

Fall 2018

# DEVELOPer



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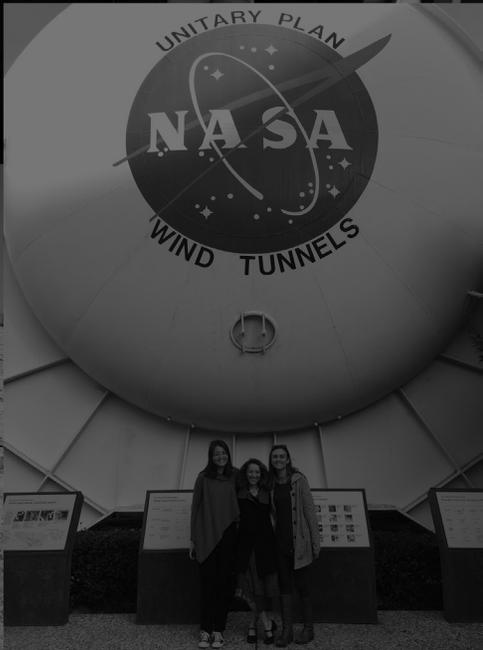
**15** Fall 2018 Awards

**18** DEVELOP @ AGU

*Nancy Searby, NASA's Capacity Building Program Manager, stands near the DEVELOP tree, planted at NASA Langley Research Center in honor of DEVELOP's 20th anniversary.*



# A Year In Review...



# Program Highlights

## 20 Years of Science Serving Society

The fall 2018 term wrapped up DEVELOP's recognition of 20 years of *science serving society*. Over the course of the year DEVELOP nodes have recognized this accomplishment by hosting "DEVELOP Days." During these events, nodes and DEVELOP alumni came to learn about our history and to reminisce on their time with DEVELOP. Not only was this a time to reflect on the accomplishment of DEVELOP, but a time to look to the future. NASA Langley Research Center (LaRC), homebase of DEVELOP operations, planted a tree to commemorate this accolade. Located outside of Langley's most central common area, the tree symbolizes the stability of the program's 20 year duration, as well as the future growth of the program. Thank you to all who have made 20 years of DEVELOP possible. May we enjoy many more years of success.

*Below: At JPL's DEVELOP Day in Pasadena, CA, participants, alumni, science advisors, and SSAI representatives celebrated the history of the program and node.*



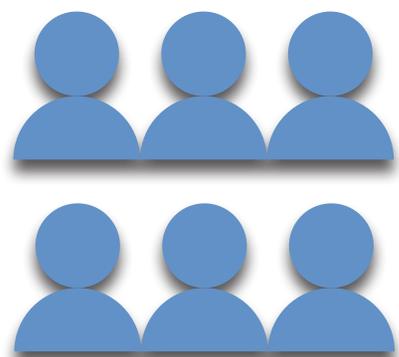
*Program Manager Mike Ruiz poses with two of the three original DEVELOPers, Meghan Sims (L) and Sarah Sole (R).*



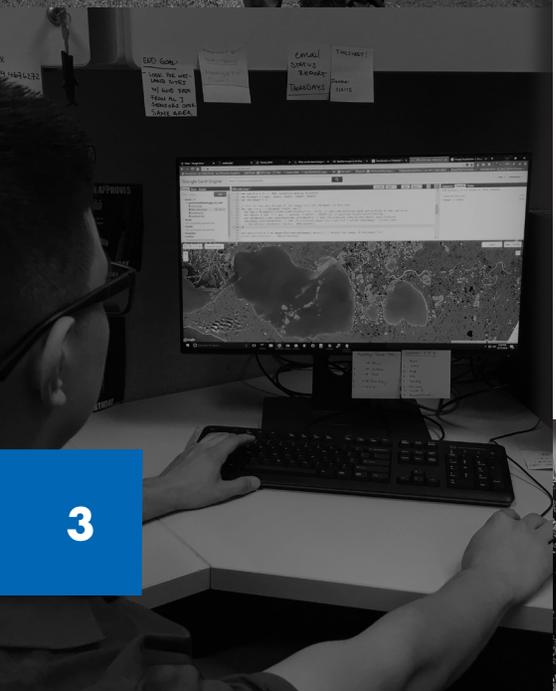
*Above: The DEVELOP Tree at NASA Langley Research Center, in Hampton, VA, is surrounded by the many faces of DEVELOP. The Tree is accompanied by a plaque that reads "In Recognition of the 20th Anniversary of the DEVELOP National Program A Sturdy Tree Grows 'With a Little Help From My Friends.'"*



# FALL TERM IN REVIEW...



**16 PROJECTS**                      **41 PARTNERS**                      **62 PARTICIPANTS**



# Alabama – Mobile

Center Lead: Helen Baldwin | Assistant Center Lead: Madison Murphy

Fall 2018 Participants: Alahna Moore, Charles Christonikos, Ann Rodden

Being so close to New Orleans, the Alabama – Mobile node was able to visit their partners at the Louisiana Public Health Institute (LPHI) and explore their study area in person. The New Orleans Health and Air Quality team had excellent engagement with their partner and were able to conduct an in-person tutorial and walkthrough of their methodologies. The team balanced work and play as they had a lot of fun delving into their project video in New Orleans and incorporated all the team members seamlessly. The node joined Alabama – Marshall at the end of the term for a joint closeout where they were able to network and present their findings to the scientists at NASA Marshall Space Flight Center.



