



ARSET

2019 ANNUAL REPORT

Train

Empower

Advance

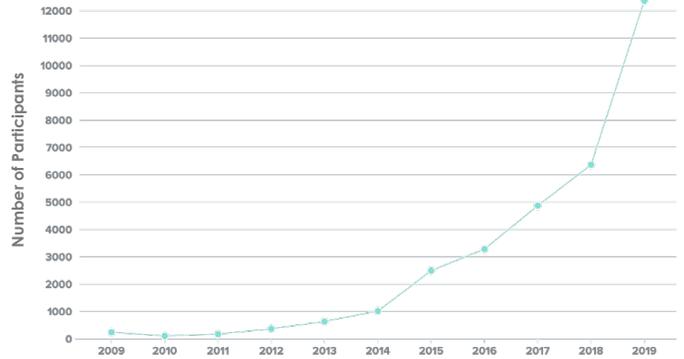
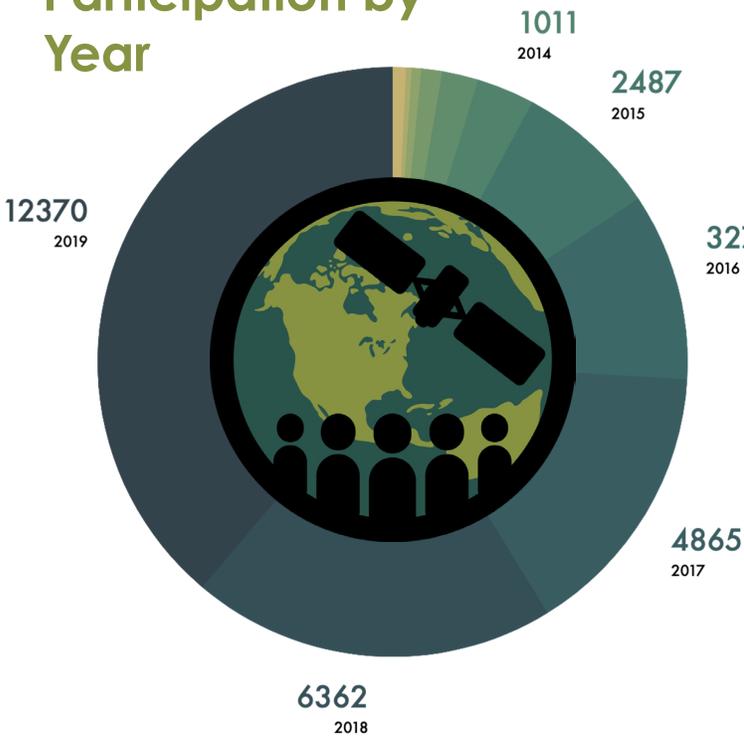




The ARSET Program offers satellite remote sensing training that builds the skills to integrate NASA Earth Science data into an agency's decision-making activities. Trainings are offered in health and air quality, water resources, disasters, and land management. Through online and in person training, ARSET has reached over **31,000** participants from **170** countries and more than **7,500** organizations worldwide. 2019 was a landmark year for NASA's Applied Remote Sensing Training Program. The year was characterized by exciting new developments in the training offered by the program, as well as exponential growth that has led to a massive increase in participation around the globe.

