

# Researcher at forefront of new field of macrosystems ecology

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Songlin Fei, associate professor of quantitative ecology at Purdue University, is co-editor of a special issue of the journal *Landscape Ecology*. Credit: Purdue Agricultural Communication photo/Tom Campbell

A Purdue University researcher is co-editor of a special issue of the journal *Landscape Ecology* that focuses on macrosystems ecology, a

relatively new field that looks to solve ecological issues by expanding the view of the problems.

Songlin Fei, associate professor of quantitative ecology in Purdue Agriculture's Department of Forestry and Natural Resources, said macrosystems ecology takes a wider look at ecosystems at different temporal and spatial scales. Much like piecing together a puzzle, scientists in the field take an abundance of patterns from the smallest scales to the largest and develop theories on how those patterns affect the fundamental relationships between life and the nonliving environment on the planet.

Scientists working in macrosystems ecology cover a variety of issues including [climate change](#), hydrology, invasive species and urban ecology.

"When you are looking at a small temporal variation or on a small spatial scale, you only see a localized problem," Fei said. "If you want to see the whole problem, you have to see how the patterns and processes in those small systems fit together. Everything is connected through major forces such as global economy. Sometimes things can be missed or misunderstood if we don't look at the larger picture."

The National Science Foundation started its MacroSystems Biology Program in 2010, funding dozens of projects in the field. Since then, scientists involved with the field have developed new tools and methods for generating and analyzing data.

This special issue that Fei co-edited focuses on those discoveries. For example, weather surveillance radar is being used to record data on roosts of a wildlife species on a regional scale, and citizen scientists are being employed to distribute camera traps for wildlife monitoring on a large scale.

"Elucidating the causes of ecological patterns and processes across broad areas, and within the context of spatial scale, requires innovative analytical methods," Fei wrote in an editorial for the special issue.

Fei's own work focuses on management of exotic and invasive species. He maps those species with nationwide field data and historical herbarium data, models the influence of natural and anthropogenic factors on invasive species invasions, and examines invasive species dispersal patterns for management prioritization.

Fei believes that bringing attention to macrosystems [ecology](#) can help address pressing global challenges.

"As the global biomes are increasingly threatened by [invasive species](#), climate change and land use change, understanding of macroscale [patterns](#) and processes is pressingly needed for effective management and policymaking," Fei wrote in the editorial.

**More information:** [link.springer.com/journal/10980/31/1/page/1](https://link.springer.com/journal/10980/31/1/page/1)

Provided by Purdue University

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