# California – Ames

Center Lead: Farnaz Bayat | Fellow: Jerrold Acdan

Fall 2018 Participants: Jashvina Devadoss, Catherine Breen, Genevieve Clow, Elizabeth Looby

During the 2018 fall term, DEVELOP California – Ames node had a team of four participants who worked on the Lake Michigan Water Resources II project to produce a *Cladophora* Predictive Wash Up tool which identifies areas where *Cladophora* is likely to wash up on the Lake Michigan shoreline in Milwaukee County, Wisconsin. The project partner, Groundwork Milwaukee, can use this tool for guidance to effectively manage their cleanup efforts in the future. In addition to the project’s deliverables and end products, the team generated an end-user tutorial that provides the partner with a step-by-step description of the predictive washup tool’s functionality and how it can be modified to better reflect their needs in future. The team presented the project’s outcome at the Space and Earth Sciences Building at NASA Ames Research Center and provided a virtual project handoff to Groundwork Milwaukee at the end of the term.



“During my term with DEVELOP, my greatest success was realizing where my passions lie. I had the freedom to explore different topics and tools during the project and learned a great deal about remote sensing and its applications. I also had amazing opportunities to attend colloquiums and talks given at Ames on topics such as Stratospheric Observatory of Infrared Astronomy (SOFIA), space exploration, and women in STEM.”

-Elizabeth Looby



# Arizona – Tempe

Center Lead: Erika Higa | Fellow: Megs Seeley

Fall 2018 Participants: Hannah Bonestroo, Roger Alvarez, Taylor Quinn, Elizabeth Swanson

During the fall term, the Tempe Urban Development team collaborated with the City of Tempe to support their Urban Forestry Master Plan by investigating the effects that tree clustering and land cover class have on the thermal environment using Landsat 5 TM and Landsat 8 OLI imagery in Google Earth Engine. Arizona also took part in a 3D printing workshop and printed the team's land surface temperature data. The node also recognized DEVELOP's 20th anniversary by hosting a local DEVELOP Day event with representatives of the National Program Office. The event consisted of a series of talks highlighting the program history, node highlights, project presentation, alumni guest speakers and a social. The node stayed active in a number of social bonding events outside of the office, including exploring a bat cave at night, camping at Joshua Tree National Park, and testing their knowledge at trivia night.



"NASA DEVELOP has been an influential step in the right direction for my professional career. It's given me the opportunity to take skills I learned in college and apply them to real-world problems. The program helped me develop skills I never would have thought of learning in college such as public speaking and working with others. The DEVELOP Program taught me invaluable lessons that I can carry on through the rest of my professional career."

-Roger Alvarez



# Colorado – Fort Collins

Center Lead: Timothy Mayer

Fall 2018 Participants: Sophia Leiker, Kristen Dennis, Kristin Davis, Leorah McGinnis, Christa Torrens, Eli Simonson, Nicole Pepper, Anastasia Kunz, Vanesa Martin

The Colorado – Fort Collins NASA DEVELOP node had the opportunity this past fall term to present two DEVELOP projects at GIS in the Rockies conference, tour the USDA National Laboratory for Genetic Resource Preservation facility, visit the Laboratory for Atmospheric and Space Physics (LASP), US National Center for Atmospheric Research (NCAR), and the Google Offices in Boulder Colorado. The Colorado & New Mexico Disaster and Wisconsin Agriculture & Food Security teams provided posters, and oral presentations, and Center Lead Tim Mayer participated in a panel discussion at the Post-GIS Day at the Geospatial Centroid at Colorado State University. Lastly, the teams were also able to work with members of the Natural Resources Ecology Laboratory (NREL) Research Scientist Staff for a hands-on field forest ecology and sensor demonstration experience in the Colorado State Forest.



**"NASA DEVELOP has been a huge growth experience for me. This is the first time I've gotten to test out my geospatial skills in a professional setting, and more than anything else I've learned how much I still don't know!"**

