GEORGE MERCER AWARD

Left: Mercer Award winners (front row): Charles D. Canham, Richard K. Kobe, John A. Silander, Jr. (Not shown: John Saponara, Eric Ribbens.)

Above: Steven W. Pacala, Mercer Award co-winner.

Stephen W. Pacala, Charles D. Canham, John Saponara, John A. Silander, Richard K. Kobe, and Eric Ribbens

The George Mercer Award is given by the Society to a young author or authors in recognition of an outstanding paper in ecology. The recipients for 1996 are Stephen W. Pacala, Charles D. Canham, John Saponara, John A. Silander, Richard K. Kobe, and Eric Ribbens for their 1996 paper entitled, "Forest models defined by field measurements: Estimation, error analysis, and dynamics," which appeared in *Ecological Monographs* 66:1–44.

Understanding the long-term dynamics of forests based on short-term observations has been a continuing goal of ecological studies. Such efforts have been frustrated, because it is not obvious how to obtain parameters needed for long-term dynamics from short-term studies, and how to assess the uncertainty in such models. Pacala et al. present the synthesis of a first effort to develop an individual-based model of forest dynamics based on parameters fitted to real data. This paper implements creative approaches to the problem and produces a convincing model to extrapolate from the short term at fine scales to long-term, landscape dynamics. Pacala et al. fit submodel parameters to data using likelihoods developed from the submodels themselves; thus, the parameter uncertainty estimated from data also applies to the model in which the parameters are used. This approach makes it possible to conduct an error analysis, i.e., an assessment of how the uncertainties in the parameters affect our confidence in the model predictions.

The model predictions and the ways in which we interpret them are fundamentally different from those of earlier models. Pacala and associates use the model to address some of the most longstanding and important puzzles in forest dynamics. By fitting the models to data (seed rain, growth/light, growth/mortality), Pacala and associates find that the dominant species differ from those predicted in the absence of fitted parameters, and they do so because of species differences in regeneration characteristics, including dispersal distances and their abilities to grow and/or survive at low light levels. Model analysis suggests strategic tradeoffs among species in life history characteristics that help explain temporal dynamics, species composition, and development of spatial pattern. These trade-offs can then be represented along a few summary axes. Perhaps more important than the specific results for their Northeastern forest communities is the demonstration of new approaches to data assimilation within complex models. The new and sometimes controversial predictions from their results are sure to enliven future debates on forest succession, community dynamics, and responses to climate change.

George Mercer Award Subcommittee

James S. Clark (Chair)
Michael Auerbach
Scott Armbruster
Lars Hedin
Robert Holt
Mary E. Power
Tim Seastedt