Curriculum Vitae of Prof. Cristina Prandi

Full Professor of Organic Chemistry

Department of Chemistry

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Education

She graduated in Biological Sciences from the University of Turin in November 1988 with a thesis in Organic Chemistry titled "*Tetrafluoroborates of 1,3-benzodithioles 2-substituted as useful acylating agents for pyrroles*". Since November 1990, she has been licensed to practice as a Biologist. In 1993, she obtained a PhD in Biotechnology with a thesis titled "*Characterization of exocellular polysaccharides from fungi*".

Academic Career

On July 1, 1993, she became a permanent researcher (RU) at the University of Turin, Alessandria campus. In 1998, she moved to the University of Eastern Piedmont. In 2005, she transferred to the University of Turin, Department of Applied Organic Chemistry.

In 2006, she was appointed Associate Professor of Organic Chemistry at the University of Turin.

Since 2017, she has been a Full Professor of Organic Chemistry at the University of Turin.

From 2019 to 2024, she has served as Vice Rector for Research at the University of Turin.

Research Projects

Her research topics have received several regional, national, and international funding.

- **2009-2012**: Responsible for the Chemistry Work Package in the Regional Call (Piedmont Region) Cipe 2007 *BioBITS* Converging Technologies for the Development of White and Green Biotechnologies, 3 million euros (Chemistry Unit, 300,000 euros).
- 2014-2017: COST Action FA1206 "Strigolactones: roles and biological applications", Coordinator and Grant Holder http://www.cost.eu/COST Actions/fa/FA1206, www.stream.unito.it.
- 2014-2016: Compagnia di San Paolo, SLEPS Strigolactones as signaling molecules at the interface between plants, microorganisms, and a changing environment (PI for the Chemistry Unit, 300,000 euros).
- 2015-2017: Compagnia di San Paolo towards Horizon H2020 Stritools (PI for Chemistry Unit, 100,000 euros).
- 2018: Funded project by the Cassa di Risparmio di Torino titled "Carbon Dioxide: From Problem to Opportunity Electrochemical and Photocatalytic CO2 Reduction for a Sustainable Economy".
- **2013**: Founded the academic spin-off *Strigolab srl*, whose mission is to synthesize and commercialize phytohormones and produce natural extracts as biostimulants. She is currently a scientific consultant for the company.
- 2019-2023: Unit leader for the Saturno project funded by the Piedmont Region's Bioeconomy Call (600,000 euros).
- 2017-2018: Work Package leader for the DEMETRE project (MANUNET Call 2017).
- 2019: Scientific Director of the IR2 2019 GreenPharma project, coordinated by Huvepharma srl (750,000 euros).
- 2021-2025: Partner in the MINDTHEGEPs project (Coordinated by University of Turin, Prof. Cristina Solera).
- 2022: Scientific Coordinator of Spoke 2 Green Technologies in the NODES Innovation Ecosystems Project.

Memberships

She is a member of the Italian Chemical Society (SCI), the European Plant Science Organisation (EPSO), and the Parasitic Plant Society.

Conference Organization

She was part of the organizing committee of the Organic Chemistry Division Conference (September 8-12, 2019, Turin).

She is a member of the Scientific Advisory Board of the International Strigolactone Congress (ICS) since 2015 and was the Chair of the second edition of ICS in 2017.

She has been invited as a keynote speaker to over 20 national and international conferences and has chaired over 25 sessions. She has presented more than 70 oral communications at national and international conferences. She has also been invited to give seminars at various institutions such as the IRCOFF-CNRS Institute in Rouen, the University of Caen (France), the Palacky University in Olomouc (Czech Republic), and the ARO Volcani Center-Bet Degan (Israel), among others.

Editorial and Peer-Review Activities

She served as editor for the monograph *Strigolactones* (13 articles) published by Planta, Springer, 2016, and a special issue on Strigolactones for *Journal of Experimental Botany*, Wiley, 2017 (9 reviews and 20 research articles).

She has reviewed for journals such as Journal of Organic Chemistry, Organic Letters, Journal of Natural Products, Tetrahedron Letters, Synthesis, Synlett, and others.