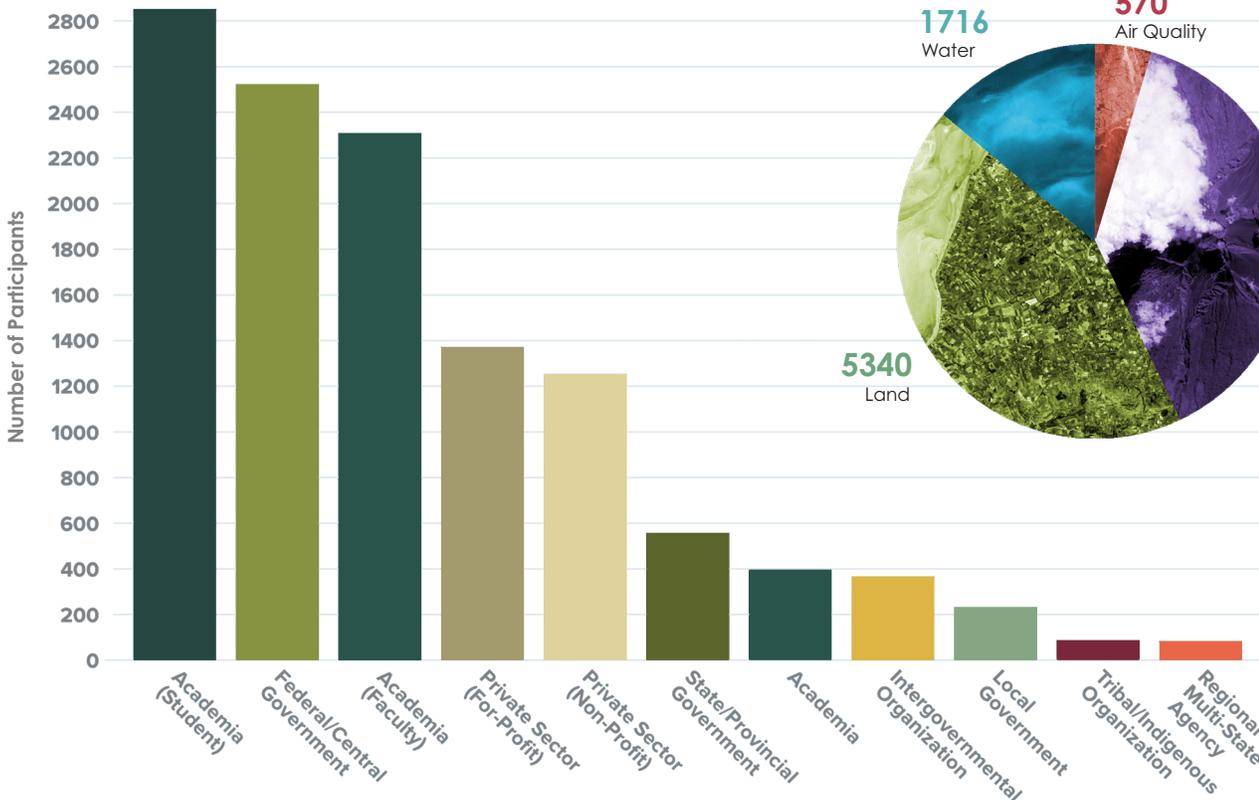
Year in Review

Participation by Year

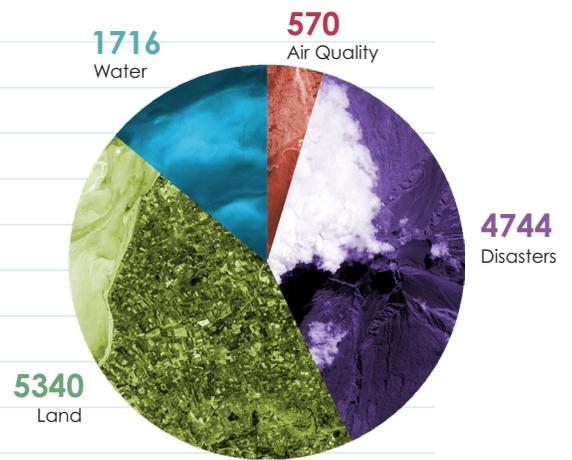


Aside from it being the 10 Year Anniversary of the program, ARSET experienced a surge in participation in 2019. Over a third of the total participants throughout the program's history came from this year alone.

Sector Breakdown



Participation by Theme





Year in Review

95% of all participants reported they improved their understanding of how remote sensing data products can be used for environmental monitoring & decision making.



94% of all participants reported they improved their understanding of the specific remote sensing data products which are appropriate to their work needs, as well as improved their ability to access these products.

89% of respondents reported an increase in use of remote sensing data for identifying areas at risk for disasters.



