Francesca Cardano, PhD
date and place of birth 27/04/1991, Italy
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GENERAL OVERVIEW

Research Fellow in Chemistry_organic chemsistry and photophysics-photopharmacology-chemical biology.
One year of the PhD program conducted in USA.
Chemical-Pharmaceutical M.Sc. background.

RESEARCH POSITIONS

- 12/2022-
  RTDa-Research Fellow in Organic Chemistry
  (PNRR) - MISSIONE 4 "ISTRUZIONE E RICERCA" COMPONENTE 2 "DALLA RICERCA ALL'IMPRESA" INVESTIMENTO 1.2 - FINANZIAMENTO DI PROGETTI PRESENTATI DA GIOVANI RICERCATORI beneficiari di Seal of Excellence- AVVISO N. 247 DEL 19/08/2022
  Department of Chemistry, University of Turin, Turin (IT)
  Content: Study of photopharmacology tools, photo-controlled liposome drug delivery systems and investigation of fluorescent nucleobase analogs to prepare emissive PNA.

- 01/2021-11/2021
  Postdoctoral Fellow
  Department of Chemistry, University of Milan, Milan (IT)
  Content: Synthesis, Photophysical characterization and applications of functionalized chiral molecules (helicenes) for the development of novel sensing systems for chemical-biology and material-chemistry.
  Supervisors: Prof. E. Licandro, Prof. S. Cauteruccio

- 01/2020-12/2020
  Postdoctoral Fellow_Horizon 2020 project nº 863170
  Department of Chemistry, University of Turin, Turin (IT)
  Content: Synthesis and Photophysical characterization of NIR dyes (cyanines_squaraines) and fluorophores (2,5-bis(benzoxazol-2-yl)thiophene derivatives) for bioimaging, biological applications and innovative materials (DSSCs-3Dprinting and optoelectronic devices).
  Supervisor: Prof. C. Barolo

- 11/2019-12/2020
  Research Fellow_Compagnia di San Paolo (Bando ExPost 2018)
  Department of Chemistry, University of Turin, Turin (IT)
  Content: Synthesis of Fluorescent molecules
  Supervisors: Prof. C. Barolo

- 10/2015-10/2016
  Research Intern. Nano Carbon Materials Lab (IIT)
  Istituto Italiano di Tecnologia, Genoa, (IT)
  Content: Assembly of graphene-based materials through the functionalization with synthesized organic molecules.

EDUCATION AND TRAINING

- 04/2023-06/2023
  IRIDI teaching course, University of Turin (IT).
  Certification and Badge issued 07/2023.

- 11/2016-10/2019

  PhD in Science and Technology of Chemistry and Materials

  Curriculum Drug Discovery and Nanobiotechnologies

  Degree obtained cum Laude (defense date: 07/04/2020)

  University of Genoa (IT), University of Miami (US), Istituto Italiano di Tecnologia (IT)

  Content: Design, synthesis, and characterization of molecular switches (i.e. spiropyrans-azobenzenes-oxazines-oxazolidines) and fluorophores (coumarins-BODIPYs-carbazoles) to develop nanotechnologies. The contribution of this research is a custom-made approach to obtain probes through the conjugation with fluorophores, photoactivatable polymers, light controlled drug delivery systems and graphene oxide composites.

  Supervisors: Prof. S. Giordani, Prof. F. M. Raymo

  Dissertation title: "Novel nanobiotechnology platforms based on photochromic molecules".

  Defense date 07/04/2020

- 10/2010- 07/2015

  M. Sc. Degree in Medicinal Chemistry and Pharmaceutical Technologies

  Degree obtained cum Laude (defense date: 21/07/2015)

  University of Genoa, Department of Pharmacy, Genoa, (IT)

  Content: Medicinal Chemistry, Pharmacology, Pharmaceutical Technology, Organic Chemistry, Biochemistry, Chemical Physics, Biology.

  February 2014- July 2015 Thesis Intern: Synthesis of organic molecules as kinase 'inhibitor.

  Dissertation title: Synthesis of Src's inhibitors with pyrazolo[3,4-d] pyrimidine structure, active on an in vivo model of glioblastoma. Supervisor: Prof. Silvia Schenone

  November 2015 Exam as certified Pharmacist according to the Italian Law.

- 09/2010- 07/2010

  Scientific High School Degree Final grade: 100/100

RESEARCH COMPETENCES AND SKILLS

- Organic chemistry synthesis: good practical and technical skills employed for synthesis of different classes of molecules.

- Materials (Graphene Oxide and reduced Graphene Oxide): functionalization with small molecules, assembly of hybrid materials and related characterization.

- Synthetic lipid liposomes (DOPC-DPPC): preparation, handling, applications.

- Nuclear Magnetic Resonance: analysis and data interpretation.

