

# Curriculum vitae

Date of birth: 22.10.1974

Place of birth: Budapest, Hungary

## Education and Employment:

1993-1998     Studies in Chemistry  
                  Eötvös Loránd University, Budapest, Hungary

1998            Diploma in Chemistry

1998-2002     PhD in Chemistry  
                  Eötvös Loránd University, Budapest, Hungary  
                  PhD thesis: Investigation of the environmental fate of xenobiotics by modern mass spectrometric techniques

1998-2000     Chemical Research Centre, Hungarian Academy of Sciences  
                  Graduate research assistant

- PhD project: application of modern mass spectrometric techniques in environmental analysis. Investigation of microbial metabolism of hazardous pollutants in the environmental samples using GC-MS and HPLC-MS methods.
- Contract analytical activities. Got acquainted with impurity profiling and ADME studies of drug candidates and the everyday service work for synthetic laboratories.
- Fundamental gas-phase ion chemistry studies under the leadership of, Károly Vékey. Development of novel experimental techniques for the investigation of internal energy effects of electrosprayed ions. Technique was also successfully applied to structure elucidation of molecules, and investigation of solvated metal cations.
- From 1999 introduction of mass spectrometric diagnostic methods for the diagnosis of inborn errors of metabolism, first in Eastern Europe. Major role in this project, and still involved in the development of a Hungarian screening program.

2000-2004     Purdue University, Department of Chemistry, Aston Laboratories for Mass Spectrometry

- Started work at Purdue in August, 2000 as visiting graduate research assistant
  - Environmental applications of membrane introduction mass spectrometry (MIMS) and electrospray/atmospheric pressure chemical ionization mass spectrometry. Took part in the **development of novel MIMS** systems and developed novel methodology for the **environmental detection of organic chloroamines**.
- 2001 finishing PhD in Hungary and returning to Purdue in 2002
  - Mainly involved in the clustering behavior of natural amino acids. The aim was to find the **origins of homochirality on Earth** in the reactions of homochiral and heterochiral amino acid clusters. Result: got acquainted with various spray ionization techniques and started own research project on the development of **new atmospheric pressure ionization techniques**.

- Discovered various ways of **chiral transmission**, i.e. how homochiral amino acids can influence the formation of other homochiral amino acids and carbohydrates.
- Started as a post doctoral research assistant at Purdue University in January 2003.
  - Project: “Preparation of protein microarrays by **soft landing** of mass-selected macromolecular ions”. Aim was the development of **preparative mass spectrometry**, for the purification of proteins. Core idea: **ionisation of proteins by electrospray** and separation of ions based on their different mass-to-charge ratio, using mass spectrometry. Separated ions were deposited onto a surface instead of destructive detection. Involvement covered everything bar the design and construction of mass analyzer. Led the subgroup responsible for the preparation of samples, for the construction of the ion source, for preparing surfaces for soft landing and the analysis of soft-landed samples.
  - **Invention of electrosonic-spray ionization**, a new spray technique capable of ionizing proteins **without any serious unfolding of protein molecules**. Development of surface analysis techniques led to the **invention of desorption electrospray ionization** and other new desorption ionization methods generally termed as **direct ionization mass spectrometry**. Both my inventions got commercialized through Inproteo LLC and Prosolia Inc. Electrosonic spray technique licensed out to Thermo Fisher, a leading mass spectrometry company. Desorption electrospray directly commercialized by Prosolia.

2005                      Chemical Research Centre, Hungarian Academy of Sciences

- Received funding from Inproteo and Prosolia, therefore mainly involved in product development and application work for Inproteo/Prosolia. Successful development of a **commercial desorption electrospray ion source: OmniSpray**.
- Aiming to become an independent researcher with field of research in Hungary. Recognition that there were no opportunities of starting an independent research group at CRC HAS, decision to move to Semmelweis University.

2006-2009              Semmelweis University, Cell Screen Applied Research Center

- Cell Screen center was established in 2006. Main profile: exploring new ways of **drug discovery**. Serve as **deputy director**, and **leader of analytical research** and core facility. New facility with three LC-MS systems and a fully equipped sample preparation laboratory. Service activities: **drug and protein analytics** and **medical diagnostics**. Main research activity: development of atmospheric pressure desorption ionization methods, and application of them for **high-throughput** and **in-vivo** analytics.
- Developed new mass spectrometric techniques capable of analyzing up to **10 synthetic samples in a second**, and also mass spectrometric **binding assay** methods taking less than a minute per sample. The in-vivo mass spectrometry project is aimed at the **direct investigation of living systems** by desorption ionization mass spectrometry. New desorption ionization techniques are being tested for the direct investigation of **cell cultures**, for the analysis of **living tissues** in **surgical environment** and **intact skin** analysis. Preliminary results: new method providing **real-time chemical information** for surgeons on the tissue being dissected; **non-invasive** methods for pharmacokinetics, employing intact skin analysis.

- 2006 Semmelweis University, 1<sup>st</sup> Department of Pediatrics  
Organisation of the **nationwide screening program** for the population-level screening of **inborn errors of metabolism**.
- Since 2008- Justus Liebig Universität Giessen, Institut für Anorganische und Analytische Chemie, Giessen, Germany