**-Leorah McGinnis**

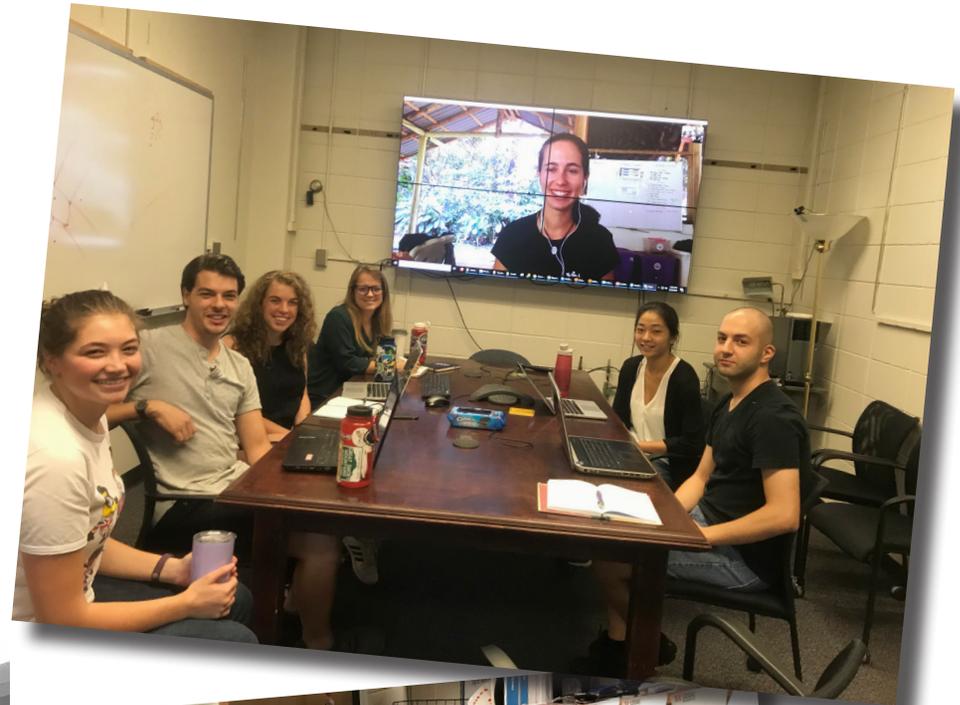


# Georgia – Athens

Center Lead: Marie Bouffard

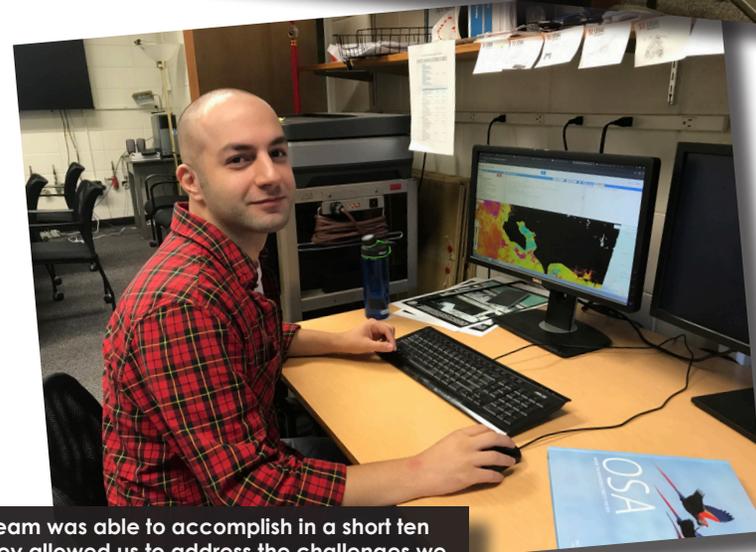
Fall 2018 Participants: Hikari Murayama, McKenna Barney, Soroush Esmaeili Neyestani, Sam Furey

The Georgia – Athens node completed another successful term and the third iteration of the Osa Peninsula Water Resources project. The third term extended the focus from watershed and river health on the peninsula to the gulf they feed into. By assessing water quality conditions in the Golfo Dulce, the team was able to help their partners at Osa Conservation connect historic upstream land use changes to the effects in the gulf. The work the team did to analyze turbidity and sea surface temperature patterns will also inform Osa Conservation’s efforts to restore coral reefs in the gulf. Together with the the land use and land cover maps and analysis from the previous terms, the water quality maps and interactive data tools the team produced provided Osa Conservation with a cohesive picture of the health of the area’s water resources and how they have been affected by historic land use change. The team presented their work at the southeast regional closeout event hosted in conjunction with GIS Day at the University of Georgia. The event was a huge success, had a large attendance, and also served as a recruitment event.



“I am still amazed by what my four person NASA DEVELOP team was able to accomplish in a short ten weeks. Our diverse backgrounds were an asset because they allowed us to address the challenges we faced with unique and innovative solutions. I feel pride knowing our outputs will be useful for our partner organization in preserving the local ecosystems in Costa Rica.”

-McKenna Barney



# Maryland – Goddard

Center Lead: Victor Lenske

Fall 2018 Participants: Logan Kline, Julio Peredo, Diane Portillo, Benjamin Whong

The fall 2018 term at Maryland – Goddard served as another tremendous example of the power of collaboration. Partnered with the Maryland Department of Agriculture, USDA ARS, USGS ESGS, and EPA Chesapeake Bay Program, the fall team built upon and enhanced the results of a previous DEVELOP term at NASA Goddard Space Flight Center (GSFC). The ambitious team of four were able to successfully integrate results of the first term into a user-friendly and open-source graphical user interface in Google Earth Engine by collaborating with the past team members and continuing clear communication with the partners. Multiple meetings took place at the Maryland Department of Agriculture Headquarters as well as the Beltsville Agricultural Research Center close to GSFC, effectively laying the foundation for the culmination of this project series that will take place at Goddard in the spring. The term concluded with a group visit to NASA Langley Research Center for a joint closeout presentation with both nodes prior to recognizing the 20th Anniversary of DEVELOP at the final DEVELOP Day event at Langley.



