Abstract Submitted
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Flagellated Janus particles for swimming and catalytic propulsion[1] LOUIS ROGOWSKI, JIANNAN TANG, XIAO ZHANG, Southern Methodist University, MICAH OXNER, Illinois Institute of Technology, MIN JUN KIM[2], Southern Methodist University — Catalytic Janus particles will become a vital tool for developing new medical applications involving drug delivery and cellular penetration. Hydrogen peroxide decomposition enables catalytic Janus particles with platinum hemispheres and magnetic cores to self-propel while being guided by an externally applied magnetic field. While effective, having alternative propulsion mechanisms available would increase the utility of Janus particles in fuel-less environments. The flagellated Janus particles (FJPs) presented here were propelled using both catalysis and swimming locomotion induced by rotating magnetic fields. The FJPs consist of a magnetic core, a platinum hemisphere, and a flagellated hemisphere composed of bacterial flagella that were isolated from *Salmonella typhimurium.* FJPs were suspended inside Newtonian fluids and actuated under both motion modes to characterize their velocity profiles. Responses to varying magnetic fields, mean square displacements, and trajectory following abilities using a proportional closed loop controller were also explored. Both motion modes were found to be similarly effective at propulsion and navigation. These are one of the first Janus particles developed to propel under two distinct motion modes and will be explored further for *in vivo* medical applications.

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