National Aeronautics and Space Administration

The DEVELOPer

Summer 2015

2 Program Highlights
3 Node Highlights
10 SSAI Scholarship Awards
11 DEVELOPer of the Term
13 Upcoming Events

NP-2015-08-645-LaRC

▲ DEVELOP's Annual Earth Science Applications Showcase (July 30).

NASA DEVELOP Program **Highlights**

This summer, 175 participants conducted 38 projects at 15 locations.

DEVELOPers have participated in 37 different conferences and meetings so far in 2015.

DEVELOPedia, an internal DEVELOP wiki for knowledge capture and sharing, was successfully launched across all locations this summer!

On July 29, the Royal Thai Embassy hosted an event showcasing the collaboration with DEVELOP and presentations demonstrating outcomes of the two Thailand-focused projects during the 2015 summer term.

DEVELOP held its *Annual Earth Science Applications Showcase* on July 30th at NASA Headquarters. The event included 38 project posters, 13 flash talks, a highlight presentation, and an end-user panel. The panel consisted of five project partners discussing the benefits they've received by collaborating with DEVELOP to use NASA Earth observations in their work.

The DEVELOP team at FC published an article in *Remote Sensing* titled "Multi-Temporal Independent Component Analysis and Landsat 8 for Delineating Maximum Extent of the 2013 Colorado Front Range Flood". ◂◂◂

NASA Ames Research Center

This summer, the Mexico Water Resources team modeled sediment load and runoff using the Soil and Water Assessment Tool (SWAT) in the Grijalva-Usumacinta River Basin. They have also derived outputs from the Turbidity Index to support results from the Earth Trends Modeler (ETM) using the Clark Labs' TerrSet software package, a new tool made available to DEVELOP projects this summer. None of these methods has ever been employed in the southern region of the Gulf of Mexico before. Additionally, the team participated in a symposium hosted by project partners from Consorcio de Instituciones de Investigación Marina del Golfo de México y del Caribe (CIIMar-GoMC), as well as the 2015 International Ocean Colour Science (IOCS) Meeting in San Francisco, California.

After a first term of defining end-user needs and strengthening partner relationships with a tribal water management agency, the Navajo Nation Climate II team produced a customized User Interface for a Navajo Nation specific Standard Precipitation Index (SPI) tool. This tool is the first of its kind and is tailored specifically to Navajo Nation needs. It will be extremely beneficial to end-users in ascertaining drought severity and water availability within the Nation. Results from this project were posted in an online **Earthzine article,** highlighted at the 2015 Annual Earth Science Applications Showcase (AESAS) in Washington D.C., and presented at the 2015 Society for Conservation GIS (SCGIS) Conference in Pacific Grove, California.

This summer, the Sierra Nevada Water Resources team investigated the effects of wildfires on snowpack and snow water equivalent. This topic has not been thoroughly examined within mountain forestry or hydrologic communities, and has never been quantified in a geospatial context. The results from this study will help address the monumental issues of drought surrounding California and neighboring states. The team partnered with the USDA Forest Service and National Park Service to analyze low, moderate, and high-severity fires within the Sierra Nevada. In August, the team presented project results at the 2015 California Climate Change Symposium (CCCS) in Sacramento, California.

BLM at Idaho State University GIS TReC

This summer, the DEVELOP National Program welcomed its newest node, the Bureau of Land Management (BLM) at Idaho State University (ISU) GIS Training and Research Center (GIS TReC). GIS TReC has conducted research related to rangeland and wildfire ecology for the last decade and is directed by lead science advisor Keith Weber.

On June 17th, The Idaho Disasters III team and their advisor took a tour of various sites in the "Big Desert" (Snake River Plains, ID) to learn how rangelands are affected by increasing rates of fire frequency. The team saw firsthand how increased fire return rates have transformed sagebrush-step ecoregions into landscapes dominated by annual and perennial grasses.

The Idaho Disasters III team presented results to project partners at the BLM field office in Pocatello, ID on July 13th. Feedback from the BLM was very positive and the results and subsequent applications were presented by local BLM end-users at the BLM state office in Boise, ID.

The Idaho Disasters III team submitted their technical paper for publication in the *Journal of the Idaho Academy of Science and Engineering*. This is semi-annually released journal that publishes articles related to scientific research conducted in, or that has an impact on, Idaho.

