Title	Exploring unknowns in Omics by Artificial Intelligence and Mass Spectrometry

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International Secondment	
PI	Robert Peharz
Institute	Graz University of Technology (TU Graz)
Place, country	Graz, Austria
# months (min.3)	Minimum 6, maximum 12 (depending on project progression)

Project description:

Explore the unknown diving into the fascinating world of Omics sciences! This innovative field has revolutionized our understanding of complex chemical systems, offering unprecedented insights into some of the most intriguing questions in modern science. From unraveling the mysteries of animal and plant physiology and physiopathology to facing always more complex environmental issues, Omics is a promising approach for new scientific discoveries.

In recent years, we've witnessed remarkable advancements in analytical platforms, from many improvements in chromatography performances to high-resolution mass spectrometry and ion mobility. These powerful tools have enabled us to collect plenty of accurate, robust, and reliable data through non-targeted methods, opening to new possibilities in scientific exploration.

Today, we are facing the next big challenge in Omics sciences. As a doctoral student in this program, you'll be involved in developing innovative approaches for handling and interpreting big data, from identification of unknown chemical species to their quantitative or semi-quantitative analysis, even in the absence of certified standards.

The heart of this Project lies in the application of advanced Artificial Intelligence (AI) techniques to the field of Omics. You'll have the opportunity to work with accurate molecular modeling (MM) merged with machine learning algorithms and neural networks, combining them to analyze intricate mass spectrometry (MS) data. This fusion (MM/AI/MS) will push the boundaries of what's possible in molecular characterization.

In this light, you will also face the development of practical application and user-friendly tools that make complex data analysis, visualization, and molecular property prediction accessible to researchers worldwide.