

NASA DEVELOP

2022 Year in Review



JANUARY 17, 2023

NASA DEVELOP

COLLABORATION • DISCOVERY • SERVICE • PASSION

Message from the Program

Hello DEVELOP family and friends,

It's been another year for the record books! As we reflect on 2022, we are proud of the teamwork and flexibility that led DEVELOP to successfully navigate a whirlwind of change, growth, and forward momentum. We hope you enjoy reading our 2022 highlights, as our program continues to evolve and focus on how we can build on our past successes while transitioning into the next year.

2022 was a year of incredible growth for the program. DEVELOP engaged 285 participants, 27 Fellows and Senior Fellows, and over 150 partner organizations, while conducting 71 projects impacting 37 states and 20 countries.

While working together to reopen our DEVELOP offices and bring back in-person projects, the program was able to maintain virtual opportunities through our established Virtual Environmental Justice (VEJ) projects and utilize floating Pop-up Projects (PUP) to conduct projects in exploratory locations. Expanding how we work with project partners, DEVELOP was also able to beta-test new project types, including listening projects and tech and innovation projects.

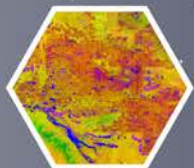
In a continued effort to increase outreach and recruitment, DEVELOP ramped up participation in conferences and meetings around the U.S., participating in over 30 events. This engagement highlighted the many applications of Earth observations used for addressing decision making needs. It also highlighted how DEVELOP's emphasis on participant development is an integral component to how those decision-making needs are addressed.

To cap off the year of change, Mike Ruiz made the difficult decision to retire at the end of December 2022. After 24 years of creating and leading the DEVELOP Program, Mike stepped down as the Program Manager to spend more time with his family. Words can't express the gratitude and respect the entire program has for his efforts and the commitment to ensure the program continued to successfully move forward the past 24 years. Mike will be greatly missed!

We are thankful to all who have supported DEVELOP in the past 24 years and enthusiastically look forward to our 25th anniversary in 2023.

Cheers to a happy and healthy 2023!
-DEVELOP National Program Office

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Fellow Cohort 2022-2023

Meet the Fellows and Senior Fellows who make each project possible.



DEVELOPers of the Term

Congratulations to the DEVELOPers of the Term for 2022!



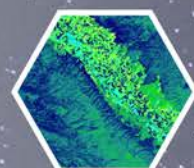
Communications Highlights

DEVELOP migrated to a new website, introduced a Website Image competition, and unveiled an ArcGIS Online Hub for hosting StoryMaps.



Project & Participant Highlights

DEVELOP is committed to bolstering DEIA across the program to support the next generation of Earth scientists.



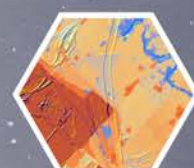
Software Carpentry & Coding Workshops

Over 50 instructors and helpers trained more than 400 Software Carpentry students in Unix Shell, Git, Python, R Studio, and Google Earth Engine.



Events, Conferences, and Publications

DEVELOPers participated in 34 conferences and meetings last year, and two teams successfully published their work.



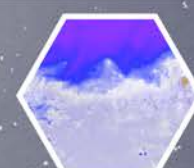
New Nodes: Pop-Up and Environmental Justice

Learn about the two new nodes DEVELOP introduced in 2022.



Long-Term Partners

The National Park Service and Groundwork USA have been frequent partners on dozens of DEVELOP projects.



Awards and Celebrations

DEVELOP received a 'Blue Marble' Award and two cornerstones of our program received NASA agency honor awards.



Mike Ruiz: Celebrating 25 Years

We reflect on the past 25 years of DEVELOP and celebrate the leader who set the foundation for the program: Mike Ruiz.



Fellow Cohort 2022–2023

This year, we welcomed new fellows at all but two of our nodes. Thank you to our outgoing fellows for supporting participants, partners, projects, and the DEVELOP Program as a whole; we are excited for what the next chapter holds for you!