BLM-ISU Center Lead and Project Lead, Jeff May, attended the NASA Annual Earth Science Applications Showcase on July 30th and gave a flash talk on NASA Earth observations and how they were applied to address community concerns in the project team's study area. This term, the Idaho team used Landsat 8 OLI data to construct a fuel and fire susceptibility model that helped their end-users monitor invasive species and assess overall land health, as well as plan fuel treatment projects in southeast Idaho.

NASA Goddard Space Flight Center

The Thailand Disasters team from Goddard and Wise County traveled to the Royal Thai Embassy to meet with the Thai Ambassador and his team and to present their drought research.

The Alto Orinoco Health & Air Quality team hosted Lindsay Rakers from The Carter Center to update her on project progress and give her a tour of the satellite facilities at GSFC.

The Maryland Ecological Forecasting team had the opportunity to meet with their end-users, the Maryland Department of Natural Resources, in the field to respond to a dolphin stranding. They also had the opportunity to examine a stranded sea turtle and visit two turtle nests.

The Himalaya Disasters team worked with participants from ICIMOD this term investigating triggers for landslides in the Nepal region. The impact of this project is high since the rainy season is beginning which can initiate landslides on unstable slopes caused by the Gorkha earthquake.

The participants at GSFC took part in many team-building exercises, including blue crab night, potlucks, scientific presentations, tours of science and visualization facilities, and the annual GSFC Science Jamboree.

International Research Institute for Climate and Society

The IRI teams successfully completed their summer term projects (Malawi Disasters and Indonesian Disasters). The Malawi Disasters team hopes their project results will help the Malawi Red Cross in the future with faster response times and better resource allocation during flood events, while the Indonesian Disasters team hopes their results will aid researchers at the Bogor Agricultural University and CIFOR in identifying burn scars at high spatial resolution.

The IRI team attended the Annual Earth Science Applications Showcase in D.C. Each team presented a poster on their work, and the Indonesia Disasters team gave a flash talk, as well.

Andrew Kruczkiewicz had the opportunity to return to Malawi in June of 2015, courtesy of IRI and the Red Cross/Red Crescent Climate Center, where he observed flood damage and interacted with project partners from his spring and summer DEVELOP project.

The IRI team, along with their science advisor Dr. Pietro Ceccato, participated in team-building activities in Manhattan.

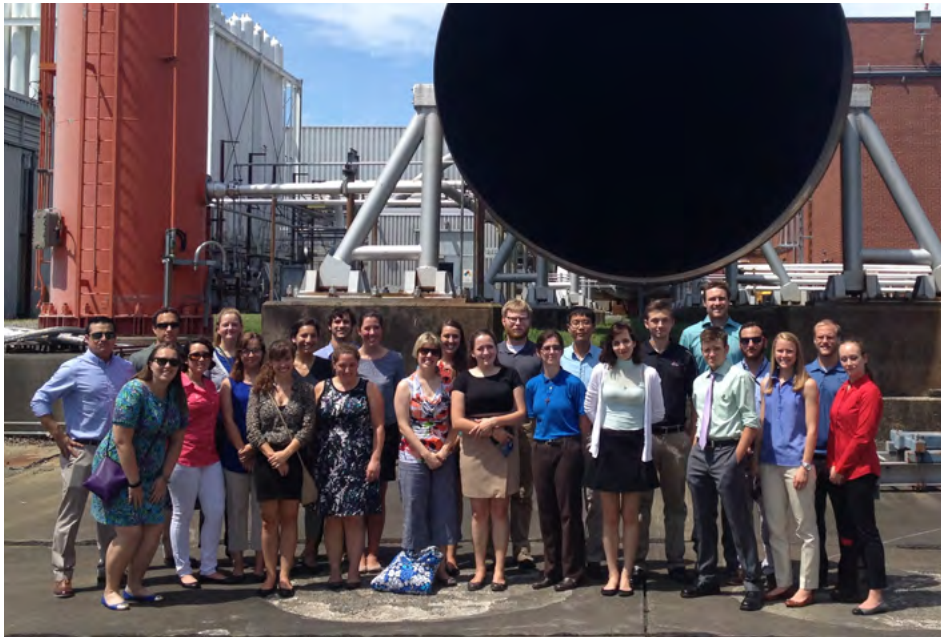
NASA Jet Propulsion Laboratory

DEVELOPers went on a special tour of the UAVSAR being repaired. Past and present DEVELOP teams use data from this instrument, which makes seeing this NASA sensor even more exciting!

