**Gangnam Style in Microbiorobotics:**

**Biologically Inspired Microscale Robotic Sytems**

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One of the challenges in microrobotics is to find suitable and simplistic ways to swim in low Reynolds number. For such work, magnetically controlled achiral microswimmers with the simplest possible body structures were shown to swim in low Reynolds number environment. Most previous works on artificial microswimmers had always focused on using chiral or flexible structures to generate non-reciprocal swimming motions in low Reynolds numbers; this inevitably brings complicity to the swimmers’ shapes and structures. However, an achiral and rigid structure can swim under the proper conditions, as demonstrated by this work. An achiral microswimmer consists of three magnetic micro-particles conjugated through avidin-biotin chemistry and magnetic self-assembly. A magnetic control system of approximate Helmholtz coils was used to control the microswimmers. Both directional and velocity control were successfully implemented to navigate the swimmers through low Reynolds number environment. Furthermore, multi-robot manipulation, modular robot control, and PIV characterization had been employed. The implication of the swimming phenomenon and the robust control demonstrated herein serves as great potential to revision future developments of microrobots, especially for therapeutic targeting and minimally invasive surgical procedures.

**Short Biography**

Dr. MinJun Kim is presently an associate professor at Drexel University with a joint appointment in both the Department of Mechanical Engineering & Mechanics and the School of Biomedical Engineering, Science & Health System. He received his B.S. and M.S. degrees in Mechanical Engineering from Yonsei University in Korea and Texas A&M University, respectively. Dr. Kim completed his Ph.D. degree in Engineering at Brown University, where he held the prestigious Simon Ostrach Fellowship. Following his graduate studies, Dr. Kim was a postdoctoral research fellow at the Rowland Institute in Harvard University. For the past several years, Dr. Kim has been exploring biological transport phenomena including cellular/molecular mechanics and engineering in novel nano/microscale architectures to produce new types of nanobiotechology, such as nanopore technology and nano/micro robotics. His notable awards include the National Science Foundation CAREER Award (2008), Drexel Career Development Award (2008), Human Frontier Science Program Young Investigator Award (2009), Army Research Office Young Investigator Award (2010), Alexander von Humboldt Fellowship (2011), KOFST Brain Pool Fellowship (2013), Bionic Engineering Outstanding Contribution Award (2013), Louis & Bessie Stein Fellowship (2014), and ASME Fellow (2014).