

STEFANO CIURLI

Curriculum Vitae · March 2026

Professor of General and Inorganic Chemistry · University of Bologna

Date of Birth: May 11, 1960

Home Address: Via Giuseppe Bentivogli 74/5 - 40138 Bologna, Italy

Work Address: Laboratory of Bioinorganic Chemistry

Department of Pharmacy and Biotechnology

University of Bologna

Via Piero Gobetti, 87 - 40129 Bologna (Italy)

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Education

October 1979 - December 1984

University of Pisa, Faculty of Sciences (Italy)

Chemistry Department

Major in Inorganic and Physical Chemistry

January 1985 - June 1986

Columbia University, New York, NY (USA)

Chemistry Department

Research Assistant – Tutor: Prof. Carlo Floriani

July 1986

University of Pisa, Faculty of Sciences (Italy)

Chemistry Department

Laurea 110/110 cum laude

"Synthesis, reactivity and structural characterization of metal complexes with macrocyclic ligands"

September 1986 – September 1990

Harvard University, Cambridge, MA (USA)

Chemistry Department

Ph.D. in Inorganic Chemistry – Tutor: Prof. Richard H. Holm

"Synthesis and properties of subsite-differentiated cubane clusters MFe₃S₄"

September 1990 – September 1992

University of Bologna post-doctoral fellowship with Prof. Ivano Bertini and Prof. Claudio Luchinat

NMR spectroscopy and study of the electronic structure of iron-sulfur centers in proteins

Academic Career

October 1992 – September 2001

University of Bologna

Associate Professor of Agricultural chemistry (AGR/07)

October 2001 - present

University of Bologna

Professor of General and Inorganic Chemistry (CHIM/03)

October 2004 - 2018

Free University of Bolzano

Professor of General and Inorganic Chemistry (CHIM/03)

January 2013 – December 2015

Universidade Federal do Rio Grande do Sul (Porto Alegre, Brazil) – Center for Biotechnology

Visiting Professor in the framework of the program Science without Borders (CAPES)

April and September 2025

Johannes Kepler University (Linz, Austria) – Department of Biochemistry

Research Fellow in the group of Prof. Frans Mulder

Academic Honors

- Nominated by the Rector of the University of Bologna for the excellent teaching quality in the course on Agricultural Biochemistry (academic year 2002-2003)
- Nominated by the Rector of the University of Bologna for the excellent teaching quality in the course on General and Inorganic Chemistry (academic year 2004-2005)
- Member of the Istituto di Studi Avanzati, University of Bologna (2006-2012; 2019-2022)
- Member of the Board of the Istituto di Studi Superiori - University of Bologna (2009-2012)
- Tutor of the Collegio Superiore - University of Bologna (2016-present)

Teaching Activity

Lecturer for the following courses

Academic year	Course	Program
1992-1993	Soil fertility and plant nutrition	B.Sc. Agricultural Science
1993-1994	General and inorganic chemistry Chemistry and biochemistry of pesticides	B.Sc. Agricultural Science
1994-1995	Soil fertility and plant nutrition Chemistry and biochemistry of pesticides	B.Sc. Agricultural Science
1995-1996	Spectroscopic chemical analysis Chemistry and biochemistry of pesticides	B.Sc. Agricultural Science
1996-1997	Physical methods in inorganic chemistry Chemistry and biochemistry of pesticides	B.Sc. Agricultural Science
1997-1998	Agricultural biochemistry Chemistry and biochemistry of pesticides	B.Sc. Biotechnology
1998-1999	General and inorganic chemistry	B.Sc. Agricultural Science
1999-2000	Agricultural biochemistry General and inorganic chemistry Bioinorganic chemistry	B.Sc. Biotechnology B.Sc. Agricultural Science B.Sc. Biotechnology
2000-2001	Bioinorganic chemistry Agricultural biochemistry	B.Sc. Biotechnology B.Sc. Biotechnology
2001-2002	General and inorganic chemistry Agricultural biochemistry	B.Sc. Agricultural Science B.Sc. Biotechnology
2002-2003	General and inorganic chemistry Agricultural biochemistry	B.Sc. Agricultural Science B. Sc. Biotechnology
2003-2004	General and inorganic chemistry	B.Sc. Agricultural Science
2004-2005	General and inorganic chemistry Biomolecular NMR spectroscopy General and inorganic chemistry	B.Sc. Agricultural Science M.Sc. Molecular and Industrial Biotechnology B.Sc. Free University of Bolzano
2005-2006	General and inorganic chemistry Biomolecular NMR spectroscopy General and inorganic chemistry	B.Sc. Agricultural Science M.Sc. Molecular and Industrial Biotechnology B.Sc. Free University of Bolzano
2006-2007	General and inorganic chemistry Biomolecular NMR spectroscopy General and inorganic chemistry Water Chemistry	B.Sc. Agricultural Science M.Sc. Molecular and Industrial Biotechnology B.Sc. Free University of Bolzano M.Sc. Land and water conservation
2007-2008	General and inorganic chemistry Biomolecular NMR spectroscopy General and inorganic chemistry Water Chemistry	B.Sc. Agricultural Science M.Sc. Molecular and Industrial Biotechnology B.Sc. Free University of Bolzano M.Sc. Land and water conservation
2008-2013	General and inorganic chemistry Biomolecular NMR spectroscopy General and inorganic chemistry Water Chemistry	B. Sc. Agricultural Science M.Sc. Molecular and Industrial Biotechnology B.Sc. Free University of Bolzano M.Sc. in Land and water conservation
2013-2016	General and inorganic chemistry Biomolecular NMR spectroscopy Chemistry General and inorganic chemistry	B. Sc. Agricultural Science M.Sc. Molecular and Industrial Biotechnology B.Sc. Free University of Bolzano M.Sc. Pharmaceutical Chemistry and Technology
2016-2018	General and inorganic chemistry Chemistry Biomolecular NMR spectroscopy	M.Sc. Pharmaceutical Chemistry and Technology B.Sc. Free University of Bolzano M.Sc. Molecular and Industrial Biotechnology
2018-2022	General and inorganic chemistry Biomolecular NMR spectroscopy	M.Sc. Pharmaceutical Chemistry and Technology M.Sc. Molecular and Industrial Biotechnology
2022-2024	General and inorganic chemistry Chemistry Biomolecular NMR spectroscopy	M.Sc. Pharmaceutical Chemistry and Technology B.Sc. Free University of Bolzano M.Sc. Molecular and Industrial Biotechnology
2024-2026	General and inorganic chemistry Biomolecular NMR spectroscopy	M.Sc. Pharmaceutical Chemistry and Technology M.Sc. Molecular and Industrial Biotechnology