Continuing Node Fellows



Sarah Payne



Tyler Pantle



Caroline Williams



Tamara Barbakova



Sophia Skoglund



Hayley Pippin



Rochelle Williams



Celeste Gambino



Cecil Byles



Outgoing Node Fellows



Britnay Beaudry



Scott Cunningham



Nicole Ramberg-Pihl



Brandy Nisbet-Wilcox



Erica Carcelen



Adriana Le Compte



Paxton LaJoie



Katie Lange



Marco Vallejos



Ryan Hammock*



Incoming Node Fellows



Lisa Tanh



Sarah Hettema



Carli Merrick



Ryan Healey



Michael Pazmino



Olivia Landry



Brianne Kendall



Kathryn Caruso



Julianne Liu

*Retired node
^New node



2022

DEVELOPers of the Term



DEVELOPERS OF THE TERM

Each term, DEVELOP Fellows nominate a participant from their node who not only embodies DEVELOP's core values of collaboration, service, passion, and discovery, but also excels in building their own capacity and supporting the growth of their teammates. DEVELOP's National Program Office then selects the DEVELOPers of the Term. Congratulations to the 2022 winners and nominees!

Spring 2022

Julianne Liu, Project Lead

Environmental Justice Disasters Needs Assessment, VEJ

Haley Stuckmeyer, Team Member

Phoenix Climate, Arizona – Tempe

Summer 2022

Liam McGraw, Project Lead

New York Ecological Forecasting, California – Ames

Carson Schuetze, Team Member

Idaho Wildfires, Idaho – Pocatello

Fall 2022

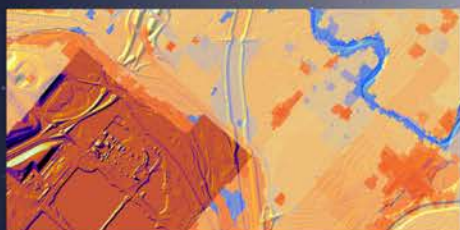
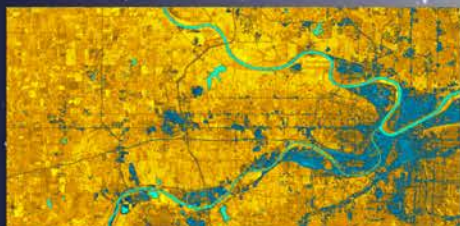
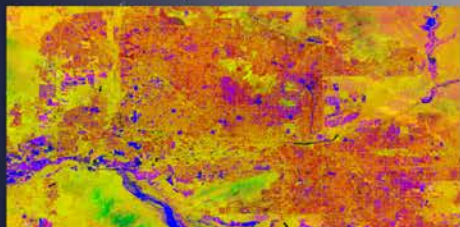
Will Hadley, Team Member

Gatlinburg and Beatty Wildfires, North Carolina – NCEI

Heidi Rogers, Project Lead

Southeast US Climate, PUP

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COMMUNICATIONS HIGHLIGHTS

Early in 2022, DEVELOP completed a migration to a new, fully revamped website under the Applied Sciences site. The move brought a refreshed look to the site and improved integration with the rest of Capacity Building and Applied Sciences. Explore DEVELOP's new site below.

This year we introduced the 'Project Thumbnail Bracket Challenge,' a March Madness-style competition between teams' Website Image deliverables on DEVELOP's Twitter. The competition was held each term and drew widespread engagement across DEVELOP.

DEVELOP is excited to announce all StoryMaps are now hosted in an ArcGIS Online Hub! Started by former AZ Fellow Ryan Hammock, the Hub is now updated by the Communications Team. Stay tuned for more exciting updates throughout next year!

[New Website](#)

[AGOL Hub](#)

PROJECT AND PARTICIPANT HIGHLIGHTS

Throughout 2022, DEVELOP projects have impacted 37 states and 20 countries. Arizona, Colorado, and Texas had the most DEVELOP engagement with five projects each. Outside of North America, the second most impacted region was Central America with 7 impacted countries.

