How do Flies Fly?

Dickinson Lab

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Active flight evolved 4 times.
Insects are the most diverse group of animals on earth.
Insects are cool!
'An engineer proved a bumblebee cannot fly.'

anonymous
Insect wings create a leading edge vortex.
Recording free flight responses to looming stimuli.

Muijres, et al., Science, 2014
Recording free flight responses to looming stimuli.

Automated tracking of high speed sequences

Fontaine, et al., JEB, 2009
Flies execute maneuvers with subtle changes in wing motion.

- Stroke angle ($\phi$)
- Axial rotation ($\alpha$)
- Stroke deviation ($\gamma$)

Graphs showing changes over time:
- Stroke angle
- Axial rotation
- Stroke deviation

Time (ms): -40 to 40
Ideas for project

raw image stream

wing kinematics

DNN

body motion