Course Content

The scope of the course in General Chemistry is to provide the basic knowledge of the structure of matter and thermodynamic and kinetic principles that govern its transformation, with particular attention to chemical reactions occurring in the environmental biosphere, through the study of structural and functional properties of small molecules involved in the cycles of nutrients. This description is built starting from the electronic structure of atoms and molecules, describing the nature of the chemical bond and the processes of its formation and breaking, also using computational methods. The equilibria in homogeneous and heterogeneous phases are described with special focus on the treatment of acid-base and redox reactions. The course always includes a section on the role of metal ions in biological systems. The lectures in Bioinorganic chemistry, Agricultural Biochemistry and Soil Biochemistry contained references and concepts typical of the chemistry of metal ions in biological systems. The syllabus of Biomolecular Magnetic Resonance Spectroscopy involves the application of NMR spectroscopy to the structures of proteins and metallo-proteins in solution.

Supervision

Tutor for the following Laurea Theses

1. Sofia Cei, Laurea in Scienze Agrarie

Academic year 1995-1996

"Proteine Fe-S e citocromi coinvolte nel ciclo fotosintetico dei batteri *Rps. viridis* e *Rf. fermentans*. Caratterizzazione biochimica, spettroscopica, e funzionale"

2. Matteo Lamborghini, Laurea in Scienze Agrarie

Academic year 1995-1996

"Proprietà biochimiche, spettroscopiche e funzionali di ureasi, citocromo c-553 e flavoemoproteina (FHP) isolate da un batterio alcalofilo del suolo, *Bacillus pasteurii*"

3. Silvia Miletti, Laurea in Scienze Agrarie

Academic year 1995-1996

"Adsorbimento di ureasi su fosfati di calcio: un modello per l'idrolisi dell'urea nel suolo"

4. Afro Stecchezzi, Laurea in Chimica

Academic year 1996-1997

"Studio del trasferimento elettronico foto-indotto in batteri fotosintetici implicati in processi ambientali biodegradativi"

5. Michela Marabini, Laurea in Scienze e Tecnologie Alimentari

Academic year 1997-1998

"Spettroscopia SNIF-NMR applicata al settore agroalimentare"

6. Giuliano Sciara, Laurea in Scienze Biologiche

Academic year 1998-1999

"Struttura in soluzione del citocromo c-553 ossidato da *Bacillus pasteurii* tramite spettroscopia NMR"

7. Massimo Strocchi, Laurea in Scienze Agrarie

Academic year 1999-2000

"Purificazione del centro di reazione fotosintetico da *Chromatium vinosum*: studi cinetici di trasferimento elettronico fotoindotto utilizzando proteine mutate in siti specifici"

8. Massimiliano Stola, Laurea Magistrale in Biotecnologie Industriali

Academic year 1999-2000

"Analisi teorica del meccanismo catalitico delle metallo-fosfatasi acide: implicazioni nel drug design"

9. Luca Lotito, Laurea Magistrale in Biotecnologie Industriali

Academic year 1999-2000

"Espressione eterologa e purificazione di fosfatasi acida e UreG, proteine coinvolte nei cicli biochimici di fosforo e azoto"

10. Francesca Malerba, Laurea Magistrale in Biotecnologie Industriali

Academic year 1999-2000

"Espressione eterologa, purificazione e caratterizzazione di una nichel-chaperonina: UreE da *Bacillus pasteurii*"