She is also a reviewer for research proposals for national (Piedmont Region, MIUR) and international agencies (KAUST, AgreenSkills, COST Association).

Publications

She is co-author of 144 scientific publications (3057 citations, h-index 32 on Scopus).

Visiting Scientist Activities

She was a visiting scientist at the IRCOFF CNRS Institute in Rouen (France) from 2004-2005 and at the ARO Volcani Center (Israel) from 2012-2021.

Collaborations

Prof. Cristina Prandi has numerous collaborations with national and international universities and research centers, including Prof. Binne Zwanenburg (Dept. of Organic Chemistry, Nijmegen, The Netherlands), Prof. François- Didier Boyer (Institut de Chimie des Substances Naturelles, CNRS, France), Dr. Ronit Yarden (George Town University, USA), Prof. Hinanit Koltai and Prof. Yoram Kapulnik (ARO Volcani Center, Israel), Prof. Yukihiro Sugimoto (Kobe University, Japan), Jacques Maddaluno (UMR CNRS 6014 "COBRA", Université de Rouen, France), and others.

Research Activities and Scientific Publications

Research activities began with a two-year degree thesis in organic chemistry, which focused on the synthesis and use of benzoxathiolium and benzodithioilium salts in organic synthesis. During her PhD, she worked on the production of chitosan from fungal biomass, and the characterization of the polysaccharides obtained using spectroscopic techniques, solid-state NMR, and HPLC-MS. Her research themes expanded into organometallic synthesis, transition metal-catalyzed reactions, the functionalization of heterocyclic systems as key intermediates in natural product synthesis, the synthesis of natural products, and their applications in sustainable agriculture and as anticancer agents. Since 2016, her research has focused on developing synthetic methodologies more aligned with sustainability principles and green chemistry, with particular attention to the use of unconventional solvents, including Deep Eutectic Solvents, and biocatalysis.

Her research lines developed as follows:

a) Organometallic Synthesis: Synthesis of conjugated unsaturated systems. This study involved the use of lithiated and/or mixed Li/K organic bases, which have the unique characteristic of combining high basicity with low nucleophilicity, thus allowing for the formation of products with high chemoselectivity. Using α , β -unsaturated acetals as substrates in this type of study, it is possible to obtain alkoxydienes with high stereoselectivity. Further metallation at the α -vinyl position allows for the functionalization of the substrate with various electrophiles. Finally, a simple hydrolysis reaction under mild conditions restores the initial carbonyl function. In general, the entire synthetic sequence follows the principle of "umpolung," or reactivity inversion.

b) Palladium-catalyzed Cross-Coupling Reactions: Cross-coupling reactions were applied to the functionalization of heterocyclic systems. Triflates and phosphates derived from lactones, thiolactones, or lactams were used as coupling partners in palladium-catalyzed reactions with vinyl, dienyl, aryl, and alkyl boronates.

c) Synthesis of Fused Bicyclic Heterocyclic Systems via Nazarov Cyclization: The synthetic strategy in point b) allows access to divinyl ketones, which can easily undergo a Nazarov electrocyclization reaction to form pentacyclic systems.

d) Synthesis of Biologically Relevant Molecules: Since 2011, she has developed the synthesis of plant hormones and their structural analogs known as strigolactones. In-depth structure-activity relationship (SAR) studies have extended the applications of these interesting molecules both in agriculture and biomedicine.

e) Deep Eutectic Solvents in Synthesis: The use of unconventional solvents was applied in the context of organometallic chemistry (in protic conditions), serving both as solvents and catalysts in acid-catalyzed transformations. Reaction mechanisms and new synthetic opportunities with these solvents have been explored.

f) Biocatalysis: The use of enzymes as biocatalysts was applied in the synthesis of chiral amines using IRED (imminored reductase) both in traditional conditions and in the presence of unconventional solvents.

Her expertise is documented by 144 publications, 3057 citations, h-index 32 (Scopus), 2 book chapters, 2 books, and over 70 oral communications at conferences and congresses.