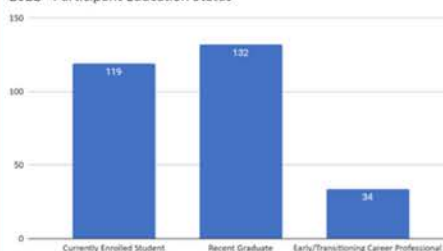
DEVELOP also reopened its offices and began the transition back to more in-person projects. All spring projects were conducted virtually, but the summer and fall projects saw some nodes migrating back to the office. Roughly 37% of summer projects and 45% of fall projects were conducted on-site; that number is projected to increase to almost 75% this upcoming spring. Although DEVELOP is excited that on-site projects are back underway, the program will continue to offer virtual projects.

DEVELOP is committed to bolstering Diversity, Equity, Inclusion and Accessibility (DEIA) across the program. Each year, DEVELOP analyzes demographic data from voluntary self-identification information provided by participants to track applicant diversity. Some of those comparisons are shown below. DEVELOP will continue to track demographic data in the coming year to support inclusive recruiting efforts and diverse teams of scientists.

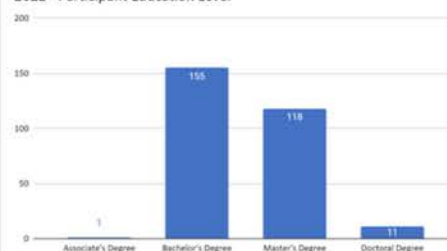
2022 Participant Racial Demographics



2022 - Participant Education Status



2022 - Participant Education Level



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SOFTWARE CARPENTRY AND CODING WORKSHOPS

DEVELOP's Geoinformatics team continued to host Software Carpentry lessons each term to train participants in Unix Shell, Git, and Introductory and Intermediate Python or R Language. The program also offered Google Earth Engine lessons based on ecological remote sensing modules developed by Colorado State University. The Geo Team was joined by trained Software Carpentry instructors, DEVELOP Senior Fellows, and helpers who facilitated live coding workshops that included instructional tutorials, hands-on exercises, and troubleshooting and support as needed. Participants enter DEVELOP with a variety of technical skills, and these lessons—as part of DEVELOP's capacity-building framework—continue to give participants opportunities to build and improve technical skills, which they can apply in DEVELOP projects and beyond.

In total this year,

408 
PARTICIPANTS

19 
INSTRUCTORS

35 
HELPERS

took part in coding workshops!



EVENTS, CONFERENCES, & PUBLICATIONS

This year, DEVELOPers presented at 34 conferences and meetings, including the National Assembly with Groundwork USA, the American Geophysical Union Fall Meeting, Earth Sciences Applications Week, and participated in the first in-person DEVELOP Leadership Retreat since 2019.

Congratulations to the Fall 2020 California & Oregon Ecological Forecasting team and the Summer 2022 Maipo River Valley Agriculture team for publishing their projects this year! These teams researched trends in fog and cloud cover along the Pacific Coast ([view here](#)) and crop coefficients and irrigation requirements in Central Chile ([view here](#)), respectively. To learn more about publishing your project, contact your Fellow and Amanda Clayton (amanda.l.clayton@nasa.gov).

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INTRODUCING THE NEW POP-UP & ENVIRONMENTAL JUSTICE NODES

At the start of the year, DEVELOP welcomed two new nodes, both without fixed locations.

The **Pop-Up Project (PUP)** node offers unique opportunities across the United States, being hosted by different locations each term. In addition to the traditional DEVELOP feasibility studies, they also piloted a new type of project, Tech and Innovation projects, which focus on technical advancement to develop and update tools for future DEVELOP teams in their work to support decision-making organizations.

After a successful first term that was virtually due to continued COVID-19 precautions, the University of Virginia hosted two teams on-site in Charlottesville, VA in the Summer 2022 term. In the following Fall 2022 term, PUP hosted a team at the University of Wyoming, in Laramie, WY, as well as a second virtual project that collaborated with NASA SERVIR. Through these locations, participants have had great experiences travelling to nearby NASA centers, working with experts in water resources at these universities, visiting nearby study sites, and presenting their project work to partners in-person. Looking back at a year of PUP, we are excited to continuing offering diverse project and networking opportunities at our upcoming host locations!



