

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**Thermal and Chemical Denaturation of Staphylococcal Nuclease: A Dynamic Light Scattering Study**<sup>1</sup> WILLIAM OLIVER III<sup>2</sup>, University of Arkansas, WESLEY STITES<sup>3</sup>, ELAINE CHRISTMAN, AMEE SALOIS, LAUREN CLARK, NATHAN TOBEY, University of Arkansas — Thermal and chemical denaturation data are presented from dynamic light scattering (DLS) experiments in which both wild-type and a quadruple mutant form of the small globular protein staphylococcal nuclease (SN) were studied. Previous studies on this particular mutant, known as mutant 62, indicate it has a smaller solvent-accessible surface area, and hence, more compact denatured state than wild-type SN. We performed DLS experiments at temperatures from 23°C–55°C for dilute solutions of SN in buffer for GuHCl concentrations from 0–2 M. Diffusivities were measured and protein sizes were calculated. A dramatic increase in protein size occurs at temperatures ranging from 44.4°C – 53.0°C as the GuHCl concentration was increased. Protein size is also dependent on GuHCl concentration at temperatures below this dramatic denaturation event. These and other results will be presented as well as their implications for the existence of intermediate states and models for denaturation in this system.

<sup>1</sup>This work was supported by NSF grant NO.: DMR-0552944.

<sup>2</sup>Department of Physics

<sup>3</sup>Dept. of Chemistry and Biochemistry

William Oliver III  
University of Arkansas

Date submitted: 02 Dec 2009

Electronic form version 1.4