11. Manuela Dezi, Laurea Magistrale in Biotecnologie Agrario-Vegetali

Academic year 2001-2002

"Accumulo di cadmio in *Skeletonema costatum*: studi chimici e biochimici"

12. Barbara Zambelli, Laurea Magistrale in Biotecnologie Industriali

Academic year 2001-2002

"Espressione eterologa, purificazione, caratterizzazione e studi di modellistica molecolare di nichel-chaperonine"

13. Giovanni Guarguaglini, Laurea Magistrale in Biotecnologie Agrario-Vegetali

Academic year 2001-2002

"Isolamento e purificazione di una proteina responsabile dell'accumulo di Cd²⁺ in *Cylindrotheca fusiformis*"

14. Cristina Baia, Laurea Magistrale in Biotecnologie Agrario-Vegetali

Academic year 2002-2003

"UreD, una chaperonina coinvolta nell'introduzione del nichel nel sito attivo dell'ureasi"

15. Stefano Torti, Laurea Magistrale in Biotecnologie Industriali

Academic year 2003-2004

"Espressione, purificazione e cristallizzazione di UreE da *Bacillus pasteurii*: studi strutturali su una nichel-chaperonina"

- 16. Matteo Savini, Laurea Magistrale in Biotecnologie Agrario-Vegetali**
Academic year 2004-2005
 "UreG e UreD: approccio molecolare e computazionale per lo studio di proteine accessorie dell'ureasi"
- 17. Marco Salomone, Laurea Magistrale in Scienze Biologiche**
Academic year 2004-2005
 "Sulla biologia del nichel: un approccio biochimico e bioinformatico all'ureasi ed alle sue proteine accessorie"
- 18. Matteo Bellucci, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2005-2006
 "NikR di Helicobacter pylori: un regolatore trascrizionale nichel-dipendente"
- 19. Fabio Martignani, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2006-2007
 "Struttura e funzione di Helicobacter pylori UreG, una chaperonina nel metabolismo del nichel"
- 20. Alice Soragni, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2006-2007
 "Towards a structural characterization of Tau: Cu(II) toxic conformers"
- 21. Rosanna Clima, Laurea in Scienze Biologiche**
Academic year 2008-2009
 "Clonaggio ed espressione di UreD da Helicobacter pylori, una nichel-chaperonina dell'enzima ureasi"
- 22. Andrea Raspadori, Laurea Magistrale in Biologia Molecolare e Cellulare**
Academic year 2009-2010
 "Studi biochimici e strutturali di HypB da Helicobacter pylori: una metallo chaperonina della [Ni,Fe]-idrogenasi"
- 23. Federico Agostini, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2009-2010
 "Spettroscopia NMR di UreE da Bacillus pasteurii: struttura e dinamica di una nichel-chaperonina"
- 24. Andrea Berardi, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2009-2010
 "Espressione, purificazione e caratterizzazione di HpUreF: una metallo-chaperonina coinvolta nel meccanismo di attivazione e maturazione dell'ureasi di H. pylori"
- 25. Luca Mazzei, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2010-2011
 "Studi biochimici e strutturali su NikR da Helicobacter pylori, un regolatore trascrizionale nichel-dipendente"
- 26. Cristian del Campo, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2010-2011
 "Studi biochimici e strutturali su Fur da Helicobacter pylori, un fattore di trascrizione ferro-dipendente"
- 27. Francesco Biagi, Laurea Magistrale in Biologia Molecolare e Cellulare**
Academic year 2011-2012
 "Un approccio teorico-strutturale al metabolismo del nichel in Helicobacter pylori: modelli e interazioni proteina-proteina nell'attivazione di ureasi"
- 28. Manfredi Miraula, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2011-2012
 "Struttura e funzione di UreG e RcnR, due proteine coinvolte nell'omeostasi e nel metabolismo del nichel nei batteri"
- 29. Cinzia Tarsia, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2012-2013
 "Interazioni proteina-proteina in cellula: il trasporto del nichel nell'attivazione dell'ureasi di Helicobacter pylori"
- 30. Lucia Crisci, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2013-2014
 "Espressione, purificazione e caratterizzazione di RcnR e Nur, regolatori dell'espressione genica dipendente da nichel"
- 31. Leonardo Bertini, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2014-2015
 "Caratterizzazione cinetica e strutturale di vecchi e nuovi inibitori dell'ureasi"
- 32. Edoardo Salladini, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2014-2015
 "Studi strutturali su Jaburetox, un insetticida naturale derivante dall'ureasi"
- 33. Francesca Benigni, Laurea Magistrale in Chimica e Tecnologie Farmaceutiche**
Academic year 2016-2017
 "Caratterizzazione biochimica e strutturale dell'inibizione dell'ureasi: un enzima nichel - dipendente"
- 34. Umberto Contaldo, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2017-2018
 "Inibizione dell'ureasi, un fattore di virulenza nichel dipendente. Caratterizzazione strutturale, biochimica e bioinformatica"
- 35. Elia Barchi, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2017-2018
 "Studi strutturali sul repressore trascrizionale nichel-dipendente InrS di Synechocystis sp. pcc6803"
- 36. Andrea Dallapé, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2017-2018
 "Characterization of a prebiotically plausible binuclear Iron-Sulfur Rieske-like cluster"
- 37. Elisa Evangelisti, Laurea Magistrale in Biotecnologie Molecolari e Industriali**
Academic year 2018-2019
 "Ammoniaca mono-ossigenasi: un approccio biotecnologico per migliorare l'efficienza della fertilizzazione azotata nel suolo"

