

Contact Dr. Zhuang for more details:

1. Wireless charging

The traditional charging requires electrical connections and wirings to plug in power source. This method is, however, inconvenient in many situations, and brings in new fault pathways, like connector breakage, into the system. Additionally, limited by the rate capability, battery charging becomes unbearably long, e.g. over night. In this work, we are planning to build the so-called resonance charging system, which is anticipated capable to deliver large amounts of power over a medium distance within a short period. In this system, energy can tunnel from emitter to receiver at specific frequencies.

2. Micro-aerial vehicle

Bio-inspired micro aerial vehicles (MAVs) have recently attracted lots of attentions for its capability of conducting a wide range of military missions. It is envisioned that the MAVs will be used for sensing, targeting, communications, surveillance, environment monitoring, and disaster search. Inspired by insects, MAVs equipped with flapping-wing are anticipated to have superior maneuverability due to the large structural deformations (torsion, camber change and transverse bending) of the wings during each cycle.

Traditional design of flapping wing MAV uses mechanical motor to create sufficient stroke angle of wing, and consequently sufficient lift. However, the mechanical motor consumes a lot space and adds excessive weight, which reduces the overall payload significantly. At WSU, we are interest in designing an innovative MAV without mechanical motor. The task is to utilize the so-called piezo-effect, i.e. piezo-materials producing stress and/or strain under electric field, to drive the wing system of the MAVs.