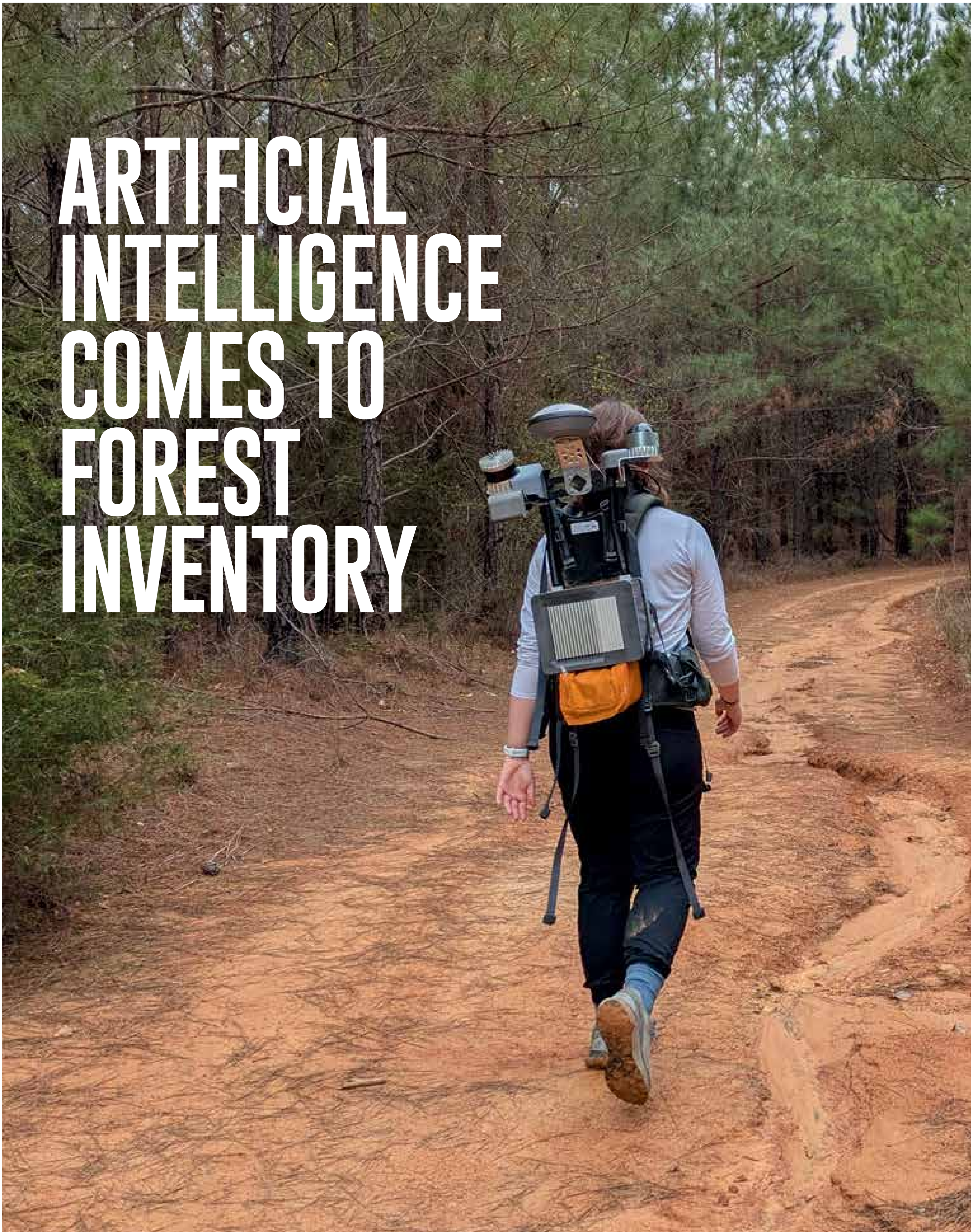
ARTIFICIAL INTELLIGENCE COMES TO FOREST INVENTORY



ALL PHOTOS COURTESY GAIA AI

BY ERIC KINGSLEY

Every forester has spent time measuring plots using a prism, cruise sheet, and diameter tape. It's a rite of passage, and not one that all foresters love. At a time when cars are learning to drive themselves – sensing fixed and moving objects and navigating a complex environment – it's clear that the technology exists to conduct inventories more efficiently using modern technology.

In 2023, *Forbes Magazine* recognized the co-founders of Gaia AI, Peter McHale and Matt Carpenter, in their "30 Under 30" issue, highlighting the impact young people are making in manufacturing and industry. By bringing technology and learnings from the artificial intelligence and autonomous vehicle industries to forest inventories, their team is bringing new ideas that can help revolutionize what we know about forests and provide better data to inform better decisions.

