CURRENT POSITION:

2007-present: Full Professor of Analytical Chemistry, Department of Chemistry “G. Ciamician”, University of Bologna.

EDUCATION and UNIVERSITY CAREER:

1985: Degree in Chemistry (Laurea) at the University of Ferrara (summa cum laude).

1988-89: Graduate student at the Field-Flow Fractionation Research Center, Salt Lake City, UT, USA (director: Prof. J.C. Giddings).

1991: PhD in Analytical and Environmental Chemistry at the University of Ferrara.

2/12/1992 - 10/31/1998: research assistant in Analytical Chemistry at the Department of Chemistry "G. Ciamician", University of Bologna.

11/1/98 – 31/05/2007: Associate Professor in Analytical Chemistry at the Department of Chemistry "G. Ciamician".

ACADEMIC ROLES:

Past-Member of the Board of Teachers for the PhD course in Chemistry, University of Bologna

Current Member of the Commission “Third Mission”, Department of Chemistry “G. Ciamician”, University of Bologna.

Current Member of the “Entrepreneurship Club” of the University of Bologna, and of the related Board for the Academic Action “Financial Support of Academic Entrepreneurship Projects”.

Positions in Scientific Societies:

Past-Member of the Board of the Interdivisional Group for Colloids and Interphase Chemistry of the Italian Chemical Society.

Past-Member member of the Board of the Interdivisional Group for Separation Sciences of the Italian Chemical Society.

Past-Member of the Board of the Interdivisional Group for Proteome Chemistry of the Italian Chemical Society.

TEACHING:

Degree Courses:

Professor in charge of the course of Instrumental Analytical Chemistry (First Cycle Degree Course in Chemistry) and of the course of Analytical Methods for Nano/Biosciences (Second Cycle Degree Course in Chemistry) (Department of Chemistry “G. Ciamician”, University of Bologna) from 2012/2013 academic year to date.

Postgraduate Degree Courses:

Teacher of the course “From IP Management to Technology Transfer for Business” at the PhD School in “Chemistry”, University of Bologna, from 2015/2016 academic year to date.

Thesis tutoring:

Supervisor and co-supervisor of over 50 theses of different First-level and Second level Degree Programs in Chemistry, Pharmaceutical Chemistry, Economical, Marketing, Communication, Architectural and Philosophic Sciences, and of 5 PhD theses in Chemical Sciences in National and International Universities.

Schools and Professional Training Courses:

Interdisciplinary lecturer at many First and Second Cycle Degree, MS and PhD Courses organized by different Italian and International Universities.

SCIENTIFIC ACTIVITY:

H-index = 36, i10-index: 97, Citations: > 4000.

Author/co-author of more than 140 papers in international journals of Chemistry, Biochemistry, Clinical Chemistry and Analytical Chemistry of high impact factor, 5 nationally and internationally issued patents, invited author/co-author of 12 book chapters on analytical and bioanalytical chemistry.

He’s the top scientist of Field-Flow Fractionation (FFF) in Italy, and he’s played a significant role in the dissemination of these techniques and related applications in Italy and in the global scientific community.

Fundamental research:

(i) separation and characterization of macromolecules, colloids and particulate of biological, environmental and alimentary interest.

(ii) characterization of nano- and microdispersed analytes by coupling FFF with uncorrelated techniques for morphological analysis.

(iii) hyphenation of FFF with chemiluminescence (CL) detection for high sensitivity and high selectivity analysis of dispersed bioanalytes. Development of flow assisted immunoassays and biosensors.

(iv) instrumental development of miniaturized, disposable, biocompatible FFF devices.

Application research:

Analysis and characterization of nanoparticles of different origin: inorganic, metal, organic, biological, pharmaceutical, poly-structured/functional (core-shell).

1. Invention and development of cell sorting methods for prokaryotic and eukaryotic cells;
2. Hyphenation of the developed cell sorting methods with CL, laser scattering and mass spectrometric detection.
3. Analysis and characterization of protein expression of cells and native proteins by coupling hollow- fiber FFF and mass spectrometry for microorganism protein profiling, study of functional and allosteric proteins, characterization of recombinant proteins of pharmaceutical interest.