Patent List

Patent 1: Cristina Prandi, Silvia Tabasso, Ernesto Occhiato, Maria Elena Bova, Paola Bonfante, Mara Novero (2011). "Synthesis of Structural Analogues of Strigolactones for Industrial Applications in Weed Control." TO2011A000454, Cristina Prandi, Ernesto Occhiato, from May 24, 2011, to present. Patent 2: Yoram Kapulnik, Hinanit Koltai, Ronit Yarden, Cristina Prandi (2011). "Growth Inhibition of Human Cancer Cells and Cancer Treatment with Natural and Synthetic Strigolactones Analogues." US 61/537,062, USA, from September 21, 2011, to present. Patent 3: Hinanit Koltai, Cristina Prandi, Ronit Yarden, Yoram Kapulnik (2012). "Use of Strigolactones and Strigolactone Analogs for Treating Proliferative Conditions." 30113-WO-12, ARO Volcani Center, George Town University, from March 28, 2013, to present. Patent 4: Landolfo Santo, De Andrea Marco, Dell'oste Valentina, Biolatti Matteo, Prandi Cristina, Blangetti Marco, Artuso Emma, Lombardi Chiara (2019). "Strigolactones for Use in Preventing and/or Treating Infections Caused by Viruses of the Herpesviridae Family." PCT/IB2019/059611

Teaching Activities

With over twenty years of teaching experience, Prof. Cristina Prandi has taught numerous Organic Chemistry courses for undergraduate programs in Chemistry, Biology, Environmental Science, and Industrial Chemistry at the University of Eastern Piedmont, Torino, Verbania, and Rouen (FR). She has tutored many PhD students and has been an examiner for doctoral theses at the University of Florence and co-supervisor at the University of Rouen and Florence.

Over the years, Prof. Cristina Prandi has been actively involved in teaching Organic Chemistry with an excellent level of student satisfaction (Edumeter data and documents attached for the past three academic years), both for undergraduate and graduate programs.

At the University of Eastern Piedmont, she taught the following courses:

- From 1997/98 to 2001/02: Instructor of Organic Chemistry Lab I for the Bachelor's in Chemistry.
- From 1998/99 to 2003/04: Instructor of Organic Chemistry I for the Bachelor's in Chemistry and Biological Sciences.
- 2002/03: Instructor of Organic Chemistry Lab II for the Bachelor's in Chemistry.
- 1996/97 to 2001/02: Lecturer in Organic Chemistry II.

At the University of Torino:

- 2006-2016: Instructor of Organic Chemistry for the Bachelor's in Biological Sciences (6 ECTS).
- 2011-present: Instructor of Organic Chemistry I for the Bachelor's in Chemistry and Chemical Technologies (10 ECTS).
- 2011-present: Instructor of New Directions in Organic Synthesis for the Master's in Chemistry (3 ECTS).
- 2016-present: Instructor of Synthesis and Mechanisms in Organic Chemistry (8 ECTS).

She also participates in third-level teaching within the Doctoral Programs in Biological and Applied Biotechnology Sciences, and in Chemical and Materials Sciences at the University of Torino.

Since 2006, she has supervised over 45 Bachelor's theses, 25 Master's theses, and 8 PhD theses, including one co-supervised with the University of Rouen (FR).

Institutional, Organizational, and University Service Activities

Over her academic career, she has carried out numerous institutional roles:

- 2001-2002: Member of the Integrated SA and participated in drafting the University Statute of the University of Eastern Piedmont.
- 2007-2017: Member of the Faculty of the Doctoral Program in Biological Sciences and Applied Biotechnologies.
- Since 2017: Member of the Faculty of the Doctoral Program in Chemical and Material Sciences at the University of Torino.
- 2013-2016: President of the Master's Degree in Chemistry at the University of Torino.

- 2013-2016: Head of the European Project Commission for the Department of Chemistry.
- 2013-2016: President of the Erasmus Commission for the Department of Chemistry.
- Since 2016: Representative of the University of Torino in the National Cluster for Green Chemistry.
- 2015-2018: Deputy Director for Research in the Department of Chemistry at the University of Torino.
- Since 2019: Vice Rector for Research at the University of Torino.