"I've never learned more about myself as a leader than I did as a project lead for NASA DEVELOP. Through project development, corresponding with partners, and submitting deliverables on time, I discovered the value of creating a unified team goal in order to create a scientific product. I will always be thankful for my experience and know I will carry the skills I've picked up during this term into my future career."

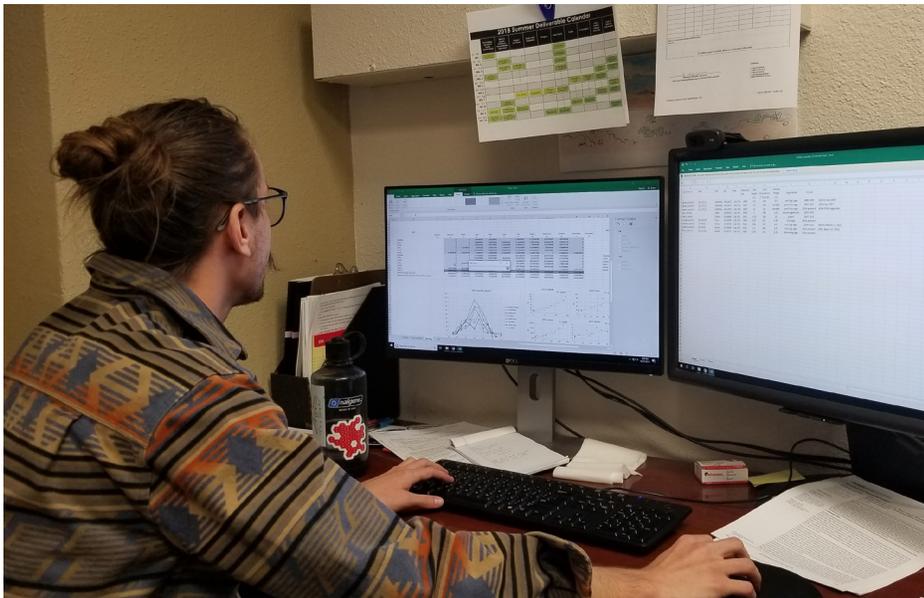
-Logan Kline

# Idaho – Pocatello

Center Lead: Timothy Mayer | Fellow: Dane Coats

Fall 2018 Participants: Ian Lauer, Carolyn Macek, Frank Zurek, Carl Jurkowski

The Idaho – Pocatello NASA DEVELOP node conducted their NASA DEVELOP Day this fall term. The Idaho node hosted Senior Fellow Jordan Vaa and included current and past partners, Center Leads, Fellows, and DEVELOP participants in a presentation series at Idaho State University GIS Center. This presentation series displayed current Idaho DEVELOP projects and recognized the impact of 20 years of DEVELOP. The Idaho NASA DEVELOP team culminated their DEVELOP Day experience with a trip to nearby Yellowstone National Park. Additionally, Geoinformatics Fellow and Assistant Center Lead, Dane Coats provided a Google Earth Engine training at the Idaho Geospatial Council’s Fall Meeting, and presented a Idaho Water Resources I NASA DEVELOP poster at the American Geophysical Union (AGU) Fall Meeting in Washington DC. Lastly, the Idaho node ended the term by participating in a joint closeout event with the Fort Collins Node.



# California – JPL

Center Lead: Erika Higa | Fellow: Neda Kasraee

Fall 2018 Participants: Annemarie Peacock, Briant Fabela, Alice Lin, Adam Vacarro, Brigitte Moneyemaker, Manda Au, Gisela Beltran

DEVELOP’s California – JPL node had another amazing fall term with three returning DEVELOPerS and four new participants. The Mojave Desert Ecological Forecasting team produced promising results as they incorporated NDVI, soil moisture, and elevation to model habitat probability for the endangered bighorn sheep. The Alaska Ecological Forecasting team collaborated with the Alaska Satellite Facility to produce wetland inundation products from radar data and used optical data to validate their wetland extent maps. Participants were able to tour key locations around JPL including the Space Flight Operations Facility, the Mars 2020 assembly clean room, and the Mars Yard. On November 2nd, JPL celebrated DEVELOP Day with a series of talks from alumni and showcased presentations from the recent projects and JPL’s contributions to the program. The node also took part in many social bonding events including trivia night and the annual Pink Halite excavation at Searles Lake.



"NASA DEVELOP has been an extremely positive experience for me. It has given me the opportunity to use my skills in remote sensing and GIS in a world-changing project and learn new skills along the way. I was also able to improve my communication abilities, scientifically and otherwise, which has really allowed me to break out of my shell. This will prove invaluable to me as I transition into higher education and pursue employment opportunities."

