
My NASA Data - STEM Career Connections

So, You Think You Can be a Remote Sensing Scientist



Dr. Catherine Nakalembe, Remote Sensing Scientist

STEM can help solve important real-world problems that affect people and communities. Scientists, engineers, and researchers use STEM skills to study what is happening, understand why problems exist, and find better ways to help. Sometimes this means using technology and data to carefully consider what is happening and work to prevent problems before they get worse. Other times, it means helping leaders and communities make smarter decisions that protect people, food, and the environment. In this way, STEM is about **using knowledge to help others and improve the world.**

Collecting Data From Far Away

Remote sensing means studying Earth **from a distance**, without visiting a place or touching it directly. Scientists use satellites, cameras, and sensors high above Earth to collect information they couldn't easily gather on the ground. These tools can photograph our planet and measure all kinds of things: how tall trees are in a faraway rainforest, how healthy plants and crops are, how much water is in the soil, and even weather patterns, and disaster events like droughts, floods, and fires.

Remote sensing is especially useful because satellites can:

- Cover very **large areas** at once
- Collect data **often and over time**
- Reach places that are **hard or dangerous** to visit, like active fires and volcanoes

However, remote sensing does not rely solely on satellite data. Scientists also collect **ground data** directly from farms, fields, weather stations, ground sensors, and people on Earth. This ground data helps scientists verify, refine, and improve what satellite data show, making the information more complete, reliable, and verifiable.

Together, **satellite data (the big picture)** and **ground data (close-up details)** help scientists understand what is really happening on Earth and make better decisions for the people and the environment.

Your Skills

Perhaps you have not considered becoming a remote sensing scientist (yet). But soon you will discover that you are already practicing skills that you will use if you decide to pursue a career in remote sensing science!

Consider if you ever practice any of the following skills:

Skill	Examples
Helping others.	• You teach a grandparent how to use a smartphone or tablet. • You pack lunches for a younger sibling.
Noticing patterns.	• You find that some plants produce more food than others in the same garden. • You use legos to build something.
Using maps to gather useful information.	• You use a map app to choose the fastest route or find a meeting place. • You use a map when visiting an amusement park, a botanical garden, or a zoo to plan the best route to see/do everything you want.
Using data to answer questions.	• You compare prices before buying something. • You read the nutritional labels of the food items you buy to see which ones have less sugar or more protein.
Choosing the right photo quality.	• You zoom in on images of a piece of clothing you want to buy online to examine the fabric, stitching, or texture. • You use a high-resolution photo to identify everyone's faces before printing a group picture. • You improve a photo's quality with filters, changing contrast, color, etc
Making predictions using evidence.	• You notice dark clouds and predict it will

Validate information by using multiple sources.

- rain.
- You predict how you'll perform on your next sports event based on your recent practice times.
- You read reviews on more than one website before buying a new pair of sneakers, a backpack, or a video game.
- You look at the weather forecast from two or more different apps or websites before deciding whether to cancel an outdoor event.

If you have practiced any of the skills above, please know they can be very helpful for a career in remote sensing science!

Meet Dr. Catherine Nakalembe



Catherine (center) going over field data collection with a local district officer (behind rain gauge); Office of the Prime Minister staff Swalehe Katoto and Emmanuel Okecho (left); and Uganda Wildlife Authority Ranger James Munana (right) in the Bududa District of Mt. Elgon. Credit : Dr. Catherine Nakalembe

Dr. Catherine Nakalembe is a remote sensing scientist who uses NASA satellite images and ground

data to help people and communities. She focuses on studying smallholder farms in Africa that face serious challenges, including fires, pests, plant diseases, droughts, and floods. When crops fail, families who depend on their crops for survival may not have enough food to eat or sell for income, which can affect entire communities for many years.

While there is a lot of satellite data available, much of it does not work well for African farms because the fields are very small and often grow many different crops close together. This can cause maps and data to be incorrect or incomplete. Catherine works to improve these tools so the information better matches what is really happening on the ground. This helps governments and organizations make better decisions and support farmers, leading to more sustainable farming and stronger communities.

Your Shared Skills

Next you will complete a table that shows the connection between skills and career practices. *A skill is the ability to do something. Practices are habits applying skills for a purpose and continuing to improve the skills.* It is possible for a skill to connect to more than one career practice.

1. Watch the video [Our World: Where Do Crops Grow?](#)
2. Add examples of how Catherine uses data skills to determine which crops will grow best where.
3. Think of a time when you used similar skills and add them to the table.

Practices and Skills

Career Practices	Skill that supports practice/s.	Example of How Catherine Use This Skill	Example of How You Use This Skill
Asking Questions and Defining Problems	Helping others.		
Analyzing and Interpreting Data or Using Models	Noticing patterns.		
Obtaining Information or Analyzing and Interpreting Data	Using maps to gather useful information.		
Constructing Explanations	Using data to answer questions.		
Analyzing and Interpreting Information or Communicating Information	Choosing the right photo quality.		
Engaging in Argument from Evidence	Making predictions using evidence.		
Obtaining Information or Analyzing and Interpreting Data	Validate information by using multiple sources.		

How might these Career Practices be important for this career?

Just for Fun

What is your favorite ice cream flavor? Catherine's favorite ice cream flavor is mint! Whether or not you and Catherine have the same ice cream preferences, you and Catherine share many important skills!

Reflection

Many of your current activities are already preparing you for a very bright future. If you want to help farmers, or you are interested in agriculture, or you want to help ensure everyone has access to food, or you are interested in any other remote sensing application, you are practicing many skills that will help you succeed as a Remote Sensing Scientist! Feel free to use the diagram below to envision your Remote Sensing Science career:

A circular graphic organizer with a central circle and six surrounding segments, each with a prompt and lined space for writing.

Central circle prompt: I will focus on topics such as...

Segments (clockwise from top):

- I will collaborate with...
- My data will include...
- I will work at...
- I will use tools like...
- Some skills I will use...
- My work will help...

Answer Key

Teachers who are interested in receiving the answer key, please complete the [Teacher Key Request and Verification Form](#). We verify that requestors are teachers prior to sending access to the answer keys as we've had many students try to pass as teachers to gain access.

