find solutions to waters contaminated by agricultural pollution and the diseases caused by such.

Country: United States

SPTh17

Study of Mango Trees Non-flowering Reasons in Village Area of Al-Mazarei, Qurayat

Team: Yaqyani Shamis Mohammed Albattashi. Age 15, Grade 9

Teacher: Rahma salim Amer Al Talbi

Abstract: We discovered that water source is a valley flowing behind the farms, Al-Qarya area (a lightly-dark alkaline clay soil of moderate salinity, and significantly alkaline and water with low salinity). Juzair area (an alluvial very-dark soil of low alkalinity and high fertility with water of low alkalinity and high salinity).

Country: Oman

SPTh18

Extraction of Fresh Water from the Sea Bed Aquifers

Team: Mpumelelo Shaun Zungu, Age 18, Grade 12

Teacher: Helena Joubert

Abstract: Large quantities of low-salinity water trapped beneath the ocean floor could provide drinking water for countries like South Africa that faces water shortages. This project explores possible extraction of freshwater from huge aquifers beneath the ocean floor by drilling through the seabed from offshore platforms like the oil RIG.

Country: South Africa

SPTh19

Toxic Waters

Team: Triston Dodson, Age 18, Grade 12;

Dalton Wages, Age 17, Grade 12

Teacher: Audra Edwards**Abstract:** This is a comparison hydrology study of: Lone Star Lake and Lake Hawkins Tankersley Creek and Sabine River.**Country:** United States**SPTh20**

Effect of Sewage Water (in Hadri Belad Village) on Water of Wells

Team: Tif Amer Said Al-Mashaiki**Teacher:** Shamsa Al-Hakmani**Abstract:** The study aims at exploring the impact of sewage water in the drinking water wells. The tests reveal of the existence of two types of Colon bacteria in water which might affect humans' health. A periodic test for the water wells was recommended and to share the results with citizens. In addition there should be signs of suitability on these wells.**Country:** Oman**SPTh21**

Create Clean and Pure Water for Human Use and Consumption in Ezimbeni Area

Team: Irfaan Sabat, Age 18, Grade 12**Teacher:** Helena Joubert**Abstract:** Watertightening the three pits situated in Ezimbeni, above Lake Mbukwini, near uMfolozi River, by lining them with clay and redirect the water into the lake for purification can increase the amount of clean water available for human consumption in KwaZulu-Natal rural areas where untreated drinking water is a major concern.**Country:** South Africa**SPTh22**

Improving Water Quality after Hurricane Maria

Team: Bria Roettger, Age 14; Janeliz Guzman,

Age 14; Kailey Aponte, Age 13

Teacher: Ingrid Rapatz-Roettger**Abstract:** Hurricane Maria devastated Puerto Rico, leaving it without potable water or electricity. It exposed people to hazardous water that led to bacteria-related diseases. To prevent water contamination, we created an effective prototype to distill and eliminate bacteria using natural resources resulting in zero bacterial pathogens identified in filtered water.**Country:** United States**SPTh23**

Study About the Water Quality and Validity In Sa'ara Falaj after a Break of 16 Years

Team: Majid Salim Suliman Alsaad'i**Teacher:** Ibrahim Habib Albalushi**Abstract:** By the application of the water protocol at Umm Al-Falaj, the Busanda tower and the Sharia area we reached that the Falaj water is not suitable for drinking due to high acidity and salinity except in Umm Al-Falaj. We recommend to raise awareness of the community to take care of the Falaj.**Country:** Oman**SPTh24**

Starting Long-Term Project on Insect Emergence In Spring

Team: Timothy Czajkowski**Teacher:** Kevin Czajkowski**Abstract:** We collected insects and temperature data on and off this spring with the goal to learn when certain insects come out of hibernation. Temperature observations are taken where the insects are found. The goal is to find how insect activity is affected by weather and climate in future years.**Country:** United States**SPTh25**

Can Modifying the Soil with Erosion Control Techniques Lower the Risk of Erosion?

Team: Seth Kirk, Age 12, Grade 6**Teacher:** Darnise Woods**Abstract:** Three major types of soil were tested for water runoff without any type of control method to determine which type would retain the most soil when impacted by a water event. A corrosion control technique was built and tested to determine if it would lower the risk of runoff.**Country:** United States**SPTh26**

The Effect of Alansab Wetland on the Environmental Diversity

Team: Mohammed AlMamari, Age 14, Grade 8;

Alreem Almamari, Age 15, Grade 10;

Ghassan Al Sadi, Age 13, Grade 7; Yumna Al Sadi,

Age 15, Grade 9

Teacher: Naylaa Albalushi**Abstract:** The goal of this study is to research the effect of Alansab Wetland which is human made from sewage treatment on the environment in the region, and how the presence of these lakes effect the climate, and how it affected the diversity of living organisms such as birds and plants.**Country:** Oman**SPTh27**

Are Increased Aerosol Levels in Spring Related to the Burning of Solid Fuels?

Team: Clara Feeney, Lily Price, Ciara O'Connor**Teacher:** Nicola Meere**Abstract:** We measured aerosols for twenty days in spring 2018 and noticed that aerosol levels tended to be higher on cold and overcast days. Could this be linked to the burning of solid fuels by households when it is cold? Future research could help confirm our hypothesis and develop solutions.**Country:** Ireland

SPT28

The Effect of Indoor and Outdoor Humidity on PM_{2.5}

Team: Su,Ching-Yi, Age 16, Grade 11; Li,Pei-Jou, Age 16, Grade 11; Chang, Chiun-Fang; Liu, Yu-Ming, Age 16, Grade 11

Teacher: Cheng Chueh Liu

Abstract: Air pollution has become one of serious problems in Taiwan. Compared with outdoors, relatively small space of indoors may contain higher concentration of particulate matters (PM). In addition to the size of space factor, the humidity may also play an important role on the concentration of PM. Therefore, we analyze the effect of indoor and outdoor humidity on the concentration of PM.

