



NIMBioS

National Institute for Mathematical
and Biological Synthesis



NIMBioS Interdisciplinary Seminar

3:30 p.m.*, Tuesday, October 6, 2015

Dr. Charles Price

NIMBioS Sabbatical Fellow

Biology, Univ. of Western Australia

“Flow similarity, stochastic branching, and quarter power scaling in plants”

The origin of allometric scaling patterns that are multiples of one-fourth has long fascinated biologists. Several models have been advanced to explain the underlying principles of such patterns, but questions regarding the disconnect between model structures and empirical data have limited their widespread acceptance. I show that quarter power scaling can be derived using only the preservation of volume flow rate and velocity as constraints. Applying the model to the specific case of land plants, I show that incorporating biomechanical principles and allowing different parts of plant branching networks to be optimized to serve different functions predicts non-linearity in allometric relationships, and helps explain why interspecific scaling exponents covary along a fractal continuum. Data from numerous sources at the level of plant shoots, stems, petioles, and leaves show strong agreement with model predictions. This novel theoretical framework provides an easily testable alternative to current general models of plant metabolic allometry.

Location: Room 206 at NIMBioS, Claxton Education Bldg, 1122 Volunteer Blvd.

**Join us for refreshments at 3 p.m.*

**The seminar will be live streamed. Visit <http://www.nimbios.org/videos/livestream>.
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The National Institute for Mathematical and Biological Synthesis (NIMBioS) brings together researchers from around the world to collaborate across disciplinary boundaries to investigate solutions to basic and applied problems in the life sciences. NIMBioS is sponsored by the National Science Foundation with additional support from The University of

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