78% of respondents reported an increase in use of remote sensing data for flood forecasting.

91% of respondents reported an increase in use of remote sensing data for documenting land use change.



87% of respondents reported an increase in use of remote sensing data for documenting air quality monitoring.

2019 ARSET Trainings

ARSET offers both online and in-person trainings, with the former being the most common. After each online training is conducted, a recording of the training and all related materials are available on the ARSET website and on YouTube. Materials are offered in English and Spanish, and some recordings are offered in Spanish.

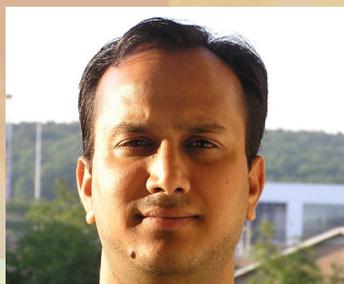
ARSET offered **15** new trainings in 2019, mostly online. These trainings were offered in Air Quality, Disasters, Land, and Water, and cover a variety of satellites and sensors, utilizing the majority of NASA's Earth observing fleet. See below for a catalog of new trainings for 2019.

Air Quality

Trainers



Melanie Follette-Cook
Goddard Space Flight Center



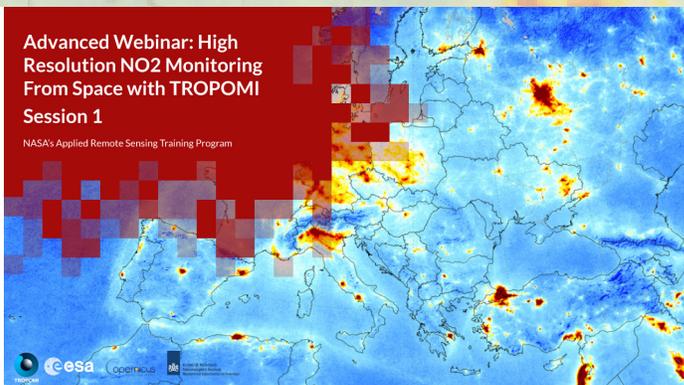
Pawan Gupta
Marshall Space Flight Center

May 28 - June 3 Eng

The TROPOMI instrument onboard Sentinel-5P represents a significant improvement in spatial resolution over OMI. It is better-suited for many applications, including monitoring air pollution. In this training, attendees learn how to access and analyze TROPOMI data and learn about its applications.

Advanced Webinar: High Resolution NO2 Monitoring From Space with TROPOMI Session 1

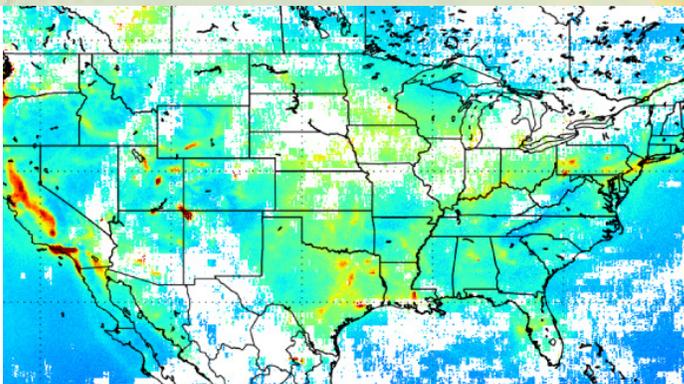
NASA's Applied Remote Sensing Training Program



High Resolution NO2 Monitoring from Space with TROPOMI

October 9-11 Eng

This in-person training was conducted in Huntsville, AL for air quality and health professionals, decision makers from local, state, and federal agencies, NGOs, and the private sector. It highlights applications related to air quality monitoring, forecasting, smoke, fire, PM2.5 monitoring, image interpretation, and data access for modeling efforts.