The California Disasters II team went out to the field to look at the Highway Fire burn scar. The Highway Fire occurred in April 2015 and is located near the Prado Dam in Corona, CA. Visually assessing the site helped the team infer the data derived from NASA's UAVSAR.

The New Mexico Water Resources and Agriculture team had so much data they used the supercomputers at JPL to help run models needed to compute evapotranspiration!

Daniel Jensen, Christine Rains, and Jerry Heo presented their work at a Tactical Fire Remote Sensing Advisory Committee meeting held at NASA Ames on May 27th.



NASA Langley Research Center

The Great Lakes Climate project, completed during the spring term, was invited to present their findings at the Great Lakes and St. Lawrence Cities Initiative annual meeting in Sarnia, Ontario, Canada. Emily Adams, project lead and current center lead, presented on behalf of the team.

DEVELOPers toured many parts of Langley including the model shop, the 8 ft supersonic wind tunnel, the hangar, the 14 x 22 ft wind tunnel, the transonic dynamics tunnel, and the vertical spin tunnel.

The Alaska Disasters team created a shapefile locating natural oil seeps off the coast of Alaska, which is now hosted on the Arctic Emergency Response Management Application (ERMA). This tool will facilitate fast visualization and coordination for emergency responders such as the Coast Guard. The team's partner, Justin Hoffer MST1 (USCG), also visited Langley.

LaRC hosted PHB for a joint final close-out where partners from the Albemarle and Pamlico Sound National Estuary Partnership, the Virginia Department of Environmental Quality, the Hampton Roads Sanitation District, and Langley scientists were in attendance.

Mobile County Health Department

The Coastal Texas Water Resources team partnered with Joe Meiman at the National Park Service, an engaged and enthusiastic partner, to explore the potential relationship between increasing mesquite trees and decreasing groundwater inflow to the Laguna Madre at the Padre Island National Seashore.

The Coastal Texas Water Resources project was highlighted at DEVELOP's Annual Earth Science Applications Showcase closeout event in D.C.

Stennis hosted MCHD at a local closeout event including presentations, NASA trivia, and a tour of Stennis.

Jamie Favors, Deputy Operations Lead for DEVELOP, visited MCHD to meet the participants and discuss participants' ability to grow and help shape DEVELOP.

Mobile's node buddies at Stennis came for a visit to explore the USS Alabama in Mobile Bay.

NASA Marshall Space Flight Center at NSSTC

Between July 29th and July 31st, participants from the MSFC location attended the DEVELOP Annual Earth Science Applications Showcase at NASA Headquarters in Washington, D.C. During this time, the participants met with NASA HQ staff and presented their projects. For many of the participants, this was their first time visiting Washington D.C. While there, the participants from the Thailand Agriculture project also presented their results to their partners at the Royal Thai Embassy.

The MSFC node took a tour of the US Space and Rocket Center where they got to learn about the Saturn V rocket and Huntsville's contributions to the space race. They also explored a robot exhibit that included mechanical animals.

In preparation for the HQ Closeout in D.C., the participants competed in a NASA Knowledge Bingo. The game provided some friendly competition between the participants and encouraged inter-team mingling.

On July 25th, the participants attended a summer barbeque at Leigh Sinclair's (Center Lead) house to celebrate an awesome term and promote team building.

NOAA's National Centers for Environmental Information

There were more than 60 applications for the summer 2015 term at NCEI. This led to the selection of two teams for the Summer, Southwest US Disasters and Pacific Water Resources. This is the largest number of DEVELOP applicants and projects that have taken place at NCEI.

The Pacific Water Resources project worked closely with NOAA's Pacific Regional Climate Service Director, John Mara. The proposed fall 2015 Missouri River Climate project will be working closely with NOAA's Central Regional Climate Service Director Doug Kluck. Initial steps have also been taken to work with USAF 14th Weather Squadron on future projects.

Southwest US Disasters and Pacific Water Resources will be presenting posters in the NOAA Climate Data Record Annual Meeting held at NCEI in Asheville, NC. Additionally, the Pacific Water Resources project has been submitted an abstract to present at the 2015 AGU Meeting.

