

Dr. Donghua H. Zhou

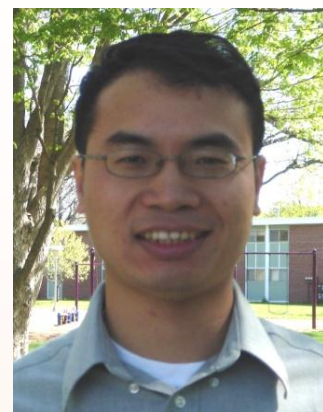
Department of Physics

Dr. Donghua H. Zhou joined the Oklahoma State University physics faculty in 2008 after completing a six-year postdoctoral appointment in chemistry at the University of Illinois at Urbana-Champaign. He earned his doctorate in physics from the College of William and Mary in 2003 and his bachelor's in physics from Peking University in 1997.

Dr. Zhou works in an exciting field, namely Biomolecular Solid-State NMR. Recent instrument and methodology developments have established solid-state NMR as a new structural biophysics tool for proteins and protein complexes in conditions that are challenging to conventional methods.

Zhou and his team pursue structural studies on membrane proteins and protein aggregates involved in human health. Membrane proteins make up 30 percent of the human genome. They play many important roles as transporters, channels, enzymes, and receptors. Membrane proteins posed limitations (such as solubility, yield, crystallization difficulty, and size) to conventional structure determination techniques. Consequently, only around 250 membrane proteins have known 3-D structures. In contrast, crystallography and solution NMR have facilitated over 66,000 structures for non-membrane proteins. Protein aggregation has been identified as a common mechanistic theme in at least 16 diseases, such as prion disease (Mad Cow disease), Alzheimer's disease, Parkinson's disease, Huntington's disease, multiple sclerosis, and amyotrophic lateral sclerosis. These aggregates have insufficient order for crystallographic study, and their large particle size makes them inaccessible to solution NMR study. Solid-state NMR is not restricted by these factors and therefore it holds the promise to provide the structural basis for understanding these diseases.

Zhou and his team work collaboratively with biological scientists at OSU in departments of biochemistry, animal science, microbiology, and physiology. Zhou says the collaboration provides his group members the opportunity to broaden their knowledge scope and hone important presentation and communication skills. He says training new scientists in an interdisciplinary research environment is an important goal of his work.



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