



Nalini Nadkarni climbs a fig tree in the Monteverde Cloud Forest in Costa Rica in 1988.

# Treetop Scientist


Nalini Nadkarni climbs to the tops of trees to study what lives up there

» As you read, think about what role plants play in the top layer of forests.

**N**alini Nadkarni spent her childhood in Bethesda, Maryland, climbing trees. “I wanted to invent a magic microphone that I could plug into the tree and listen to its responses,” she says. Now Nadkarni is an **ecologist**, a scientist who studies living things and their environment. For 40 years, she has traveled

the world climbing trees to explore warm, wet ecosystems called **tropical rainforests**.

Nadkarni focuses on the leafy upper layer of forests called the **canopy**, about 30 meters (100 feet) above the ground. She’s discovered that some trees grow aboveground roots from high up on their branches. The roots get nutrients from soil that forms in the canopy. Nadkarni recently spoke with *SuperScience* about her work.

 **What does the canopy look like, and what lives there?**

I love climbing from the dark, damp forest floor into the

canopy that has more sunlight and wind. In the canopy, you’re immersed in leaves, flowers, and fruits. It’s beautiful!

Many kinds of plants grow in rainforest canopies, like orchids, ferns, and mosses. These plants grow in soil that forms on the trees. They get nutrients from the canopy soil and have special leaves that absorb rain and mist containing nutrients.

Birds, mammals, and bugs feed on the flowers and fruits of these plants. When the plants die, they stay on the branches and break down. This creates soil in the canopy.

 **What type of research do you do?**

Tropical rainforests face many threats. My experiments investigate how plants in the canopy react to changes to their environment. I’ve learned that the canopy ecosystem is full of life but fragile.

I’ve studied how long it would take for canopy plants to grow back after removing them. We stripped off long patches of plants from their branches. I thought they’d come back immediately. But it took 25 years for half of the plants to regrow.

Now I’m studying how changes in the climate will affect the canopies in Costa Rica. Rising

temperatures are creating longer dry seasons in tropical mountain forests there.

 **Why is it important to study trees and forest canopies?**

The billions of leaves in the canopy provide a lot of energy to the forest. They collect sunlight and convert it into sugars using **photosynthesis**. Animals eat the leaves for these nutrients.

Trees store carbon dioxide and release oxygen. They are **habitats** for animals and other plants. Trees also provide wood, paper, fruit, shade, and beauty. If we want to use trees, we need to understand what makes them grow, what’s bad for them, and how we can help them.




Mattel designed a one-of-a-kind Barbie to look like Nadkarni.



Plants like these bromeliads grow in soil found on tree branches in the canopy.



Nadkarni cuts off sections of plants and soil from tree branches to study how they grow back.

 **How do you inspire future scientists?**

Back in 2003, my students and I created TreeTop Barbies, adventure dolls who climb trees and visit rainforests. Years later in 2019, National Geographic asked me to help with their new project with Mattel, the company that makes Barbies. They were creating Explorer Barbies with different science careers who explore the Earth. I suggested what clothing and tools each doll would need. I love that these dolls give kids more scientific role models.

—Dani Levis