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[Session ET: Biocomotion IV: Morphology of Flying and Swimming](#)

4:10 PM–6:20 PM, Sunday, November 21, 2010

Long Beach Convention Center Room: Grand Ballroom B

Chair: Jifeng Peng, University of Alaska Fairbanks

Abstract: ET.00005 : Hydrodynamics of penguin wing models

5:02 PM–5:15 PM

[Preview Abstract](#)

Authors:

Flavio Noca
(hepia)

Nhut Cuong Duong
(EPFL)

Jerome Herpich
(hepia)

The three-dimensional kinematics of penguin wings were obtained from movie footage in aquariums. A 1:1 scale model of the penguin wing (with an identical planform but with a flat section profile and a rigid configuration) was actuated with a robotic arm in a water channel. The experiments were performed at a chord Reynolds number of about 10^4 (an order of magnitude lower than for the observed penguin). The dynamics of the wing were analyzed with force and flowfield measurements. The two main results are: 1. a net thrust on both the upstroke and downstroke movement; 2. the occurrence of a leading edge vortex (LEV) along the wing span. The effects of section profile, wing flexibility, and a higher Reynolds number will be investigated in the future.

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