**CHEMICAL EQUILIBRIA AND PHASE SEPARATION IN CONCENTRATED EYE-LENS PROTEIN SOLUTIONS**. ***B. Pappas****, Department of Chemistry, G. Thurston*, Department of Physics, bap4418@rit.edu.*

Cataract formation occurs when a liquid-liquid phase change in the concentrated aqueous eye-lens protein solutions causes the protein molecules present to cluster. This clustering scatters light, and can cause blurred vision or blindness. To further understand the cause of cataracts, systematic study of the effect on phase separation of the interaction of these proteins with smaller molecules is being pursued. To study this, pseudo-ternary solutions consisting of gamma crystallin (one of the three protein classes found in the lens), a phosphate buffer solution, and adenosine triphosphate or its magnesium complex are made up at varying concentrations. The crystallin proteins are obtained from the nuclei of calf lenses, which are homogenized and centrifuged to extract the proteins of interest; these proteins are then separated, collected, and concentrated down for use in the ternary solutions. A temperature-controlled microscope is being used to explore phase separation in small volumes of these solutions. Initial findings show that ATP has a considerable impact on phase separation of gamma-b crystallin; this impact is increased with the addition of magnesium. Preliminary fluorimetry results have shown significant interaction between the gamma crystallins and both free ATP and the Mg/ATP complex. These findings are the focus of this presentation.