Curriculum Vitae

Valeria Amendola

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Born in Milano, 11th February 1974

1 Education

- **1997:** Laurea in Chemistry, University of Pavia, Five-year single-cycle degree, graduated *summa cum laude*
- **1997:** State Professional Qualification as a Chemist (Italy)
- **2000:** Ph.D. in Chemical Sciences, University of Pavia (XIII Cycle). PhD scholarship funded by the Italian Ministry of University and Research (MUR). Final assessment: excellent
  - Thesis: *Transition Metal Ions in Supramolecular Chemistry*
  - Supervisor: Prof. Luigi Fabbrizzi
- **2000:** Postgraduate Diploma, Advanced School of Integrated Training (SAFI), University School for Advanced Studies (IUSS) in Pavia. Study prizes awarded in all years of attendance at the IUSS School (1998–2000).

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2. Academic Appointments

Period	Position	Institution	Key Responsibilities & Research Focus
2015–Present	Associate Professor	University of Pavia & INSTM	Project management; international collaborations; research focus: development of molecular receptors, extractants, functional materials
2005–2015	Assistant Professor (Ricercatore)	University of Pavia	Teaching undergraduate chemistry; MSc and PhD supervision; Research on molecular receptors, anion sensors, supramolecular devices; Organizing Committee member, ISMSC 2007
2001–2004	Postdoctoral Fellow	University of Pavia	Supramolecular systems with transition-metal centers; controlled molecular motion; selective analyte recognition; molecular machines

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3. National Academic Qualification (Italy)

National Scientific Qualification (ASN) at Full Professor level, awarded through competitive national evaluation procedures in the following scientific sectors:

- **03/B1** – Foundations of Chemical Sciences and Inorganic Systems. Awarded in 2013; renewed in 2018 and 2025 (valid until 2037).
- **03/B2** – Chemical Foundations of Technologies. Awarded in 2025 (valid until 2037).

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4. International Mobility

2010 Short-term Visiting Scientist, Technical University of Munich (Germany)
Research: thermodynamics of molecular recognition via calorimetry.
Selected output: *Chemistry – A European Journal*, 2011, 17, 5972–5981

2012 – 2013 Visiting Scientist, University of Zurich, Switzerland
Research: molecular receptors and fluorescent chemosensors for pertechnetate.
Selected outputs: *Angewandte Chemie International Edition* 2012, 51, 9772–9776 **Cover Feature**, **highlighted in Nature Chemistry**; *Chemical Science* 2014, 5, 1820–1826.

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5. On-going Grants

Project Title: "CO_2: from a global problem to a tool to implement circularity – CO-Tool" (ID 6144755)
Funding source: Lombardy Region (ERDF 2021–2027) under the Collabora & Innova 2024 call.
Amount (Euros): Total project budget: €1,151,437.05; Funding allocated to the Pavia unit: €460,574.82.
Period: October 2025 - November 2027 (25 months)
Role: Principal Investigator (Partner unit)

Project Title: "Organic/Metal–Organic Composite Materials and Technologies for Water Treatment and Gas Separation - OMEGA" (Project No. 20224HH9KP)
Funding source: Italian Ministry of University and Research (MUR).
Amount (Euros): Total funding: €180,855; Funding allocated to the Pavia unit: €53,171.
Period: February 2025 - January 2027 (24 months)
Role of the PI: Principal Investigator (Partner unit)

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6. Completed projects

Project Title: "MOCA – Metal Organic Frameworks and Organic Cages for Highly Selective Gas Separation Membranes and Heavy Metal Capture Devices" (Grant No. 2019-2090), funded by Funding source: Cariplo Foundation (Circular Economy 2019 Call).

