1075-92-243 **On Shun Pak*** (s0pak@ucsd.edu), Dept. of Mechanical and Aerospace Engineering, University of California San Diego, 9500 Gilman Drive, La Jolla, CA 92093, and **Saverio Eric Spagnolie**, **Wei Gao**, **Joseph Wang** and **Eric Lauga**. *Biological and bio-inspired locomotion in viscous fluids: from spermatozoa to synthetic microswimmers.*

The locomotion of microorganisms plays a vital role in many important biological processes, such as reproduction and bacterial infection. We will discuss the propulsive mechanism exhibited by many insect spermatozoa which possess a special morphology, which we idealize as a superhelical structure. Resolving hydrodynamic interactions with a non-local slender body theory, we predict the swimming dynamics of these superhelical swimmers based on experimentally collected geometric and kinematic data. Counter-intuitive results are revealed, particularly for the case when the minor and major helical structures are of opposing chirality.

The knowledge obtained by studying natural microorganisms has aided in the development of synthetic microswimmers, an avenue which has attracted considerable recent attention due to its promise for biomedical applications such as targeted drug delivery. A new magnetically driven microswimmer which exploits the flexibility of nanowires in order to swim will be presented. Asymptotic analysis of an elasto-hydrodynamic model is found to provide a good prediction of experimental measurements. The number of body lengths traversed per propeller revolution is surprisingly large when compared with that of natural microorganisms and other artificial swimmers. (Received August 30, 2011)