-Briant Fabela

# Virginia – Langley

Center Lead: Patrick Frier | Fellow: Madison Broddle

Fall 2018 Participants: Danielle Ruffe, Holly Gould, Eric Deutsch, Shaifali Prajapati, Kaitlyn McHenry, Jared Goldbach-Ehmer, Annsley Adams

Langley Research Center conducted two DEVELOP projects in the Fall of 2018, the Hampton Roads Urban Development and Intermountain West Health and Air Quality II projects. This term was the first time that the Virginia – Langley node partnered with our own local municipal government, the City of Hampton, providing a unique opportunity for the participants from the Hampton Roads Urban team to interface directly with their project partners at City Hall. The Intermountain West Health and Air Quality II team partnered with the National Park Service at the regional level to study trends in landscape visibility across the American west. In recognition of DEVELOP’s 20th anniversary, the project team from Goddard joined the Langley teams for a joint closeout and reception. At the reception, DEVELOPers heard the perspectives of various past participants, including the original three DEVELOP interns from the summer of 1998. The teams also enjoyed tours of the Model Shop, Transonic Dynamics Tunnel, and Vertical Spin Tunnel at NASA Langley throughout the term.



“My experience with DEVELOP has taught me the art of professionalism within communications and work life. Working with DEVELOP and the City of Hampton, I was able to expand and hone my communication skills. Whether it was drafting an email, leading meetings, or prepping the team for conference calls, I was constantly challenged and learning in a fast-paced engaging work environment.”

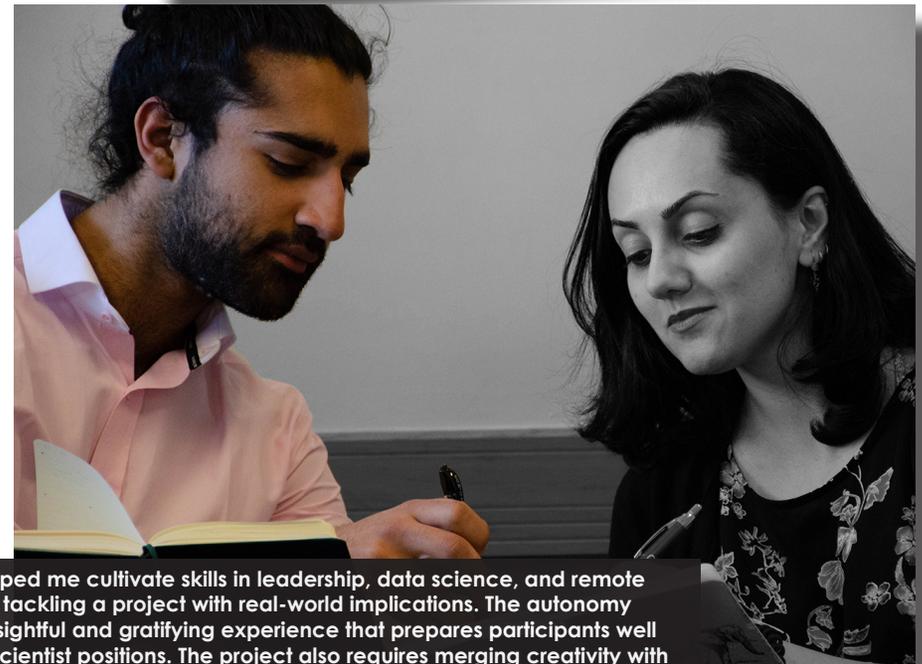
-Danielle Ruffe

# Massachusetts – Boston

Center Lead: Zach Bengtsson

Fall 2018 Participants: Juan Jaimés, Krishna Sharma, Huan Mi, Mahrokh Moknatian

The Great Bear Lake Water Resources team tackled the difficult task of evaluating water quality in an arctic lake using satellite imagery. They worked diligently with the indigenous renewable resources council located in the remote community of Deline, Northwest Territories, Canada, and pushed the boundaries of effective science communication. Their work will be used as a framework for future water resources remote sensing efforts to manage the vast freshwater resources of the lake. The Massachusetts node has also been involved in the Boston University Earth & Environment Department’s initiative to reinvigorate the Center for Remote Sensing (CRS). DEVELOPerS attended the first CRS meeting and seminars held by the center. The node also secured office space within the CRS, and the 2019 spring term project team will be operating out of the new office. Members of the MA node are especially excited to be closer to remote sensing faculty, students, and post-docs.



“DEVELOP helped me cultivate skills in leadership, data science, and remote sensing while tackling a project with real-world implications. The autonomy creates an insightful and gratifying experience that prepares participants well for research scientist positions. The project also requires merging creativity with intellect to craft engaging products, which were always satisfying to produce and share. I also met wonderful people and truly enjoyed coming to work every day!”

-Krishna Sharma

# Alabama – Marshall

Center Lead: Helen Baldwin | Fellow: Kathrene Garcia | Assistant Center Lead: Christine Evans

Fall 2018 Participants: Kane Cook, Christine Evans, Alex Younger, Sara Miller, Shelby Ingram, Essence Raphael, Michelle De Luna, Jada Blankenship

This term, Alabama – Marshall conducted the first transportation and infrastructure projects for the DEVELOP program. These two projects used NASA Earth observations to assess the impact of flooding and tropical storms on road closures in the Ohio River Valley and oil infrastructure risk in the Gulf of Mexico, respectively. The Gulf of Mexico team explored the novel uses of CYGNSS and its ability to detect wind speed through clouds. They met with NASA scientists and had the opportunity to meet the principal investigator of the CYGNSS mission, Dr. Chris Ruf! The Ohio River Valley Transportation & Infrastructure team worked with the Short-term Prediction Research and Transition Center (SPoRT) to preprocess their data and produced internal tutorials and an external storymap to help their partners with community outreach. The node enjoyed their joint closeout with Alabama – Mobile and weekly bonding at a local arcade.