Country: Taiwan

SPT29

The Effect of Eco-Friendly Embankments

Team: Eline van Toer, Yzon Dorreman, Thijs Hagenaars, Arco Hollestelle

Teacher: Diane Robyn, Klaas Groot

Abstract: For our local water board, we investigated the effect of eco-friendly embankments on the water quality. Our research question was “What is the effect of making a ditch eco-friendly on the levels of ammonium and nitrate in the water in comparison to a ditch with non-eco-friendly embankments?”

Country: The Netherlands

SPT30

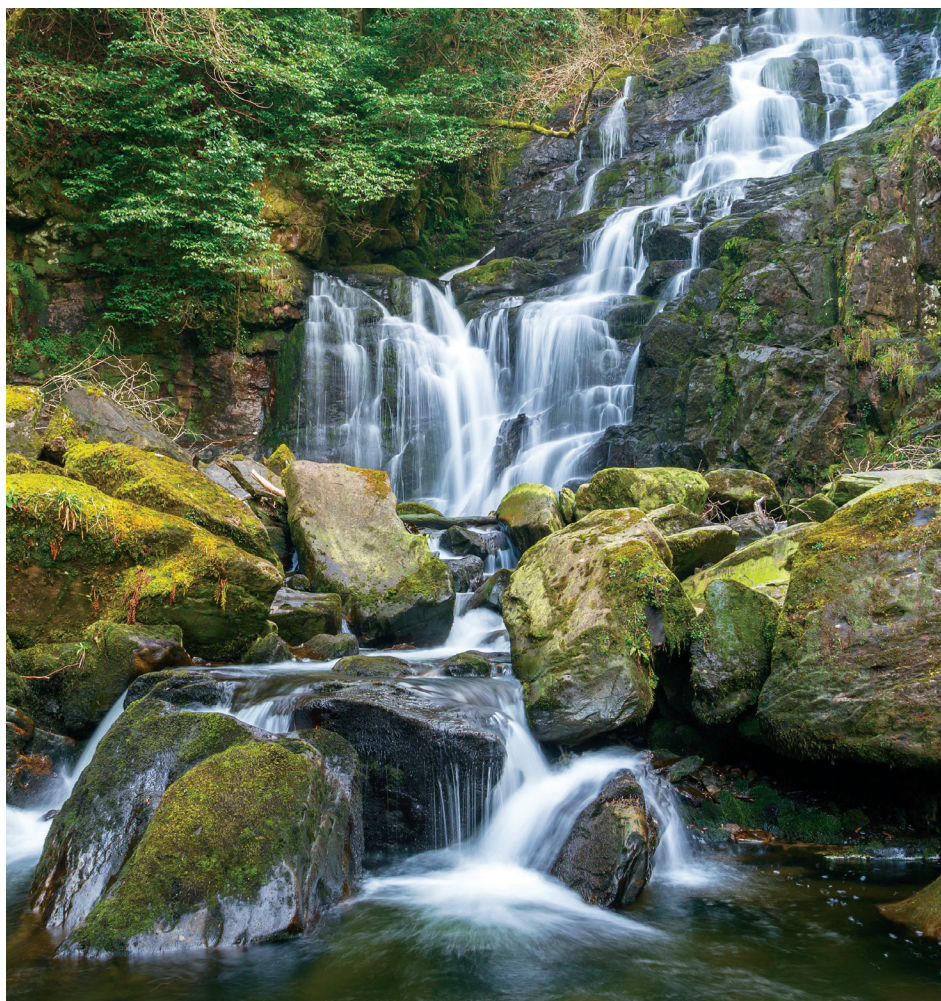
GLOBE Clouds & Aerosols Protocols, Inncity Collaboration & Peer Education

Team: Rose Mesquita, Age 15, Grade 3 Secondary; Tinu Atilade, Age 15, Grade 3 Secondary, Samsara Slinga, Age 15, Grade 3 Secondary

Teacher: Mary Conway

Abstract: We wanted to raise the awareness of the local primary school students on climate change. We taught them the cloud and aerosol protocols through learning activities, demonstrations, data collection and recording. By teaching others we deepened our understanding of GLOBE and the importance of critically reviewing research data.”

Country: Ireland



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We are incredibly grateful for the team of judges who helped score reports and provide feedback for the students. Here is the list:

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Taipei, Taiwan

Yee Chen

Lilongwe, Malawi

IVSS Drawing Winners

These student projects were selected in a drawing held on 06 April 2018. Each of these projects earned a four-star Student Research badge and at least two other optional badges.

UNITED STATES

Project Title

Surface Ozone

Teacher: Amy Woods

School: St. Francis Xavier Catholic School

Location: Gettysburg, PA, USA

Project Title

Analysis of Data Collected During the 2017 Solar Eclipse at Eighty Percent Totality

Teacher: Diana Rae Johns

School: Crestwood High School

Location: Dearborn Heights, MI, USA

INTERNATIONAL

Project Title

The influence of fireworks on the amount of aerosols

Teacher: Maaike Vollebregt

School: Helen Parkhurst

Location: Almere, Flevoland, Netherlands

Project Title

Investigating the Effectiveness of Using Common Reed (Phragmites australis) in Fertilizing Plants and its Impact on Water and Soil

Teacher: Nawar Alrawahi

School: Um hany basic school

Location: Nizwa, Oman

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Asia and Pacific

Diana Garasic / Croatia
Europe and Eurasia

Henry Saunders / Trinidad and Tobago
Latin America and Caribbean

Y'aqoub Yousuf Ali AL-Balushi / Oman
Near East and North Africa

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