

Biology Seminar

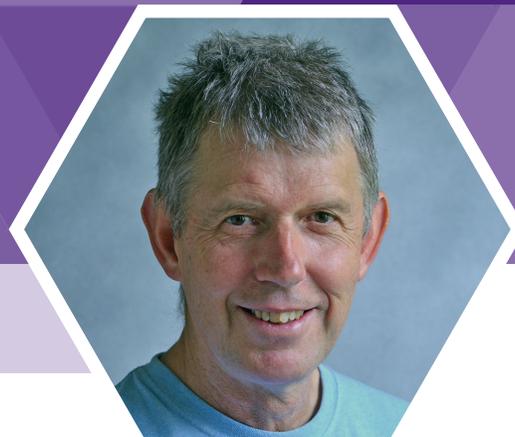


Western
UNIVERSITY · CANADA

9:30 - 10:30 am

Friday, September 18, 2020

Seminar to be held via ZOOM



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Optimal flight and migration strategies in birds: building a paradigm from aerodynamics, wind tunnel experiments to wild tracking

Our current understanding of bird migration strategies builds on some simple optimality models, where 'optimal' policies are derived on the basis of a few selection criteria: energy, time and safety. This theory is itself based on two fundamental relationships derived on the basis of flight mechanical principles. I will give some examples from research during the last 20-years with the aim of developing and testing the basis and consequences of migration theory, where a low-turbulence wind tunnel has been an important tool. Here, we have developed and used techniques to visualize the wake-flows generated by birds (bats, and insects), which holds information about the aerodynamic properties. By estimating the rate of kinetic energy of wakes, the aerodynamic power output is given, which combined with flight metabolic rates give the energy conversion efficiency of bird flight. The ultimate goal is to understand how and why birds migrate as they do, which now can be studied by using multi-sensor data loggers carried by birds for an entire migration cycle. Data obtained from such efforts can be used to test predictions from migration theory, but they have also yielded some unexpected discoveries of migration behavior, of which I will give a few examples.