Nano/Microparticles Separation Pioneering:

Separation and characterization of nanomaterials are the basis of developments and applications of emerging nanotechnologies, from electronics to biopharma/med technologies such as the nanovector-based delivery of drug/nucleic acids. Incidentally, the latter nanotechnology has recently come into sprawl because it is employed in the mRNA-based vaccines against SARS-cov2. With his research group and byFlow Srl’s team he has cooperated in many commissioned research contracts with major pharmaceutical players in the field of drug nano-vectorization. The ability of FFF for the analysis of nanodispersed analytes was for the first time investigated in the field of material science for nano-biotech applications. FFF was for the first time applied to the fractionation and size analysis of silica and titanium dioxide synthesized in the presence of fluorescent modifiers. FFF showed able to control the synthesis of such multi-chromophoric structures, which were then further characterized using spectrometric and microscopic techniques. For the first time FFF was also applied to fractionate functionalized carbon nanotubes (CNT). The project "LIGHT4HEALTH" (University Strategic Project - Junior, coordinator N. Zaccheroni) involved for the first time the use of FFF coupled with multiangle laser scattering (MALS) detection to the analysis of fluorescent nanoparticles for applications in medicine. In the field of food microparticles FFF was for the first time applied to the separation and characterization of starch granules (EU Inco-Copernicus Project ERB IC15-CT98-0909, Local Coordinator) and the enzymatic degradation products from mutant cereals ("STARCHitechture", University Strategic Projects - Senior, coordinator P. Trost).

COORDINATION OF RESEARCH GRANTS:

1998-2001: Local unit coordinator, EU Inco-Copernicus Project ERB IC15-CT98-0909 “Development of rapid methods for assessing the quality of starch particles from various cereal species for purposes of agricultural and food industry”, IV Framework Program 1998-2001.

2001-2002: Italian coordinator of the Scientific Collaboration Project Italy-France “Galileo” between the Department of Chemistry “G. Ciamician” and LCAB Faculté de Pharmacie, University of Limoges: “Analytical separation methods and techniques for the purification and analysis of micro and nano-systems.”

2002: Italian coordinator of the Scientific Collaboration Project Italy-Spain “INTEGRATED OPERATIONS" between the Department of Chemistry “G. Ciamician” and the Department of Analytical Chemistry, University of Barcelona: “Characterization of dispersions of industrial interest by field-flow fractionation”.

2000-2001: “Leonardo” Mobility Project for Technological Transfer between University of Bologna and EU Small and Medium Enterprises: SBL Vaccine, Solna (Sweden) and Pharmacia, Uppsala (Sweden).

2007-2009: National Coordinator of the Significant Research Project “Novel methods for top-down analysis of macromolecular and nanosized samples of biotechnological and environmental interest” within the Executive Program for Scientific and Technological Cooperation Italy / Korea 2007-2009.

2007-2009: Local Unit Coordinator of the National Project PRIN 2006 “Integration of novel separation and mass spectrometric methodologies for new-generation proteomics” (National Coordinator Prof. G. Marino).

NATIONAL/INTERNATIONAL CONFERENCES:

Guest speaker at numerous congresses, seminars and educational activities at national and international level, and author/co-author of hundreds of abstracts and/or contributions.

EDITORIAL AND REFEREEING ACTIVITIES:

Invited reviewer for the most important analytical chemistry international journals.

“Top Referee 2006 Award” by Journal of Chromatography A.

THIRD-MISSION ACTIVITIES:

Co-Founder and Past-CEO of the academic spin-off companies of the University of Bologna: Stem Sel Srl (2013), and byFlow Srl (2010).

Consultant in “Company Administration”, qualified by Spinner-ASTER (Emilia-Romagna, Italy).

AWARDS:

“A. Mangia” Medal 2022, given by the Group of Bioanalytical Chemistry, Analytical Chemistry Division, Italian Chemical Society.

As co-founder and CEO of the academic companies byFlow Srl and Stem Sel Srl, he received with their teams the following prizes, awards, and acknowledgments: StartCup Emilia Romagna (2012), GREAT UK-IT Entrepreneurship Award (2012); Prize ROTARY STARTUP DISTRETTO 2072 (2014-2015); Finalist of Premio Marzotto (2014), UniCreditStartLab (2017), and Boost Heroes (2019); “Seal of Excellence” H2020-SME (2016, 2017, 2020).