Application of Satellite Observations for Air Quality and Health Exposure

Disasters

Trainers

2019 Catalog



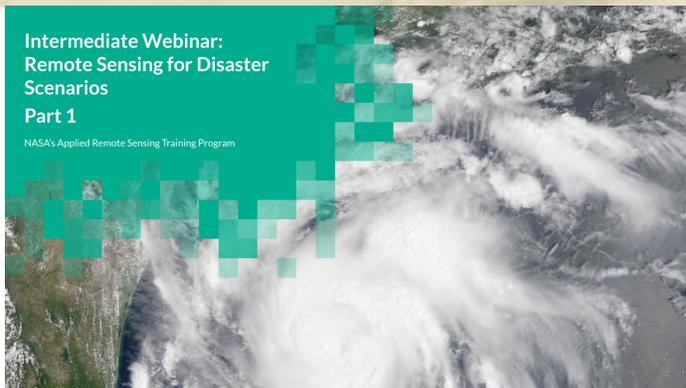
Amita Mehta
Goddard Space Flight Center

April 16-30 Eng/Span

According to the WHO, every year disasters “kill around 90,000 people and affect close to 160 million people worldwide.” This training shows participants how NASA remote sensing data can be used to characterize and monitor disaster related events and support relief efforts.

**Intermediate Webinar:
Remote Sensing for Disaster
Scenarios
Part 1**

NASA's Applied Remote Sensing Training Program



Remote Sensing for Disaster Scenarios



Erika Podest
Jet Propulsion Laboratory

August 6-15 Eng

This series focuses on Earth observation (EO) data useful for disaster risk assessment. The series covers disasters including tropical cyclones, flooding, wildfires, and heat stress. The training also includes access of socioeconomic and disaster damage data. Sessions 3 & 4 cover case studies and operational applications.

**Introductory Webinar: Earth
Observations for Disaster Risk
Assessment & Resilience
Part 1**

NASA's Applied Remote Sensing Training Program



**Earth Observations for Disaster Risk
Assessment & Resilience**



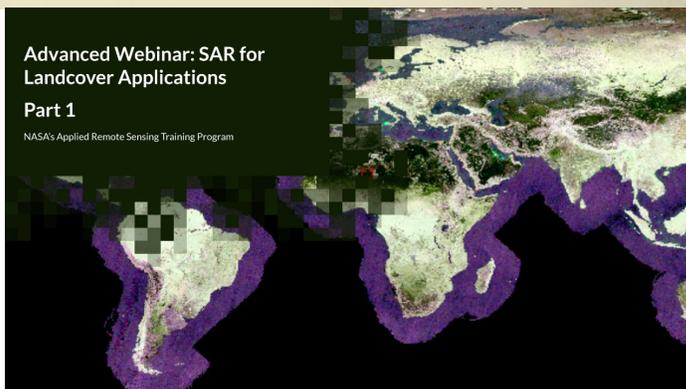
Sean McCartney
Goddard Space Flight Center

**August 28 - September 4
Eng**

Learn to characterize floods with Google Earth Engine and analyze synthetic aperture radar (SAR) for agricultural applications, including retrieving soil moisture and identifying crop types. Presentations focus on agriculture and flood applications.

**Advanced Webinar: SAR for
Landcover Applications
Part 1**

NASA's Applied Remote Sensing Training Program



SAR for Landcover Applications



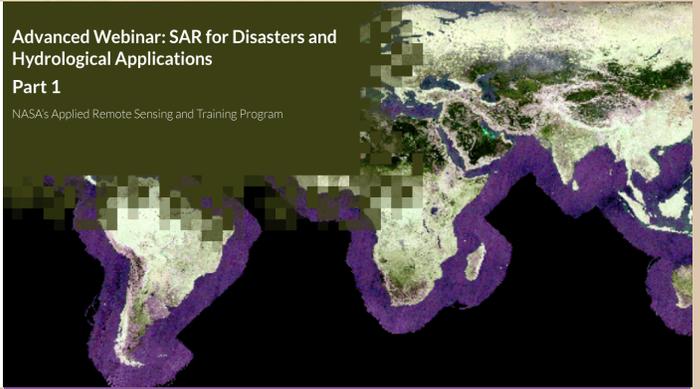
A Q&A Session on Radar Remote Sensing (Eng/Spa)

December 3-5 Eng/Spain

Building on the skills from the previous ARSET SAR webinar series and the use of Google Earth Engine for flood mapping, this training added two new topics: the use of InSAR for characterizing landslides and the generation of a digital elevation model (DEM).

