



The University of Western Ontario

Faculty of Science

Department of Applied Mathematics

APPLIED MATHEMATICS COLLOQUIUM

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Numerical Characterization of the Early Steps of Protein Aggregation

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Abstract:

Protein aggregation is associated with numerous diseases such as Alzheimer's and Parkinson's. While the relation between aggregation and the neurodegenerative diseases is still incompletely understood, it appears that small protein assemblies, called oligomers, could be the dominant toxic species. Recent experiments also indicate that the oligomers formed by vary different proteins, associated with various diseases, are identified by the same antibody, suggesting that these oligomers share a number of "universal" structural properties. Given that these oligomers are dynamical structures, it is very difficult to characterize them fully experimentally and it is therefore necessary to turn to computer simulations. In this talk, I will present recent simulation results, obtained using a number of techniques, some of them developed in my group. These have allowed us to develop a basic understanding of the assembly process of various sequences and to point to a number of universal features associated with early steps of aggregation.