- Mass Spectrometry: analysis and data interpretation.

- Spectroscopy: UV-vis Absorption and Steady State and Time Resolved Emission Spectroscopy, Fourier Transform Infrared Spectroscopy, Raman Spectroscopy: analysis and data interpretation.

- Chromatography: Direct and Reverse Flash chromatography (classic and automated equipments), High Performance Liquid Chromatography (HPLC).

- Settings up of chemical reactions, optimization and validation of laboratory protocols, data analysis, editing of research, projects 'reports and papers' drafts.

- Laboratory work with management and maintenance of equipment/storage of chemicals, good health, and safety rules knowledge.

- Mentoring and supervision of undergrad and grad students

Proficient with MS office suite, Origin Pro 9.0, ACD/Labs, Chimera1.10.2, Chem DrawProfessional, KaleidaGraph, Mestrenova, Delta, Scifinder, Reaxys, Mendeley, EndNote, Zootero, ChemInventory.

ADDITIONAL SKILLS

- Co-operative, dynamic, assertive, proactive, and competent team player that undertakes any task continuously collaborating to other group members.
- Good communication and relational skills with colleagues and with the public acquired attending international conferences and during students' supervision.
- Very efficient and creative in translating ideas into actions independently and in a timely manner, efficient problem-solving attitude.
- Excellent organizational skills and great adaptability to work in different reality with different supervision.
- Very good interpersonal and approachability skills, excellent in motivating and developing others.

RELATED RESEARCH OUTCOMES

-PEER-REVIEWED PUBLICATIONS (original research papers and review articles):

13) M. Giordano, G. Volpi, C. Garino, **F. Cardano**, C. Barolo, G. Viscardi, A. Fin. New fluorescent derivatives from papaverine: Two mechanisms to increase the quantum yield. Dyes and Pigments, 2023, *218*, 111482.

12) G. Renno, **F. Cardano***, V. Ilieva, G. Viscardi, A. Fin. Near-Infrared squaraine dyes as bright fluorescent probes: a structure-activity photo physical investigation in liposomes. Eur. J. Org. Chem.2022, e202200833. DOI: 10.1002/ejoc.202200833

11) G. Renno, **F. Cardano**, G. Volpi, C. Barolo, G. Viscardi, and A. Fin. Imidazo[1,5-*a*]pyridine-based fluorescent membrane probes: a photophysical investigation in liposome models. Molecules, 2022, *27*, 3856-3870.

10) V. Pelliccioli, **F. Cardano**, G. Renno, F. Vasile, C. Graiff, G. Mazzeo, A. Fin, G. Longhi, S. Abbate, A. Rosetti, C. Villani, G. Viscardi, E. Licandro and S. Cauteruccio. Synthesis, Stereochemical and Photophysical Properties of Functionalized Thiahelicenes. Catalysts, 2022, *12*, 366-384.

9) C. Bellomo, D. Zanetti, **F. Cardano**, S. Sinha, M. Chaari, A. Fin, A. Maranzana, R. Núñez, M. Blangetti and C. Prandi. Red Light-Emitting Carborane-BODIPY Dyes: Synthesis and Properties of Visible-Light Tuned Fluorophores with Enhanced Boron Content. Dyes Pigm. 2021, *194*, 109644-109657.

8) A. Mannu, **F. Cardano**, S. Baldino, A. Fin. Behavior of Ternary Mixtures of Hydrogen Bond Acceptors and Donors in Terms of Band Gap Energies. Materials, 2021, *14*, 3418-3426.

7) A. Mannu, **F. Cardano**, A. Fin, S. Baldino and C. Prandi. Choline chloride-based ternary Deep Band Gap Systems. J. Mol. Liq., 2021, *330*, 115717-115723.

6) M.M.A. Mazza, **F. Cardano**, J.D. Baker, S. Giordani and F.M. Raymo. Switchable Coumarins for Ratiometric pH Sensing. Front. Mater. 2021, *8*, 630046-1-9.

5) M. Gastaldi, **F. Cardano**, M. Zanetti, G. Viscardi, C. Barolo, S. Bordiga, S. Magdassi, A. Fin and I. Roppolo. Functional Dyes in Polymeric 3D Printing: Applications and Perspectives. ACS Materials Lett., 2021, *3*, 1-17.

4) **F. Cardano**, E. Del Canto and S. Giordani. Spiropyrans for light-controlled drug delivery. Dalton Trans., 2019, *48*, 15537-15544.

3) M.M.A. Mazza, **F. Cardano**, J. Cusido, J.D. Baker, S. Giordani and F.M. Raymo. Ratiometric temperature sensing with fluorescent thermochromic switches. Chem. Commun., 2019, *55*, 1112-1115.

2) **F. Cardano**, M. Frasconi and S. Giordani. Photo-responsive graphene and carbon nanotubes to control and tackle biological systems. Front. Chem., 2018, *6*, 102-1-17.