38. Sebastiano Baldassar, Laurea Magistrale in Biotecnologie Molecolari e Industriali*Academic year 2019-2020*

"Studi strutturali sulla proteina DNA primasi umana"

39. Sofia Ranieri, Laurea Magistrale in Biotecnologie Molecolari e Industriali*Academic year 2023-2024*

"Expression, purification, and characterization of SARS-CoV-2 main protease, Mpro"

40. Paolo Santucci, Laurea Magistrale in Biotecnologie Molecolari e Industriali*Academic year 2024-2025*

"The multi-copper oxidase CueO: biochemical and structural study elucidating its function"

Tutor for the following Ph.D. theses**Silvia Miletti****Doctorate in Crop production***University of Udine, 1997-1999*

"Studio delle relazioni struttura-funzione dell'ureasi e delle proteine accessorie necessarie per l'assemblaggio del sito attivo contenente nichel"

Massimiliano Stola**Doctorate in Functional biology of cellular and molecular systems***University of Bologna, 2001-2003*

"Caratterizzazione della metallo-chaperonina UreE: una proteina accessoria dell'ureasi"

Barbara Zambelli**Doctorate in Functional biology of cellular and molecular systems***University of Bologna, 2002-2005*

"Caratterizzazione molecolare delle nichel-chaperonine UreG, UreF, e UreD: proteine proteina accessoria dell'ureasi"

Matteo Bellucci**Doctorate in Cellular, Molecular and Industrial Biology***University of Bologna, 2007-2009*"Molecular interactions: metal ions and protein chaperones in the urease system from *Helicobacter pylori*"**Anna Merloni****Doctorate in Cellular, Molecular and Industrial Biology***University of Bologna, 2011-2013*"Structural and biochemical studies of *Sporosarcina pasteurii* UreE: a nickel-chaperone involved in the urease activation process"**Luca Mazzei****Doctorate in Cellular, Molecular and Industrial Biology***University of Bologna, 2014-2016*

"Structural and biochemical studies of urease: old and new inhibitors"

Other Academic and Research Activities

- Coordinator of the ERASMUS/SOCRATES network in Agricultural Chemistry and Biochemistry with the Universities of Bologna, Kent, Rennes, Newcastle, Nottingham, Lleida, Cordova, Siviglia, Gottingen, Pisa (1993-1998)
- Board member of the research doctorate in "Crop productivity", University of Bologna and Udine (1993-1999)
- Board member of the Interuniversity Consortium on Magnetic Resonance of Paramagnetic Metallo-Proteins (CIRMMP), University of Firenze, Bologna and Siena (1997-)
- Board member of the Interdepartmental Consortium for Biotechnological Research (CIRB), University of Bologna (1997-2012)
- Board member of the Ph.D. program in "Functional biology of cellular and molecular systems", University of Bologna (2000-2020)
- Board member of the Ph.D. program in "Nanosciences for medicine and the environment", University of Bologna (2021-)
- Member of the Editorial Board of Chem. Tracts – Inorganic Chemistry (2001-2003) — Editor: Harry Gray, California Institute of Technology
- Elected Board member of the Council of the Division of Chemistry of Biological Systems of the Italian Chemical Society (2000-2002 and 2012-2014)
- Member of the Editorial Board of J. Biol. Inorg. Chem. (2000-2002)
- Member of the Editorial Board of J. Biol. Inorg. Chem. (2004-2006)
- Board member of the Institute for Advanced Studies, University of Bologna, 2007-2012; 2019-2021
- Member of the evaluation committee of the Research School in "Metal Ions in Biological Systems – MIBS), Department of Life Sciences, University of Copenhagen – 2009
- Member of the Editorial Board of J. Biol. Inorg. Chem. (2012-2014)
- Associate Editor for the Encyclopedia of Metalloproteins (Co, Ni, Cu), Springer (2010-2012)
- Member of the Editorial Board of PeerJ (2012-2014)
- Member of the Editorial Advisory Board of the Metallo-Biology book series (Royal Society of Chemistry) (2015-2016)
- Member of the Editorial Board of the Metallo-Biology book series (Royal Society of Chemistry) (2016-2021)
- Member of the Editorial Board of J. Biol. Inorg. Chem. (2019-2021)
- Director of the M.Sc. Program in Molecular and Industrial Biotechnology, University of Bologna (2015-2021)
- Guest Editor for the issue on "Nickel Biochemistry" of MDPI Inorganics (2019)
- Member of the Editorial Board of Journal of Inorganic Biochemistry (2020-2021)
- Guest Editor for the issue on "Nickel Biochemistry" of Inorganics (2019)
- Editorial Board Member for the International Journal of Molecular Sciences - Molecular Biophysics) (2019-2021)
- Editor in Chief for the "Journal of Inorganic Biochemistry" (Elsevier) (2022-present)

