1048-76-180 **Clement Kleinstreuer*** (ck@eos.ncsu.edu), NC State University, Dept. of Mechanical & Aerospace Engineering, Raleigh, NC 27695-7910, and **Jie Li**. *Nanofluid Flow in Bio-MEMS.*

Nanofluids are dilute suspensions of nano-size solids in liquids with particle volume fractions of 0.1 to 6%. Examples of such quasi-homogeneous mixtures include metal (or metal-oxide) nanospheres, carbon nanotubes and nanodrugs in water (or aqueous solutions), oil, ethanol glycol, etc. As originally shown at ANL (see Choi, 2009), Cu-water nanofluids in vessels generated effective thermal conductivity coefficients, k-eff, up to 25% higher than the base fluid. Nevertheless, the accuracy of k-effective measurements for nanofluids and a comprehensive theory are still controversial (see Choi, 2009; Kleinstreuer & Li, 2008; Koo et al., 2008; among many others). A key dynamic component of a bio-MEMS is "nanofluid flow in microchannels". In the special case of nanomedicine application, the nanoparticles are drugs and the tasks include controlled drug delivery in miniaturized, implantable devices. Hence, in this ongoing research project, we advance the underlying theory for nanofluid properties, especially k-eff, and analyze computationally nanoparticle mixing in a heated microchannel to achieve pre-determined, near-uniform nanodrug exit concentrations and minimal microchannel lengths at lowest possible pumping power (Li & Kleinstreuer, 2008). (Received February 06, 2009)