

# Biology Seminar



Western  
UNIVERSITY · CANADA

12:30 - 1:30 pm  
Friday, December 4, 2020  
Seminar to be held via ZOOM

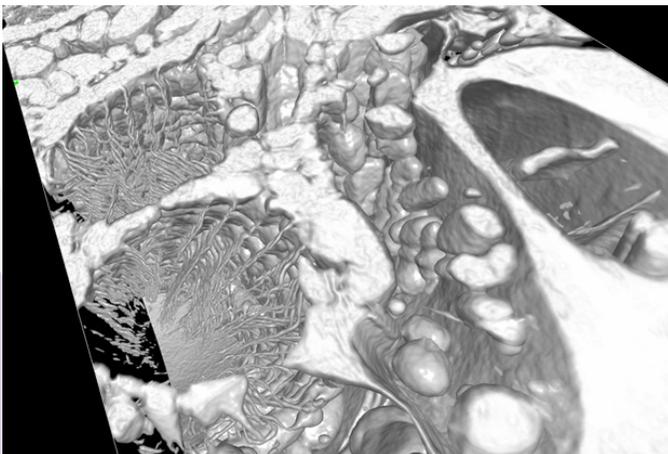


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## Physiological and evolutionary interactions among body size, metabolic rate and oxygen

The hypometric scaling of metabolic rate with body mass (larger animals use energy at a lower rate per gram) is arguably the best-documented and least understood pattern in animal biology. I will provide evidence and arguments that pattern is not likely caused by limitations in oxygen or nutrient supply in larger animals as proposed by popular theoretical models such as the Metabolic Theory of Ecology or Dynamic Energy Budget Theory; alternatively proposing that metabolic scaling is driven by body-size-associated natural selection effects on function. A related topic is the idea that insects achieve smaller maximal sizes than vertebrates due to their dependence on a tracheal respiratory system. The tracheal system of insect legs becomes progressively filled with tracheae or air sacs as insects within a clade enlarge, supporting this hypothesis.



Inverse rendering of micro-CT image of beetle thorax and adjacent leg, showing air sacs surrounding the muscles and tracheae penetrating the flight and leg muscles.