1) J. Sun, F. Morales-Lara, A. Klechikov, A.V. Talyzin, I.A. Baburin, G. Seifert, **F. Cardano**, M. Baldrighi, M. Frasconi and S. Giordani. Porous graphite oxide pillared with tetrapod-shaped molecules. Carbon N. Y., 2017, *120*, 145-156.

-CONFERENCE ORAL COMMUNICATIONS:

3) **F. Cardano**, G. Renno, C. Barolo, E. Licandro, G. Viscardi, G. Cravotto, A. Fin "Squaraine NIR dyes: a structure to function study for novel bilayer membrane probes" at European Chemical Biology Symposium, Virtual Symposium, 26/05/2021-28/05/2021.

2) **F. Cardano**, N. Barbero, M. Giordano, M. Bonomo, Y. Ren, F. Grifoni, W. Naim, R. Borrelli, G. Viscardi, F. Sauvage, S.M. Zakeeruddin, M. Gratzel, C. Barolo "Low cost Near-infrared absorbing dyes for building integrated applications" at Central European Conference on Photochemistry, CECP2020, Bad Hofgastein, Austria, 09/02/2020-13/02/2020.

1) **F. Cardano**, E. Del Canto, S. Giordani "A Spiropyran Molecule for the Delivery of Aspirin" at XXXIX Convegno Nazionale della Divisione di Chimica Organica della Società Chimica Italiana, Turin, Italy, 08/09/2019-12/09/2019.

-CONFERENCE POSTER PRESENTATIONS:

4) **F. Cardano**, G. Renno, M. Fresia, M. Blangetti, C. Prandi, G.Viscardi, A. Fin. "Nucleic acids visualization by amphiphilic naphthalenediimides emissive probes" at XLI Convegno Nazionale della Divisione di Chimica Organica, CDCO_Rome 10/09/23-14/09/23.

3) **F. Cardano**, R.M. Dell'Acqua, S. Cauteruccio, E. Licandro, G. Catucci, G. Di Nardo, G. Gilardi, G. Viscardi, A. Fin. "Intrinsically emissive peptide nucleic acids" at WORKSHOP: I chimici per le biotecnologie_Naples 27/02/23 with ORAL FLASH PRESENTATION.

2) **F. Cardano**, M. Frasconi, S. Giordani "Assembly of pillared Graphene Oxide Mesostructures" at Technological Workshop SCI: Chemistry of graphene and applications in catalysis and polymer_ Milan, Italy, 13/06/2019.

1) **F. Cardano**, M. M.A. Mazza, J.D. Baker, S. Giordani, F.M. Raymo "Photochemical and Photophysical Studies of Coumarin and Carbazole Fluorophores Conjugated with Photochromic Subunits". at 27th IUPAC International Symposium in Photochemistry, Dublin, Ireland, 08/07/2018-13/07/2018.

-CONFERENCES ATTENDANCE:

SCS Spring Meeting 2022, Geneva, Switzerland, April 2022.
Photopharmacology III, online event, November 2021.

-SUMMER SCHOOLS:

COST ACTION 1507 "Training School on Spectroscopy for the Characterization of Carbon-Related Materials" at University of Wien, Austria, 05/06/2018-08/06/2018. Travel Grant received for participation.

- GRANTS SUBMISSION:

PIANO NAZIONALE DI RIPRESA E RESILIENZA (PNRR) - MISSIONE 4 "ISTRUZIONE E RICERCA" COMPONENTE 2 "DALLA RICERCA ALL'IMPRESA" INVESTIMENTO 1.2 - **FINANZIAMENTO DI PROGETTI PRESENTATI DA GIOVANI RICERCATORI beneficiari di Seal of Excellence-** AVVISO N. 247 DEL 19/08/2022- Host Institution University of Turin, SSD CHIM/06, ranked n°30, to be enrolled by December 20, 2022 as RTDA at the University of Turin.

HORIZON-MSCA-2021-PF-01-EUROPEAN FELLOWSHIP, with University Medical Center Groningen (UMCG) as host institution and Prof. W. Szymanski as supervisor, score achieved 87.20%
Seal of Excellence obtained (not funded but score over 85%).

NOT funded: **ERC StG 2022**, **Roche per la Ricerca 2023** (in evaluation)

- AWARDS:

best EurJOC Research Article by an early-career researcher-for the research article: Near-Infrared squaraine dyes as bright fluorescent probes: a structure-activity photo physical investigation in liposomes_ notified August 2023, certificate received 12 September 2023 at XLI CDCO.

-REVIEWING ACTIVITIES:

Since Sep. 2022 Review Editor for Frontiers in Chemistry-section Supramolecular Chemistry.
Since Feb. 2023 Reviewer for Current Issues in Molecular Biology (MDPI), Molecules (MDPI).

