Mechanical Ornithology: Revolutionizing Flight Maneuver Mechanisms Through Modelling Morphological Bird Structures and Airfoil Characteristics

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For as long as humanity has been able to observe, the question of flight has always been. From the beginning, with ornithopters, to now full commercial airline use, despite the numerous advancements made to understand flight, the perfection and replication of bird flight has not been identified. Observing the kayak-like patterns that birds use to fly, the student composed a 3D printed gear mechanism and simulations to replicate the same pattern seen in flight, which has never been seen in opensource flight drones. Through the calculations and simulations of the components of flight (thrust, drag, lift, weight), and analyzing bird airfoils, the morphological replica of bird flight with the addition of pneumatized-like structures and more, this flight mechanism can be used to better change the flight industry. With the application of DC motors, PCB, RC car parts, custom prints, and more- an accurate depiction of birds in mechanical form is becoming a reality with this project. With the observation specifically of Cockatiel structures first-hand, this model combines the best aspects of an ornithopter with the same weight, style, and flying patterns as regular birds, to better anatomical bird education, biomechanics, and to be used in the future to advance drone capabilities.

Awards Won: