Performing repetitive, routine activities takes a large part of every person's life. Most of the daily tasks are neither satisfying nor interesting - so it is not surprising that in the course of civilization progress, their automation was pursued. Scientific studies do not differ much in this respect from other areas of human activity. However, researchers, especially those performing basic research, often think that the creation of "automated" solutions is outside their area of responsibility. They limit their activity to the creation of „prototypes” or schemes that often remain in the "manual-control" phase for years, since a small number of their users is not a sufficient motivation to invest in further development. However, automation of methods often results not only in faster but also more accurate results.

A good example of this problem in the field of science is Nuclear Magnetic Resonance (NMR) spectroscopy, which is one of the main tools for analyzing the structure of chemical molecules. Based on the same physical phenomenon as, known to many patients, so-called magnetic resonance imaging (MRI) has similar advantages: non-invasive and unique insight into the structure of the examined objects. Unfortunately, it also has similar disadvantages, especially the costly and time consuming measurements associated with both the relatively low sensitivity of the method and the mathematical requirements of signal sampling. Time requirements become a particular problem in serial measurements such as, for example, testing of sample behaviour at various temperatures. Performing them in a classical manner requires an appropriate sensitivity (signal to noise ratio) for each measurement separately. However, there are methods that allow one to circumvent this limitation by treating the measurement series as a single data object. Even if the result of each of the measurements in the series is difficult to interpret, joint processing of all of them provides a significant increase in the quality of the result and facilitates interpretation.

The proposed project is based on the adaptation of one of these methods, known as the Radon transformation, to study with NMR the samples of intrinsically disordered proteins, that play a significant role in many diseases (eg, Parkinson, Alzheimer, and others). In collaboration with the Vienna Biocenter, one of the world's best research centers studying these molecules, we intend to create a package of methods that will facilitate insight into their dynamics and structural changes related to biological and medical impacts. The rich experience of project's coordinator, both in developing new techniques and in popularizing them, will allow to improve the protein research, one of the most important areas of modern science.