Amount (Euros): Total funding: €300,000; Funding allocated to the Pavia unit: €120,000.
Period: July 2020 - June 2023 (36 months)
Role of the PI: Principal Investigator (Leading unit)

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7. Research contracts & responsibilities

2018 – present: Head of the INSTM research unit in Pavia
Research Contract, INSTM Consortium / University of Pavia – Department of Chemistry
Funded by **CEA – Commissariat à l'Énergie Atomique**
Project: *"New Generation Separation Processes (PRONG)"*
Contract renewals: 2018–2020 (total grant: 32,000.00€)

- 2020 – 2022 (3-year project: 14,501.16€). Head of the INSTM-research unit at the Department of Chemistry of the University of Pavia for the project: "New Generation Separation Processes (PRONG)" focused on the development of new molecular receptors to be used in the selective separation of technetium from nuclear fuel.
- 2023 – 2025 (3-year project: 18,166.86€). Head of the INSTM-research unit at the Department of Chemistry of the University of Pavia for the project: "Materials for Recognition, Adsorption and Separation Processes", focused on the development of new materials for use in molecular recognition, sensing, adsorption, and selective separation of target analytes.

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8. Participation in Research Projects

Member of the research unit - University of Pavia - for the following projects:

- **Network on Transition Metals in Supramolecular Catalysis**, Human Capital and Mobility Programme, European Union (1994–1998), Contract No. CHRX-CT94-0492
  • Participation period: 01/11/1997 – 30/09/1998
- **Targeted Project 2000 "Biotechnologies"**, Subproject "Biosensors and Diagnostic Biotechnologies", Topic: "Biosensors and Analytical Spectroscopy", Research Line: "Development of Innovative Microscopy Systems", Project title: *"Fluorescent Chemosensors for Amino Acids and Nucleosides"*, Local Coordinator: Prof. L. Fabbrizzi
  • Participation period: 05/03/1998 – 31/07/2002
- **COFIN 1999 "Supramolecular Devices"**, Participation in research activities of the University of Pavia group. Research programme of the unit: "Supramolecular devices generating signals: sensors and switches"
  • Participation period: 01/01/2000 – 31/12/2001
- **Research Training Network "Molecular Level Devices and Machines (MLDM)"**, 5th European Union Framework Programme (2000–2004), Contract No. HPRN-CT-2000-00029
  • Participation period: 01/09/2000 – 31/08/2004
- **PRIN 2001 "Supramolecular Devices"**, Participation in the research activities of Prof. L. Fabbrizzi's group. Research focused on the synthesis and characterization of supramolecular systems containing transition metal centers, and on the study of molecular movements induced by chemical and electrochemical inputs
  • Participation period: 01/11/2001 – 31/10/2003
- **PRIN 2006 "Supramolecular Systems for the Construction of Molecular Machines, Energy Conversion, Sensing, and Catalysis"**, Research unit programme at the

University of Pavia: *Anion and Ion-Pair Recognition and Translocation*
• Participation period: 01/02/2007 – 31/01/2009

- **Fondazione Cariplo 2009**, Call for Scientific and Technological Research on Advanced Materials; Project title: *"CO2 Photoconversion on Nanoparticles"*, University of Pavia, participation in the research unit activities. Project leaders: Prof. L. Fabbrizzi, Prof. A. Albini
  • Participation period: 01/01/2010 – 31/12/2012

- **PRIN 2008 "Supramolecular Systems for the Construction of Nanomachines, Signal Processing, Sensing, and Catalysis"**, Project leader Margherita Venturi (previously V. Balzani); • Participation period: 01/05/2010 – 30/09/2012

- **PRIN 2011 "Integrated Supramolecular Technologies for Chemical Information Processing: Advanced Molecular Devices and Materials (infoChem)"**, Scientific coordinator: M. Venturi
  • Participation period: 01/10/2012 – 28/02/2016

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9. Publications & Metrics

- Total publications: 103
- Total citations: > 6100
- h-index: 38 (Scopus, Dec 2025)
- See the list of publications in the Appendix

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10. Main Research Lines

My research focuses on the design and application of molecular receptors and supramolecular systems to control intermolecular interactions for molecular recognition, sensing, and separation processes with relevance to biomedicine, energy, and advanced materials.

Fundamental supramolecular chemistry and molecular recognition.
I investigate host–guest interactions in solution, with particular emphasis on hydrogen bonding and halogen bonding and their role in determining the structure, thermodynamics, and function of self-assembled systems. Through thermodynamic and spectroscopic studies, my work provides fundamental insight into molecular recognition mechanisms in aqueous and organic media.