Advanced Webinar: SAR for Disasters and Hydrological Applications Part 1

NASA's Applied Remote Sensing and Training Program



SAR for Disasters and Hydrological Applications

Land

Trainers

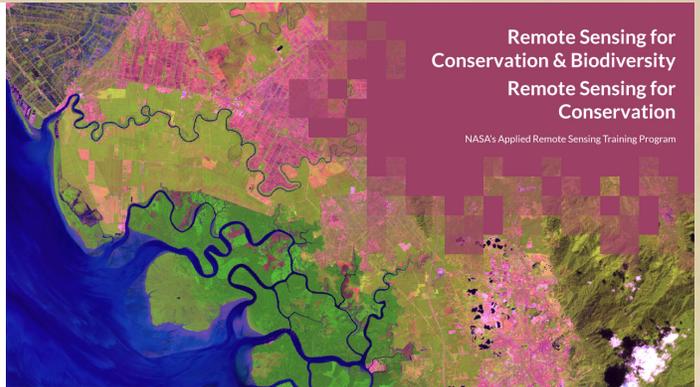
2019 Catalog



Amber McCullum
Ames Research Center

January 22-24 Eng

This series introduces participants to the use of satellite data for conservation and biodiversity applications. The series also highlights specific projects that have successfully used satellite data. Some examples include monitoring chimpanzee habitat loss, decreasing whale mortality, detecting penguins, and monitoring wildfires.



Remote Sensing for Conservation & Biodiversity Remote Sensing for Conservation

NASA's Applied Remote Sensing Training Program

Remote Sensing for Conservation and Biodiversity



Juan Torres-Pérez
Ames Research Center

April 15-17 Eng

AppEEARS enables users to integrate ground-based data with satellite imagery. LandTrendr enables users to analyze land cover dynamics, including short-term disturbances and long-term trends. This training focuses on the use of both tools, AppEEARS from the LP-DAAC and LandTrendr via Google Earth Engine (GEE).



Advanced Webinar: Investigating Time Series of Satellite Imagery Session 1

NASA's Applied Remote Sensing Training Program

Investigating Time Series' of Satellite Imagery

Special Thanks



Cindy Schmidt
Ames Research Center

Dr. Cindy Schmidt was the Lead Trainer for our Land application area throughout most of 2019. We would like to thank her for her years of service to the ARSET Program.

2019 Catalog

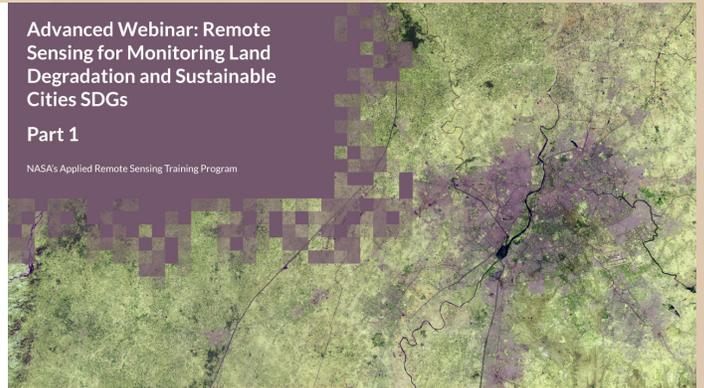
July 9-23 Eng/Spain

Trends.Earth is a freely-available QGIS plugin that allows users to plot time series of key land change indicators. Learn to use Trends.Earth, created by Conservation International (CI), and hear from special guest speakers from the United Nations Convention to Combat Desertification (UNCCD) and UN Habitat.