Referee for international scientific journals

J. Am. Chem. Soc.	Biochemistry	Eur. J. Inorg. Chem.
J. Biol. Chem.	J. Biol. Inorg. Chem.	Coord. Chem. Rev.
Biochim. Biophys. Acta	Biochem. Eng.	Bioorg. Chem.
Comp. Biol. Med.	Eur. J. Med. Chem.	Inorg. Chimica Acta
ChemBioChem	Biochimie	J. Inorg. Biochem.
Arch. Biochem. Biophys.	Eur. J. Biochem.	J. Mass Spectr.
J. Phys. Chem.	J. Mol. Evol.	FEBS Lett.
Int. J. Biol. Macromol.	Inorg. Chem.	Acta Cryst.
Microbiology	Biochemical J.	J. Mol. Graph. Model.
J. Mol. Biol.	RSC Chem. Commun.	J. Bacteriol.
J. Biotechnol.	J. Coll. Interf. Sci.	J. Mol. Biol.
J. Mol. Catal.	Thermochim. Acta	J. Anal. Biochem.
ACS Med. Chem. Lett.	ChemCatChem	

Research Interests

The main interest of my research activity is the elucidation of the role of metals found in biomolecules. The final goal is the identification of the molecular structure of the active site of metallo-enzymes, and the elucidation of structure-function relationships. The objective is to determine how the chemistry of the metal ion is modulated by the protein matrix, and thus to determine the mode of interaction with the substrate or with other proteins. Proteins from bacteria living in waters and soils are purified, and their biochemical characterization is performed. Then, by applying sophisticated physical methods such as mono- and multidimensional NMR spectroscopy, EPR, Mössbauer, circular dichroism, magnetic susceptibility, bioelectrochemistry, X-ray spectroscopy (EXAFS), Raman and crystallography the structure of the active site is elucidated at the molecular level. Subsequently, mechanistic studies of the protein-substrate or protein-protein interactions are carried out using classic kinetic measurements or, for the photosynthesis-related projects, laser-induced rapid transient kinetics. Molecular mechanics and dynamics are used to model protein-substrate and protein-protein interactions. In particular, on-going research projects involve i) biochemistry of metallo-enzymes involved in the nitrogen, phosphorous and sulfur cycles in the environment, ii) biochemistry of photosynthesis.

Research Grants

Period / Amount	Funding source	Project title
1993 – 1997 (L. 55,000,000)	National Research Council (CNR): "Indagine sulla relazione struttura-funzione dell'ureasi, un enzima del suolo importante per la nutrizione delle piante: utilizzo di tecnologie avanzate per lo studio dell'interazione enzima-inibitori"	
1997 – 1999 (L. 210,000,000)	Contract NMR with Ministero delle Politiche Agricole	"Applicazione del metodo SNIF-NMR per la determinazione del rapporto isotopico 2D/1H in matrici biologiche"
1997 – 1999 (L. 335,000,000)	Research program of national interest – PRIN	"NMR di metallo-biomolecole paramagnetiche".
1997-2000 (L. 40,000,000)	NATO Linkage Grant	"Molecular Studies on Photosynthetic Redox Proteins Alternative to Cytochromes c2"
1998 -2000 (L. 260,000,000)	European Project Biotech-II	"Iron Containing Phosphatases: Structure and Function"
1998-2001 (L. 7,000,000)	European Project INTAS	"Biomimetic model complexes for dinuclear active sites of metalloproteins"
1999 -2000 (L. 244,000,000)	Research program of national interest – PRIN	"Il ruolo del cofattore metallico nella biologia strutturale inorganica"
2001-2005 (€ 7,500)	European Project Marie Curie Training Site	"Metals in biological systems"
2001-2003 (€ 22,500)	NATO Linkage Grant	"The development of biosensor technology for monitoring antioxidant activity of beverages"
2001 – 2003 (€ 90,000)	European Project INTAS	" Monitoring of total antioxidant activity in different beverages using biosensors technology "
2002 – 2004 (€ 81,000)	European Project INTAS	"EPR and electrometric study of the photosynthetic pigment-protein complexes in chloroplasts and hybrid model systems"
2001 – 2003 (€ 116,200)	Research program of national interest – PRIN	"Biologia strutturale inorganica nell'era post-genomica: metodologie e targeting".
2003 – 2005 (€ 55,800)	Research program of national interest – PRIN	"Il ruolo degli ioni metallici nei processi metabolici"
2005 – 2007 (€ 48,000)	Research program of national interest – PRIN	"Genomica strutturale di metalloproteine e delle loro interazioni funzionali"
2006 – 2007 (€ 45,000)	Progetto Strategico UniBO – in collaborazione con il Prof. Vincenzo Scarlato	" Molecular mechanisms governing essential urease and hydrogenase activity in the human gastric pathogen Helicobacter pylori "
2007 – 2009 (€ 37,000)	Research program of national interest – PRIN	"Gli ioni metallici nelle interazioni proteina-proteina"
2009 – 2011 (€ 16,000)	Research program of national interest – PRIN	"Biologia strutturale meccanicistica: avanzamenti metodologici e biologici"
2010 – 2014 (€ 425,000)	Research grant from Specialty Fertilizer Products LLC (USA)	"The role of polysaccharides in the efficiency of soil nitrogen fertilization with urea".
2013-2015 (€ 55,400)	Research program Science without borders – CAPES Foundation, Government of Brazil	"Estrutura tridimensional e potencial biotecnológico de peptídeos derivados de ureases"
2016-2025 (€ 380,000)	Research grants from Verdesian LLC (USA)	