Patrick Henry Building

For the first time, the DEVELOP office in Richmond hosted a project. The summer 2015 DEVELOP PHB team partnered with the Virginia Deputy Secretary of Natural Resources, the Virginia Institute of Marine Science, and the Virginia Department of Environmental Quality to start the work of creating ArcGIS tools for early detection of algae hotspots in Virginia's Chesapeake Bay and estuaries. The picture [above] was taken at the summer hand off at Virginia Institute of Marine Science in Gloucester Point, Virginia, along the York River.

The team met with the Virginia Deputy Secretary of Natural Resources for the Chesapeake Bay, Russ Baxter, to discuss how remote sensing could be used to fill in gaps left by current monitoring practices and enhance research in the identification of algae hotspots in Virginia waters.

The DEVELOP PHB team created an ArcGIS Online Web Application to highlight the use of remote sensing to monitor harmful algal blooms. Utilizing Landsat 8 and MODIS imagery, conditions were compared to give an overview of changes in and out of the algal bloom season.

NASA Stennis Space Center

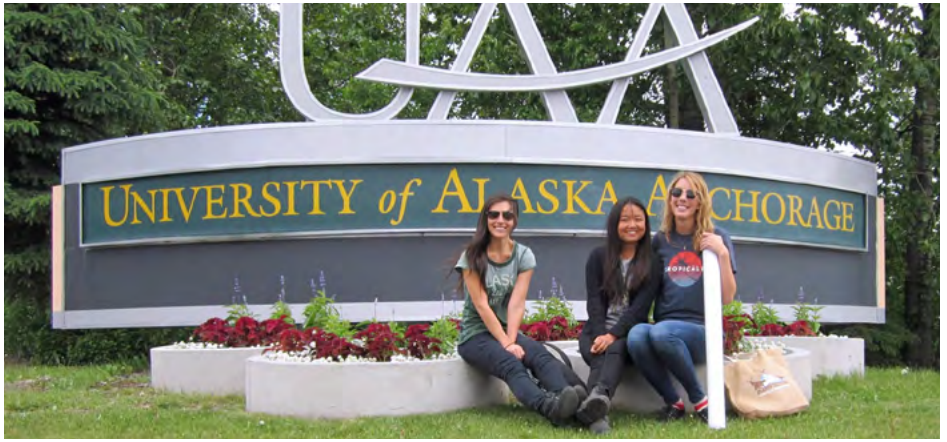
SSC DEVELOPers participated in a Luncheon meet-and-greet with SSC senior leadership and the SSC Center Director, Rich Gilbrech.

The team participated in a number of team-building activities including: SSC Steak Night, NASA shrimp boil, SSC site tours, NRL summer lecture series, viewing of RS-25 and RS-68 rocket engine tests, and a tour of the World War II battleship USS Alabama with MCHD participants.

The team participated in SSC 2015 Summer Intern Poster Session.

The team met NASA Astronaut Patrick Forrester (STS-105, STS-117, STS-128).

The team met and shared experiences with a group of aerospace engineering interns from Johnson Space Center.



University of Georgia

The University of Georgia's Costa Rica Water Resources team worked with the Costa Rican Embassy and Costa Rica's National Service of Underground Water, Irrigation, and Drainage to create a comprehensive water budget using NASA datasets. A representative from the Costa Rican embassy attended the Summer Showcase in Washington, D.C.

The Colombia Ecological Forecasting project was presented at the Animal Behavior Society's annual conference in Anchorage, Alaska.

The UGA Center Lead was selected to serve as the Deputy Chair for the American Society for Photogrammetry and Remote Sensing (ASPRS) Student Advisory Council.

USGS at Colorado State University

DEVELOP Fort Collins presented and handed off their work on the Colorado Agriculture II project to the Colorado State Forest Service (CSFS), Bioenergy Alliance Network of the Rockies (BANR), and Ben Delatour Scout Ranch (BDSR). The team would also like to thank Dr. Paul Evangelista, Bob Sturtevant, and Tony Vorster for their help throughout the course of the project!

The Colorado Agriculture team had the opportunity to conduct field validations under the guidance of their project partners, Tony Vorster and Bob Sturtevant. Tree coring, measuring tree diameter, and identifying native trees kept the team busy for a day in the Rockies.

The Ethiopia Ecological Forecasting team created the most current and comprehensive map of fire history in the unique tropical alpine landscape of the Bale Mountains. Using imagery from the full Landsat record, the project significantly improved understanding of fire in this internationally-recognized biodiversity hotspot, augmenting the intermittent fire observations published in the literature and the MODIS burned area product.