Molecular receptors for biomedical sensing and diagnostics.
I develop organic and metal-based receptors for the selective recognition of biologically relevant anions and metabolites. By integrating fluorescent and chiral signaling units and exploiting indicator displacement strategies, I have introduced new sensing platforms for biomarkers of clinical relevance, including trans,trans-muconic acid, succinate, and fumarate. These studies have led to portable and on-site detection devices, including smartphone-based sensors, and were carried out in collaboration with leading international institutions (Universitat Politècnica de València; Mayo Clinic).

Selective separation of strategic anions and nuclear waste remediation.
My research has demonstrated, for the first time, the selective capture and sensing of the pertechnetate anion ($^{99}TcO_4^-$) using tailor-made molecular receptors. By combining hydrogen-bonding and electrostatic interactions, I developed receptors capable of selectively extracting $^{99}TcO_4^-$ from complex matrices, contributing to the advancement of next-generation nuclear fuel reprocessing technologies.

Innovative porous materials for CO_2 capture and separation.
I extend molecular recognition concepts to the solid state, designing porous molecular materials and membranes for selective CO_2 adsorption and separation from gas mixtures. This research addresses critical challenges in carbon capture and circular economy, and is supported by European (ERDF 2021–2027 Lombardy Region), national (MUR), and private funding (Cariplo Foundation).

Overall, my work bridges fundamental supramolecular chemistry and real-world applications, advancing molecular-level control over recognition and separation processes in complex environments.

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11. PhD & Postdoctoral Supervision

I have supervised **five PhD students** (all completed) and **multiple postdoctoral researchers**, developing an independent research line with sustained attention to the training and career development of early-career scientists.

Postdocs supervised: with full scientific responsibility

Greta Bergamaschi (2013–2016; 3 consecutive years), present: Research Scientist at SCITEC-CNR (Milan).
Ana Miljkovic (2018–2020; 2 consecutive years)
Sonia La Cognata (2020–2023; 2025–present; 5 non-consecutive years), present: post-doc Researcher at the University of Pavia
Riccardo Mobili (2023–2024; 2 consecutive years), present: post-doc Researcher at the Sorbonne University (Paris)

12. Editorial & Professional Service

2024 – Co-Editor of the themed collection “Supramolecular Sensors: From Molecules to Materials”, Sensors & Diagnostics, Royal Society of Chemistry.

2017 – present – Editorial Board Member, Frontiers in Chemistry, Frontiers Media SA, Switzerland.

2017 – present – Associate Editor, Molecules, MDPI, Basel, Switzerland.

2008 – present – Ad hoc scientific evaluator of research proposals and doctoral theses for national and international funding agencies and academic institutions, including:

ANR (France), IIT Palakkad (India), and several Italian universities (Cagliari, Padua, Perugia, Trieste, Urbino).

Ad hoc expert reviewer for high-impact international journals, including Nature Communications, Nature Reviews, Angewandte Chemie, Journal of the American Chemical Society, Small, Chemical Reviews**.**

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13. Honors and Recognitions

1. Fellow of the **Royal Society of Chemistry (FRSC)**
2. **Research Highlight** in *Nature Chemistry* 4, 772 (2012) [“Trapping Technetium” by Stuart Cantrill] for the publication:

Alberto, R.; Bergamaschi, G.; Braband, H.; Fox, T.; Amendola, V. *$99TcO_4^-$: Selective recognition and trapping in aqueous solution*, **Angew. Chem. Int. Ed.**, 2012, 51(39), 9772–9776; DOI: 10.1002/anie.201205313

3. Invited **Feature Article** in *Chemical Communications*:
   La Cognata, S.; Amendola, V. *Recent applications of organic cages in sensing and separation processes in solution*, **Chem. Commun.**, 2023, 59(92), 13668–13678; DOI: 10.1039/D3CC04522F
   Included in themed collections: Chemical Communications HOT Articles 2023 and Chemosensors and Molecular Logic
4. Invited **Concept Article** in *Chemistry – A European Journal*:
   La Cognata, S.; Marie, C.; Guilbaud, P.; Poggi, A.; Amendola, V. *Molecular Hosts for the Sensing and Separation of $99TcO_4^-$*, **Chem. Eur. J.**, 2024, 30(42), e202401551; DOI: 10.1002/chem.202401551

