Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Visualization of pulsatile flow for magnetic nanoparticle based therapies[1] ANDREW WENTZEL, PHILIP YECKO, The Cooper Union for the Advancement of Science and Art — Pulsatile flow of blood through branched, curved, stenosed, dilated or otherwise perturbed vessels is more complex than flow through a straight, uniform and rigid tube. In some magnetic hyperthermia and magnetic chemo-therapies, localized regions of magnetic nanoparticle laden fluid are deliberately formed in blood vessels and held in place by magnetic fields. The effect of localized magnetic fluid regions on blood flow and the effect of the pulsatile blood flow on such magnetic fluid regions are poorly understood and difficult to examine *in vivo* or by numerical simulation. We present a laboratory model that facilitates both dye tracer and particle imaging velocimetry (PIV) studies of pulsatile flow of water through semi-flexible tubes in the presence of localized magnetic fluid regions. Results on the visualization of flows over a range of Reynolds and Womersley numbers and for several different (water-based) ferrofluids are compared for straight and curved vessels and for different magnetic localization strategies. These results can guide the design of improved magnetic cancer therapies.

[1]Support from the William H. Sandholm Program of Cooper Union's Kanbar Center for Biomedical Engineering is gratefully acknowledged

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Date submitted: 01 Aug 2015 Electronic form version 1.4