Three positions for graduate students are available in the group of Prof. Ladizhansky in the area of solid-state NMR and its applications to problems in structural biophysics. The successful candidates will join a very dynamic and interactive team. We are currently looking for students for three major projects:

1. Solid-state NMR studies of membrane-associated Myelin Basic Protein (MBP).
Myelin Basic Protein is one of the main constituents of the myelin sheath, a multilayered lipid structure that wraps around nerve axons in vertebrates. MBP interacts with lipids to maintain compactness of the myelin sheath, and thus to keep nerve axons isolated. In Multiple Sclerosis, MBP becomes posttranslationally modified and loses its ability to interact with lipids. The main objective of this project is to understand the structural basis of the MBP-lipid interactions, and to understand, at molecular level, why posttranslationally modified forms of MBP precipitate neurodegeneration.

2. Solid-state NMR studies of the membrane protein Proteorhodopsin.
We are currently expanding our efforts towards high resolution structure determination of a novel bacterial proton pump found in ocean plankton, proteorhodopsin. Our efforts are directed towards understanding of the 3D structure of the protein, and of structural changes occurring in the protein during its photocycle.

3. Development of solid-state NMR methods for protein structure elucidation.
We are, in general, interested in developing new methods for protein structure determination. This includes, but is not limited to: novel detection methods, new methodology for spectral assignments, methods for measurement of structural constraints, methods for understanding of dynamic processes in biological macromolecules, etc.

We are part of the University of Guelph NMR Centre, which is one of the best-equipped in Canada. We have access to high-field NMR spectrometers operating at 500 MHz, 600 MHz, and 800 MHz proton frequencies. These instruments offer truly unsurpassed capabilities to study structure-function relation in biological macromolecules

Our work crosses the boundaries of traditional disciplines, and individuals willing to expand their horizons are most welcome – physicists will gain basic skills in biochemistry, and biochemists will learn the basics (including quantum mechanics) of NMR.

If interested, please contact me by email, vladimir@physics.uoguelph.ca, and/or visit my web site: www.physics.uoguelph.ca/~vladimir.