## **Investigation of Avian Flight Mechanics**

Deriving Design Inspiration from the Motion of Birds



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To observe and to emulate the wing kinematics of the peregrine falcon, using as simple an actuation mechanism as possible.

**Objective:** 

Motivation:

Biomimetics is the process of imitating natural forms in human engineering. The flight of the birds is beautiful in its efficiency and its kinematics.



## Observation

•Observed slow motion video of peregrine falcon in flight Studied wing movement through the course of stroke cycle





## Analysis

Analysed video frame by frame Mapped points along wing at different stroke positions Created a simpler and more visual model of flapping motion

Synthesis



Bronze sculptures by 19<sup>th</sup> century French engineer Étienne-Jules Marey capture the flight of a pigeon at successive time intervals.



Computer-aided frame by frame motion analysis (left) was inspired by









The functional anatomy responsible for avian flight (illustrated by D.G. Mackean's sketch above) serves as a design inspiration for the mechanical model (left).

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