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# The problem of pattern and scale in ecology: what have we learned in 20 years?

Jérôme Chave\*<sup>1</sup>

<sup>1</sup>Laboratoire Evolution et Diversité Biologique (EDB) – Laboratoire Evolution et Diversité Biologique (EDB) – Bâtiment 4R1, 118, route de Narbonne, 31062 Toulouse, France

## Abstract

Session: Ecological explanation at different levels and scales (Stefan Linquist, Karl Cotenie, Jérôme Chave). Over the past 20 years, major advances have clarified how ecological patterns inform theory, and how in turn theory informs applied ecology. Also, there has been an increased recognition that the problem of scale at which ecological processes should be considered is critical if we are to produce general predictions. Ecological dynamics is always stochastic at small scales, but variability is conditional on the scale of description. The radical changes in the scope and aims of ecology over the past decades reflect in part the need to address pressing societal issues of environmental change. Technological advances in molecular biology, global positioning, sensing instrumentation and computational power should not be overlooked as an explanation for these radical changes. However, I argue that conceptual unification across ecology, genetics, evolution and physiology has fostered even more fertile questions. We are moving away from the view that evolution is played in a fixed ecological theatre: the theatre is being rapidly and relentlessly redesigned by the players themselves. The maintenance of ecosystem functions depends on shifts in species assemblages and on cellular metabolism, not only on flows of energy and matter. These findings have far reaching implications for our understanding of how ecosystem function and biodiversity will withstand (or not) environmental changes in the 21st century.

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\*Speaker