Membership of Societies

- American Chemical Society
- Society of Bio-Inorganic Chemistry
- International Biometals Society
- Sigma Xi
- Italian Chemical Society
- Biochemical Society
- Harvard Club of Italy

Invited Speaker

National Academic Institutions

- University of Firenze, Department of Chemistry, December 1989
- University of Udine, Department of Plant Production, October 1994
- University of Firenze, Department of Chemistry, May 1997
- University of Udine, Department of Plant Production, May 1997
- International School for Advanced Studies, Trieste, February 1998
- University of Pisa, Department of Chemistry, April 2002
- University of Bologna, Department of Agro-Environmental Science and Technology, February 2004
- University of Bologna, Department of Agronomy, June 2004
- University of Bologna, Department of Pharmacy and Biotechnology, November 2012
- University of Trento, Centre for Integrative Biology, February 2014
- Free University of Bolzano, June 2018

Foreign Academic Institutions

- University di Hamburg (Germany), Department of Chemistry, April 1991
- New College of the University of South Florida (USA) April 1995
- University of California Santa Cruz (USA) Department of Chemistry, April 1996
- University of Lund (Sweden), Department of Inorganic Chemistry, September 1996
- University of Copenhagen (Denmark) Department of Chemistry, September 1996
- University of Lund (Sweden), Department of Inorganic Chemistry, August 1997
- European Molecular Biology Laboratory, Hamburg Outstation (Germany) January 1997
- Università di Hamburg, (Germany) Department of Chemistry, June 1999
- Università di Gent, (Belgium) Department of Protein Biochemistry, February 2003
- Moscow State University, (Russia) Department of Biological Chemistry, February 2003
- University of Trondheim (Norway), Department of Biotechnology, July 2005
- University of Lund (Sweden), Department of Chemical Physics, June 2006
- Dartmouth College (USA), Department of Chemistry, April 2008
- University of Lund (Sweden), Department of Chemistry, November 2008
- University of Trondheim (Norway), Department of Biotechnology, June 2009
- German Research School for Simulation Sciences GmbH, Jülich (Germany) July 2010
- University of Massachusetts at Amherst (USA), Department of Chemistry, March 2011
- Universidade Federal do Rio Grande do Sul, Center for Biotechnology, Porto Alegre (Brazil), January 2013
- University Federal do Rio de Janeiro, Medical Biochemistry Institute, Rio de Janeiro (Brazil), June 2013
- Pontificia Universidade Católica do Rio Grande do Sul, Instituto do Cérebro, Porto Alegre (Brazil), Sept. 2014
- Universidade de Brasília, Brasília (Brazil), January 2015
- University of South Florida, Department of Molecular Medicine, Tampa, FL (USA), March 2015
- European Molecular Biology Laboratory c/o DESY, Hamburg (Germany), July 2015
- University of Melbourne, School of Chemistry, Melbourne (Australia), October 2016
- University of Queensland, School of Chemistry and Molecular Biosciences, Brisbane (Australia), November 2016
- Institute Pasteur, Department of Structural Biology and Biochemistry, Paris (France), October 2018
- Rensselaer Polytechnical Institute, Troy (NY, USA), February 2021
- UT Dallas, Department of Chemistry and Biochemistry, Dallas (TX, USA), April 2024
- Johannes Kepler University, Institute of Biochemistry, Linz (Austria), April 2025

National Scientific Meetings

- National Congress of the Agricultural Chemistry Society (SICA), Piacenza, September 1994
- National Congress of the Interdivisional Group of Magnetic Resonance of the Italian Chemical Society, Rimini, October 1996
- Division of Chemistry of Biological Systems, Italian Chemical Society meeting, Parma, December 1997
- Division of Inorganic Chemistry, Italian Chemical Society meeting, Maratea, June 1998
- Division of Chemistry of Biological Systems, Italian Chemical Society meeting, Rimini, June 2000
- School for Ph.D. students in Inorganic Chemistry "Bioinorganic Chemistry", S. Miniato, June 2002
- Magnetic Resonance Group, Italian Chemical Society meeting, Porto Conte, September 2004
- National Congress of the Italian Society of Biochemistry, Riccione, September 2005
- Division of Chemistry of Biological Systems, Italian Chemical Society meeting, Sorrento, July 2009
- Ph.D School in Bioinorganic Chemistry, Pontignano, Siena (Italy), July 2011
- Division of Inorganic Chemistry, Italian Chemical Society meeting, Lecce, September 2011