Gaia AI has set out to make inventories better and faster, harnessing technology developed for other applications and adjusting it to the forest industry. The team, which was formed while at the Massachusetts Institute of Technology, is leveraging pioneering technology developed for autonomous vehicles and applying it to forest inventory. In addition to traditional timber-based inventories, this technology has applications for emerging markets in carbon and biodiversity, as well as helping landowners and policy makers evaluate wildfire risk.

ChatGPT, an artificial intelligence tool, defines AI as "the field of computer science focused on building machines and software that can perform tasks that normally require human intelligence." While this can cause people to worry (legitimately) that computers are coming for their jobs, Gaia AI is focused on ways to augment, not replace, human intelligence and provide people with excellent data for better decision-making.

The company has developed a small, portable data collection system that is worn as a backpack. This system captures data during a traditional timber cruising operation, but at about 100 hundred times faster than hugging a tree with a tape measure. According to a forester who has used the system, a 1/15th acre plot was completed in about 15 seconds, when traditionally the plot would have taken at least an hour. There is a mobile app that guides field operations and allows for in-woods observations and insights from the forester to be recorded.

Below-canopy data captured includes species, diameter at breast height (DBH), height, and live crown. By bringing modern data collection to forestry, the system allows faster measurements; data that is repeatable, objective and traceable; and high-fidelity data that lets landowners and land managers optimize the bottom line. In many cases this will be optimizing for timber values but enhanced and less expensive data will be critical for evaluating values from emerging markets such as ecosystem services.

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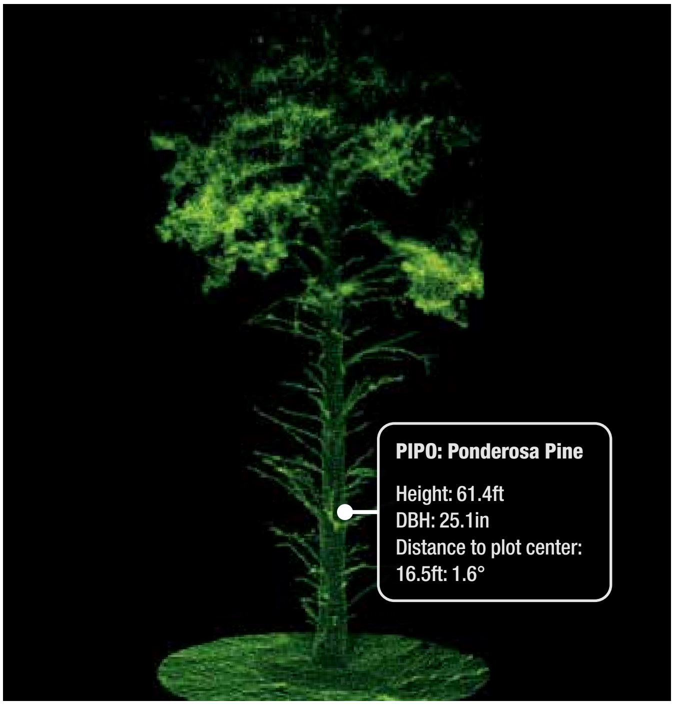
For timber markets, the technology can allow a much faster and more accurate inventory than traditional methods allow. For carbon, which requires intense inventories that measure far more than merchantable trees, reduced cost inventories may allow smaller projects to participate in these markets. For those looking to manage for biodiversity, information on species distribution, forest structure and habitat suitability may open new revenue streams for either threatened species or game species.



Examples of data collected.

So far Gaia AI has partnered with a few TIMOs (Timberland Investment Management Organizations), as well as a couple carbon project developers. The company is just a few years old, but saw revenue in 2024 and expects that to grow 3x this year, and 3x again in 2026.

Peter McHale, cofounder and CEO of Gaia AI, told me that this technology, eventually, will provide forest managers with the equivalent of "an army of PhD analysts," as Gaia works on building up the right tools and structuring the data in the right framework. This will help address our industry's growing labor shortage.

McHale notes that while timber is important, there is a range of rapidly evolving markets for ecosystem services. AI excels at complex tasks, and his hope is that "as the analytics and operations we are used to in our forests evolve, Gaia AI will allow land managers to hone in on a more complex optimization of different values and markets."

All of this rests upon good data, of course. While the forest industry has long relied on data, the way we collect it is often expensive and time consuming. AI promises to help streamline that process and allow people more robust and timely information to make better, more complex decisions. McHale notes that organizations that have used their product to date have used it to trigger creativity – allowing foresters, landowners, and customers the opportunity to ask new questions and consider new opportunities. The modern forest manager has to work with data in ways previous generations didn't, and Gaia AI has the potential to help foresters collect and analyze that data.

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