

Biology Seminar



Western
UNIVERSITY · CANADA

12:30 - 1:30 pm
Friday, October 29, 2021
Via ZOOM



Gregory Sutton

Professor
Royal Society University Research Fellow
School of Life Sciences
University of Lincoln UK

“High power insects:
The biomechanics of jumping and striking”

Gregory Sutton

The Royal Society (UK)



Courtesy of Alex Wild

Insects achieve feats of speed and acceleration that would be almost impossible for a larger animal; jumping, spinning, and diving through world through an intricate use of bio-mechanical mechanical structures within their bodies. I will first discuss the high-speed mechanisms in the Grasshopper, which can achieve a take-off velocity of 3 m/s in times as short as 20 thousandths of a second. This will then be compared with that of the frog hopper, an even faster jumping animal, which can generate a take-off velocity of 5 m/s in one millisecond (experiencing hundreds of g's of acceleration). Lastly, and then I'll go faster still to the extreme jaw closure of the trap-jaw ant, accelerating to a tip velocity of 30 m/s in a mere 100 microseconds. I'll discuss the energetics of such motions, and the springs, shock absorbers, and mechanical gears that are required for such spectacular feats of high-speed insect agility. While the mechanisms used are distinct for individual animals, the fundamental mechanical lessons learned are common across each animal, providing lessons that inform our prototype jumping robot.