International Scientific Meetings

- Workshop on Transition Metal Clusters in Biology, Medizinische Universität, Lubecca, Germany, April 1991
- American Chemical Society Congress, Denver (USA), April 1993
- 3rd Greek-Italian-Portuguese-Spanish Meeting in Inorganic Chemistry, Senigallia, June 1995
- NATO Advanced Research Workshop "New Trends In Biosensor Development" Kiev, Ukraine, March 1998
- XXXIII International Conference Coordination Chemistry (ICCC) Firenze, August 1998
- 2nd International Workshop on "Structural Characterization of Proteins by NMR, X-Ray Diffraction, and Computational Methods", University of Verona, February 1999
- 5th International Symposium on Applied Bioinorganic Chemistry Corfu, Greece, April 1999
- 9th International Conference of Bioinorganic Chemistry (ICBIC-9), Minneapolis (USA), June 1999.
- Symposium on Bioinorganic Chemistry, Chemical Center, University of Lund, June 2000.

- Biotechnology Winter School on Biomolecular Docking in Silico, Bologna, February 2001
- 20th European Crystallographic Meeting (ECM20) Krakow, Poland, August 2001
- 3rd International Workshop on "Structural Characterization of Proteins by NMR, X-Ray Diffraction, and Computational Methods", S. Vito di Cadore, Italy, September 2001
- Indo-Italian meeting on "NMR of Biological Systems" Lucknow, India, January 2002
- Meeting on Metal in Biology, Autrans/Grenoble, France, March 2002
- 6th European Conference on Bioinorganic Chemistry (EUROBIC-6), Copenhagen/Lund, July 2002
- 7th FIGIPS, Meeting in Inorganic Chemistry, Lisbon (Portugal) June 2003
- 11th International Conference of Bioinorganic Chemistry (ICBIC-11), Cairns (Australia), July 2003
- COST meeting D21 on Metalloenzymes and chemical biomimetics, Thessaloniki (Greece), September 2003
- 1st International Meeting on Metal Homeostasis, Institute of Metals in Biology of Grenoble, Villard de Lans (France), September 2004
- COST meeting D21 on Metalloenzymes and chemical biomimetics, Rome (Italy), May 2005
- International Conference on Biocatalysis, Nordforsk Research Training Course on High-Speed NMR Protein Structure Analysis, Moscow - S. Petersburg (Russia), June 2007
- 13th International Conference of Bioinorganic Chemistry (ICBIC-13), Vienna (Austria), July 2007.
- 235th Congress of the American Chemical Society, New Orleans (USA), April 2008.
- Graduate Summer School in Metal Ions in Biological Systems, Holbæk (Denmark), June 2008
- 9th European Conference on Bioinorganic Chemistry (EUROBIC-9), Wroclaw, (Poland), September 2008
- 237th Congress of the American Chemical Society, Salt Lake City (USA), March 2009
- NordForsk Research Course on "Macromolecular Interactions – Biology and Emerging Tools, Riccione (Italy) September 2009.
- 239th Congress of the American Chemical Society, San Francisco (USA), March 2010
- 240th Congress of the American Chemical Society, Boston (USA), August 2010
- 241th Congress of the American Chemical Society, Anaheim (USA), March 2011
- 15th International Conference of Bioinorganic Chemistry (ICBIC-15), Vancouver (Canada), August 2011.
- 243th Congress of the American Chemical Society, San Diego (USA), March 2012
- 245th Congress of the American Chemical Society, New Orleans (USA), April 2013
- Zing Conference on Bioinorganic Chemistry, Lanzarote (Spain), February 2013
- 16th International Conference of Bioinorganic Chemistry (ICBIC-16), Grenoble (France), July 2013.
- 248th Congress of the American Chemical Society, Denver (USA), March 2015
- 23rd Congress of the International Union of Biochemistry and Molecular Biology (IUBMB), Foz do Iguazu (Brazil), August 2015
- 17th International Biotechnology Symposium, Melbourne (Australia), October 2016
- 253rd Congress of the American Chemical Society, San Francisco (USA), April 2017
- 18th International Conference of Bioinorganic Chemistry (ICBIC-18), Florianopolis (Brazil), July 2017
- International Annual Meeting of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, Tampa (USA), October 2017
- 18th Biotechnology Congress, New York (USA), October 2017
- 7th Intern. Conference on the Development of Biomedical Engineering, Ho Chi Minh City (Vietnam), June 2018.
- Summer Annual Meeting of AAPFCO (Association of American Plant Food Control Officials), Ft. Lauderdale (FL, USA), August 2018.
- 19th International Conference of Bioinorganic Chemistry (ICBIC-19), Interlaken (Switzerland), July 2019.
- 12th International Biometals Symposium – BioMetals 2020, Grenoble (France), July 2020.
- Canadian Chemistry Conference and Exhibition, Calgary (Canada), June 2022.
- 16th European Conference on Bioinorganic Chemistry (EUROBIC-16), Grenoble (France), July 2022
- Gordon Research Conference on Metal Ions in Biology, Ventura (CA, USA), January 2023
- 8th Canadian Conference on Bioinorganic Chemistry (CanBIC-8), Perry Sound (ON, Canada), May 2023
- 16th International Symposium on Applied Bioinorganic Chemistry (ISABC-16), Ioannina (Greece), June 2023
- 17th European Conference on Bioinorganic Chemistry (EUROBIC-17), Münster (Germany), August 2024
- 9th Canadian Conference on Bioinorganic Chemistry (CanBIC-8), Perry Sound (ON, Canada), May 2025
- 21st International Conference of Bioinorganic Chemistry (ICBIC-21), Long Beach (CA, USA), July 2025.