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14. Selected Publications

Mobili, R., La Cognata, S., Monteleone, M., Longo, M., Fuoco, A., Serapian, S.A., Vigani, B., Milanese, C., Armentano, D., Jansen, J.C., Amendola, V.
Gas Permeation through Mechanically Resistant Self-Standing Membranes of a Neat Amorphous Organic Cage
(2023) Chemistry - A European Journal, 29 (56), art. no. e202301437
DOI: 10.1002/chem.202301437
N. citations: 7 (Scopus, Dec. 2025), Cover Feature: DOI: 10.1002/chem.202302814

La Cognata, S., Mobili, R., Milanese, C., Boiocchi, M., Gaboardi, M., Armentano, D., Jansen, J.C., Monteleone, M., Antonangelo, A.R., Carta, M., Amendola, V.
CO2 Separation by Imide/Imine Organic Cages
(2022) Chemistry - A European Journal, 28 (49), art. no. e202201631
DOI: 10.1002/chem.202201631
N. citations: 15 (Scopus, Dec. 2025), **Front Cover and Cover Profile** in *Chemistry – A European Journal*, 2022, 28, e202202357; DOI: 10.1002/chem.202202357

Alberto, R., Bergamaschi, G., Braband, H., Fox, T., Amendola, V.
99TcO 4 -: Selective recognition and trapping in aqueous solution
(2012) Angewandte Chemie - International Edition, 51 (39), pp. 9772-9776.
DOI: 10.1002/anie.201205313
N. citations: 119 (Scopus, Dec. 2025), **Front Cover**, **Research Highlight** in *Nature Chemistry* 4, 772 (2012) [“Trapping Technetium” by Stuart Cantrill] for the publication:

Amendola, V., Bergamaschi, G., Boiocchi, M., Alberto, R., Braband, H.
Fluorescent sensing of 99Tc pertechnetate in water
(2014) Chemical Science, 5 (5), pp. 1820-1826.
DOI: 10.1039/c3sc53504e
N. citations: 64 (Scopus, Dec. 2025)

Amendola, V., Fabbrizzi, L., Mosca, L., Schmidtchen, F.-P.
Urea-, squaramide-, and sulfonamide-based anion receptors: A thermodynamic study
(2011) Chemistry - A European Journal, 17 (21), pp. 5972-5981.
DOI: 10.1002/chem.201003411
N. citations: 106 (Scopus, Dec. 2025)

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15. Teaching

- 20+ years of teaching undergraduates and graduates, Faculty of Science, University of Pavia; mentoring of international students through Erasmus+ programmes;
- 20+ years of mentoring and supervising summer internship students (secondary school).
- **2025-present**: coordinator of the **Teaching Innovation Project** (2024) for the Department of Chemistry (University of Pavia) concerning the basic chemistry teaching laboratories for the first year of science degree programs.

Present Courses

2009/10 - present: **Stoichiometry and Chemistry Laboratory** (12 ECTS, 108 hrs.), course for the Chemistry degree (1st-year).

2014/15 - present: **Inorganic Chemistry III** (3 ECTS, 24 hrs.) core course in the field of inorganic and physical chemistry for the master's degree in Chemistry.

2014/15 - present: **Supramolecular Chemistry** (3 ECTS, 24 hrs.), core course in the field of inorganic and physical chemistry for the Master's degree in Chemistry

Former teaching activity

2005/06 - 2008/09: **General and Inorganic Chemistry** (7 ECTS, 42 hrs.), Bachelor's Degree in Biology, University of Pavia.

2008/09: **Agricultural Chemistry** (2 ECTS, 16 hrs,) for the Faculty of Science, University of Pavia.

2014/15: **Chemistry Education** (2 ECTS, 16 hrs.) for the training internship of high-school teachers.

2000/01-2004/05: Teaching of chemistry tutorials and problem-solving sessions for the courses of General and Inorganic Chemistry, Bachelor's Degrees in Biotechnology and Biology, University of Pavia. Tutoring and supervision in undergraduate teaching laboratories.

I consent to the processing of my personal data included in this CV in accordance with Legislative Decree No. 196 of 30 June 2003 (Personal Data Protection Code) and the EU General Data Protection Regulation (GDPR 2016/679)

Pavia, 02nd January 2026

Valeria Amendola

(Digitally signed)