

# AI AND FORESTS WITH PROFESSOR TIAN ZHENG

## TALKING POINTS

### KNOWLEDGE

1. What is LiDAR?
2. What is a pioneer species?

### COMPREHENSION

3. How can tropical storms affect a forest's ability to store carbon? Explain the process.
4. Why did Tian and Maria initially focus on two species of trees for their research?

### APPLICATION

5. Scientists are worried that climate-change induced storms and subsequent forest damage may lead to a positive feedback loop, or 'snowball effect'. Describe what you think they mean by this.

### ANALYSIS

6. Think about the two methods of remote sensing mentioned in the article: aerial imaging and LiDAR. What do you think are the benefits and drawbacks of each method?
7. The article says, "These days, it is often pretty easy for scientists to generate massive datasets". Why do you think this is the case?

### SYNTHESIS

8. How do you think data from ecological surveys and remote sensing can be combined into one dataset? What challenges might this process face?
9. What sort of factors do you think Tian and Maria are hoping to compare in the 'before' and 'after' maps for Puerto Rico's forests? What conclusions might they draw from these comparisons?

### EVALUATION

10. Tian mentions that the group's methodologies may have applications for medical imaging. How useful do you think these applications would be and why?
11. Some people are concerned that machine learning could become an existential threat for humanity. To what extent do you agree and why?

## ACTIVITIES YOU CAN DO AT HOME OR IN THE CLASSROOM

Create a poster that acts as a flowchart of how Tian and Maria's project came about, the development of the methodology and why this research is important. It should cover the following steps:

1. Maria's ecological surveys
2. Remote sensing (aerial imaging and LiDAR)
3. Hurricane Maria and Puerto Rico
4. Tian's work with big data
5. Machine learning
6. Applications and implications

Undertake further research on the internet to flesh out each of these steps. For example, NASA is a good place to start:

<https://earthobservatory.nasa.gov/images/144441/a-haircut-for-puerto-ricos-forests>

At each step, think about how you can succinctly summarise the information whilst keeping it accurate and engaging. Feel free to illustrate your a poster or design it on a computer. Present your poster to your group or class in an engaging way. Think about the points you want to draw particular attention to and anticipate any questions you might get asked.

## MORE RESOURCES

This grantee profile for Tian and Maria's project explains their research in more detail:

[https://ai4edatasetspublicassets.blob.core.windows.net/grantee-profiles/Columbia%20University\\_US\\_LATAM\\_Climate\\_AI4E%20Grantee%20Profile.pdf](https://ai4edatasetspublicassets.blob.core.windows.net/grantee-profiles/Columbia%20University_US_LATAM_Climate_AI4E%20Grantee%20Profile.pdf)

You can also find out more about the research on NASA's website: <https://gliht.gsfc.nasa.gov/index.php?section=49>. And explore the aerial photography taken of Puerto Rico: <https://glihtdata.gsfc.nasa.gov/puertorico/index.html>

This video from NEON Science uses clever graphics to explain how LiDAR remote sensing works: <https://www.youtube.com/watch?v=EYbhNSUldU>

This Science article explains how scientists are studying the post-hurricane recovery of Puerto Rico's forests and the broader implications for climate change: <https://www.sciencemag.org/news/2018/09/puerto-rico-s-catastrophic-hurricane-gave-scientists-rare-chance-study-how-tropical>