"My DEVELOP experience allowed me to gain a deeper understanding of how to apply what I learned in the classroom to real world problems. I enjoyed getting hands on experience working with Earth data and working on a team research project that developed my technical and interpersonal skills."

-Essence Raphael



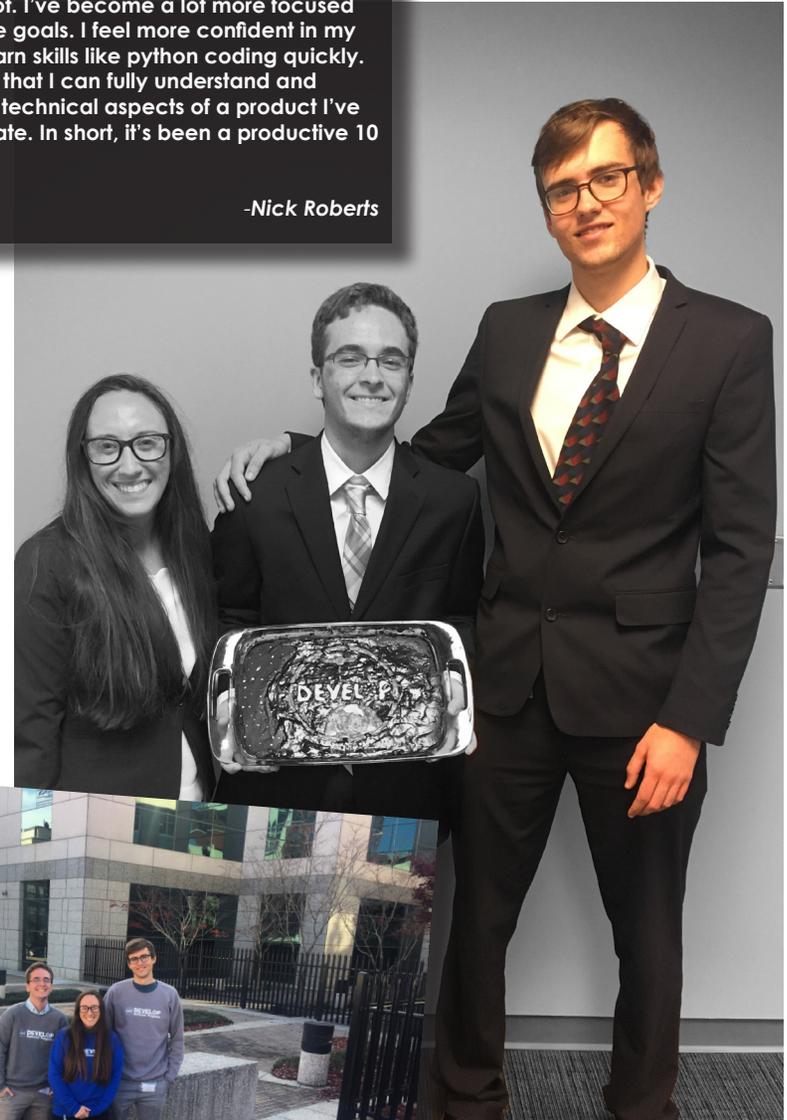
# North Carolina – NCEI

Center Lead: Aaron Mackey

Fall 2018 Participants: Natalie Belew, Nick Roberts, Tyler Hennessee

Another successful term has concluded at NCEI! The Missouri River Disasters team completed their FIRE 2.0 tool for the Great Plains. The team prioritized their partners' needs and current management strategies to create a tool that provided actionable near real-time data for wildfire managers. The final product produces daily wildfire risk maps for NE, SD, and ND and automatically pushes results out to decision-makers to inform local management practices. When they weren't applying Earth observations participants were playing board games at the local cafe, touring downtown Asheville, and getting out into the crisp air and warm hues of autumn in the Blue Ridge Mountains. The highlight of the term was sharing our results with the Osa Peninsula Water Resources III team during the Southeast Regional Closeout at the Georgia - Athens node.

