Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Complex effects of molecular topology on diffusion in entangled biopolymer blends[1] RAE M. ROBERTSON-ANDERSON, University of San Diego, COLE D. CHAPMAN, University of California, San Diego, SACHIN SHANBHAG, Florida State University, DOUGLAS E. SMITH, University of California, San Diego — By combining single-molecule tracking with bond-fluctuation model simulations, we show that diffusion is intricately linked to molecular topology in blends of entangled linear and ring biopolymers, namely DNA. Most notably, we find a previously unreported non-monotonic dependence of the self-diffusion coefficient for linear DNA on the fraction of linear DNA comprising the ring-linear blend, which we argue arises from a second-order effect of ring DNA molecules being threaded by varying numbers of linear DNA molecules. Results address several debated issues regarding molecular dynamics in biopolymer blends, which can be used to develop novel tunable biomaterials.

[1]Supported by Research Corporation, NSF, AFOSR.

Rae M. Robertson-Anderson
University of San Diego

Date submitted: 07 Nov 2012 Electronic form version 1.4