Advanced Webinar: Remote Sensing for Monitoring Land Degradation and Sustainable Cities SDGs

Part 1

NASA's Applied Remote Sensing Training Program



Remote Sensing for Monitoring Land Degradation and Sustainable Cities SDGs



Earth Observations for Indigenous-Led Land Management

September 17 - October 1 Eng

Learn how to use NASA Earth observations for habitat monitoring, specifically for freshwater fish and other species. This training also provides a conceptual overview, as well as the tools and techniques for applying landscape environmental variables to genetic and habitat diversity in species.

Intermediate Webinar: Remote Sensing for Freshwater Habitats

Part 1

NASA's Applied Remote Sensing Training Program



Remote Sensing for Freshwater Habitats

February 5-19 Eng/Spa

Indigenous territories are threatened by fires, illegal logging, mining, and other activities. Learn how Earth observations (EO) data and tools can provide spatial information for forest monitoring, mapping, and responding to ecosystem threats. Also learn data portals, web tools, software, mobile apps, and systems for early warning and alerts.

November 20 Eng

This lightning-style training focuses on a NASA instrument that was installed on the International Space Station in Summer 2018. Designed to study terrestrial ecosystems and plant water stress from the ISS, ECOSTRESS can be used to better understand crop health, volcanoes, urban heat, wildland fires, coastal systems, and more.

New Sensor Highlight: ECOSTRESS

NASA's Applied Remote Sensing Training Program



New Sensor Highlight: ECOSTRESS



Amita Mehta
Goddard Space Flight Center



Erika Podest
Jet Propulsion Laboratory



Sean McCartney
Goddard Space Flight Center

March 13 - April 3 Eng

Managing river basin watersheds is critical for developing policies for sustainable water allocation and development. Over the course of four sessions, this introductory series teaches how to estimate surface water budgets and their temporal variability with remote sensing and Earth system modeling data.

Using Earth Observations to Monitor Water Budgets for River Basin Management Session 1

NASA's Applied Remote Sensing Training Program



Using Earth Observations to Monitor Water Budgets for River Basin Management

June 5-19 Eng

Learn to integrate NASA Earth observations into water quality monitoring decision making processes. Subject matter includes data products, aquatic remote sensing-specific criteria, methods and best practices, obtaining data, and image processing for monitoring of coastal and larger inland water bodies.

Advanced Webinar: Integrating Remote Sensing into a Water Quality Monitoring Program

Part 1

NASA's Applied Remote Sensing Training Program



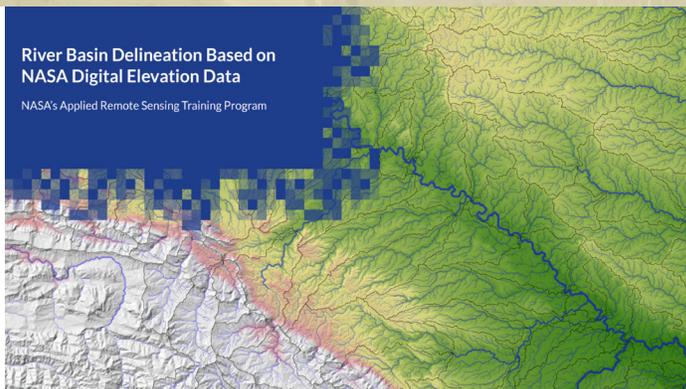
Integrating Remote Sensing into a Water Quality Monitoring Program

November 26 Eng

This lightning-style training focuses on describing NASA digital elevation data and its application in deriving river basin information by using Hydrological data and maps based on Shuttle Elevation Derivatives at multiple Scales (HydroSHEDS) database. Exercises with instructions for river basin delineation using HydroSHEDS are provided.

River Basin Delineation Based on NASA Digital Elevation Data

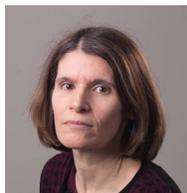
NASA's Applied Remote Sensing Training Program



River Basin Delineation Based on NASA Digital Elevation Data

Behind the Curtain

A lot of hard work, dedication, industry know-how, and experience goes into every one of our trainings; but that is only half the battle. Equally important is what goes on behind the scenes to make our trainings presentable, accessible, and well-known to our audience.