"In my short time with DEVELOP during the 2018 fall term at the NCEI node, I definitely learned a lot. I've become a lot more focused on concrete goals. I feel more confident in my ability to learn skills like python coding quickly. I now know that I can fully understand and explain the technical aspects of a product I've helped create. In short, it's been a productive 10 weeks."  
 -Nick Roberts



## DEVELOPers of the Term



# Jared Goldbach-Ehmer

Jared is a three term DEVELOPer who has grown both technically and interpersonally throughout his tenure with the program. He first joined DEVELOP for the spring 2018 term, during which he worked on a joint node project alongside participants from JPL. Jared consistently worked around his schedule to accommodate the challenge of collaborating across time zones. In his second term, summer 2018, Jared gained a reputation among his fellow participants as an enthusiastic worker and assisted other teams whenever possible, meaningfully contributing to the results of several other LaRC projects. During the fall term, Jared continued to generously share his knowledge of GIS and coding with the other project team. In addition to his willingness to rise to the occasion of his own team's technical and workforce issues, Jared continues to prove himself a smart, kind, and immensely passionate participant. Members of other teams have made an extra effort to communicate his positive contributions to their project to DEVELOP leadership. As such, he embodies DEVELOP's core values of collaboration, discovery, passion, and service. Congratulations, Jared!

# Hannah Bonestroo

Hannah Bonestroo is a recent graduate of Macalester College with a degree in Geography with an urban studies concentration. Hannah served as the Project Lead for the Tempe Urban Development team. The team studied change of land surface temperature (LST) and vegetation cover to investigate the effects that trees and land cover have on the thermal environment. This was not an easy task for Hannah, who was still expanding her skills in remote sensing. Her team took a unique path in employing the LST algorithm on Google Earth Engine so they could learn programming. Hannah kept the team's morale high and made sure all the deliverables were on time since she was determined to have useful results for the partners. She provided strong leadership and worked hard to get the task done. Even with ups and downs of the term, she always maintained a positive attitude and took initiative to move the project forward. Overall, her work ethic and determination set an example for all the participants at the node to emulate. Congratulations, Hannah!



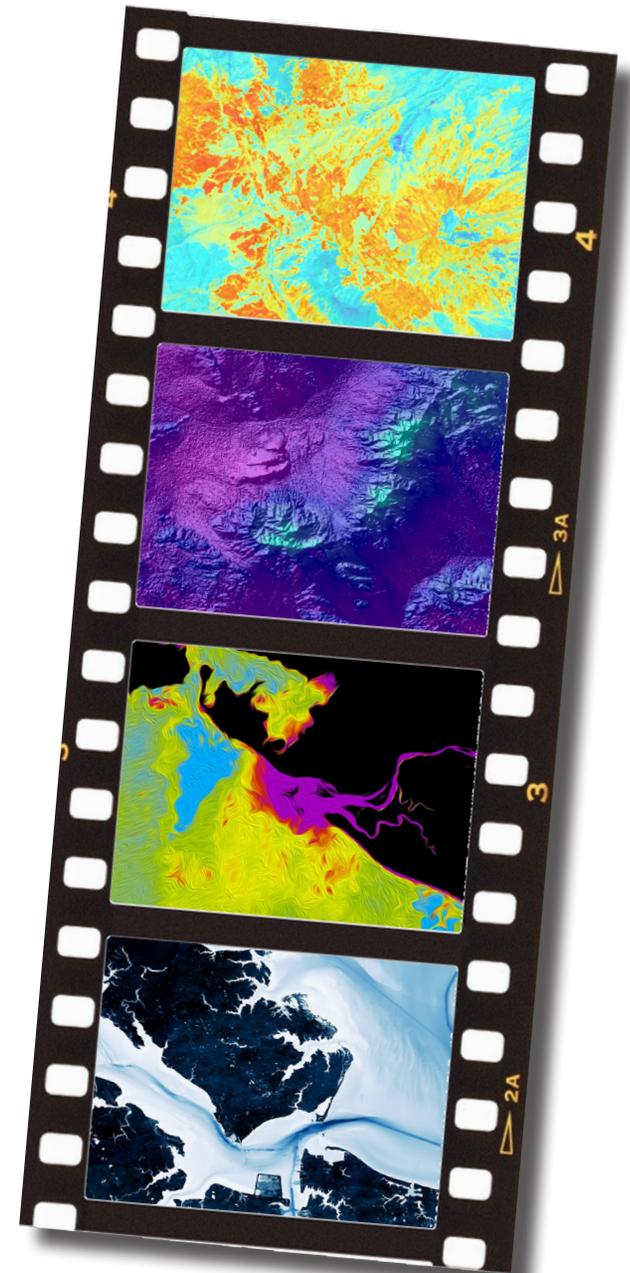
# VPS Competition

Each term DEVELOP hosts a Virtual Poster Session (VPS) competition where each project video is judged and scored. This term our project teams brought innovative ideas and creative solutions to their project videos making for strong competition all around. They received footage from their domestic and international partners, created their own detailed animations, and traveled to their study areas to film themselves. All of the project videos can be found on the NASA DEVELOP YouTube channel. Be sure to check out the fall 2018 videos as well as some of the videos from past terms!



## Congratulations

to the Fall 2018 Alaska Ecological Forecasting team at JPL for winning the VPS Competition! This project video effectively communicated how the team implemented NASA Earth science data to help the US Fish and Wildlife Service improve their land management strategies.