The **Virtual Environmental Justice (VEJ)** node was created through a DEVELOP and NASA Applied Sciences initiative to strengthen their involvement in equity and Environmental Justice (EJ). VEJ projects intentionally center marginalized EJ communities and their concerns, and participants engage in discussions about the history and praxis of EJ to contextualize their projects in the broader EJ movement.

VEJ began its first term with two needs assessment projects that engaged with 26 possible organizations working at the intersection of EJ and disasters or health and air quality to explore ways remote sensing can be leveraged to advance EJ. This process allowed DEVELOP to form relationships with potential future partners, as well as increase awareness of publicly accessible data. Additionally, teams found that across non-profit, academic, and federal sectors, EJ organizations prioritized collaboration, community engagement, holistic approaches to justice, and networking opportunities.

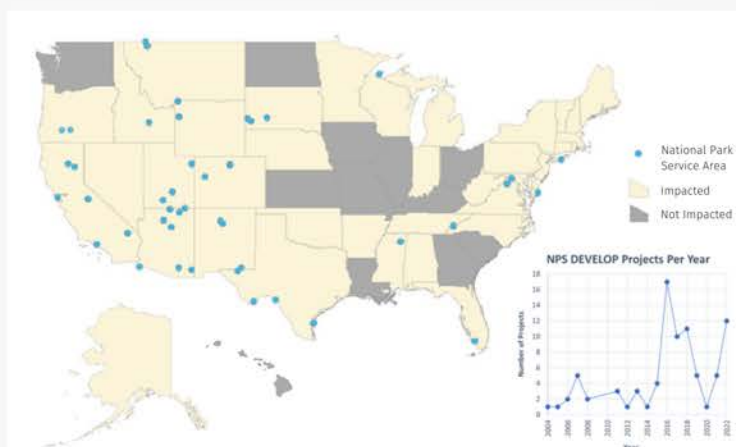
Over the summer and fall terms, VEJ teams partnered with the City of Wichita to analyze the relationship between urban heat island and tree canopy, as well as with Groundwork Milwaukee and Groundwork USA to evaluate neighborhood risk of flooding and urban heat islands. At the core of both projects, as well as those to come, was the converging and compounding environmental, sociodemographic, and socioeconomic vulnerabilities, which place communities of color and low-income at disproportionate risk and exposure and limit their access to resources.

LONG-TERM PARTNER HIGHLIGHTS

While the hallmark 10-week DEVELOP term comes and goes quickly, the program has also built strong relationships with partners that span years. The National Park Service and Groundwork USA are two organizations who have become frequent partners and fast friends. We're grateful for these communities and look forward to our next projects together!

The National Park Service (NPS) was among DEVELOP's earliest partners, with the first project dating back to 2004 in the Fremont-Winema National Forest. Since then, more than 250 DEVELOPers have worked with 40+ NPS groups across 39 states. Through these 60+ projects, DEVELOP and NPS have explored a range of application areas, including a series of urban development projects about light pollution and dark skies.

In 2022, eight more projects with the NPS joined this portfolio, four of which were two-term projects. DEVELOP will continue working with the NPS in a spring project at the Georgia – Athens node to assess vegetation change due to shifting social trails in Coronado National Monument.



Many thanks to Don Weeks, who retired this year, for his support and championing of DEVELOP to the NPS over the years!



Groundwork USA is a national network of local trusts driven by Environmental Justice (EJ) and their work with communities to create healthy, green, and resilient spaces. Since the first Groundwork partnership in 2018, DEVELOP has conducted 15 projects with nine trusts. Over 60 participants have supported Groundwork by providing geospatial analyses and tools highlighting converging sociodemographic, socioeconomic, and environmental vulnerabilities. Additionally, Groundwork partnerships have greatly contributed to EJ at DEVELOP and will continue to help strengthen our involvement in this area.

In the Summer and Fall 2022 terms, teams from the Massachusetts – Boston and Virtual Environmental Justice nodes partnered with the Groundwork Northeast Revitalization Group in Kansas City, KS and Groundwork Milwaukee. Two Fellows also had the opportunity to attend Groundwork's National Assembly, where they learned more about anti-displacement efforts, visited Groundwork Jacksonville's Emerald Trail, and met some of our wonderful partners in-person.

AWARDS AND CELEBRATIONS

Blue Marble Award

The legacy of the iconic “Blue Marble” image of Earth, captured by the Apollo 17 crew on their way to the moon in 1972, continues, in part, through an annual series of awards that celebrate excellence in environmental leadership at NASA. DEVELOP was honored with the NASA Environmental Quality award for our work enhancing environmental decision-making ([view here](#)).



Agency Honor Awards

This year, two cornerstones of our DEVELOP community received NASA agency honor awards ([view here](#)).

The team of Fellows, Science Advisors, alumni, and program friends who host Software Carpentry workshops for participants each term was awarded the Silver Achievement Medal for their swift switch to a virtual environment over the COVID-19 pandemic.

Also, DEVELOP's Science Manager, Lauren Childs-Gleason, received the Diversity, Equity, and Inclusion Medal for her leadership in a Capacity Building Program initiative that mentored a team of interns to create trainings about Earth observations and professional development topics for Groundwork USA's youth Green Teams.

Celebrating the Arizona Node

At the conclusion of Summer 2022, the Arizona - Tempe (AZ) node retired from hosting projects each term. Over six years, the node hosted 23 projects and 90+ participants. The AZ node also played a key role in the rise of urban heat island projects across DEVELOP. A grand thank you to the AZ participants, Fellows, Dr. Dave Hondula, and Arizona State University's School of Geographical Sciences and Urban Planning for their dedication, ingenuity, and support. We look forward to AZ potentially "popping up" again as a PUP host in the future!





THANK YOU, MIKE!

DEVELOP would not exist without the tremendous commitment and determination of Mike Ruiz. At Langley Research Center in the summer of 1998, Mike mentored three student interns who co-authored "The Practical Applications of Remote Sensing" (Bauer et al., 1998) and set the foundation for a new student internship program within NASA. Today, we know this program as NASA DEVELOP. For 24 years, Mike served as the DEVELOP Program Manager and mentored the National Program Office, Fellows, and participants alike. He retired at the end of December 2022.

As Mike prepared for retirement, he reflected on his time at DEVELOP. When asked what he was most proud of, he spoke glowingly of the collaborative atmosphere and how "we believe we can make a difference, and we do!" Some of his favorite memories include witnessing interactions between participants and partners and seeing how DEVELOPers succeed not only in their projects, but in their careers after DEVELOP. In Mike's words, "Everyone at DEVELOP works together to make a difference in the lives of others."

As DEVELOP prepares for the next 25 years, Mike hopes that "DEVELOP continues to make a difference" using the current pattern of success. Though he will not hold a formal position anymore, he will always be cheering us on.

Thank you for your service, Mike.
We wish you a happy retirement!



CELEBRATING 25 YEARS IN 2023!

Where It All Began



DEVELOP is celebrating its 25th birthday in 2023! The program started in 1998, when three student interns set the foundation for a remote sensing program that would support the goals of NASA's Digital Earth Initiative and increase public access to federal information about Earth and the environment. This is where the name DEVELOP came from! It stood for 'Digital Earth Virtual Environment and Learning Outreach Program' but is now simply referred to as DEVELOP. Over the past 25 years, the program evolved into a cross-country network of locations, engaged over 5,800 participants, conducted over 1,100 projects, and received multiple awards. With a mission to integrate Earth observations into global decision making, DEVELOP is looking forward to another 25 years of success!

Looking Ahead to 2023

We are excited to celebrate DEVELOP's 25th anniversary through a year of activities, initiatives, and events around the country!

Stay tuned for details on how to get involved!



To kickoff the year, DEVELOP is designing a 25th anniversary logo to use on deliverables, print materials, and DEVELOP gear! Vote for your favorite beta version and help us hone in on the 25th logo!



Vote for the Anniversary Logo!

[Click Here](#)