The DEVELOP Fort Collins Ecological Forecasting team presented their results to their project partner, The Murulle Foundation, to assist with future management decisions in the Bale Mountains, Ethiopia. The team would like to thank Nicholas Young (The Murulle Foundation and the Natural Resource Ecology Lab, Colorado State University) for his ongoing collaboration, as well as Justin Braaten (Oregon State University) for developing LandsatLinkr and for his technical support throughout the term, which greatly improved the project.

Wise County and City of Norton Clerk of Court's Office

The Wise County node was one of the three nodes hosting Thai scholars as they worked on projects in partnership with the Royal Thai Embassy. Wise County, MSFC, and GSFC presented their projects at the Embassy at the end of the term.

The Wise node was also one of the three nodes collaborating this summer on the Alto Orinoco project. The project partnered with The Carter Center to support their efforts to eradicate river blindness in the Americas.

The Peru Disasters II team worked with the CREST hydrological model in the summer term. They overcame many barriers with assistance from SERVIR and one of the original creators of the model from the University of Oklahoma. Their efforts helped increase DEVELOP's knowledge of this model and its potential for future use.

The summer of 2015 was an exciting season for the Town of Wise as they hosted the first drone delivery in the United States. Many NASA DEVELOP participants at the Wise node volunteered their efforts to the town during this event.



▲ Mobile County Health Department's Rodrigo Pereira da Silva (attending virtually), NASA Marshall Space Flight Center at NSSTC's Sara Amirazodi, and NASA Langley Research Center's Grant Mercer receive their SSAI Scholarship Awards.

SSAI Scholarship Awards

Rodrigo Pereira da Silva [MCHD]

Rodrigo Pereira da Silva is from Sao Paulo state in Brazil. He's a student at Sao Paulo State University, and is currently an international student at the University of Idaho at Moscow studying forestry. Rodrigo came down from Idaho to volunteer at MCHD this summer and has been an integral part of the team. With his background in forestry and knowledge of remote sensing, he has a lot to contribute. However, it is his determination, perseverance, and passion that make him stand out. He has taken on the challenge of doing four land covers this term and has continuously worked on making them the best he can, including doing extra research at home (after volunteering 35 hours a week), and being willing to do and redo the work. His passion about the work, as well as helping people and the environment, is clearly evident. He is always positive, ready to collaborate, and willing to help anyone on the team. Overall, Rodrigo has been a great asset to our team and node, and his hard work and enthusiasm deserve to be recognized.

Sara Amirazodi [MSFC]

Sara Amirazodi takes initiative when it comes to leadership and is a proven team player. Sara also manages stress by maintaining a positive and friendly attitude towards her fellow DEVELOPers. She never seems to get discouraged even with the biggest obstacles getting in the way. Sara embodies initiative, innovation, collaboration, and passion.

Grant Mercer [LaRC]

Grant Mercer is a rising junior at the University of Nevada, Las Vegas studying Computer Science. As team lead of the CALIPSO Cross-Cutting team, Grant has been indispensable to not only the success of his own project but many other projects occurring at Langley this summer. His passion for computer programming was evident throughout the term, as he helped many teams with writing code for their projects, often after hours or on weekends. He was also incredibly helpful at explaining the logic behind codes to participants with little to no coding experience. His optimism and generosity were infectious and he often took part in getting participants together to have fun outside of work. ◂◂◂

Summer 2015 DEVELOPers of the Term

▲ NASA Goddard Space Flight Center's Sean McCartney.

Sean McCartney [GSFC]

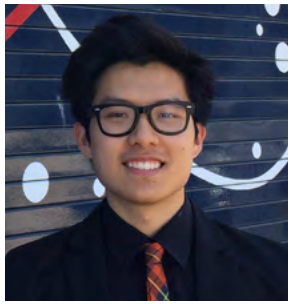
Sean McCartney recently graduated from Clark University with his Master's degree in Geographic Information Science for Development and Environment. While at Clark University he worked as a Technical Support Analyst at Clark Labs, helping users troubleshoot problems in IDRISI and TerrSet. His experiences also include working as a remote sensing teaching assistant, a guest scientist for the Geological Society of America, and living in Madagascar for the Peace Corps. The summer 2015 term was Sean's first, in which he gracefully tackled being the project lead for the Thailand Disasters team. Sean directed the five Thai Scholars located at both Goddard and Wise County through a successful term culminating with a presentation at the Royal Thai Embassy. Sean showed incredible initiative which kept the team ahead of the deliverable schedule while still outputting impressive results. At the node, Sean interacted with many scientists, organized meetings with the visualization studio for VPS filming, and developed strong relationships with participants. His charisma, helpfulness, and dedication not only made him a great participant and project lead, but also prepared him well for his new Center Lead role at GSFC. *Congratulations Sean!*