Research Experience

My research curriculum reflects an evolution from basic coordination and organometallic chemistry to model bio-inorganic chemistry, and finally to inorganic biochemistry. This evolution has allowed me to build on chemical grounds a level and breadth of knowledge extremely useful to understand the role of metals in biological processes. Furthermore, the application of a large variety of physical methods to model compounds has been a learning bench for further applications of the same techniques to more complex biomolecules. I believe that a complementary role of both model chemistry and biochemistry is fundamental for the understanding of the interaction of biomolecules with metal ions.

1985-1986

Functionalization of late transition metal (Fe, Co, Ni, Cu) porphyrino-type complexes, with the goal of study low oxidation states of the metals in ionic pair form with alkali ions. Synthesis of complexes between early transition metals (Ti, Zr, V, Nb) and highly sterically flexible macrocycles to obtain cis-coordination sites possibly available for catalysis. The techniques used involved Schlenk-line manipulation of highly air-sensitive compounds. Instrumentation used included IR, UV-vis, and 1D 1H and 13C NMR spectroscopies. Some knowledge of X-ray crystallography of small molecules was also gained.

1986-1990

Synthesis of metal-sulfur clusters as models for metallo-proteins and metallo-enzymes. The properties of subsite-differentiated cubane-type clusters of the type MFe_3S_4 (M=Fe, V, Mo, Re, Co, and Ni) were investigated. In the case of M=Fe, subsite

differentiation was achieved using a complex organic ligand, binding the cluster to three Fe sites and leaving the fourth Fe ion available for modulation of reactivity, and of structural and spectroscopic properties significant for the biological involvement of the Fe_4S_4 cluster in enzymatic catalysis. In the case of V and Mo, the reactivity of the heteroatom in the cluster was studied spectroscopically. In the case of Re, Ni, and Co, new routes for the synthesis of the corresponding heteroatom cluster were developed, and the structures and properties of the resulting complexes were studied both spectroscopically and using X-ray crystallography. The techniques used involved Schlenk-line and dry-boxes manipulation of air-sensitive compounds, organic synthesis, UV-vis spectroscopy, 1D and 2D NMR spectroscopy, electrochemistry (cyclic voltammetry, differential pulse polarography, coulometry), X-ray crystallography, Mossbauer spectroscopy, EPR spectroscopy, magnetic susceptibility measurements using NMR and SQUID. Acquaintance with EXAFS spectroscopy was also gained.

1990-1992

NMR spectroscopy of iron-sulfur proteins. Relationships between structural and magnetic, Mossbauer, NMR, and EPR spectroscopic parameters in iron-sulfur proteins. Theoretical models of magnetic exchange. Molecular mechanics and dynamics of iron-sulfur proteins. Relationships between structure and redox potential in iron-sulfur proteins.

1992-present

Isolation, purification, and physical characterization of soluble and membrane-bound proteins involved in bacterial photosynthesis. Studies of electron-transfer processes between soluble and membrane-bound electron carriers using rapid light-induced time-resolved kinetic spectrophotometry. Isolation, purification, and physical characterization of bacterial nickel proteins. Structural studies using XAS spectroscopy. Protein crystallization and X-ray structure determination of bacterial urease. Applications of high resolution nuclear magnetic resonance (NMR) spectroscopy to the determination of the structure of metallo-biomolecule. Molecular mechanics and dynamics of metallo-biomolecules. Computer assisted rational drug design of inhibitors for metallo-enzymes. Structural biology and biochemistry of nickel trafficking proteins. Nickel-dependent transcription factors in soil and pathogenic bacteria.

Research Activities Abroad

- **March 1995** Department of Biochemistry, University of Tucson, Arizona (USA)
- **June-August 1995** New College of the University of South Florida, Division of Natural Sciences (USA)
- **November 1995** European Molecular Biology Laboratory, Heidelberg (Germany)
- **June-August 1997** Department of Inorganic Chemistry, Lund University (Sweden)
- **June 1999** European Molecular Biology Laboratory, Hamburg (Germany)
- **June-July 2006** Department of Inorganic Chemistry, Lund University (Sweden)
- **June 2009** Department of Biotechnology, University of Science and Technology, Trondheim (Norway)
- **Jan. 2013-Dec. 2015** Center for Biotechnology, Universidade Federal do Rio Grande do Sul, Porto Alegre (Brazil)
- **June 2022** Rensselaer Polytechnic Institute (RPI) - Troy (NY, USA)
- **April and September 2025** Johannes Kepler University, Linz (Austria)