# American Geophysical Union

## 2018 Fall Meeting

Every year DEVELOP participates in AGU's Fall Meeting. This year the meeting was held in Washington D.C., only 3 hours from DEVELOP's National Program Office at NASA Langley Research Center in Hampton, Virginia. Over 28,000 Earth and space scientists came together to share their research and interest in understanding our earth and universe. Of those 28,000, DEVELOP's presence was strong! DEVELOP had 20 representatives that presented in 26 events! AGU provided several platforms to present including DEVELOP representation in 9 poster sessions, 2 e-Lightning talks, 3 Ignite talks, 2 NASA Hyperwall talks, 4 oral talks, 4 pop-up talks and 2 Data Visualization & Storytelling winner presentations! DEVELOP also had a table at NASA's booth in the Exhibit Hall, where we had the opportunity to engage with hundreds of interested students, recent graduates, and potential partners! Check out a few of our highlights from AGU!

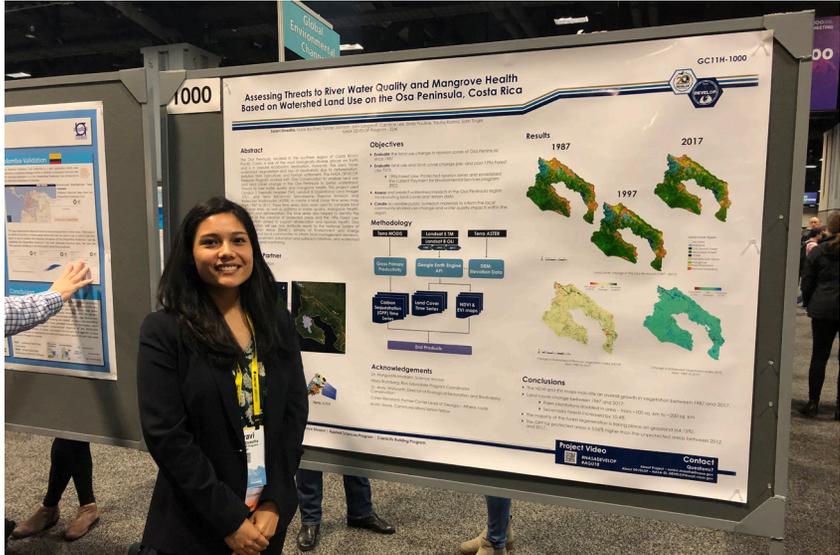


*Above: Congratulations to Alison Thieme, DEVELOP alumni from Goddard Space Flight Center, for being named 1 of 7 grand-prize winners of AGU's Data Visualization and Storytelling contest! She was recognized by NASA Administrator, Jim Bridenstein, Dr. Thomas Zurbuchen, Associate Administrator of NASA's Science Mission Directorate, and Christine McEntee, Executive Director and CEO of the AGU.*



*Above: DEVELOP Alumni, Sandy Parfait, reunites with Program Manager, Mike Ruiz, and meets National Science Advisor, Dr. Kent Ross. Sandy participated with the DEVELOP Program in 2002!*

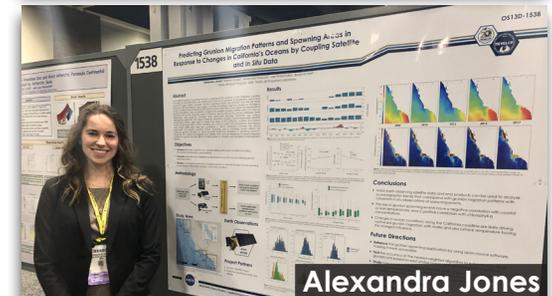
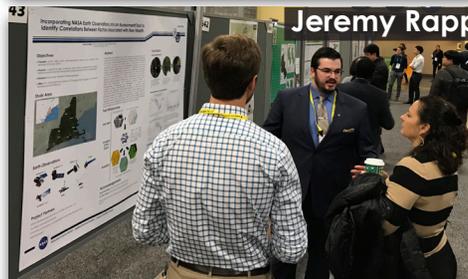
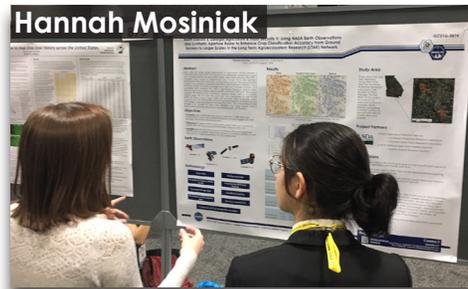
*Above: Patrick Frier, Langley's DEVELOP Center Lead, presents at Ignite on his experience with the program, and how DEVELOP projects can immediately impact communities around the globe.*



“As a first time attendee of the AGU Fall Meeting, my experience was very exciting! With over 20,000 people representing their research, I was proud to be presenting on the Osa Peninsula Water Resources DEVELOP project. The most valuable experience for me was presenting at the NASA Hyperwall where I was able to showcase my team’s work and interact with experts in the field.

I really enjoyed being part of this conference and am very grateful to the NASA DEVELOP program for giving me this opportunity.”

- Suravi Shrestha, DEVELOP Alumni



SPRING 2019

# CALENDAR

- January 14 Summer application opens
- January 28 Spring term begins
- March 1 Summer application deadline
- April 5 Spring term ends



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