# Study of the Flagellar Movement in Biology with Applications in MEMS and Micro Robotics

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Euglena virdis is a protist with an elongated, navicular body, sharpened at both ends. One end is extended with a long and thin flagllum. The root of the flagellum is bifurcated and each branch ends with a small, round corpuscle, called the basal corpus. This is the center of the movement, where the motion begins. Euglena moves actively and very efficiently at micro-scale at speeds from 20 up to 60 μm / s. This specific locomotion is due to the progressive wave like movement of the flagellum. In order to achieve similar movement I proposed three types of synthetic fibrils and after a comparative evaluation of different types of actuators, I started prototyping first models using DC micro vibration motors (up to 24000 rpm) and a copper lamel structure to mimic the flagellum. A few prototypes manifested potential into achieving high speeds and low power consumption with this non-conventional type of movement. The practical applications for this type of robot may vary from small maintenance systems for lakes and ponds to microtunnels.

**Awards Won:**