Ana Prados

Dr. Ana Prados started the Applied Remote Sensing Training Program in 2009. Ever since, her vision has guided the efforts of the program in offering remote sensing training across the globe. "On our 10th year anniversary, I am particularly proud of the high quality training that the ARSET team continues to deliver across multiple disciplines, building remote sensing skills among both traditional and non-traditional users."
- Ana

Leadership

Training Coordination

With direct engagement with over 31,000 remote-sensers and counting, our training coordinators make great efforts to reach as wide of an audience as possible. They ensure that all the moving parts in the ARSET machine are working together. ARSET's training coordinators schedule, promote, identify target audiences, conduct outreach, set internal deadlines, and much more. Through their efforts, ARSET has been able to reach participants in over 170 countries and attract over 1,000 new organizations in 2019.



Brock Blevins



Selwyn Hudson-Odoi

Program Evaluation



Annelise Carleton-Hug

In order to make sure our trainings are continually relevant, not only in terms of their content, but also in terms of their structure and delivery, it is critically important to assess the impact of our trainings. This is made possible through quantitative and qualitative data offered by our participants and collected through surveys and direct communication.

Spanish Materials

In order to make as large of an impact as possible, our trainings have to be offered in a language that our participants understand. The scientific terminology used in ARSET trainings does not always translate directly, though, and it takes somebody with a familiarity with remote sensing who is fluent in both languages to ensure that our materials maintain scientific literacy through the process.



David Barbato

Communications



Jonathan O'Brien

All of the work that ARSET does has to be communicated to a variety of different audiences, before, during, and after completion. This communication can take the form of written articles and reports, social media, flyers and graphics, and others. Along with this comes the task of managing the program's outward appearance through the ARSET brand.

Certifications

After completing ARSET trainings, most participants want something to show for it. ARSET offers certificates for courses completed during live sessions, provided that they attend all sessions and complete all homework and required materials for the course. Marínes Martins is in charge of coordinating and carrying out the certification process, and certified 3,016 participants in 2019.



Marínes Martins

Acknowledgements

We would like to extend a very special thank you to Nancy Searby and Lawrence Friedl. We would also like to extend a thank you to all of our partners and guest speakers, who augment our trainings with all of their valuable knowledge and experience.

The ARSET Team



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Brock Blevins
Training Coordinator



Annelise Carleton-Hug
Program Evaluator



Amita Mehta
Lead Instructor



Amber McCullum
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Jonathan O'Brien
Technical Writer/Editor



Selwyn Hudson-Odoi
Training Coordinator



Marines Martins
Project Support



Sean McCartney
Instructor



Pawan Gupta
Lead Instructor



Melanie Follette-Cook
Instructor



Erika Podest
Lead Instructor



Juan Torres-Pérez
Instructor

Guest Speakers

Amir Behnamian - Agri-Food Canada

Africa Flores - NASA SERVIR

Aaron Naeger - NASA SPoRT

Amelia Snyder - WRI

Alexander Zvoleff - Conservation Int

Benjamin Zaitchik - Johns Hopkins University

Corey Filiault - WRI

Cole Krehbiel - LP DAAC

Christine Lee - JPL

Daniela Gurlin - Wisconsin DNR

David Hunt - Conservation International

Dennis Mwaniki - UN-Habitat

Eric Anderson - NASA SERVIR

Eric Fielding - JPL

Eddy Mendoza - Conservation International

Emkio Martinez - Conservation International

Franz Meyer - NASA ASF

Heather McNairn - Agri-Food Canada

John Bolten - NASA Applied Sciences

Jenny Hewson - Conservation International

Kashif Shaad - Conservation International

Karyn Tabor - Conservation International

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Mariano Gonzalez-Roglich - Conservation Int

Monica Noon - Conservation International

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