

# AG RESEARCH SPOTLIGHT



## SongLin Fei

*"We are demonstrating in a fundamental, scientific way how we should combat invasive species."  
SongLin Fei, Associate Professor of Forestry and Natural Resources*

The Ag Research Spotlight shines each month on an individual whose work reflects our commitment to the six strategic themes that guide Agricultural Research at Purdue. Our spotlight for December 2014 underscores the theme, "Strengthening ecological and environmental integrity in agricultural landscapes."

**THE RESEARCHER:** SongLin Fei's dedication to natural resources is rooted in an unlikely place — a flat delta of the Yangtze River in eastern China that is notably without forests. He was fascinated by the diversity and balance of nature when he pursued his master's degree at Beijing University with the foremost pioneer in plant ecology in China. After completing his doctorate in forest ecology at Penn State, he joined the University of Kentucky faculty. On the cusp of being granted tenure, he was lured to explore opportunities at Purdue and decided to climb the tenure ladder all over again. "Purdue's FNR department is well known for good colleagues and excellent science," he explains, and the university's cross-departmental and cross-college interaction also drew him to West Lafayette in August 2011.

**THE RESEARCH:** Fei maps and models invasive exotic species using spatial analysis. "We are trying to understand this not from a single plot or a single stand, but to step back to the regional/continental scale to understand the big picture," he explains. With funding from the National Science Foundation, he is working with a regional network of ecologists, modelers, conservation biologists and natural resource practitioners to develop new models to predict nationwide exotic invasions. Another area of his research focuses on how forests in the eastern United

States are changing, including the adaptation to climate change of 200 tree species in 37 eastern states.

**INVASIVE GREEN:** "We're taught 'green is good,' so people are critical of eradication, but they don't realize that not all green is good," Fei says. Under a mature forest overstory might be an understory of pure green invasive bush honeysuckle that chokes off small trees and halts forest regeneration. Other dense ground layers might prevent human enjoyment of forestland or provide breeding grounds for disease-transmitting insects.

**TOOLS:** Fei seeks to understand large-scale ecological patterns and processes and their ecological and environmental consequences by developing a comprehensive set of spatial modeling techniques. He uses remote sensing and extensive field survey data to determine where across the country an invasive species is located; historical data to explain how it got there; analysis of the conditions, both human and environmental, that allowed it to thrive; and models to predict its future and the future of other related species. His work has immediate applicability to reduce the ecological, economic and social damage invasive species cause. But it also provides fundamental ecological and evolutionary insights such as species interactions and species response to climate change, he adds.

**A WALK IN THE WOODS:** Fei is an avid photographer who never tires of venturing into forests. "Hiking the woods is a must-have to recharge my batteries," he says. He also enjoys biking: "Since I'm in Indiana surrounded by cornfields, one nice thing that Indiana has is miles and miles of country roads."