▲ Patrick Henry Building's Sara Lubkin.

Sara Lubkin [PHB]

Sara Lubkin exemplifies DEVELOP because she has been very willing to learn all aspects of the project. Showing extreme dedication, she travels for at least 2 hours Monday through Thursday to the DEVELOP Richmond location. From the very beginning, she has been all hands on deck and jumped in to solve problems and analyze data where necessary. She is a go-getter and works to learn what she does not know. Sara holds a PhD in Geology from Cornell and teaches an introductory geology course at the University of Mary Washington in Fredericksburg, VA. Sara is completing her GIS certificate. With her first term completed, I know Sara is now an advocate for DEVELOP and will spread the usage of NASA Earth observations to not only her students but to colleagues. *Congratulations Sara!*

DEVELOPer of the Term *Runners-up*

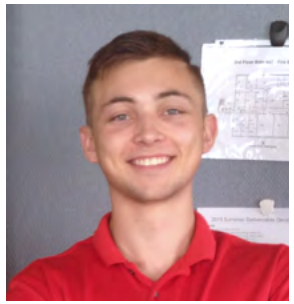


Michael Gao
NASA AMES RESEARCH CENTER

Zach Simpson
BLM AT IDAHO STATE UNIVERSITY GIS TREC

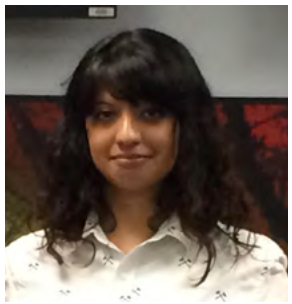
Helen Cen
INTERNATIONAL RESEARCH INSTITUTE FOR CLIMATE AND SOCIETY

Erika Higa
NASA JET PROPULSION LABORATORY



Grant Mercer
NASA LANGLEY RESEARCH CENTER

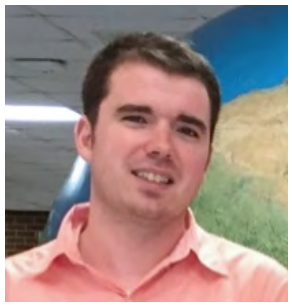
Rodrigo Pereira da Silva
MOBILE COUNTY HEALTH DEPARTMENT



Sara Amirazodi
NASA MARSHALL SPACE FLIGHT CENTER AT NSSTC

Jennifer Holder
NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION

Heather Nicholson
NASA STENNIS SPACE CENTER



Christopher "Sean" Cameron
UNIVERSITY OF GEORGIA

Christina Welch
USGS AT COLORADO STATE UNIVERSITY

Sahakait Benyasut
WISE COUNTY AND CITY OF NORTON CLERK OF COURT'S OFFICE

Upcoming Events

August 31 – October 2 Spring 2015 Term application window

September 8 FY16 Fellows class begins

September 14 Fall 2015 Term begins

September 16–17 NASA Health & Air Quality Applications Program Review — Park City, UT

October 6–8 NASA ARSET Remote Sensing for Wildlife Applications Workshop & Poster Session — Pocatello, ID

October 19–20 26th Annual Virginia GIS Conference (VAMLIS) — Charlottesville, VA

November 20 Fall 2015 Term ends

November 25 Fall 2015 Earthzine Virtual Poster Session launch

December 14–18 2015 AGU Fall Meeting — San Francisco, CA

January 4 – February 12 Summer 2016 Term application window

January 25 – April 1 Spring 2016 Term

June 6 – August 12 Summer 2016 Term

Dream Discover DEVELOP

▲ The Thailand Agriculture team & the Thailand Disasters team present their projects at the Royal Thai Embassy in Washington, D.C.

▲ WC, NCEI, and UGA participants at their summer closeout.