-TEACHING EXPERIENCES:

-Teaching in Organic Chemistry a.y, 2022/2023 University of Turin, B.Sc. Biotechnology.
-Teaching in Applied Organic Chemistry a.y. 2022/2023 University of Turin M. Sc. Industrial Chemistry.
-Teaching in Organic Chemistry for Chemical Biology and Biomedical Applications "New Concepts in Chemical Synthesis and Reactivity" University of Turin, PhD School in Chemistry and Material Science.
-Lecturer in Organic Chemistry a.y. 2019/2020-2020/2021 University of Turin, B.Sc. Biotechnology (Prof. A. Fin).
-Teaching Assistant, Laboratory of Organic and Inorganic Synthesis with industrial relevance 2020/2021 University of Turin, B.Sc. Industrial Chemistry (Prof. G. Viscardi).
-Teaching Assistant, Laboratory of Organic Chemistry a.y. 2021/2022 University of Milan, B.Sc. Chemistry,
and Industrial Chemistry (Prof. L. Belvisi- S. Sattin).

-MENTORING EXPERIENCES:

University of Turin a.y. 2023-2024

. Co-**Supervisor M. Sc. thesis project** in Industrial Chemistry by Paolo Bonino.
Synthesis and photophysical evaluation of intrinsically emissive PNA.

University of Turin a.y. 2022-2023

. **Supervisor M. Sc. thesis project** in Industrial Chemistry by Maria Sara Scatigna.
Synthesis of novel photopharmacology tools for Cancer Immunotherapy

Co-Supervisor M.Sc. thesis project in Industrial Chemistry by Rebecca Di Salvo.
Synthesis and photophysical evaluation of isomorphic emissive PNA nucleobases.

Co-Supervisor M.Sc. thesis project in Analitic and Forensic Chemistry by Arianna Sanna.
Synthesis of NDIs as fluorescent sensors for Chemical Biology.

Supervisor B.Sc. thesis project in Chemistry by Eleonora Francesca Viasco.
Fluorescent PNA: chemistry and applications.

Supervisor B.Sc. thesis project in Chemistry by Teodora Inaudi.
Azobenzene as photo-responsive molecules in photoswitchable lipids

Co-Supervisor B.Sc. thesis project in Molecular Biotechnology by Maria Luana Miron.
Photopharmacology a research approach with eminent clinical potentiality.

Co-Supervisor B.Sc. thesis project in Molecular Biotechnology by Vittorio Caggiano.
tbd

University of Milan a.y. 2021-2022

. **Co-Supervisor M. Sc. thesis project** in Chemistry by Damiano Donati.
Synthesis of NDIs for the development of emissive PNA.

Co-Supervisor M.Sc. thesis project in Industrial Chemistry by Beatrice Baldoni.
Synthesis and characterization of azathiahelicenes for application in SERS spectroscopy.

Co-Supervisor B.Sc. thesis project in Industrial Chemistry by Luca Langè.
Synthesis of novel thiahelicenes building blocks.

University of Milan a.y. 2020-2021

Co-Supervisor M.Sc. thesis project in Chemistry by Natale Crisafulli.
Synthesis and characterization of thiahelicenes with diversified optical properties.

Co-Supervisor M.Sc. thesis project in Chemistry by Cristina Gabbrielli.
Synthesis and characterization of thiahelicenes with atropoisomeric precursors.

Co-Supervisor B.Sc. thesis project in Industrial Chemistry by Marco Fattalini.

New helicene's enantioselective synthetic strategies.

Co-Supervisor B.Sc. thesis project in Industrial Chemistry by Alessandro Fumagalli.
Design and synthesis of thiahelicenes for SERS spectroscopy.

University of Turin a.y. 2019-2020

Co-Supervisor M.Sc. thesis project in Industrial Chemistry by Gaetan Kamalo Lessa.
Dyes Sensitized solar cells: NIR sensitizing dyes.

Co-Supervisor M.Sc. thesis project in Biotechnology by Giulia Vassallo.
NIR dyes: impact of the alkyl chain on the insertion kinetic and bilayer membrane visualization.

OUTREACH ACTIVITIES

-Chemistry Tutor, training high school teachers, a.y. 2020-2021-Istituto Lombardo (Milan)
Fondazione I Lincei per la scuola (Italian Ministry of Education).
-Public Engagement activities during Postdoc experiences: research group website/social media managing, enrolled for the 2023 U*NIGHT Notte dei Ricercatori (29.09.2023), with University of Turin, Cluster Health and ApertaMenteChimica (20-22 May 2023).

LANGUAGES
Italian: native speaker (C2) - English: advanced user (C1)

REFERENCES

Prof. F.M. Raymo (PhD Advisor) Full Professor of Chemistry - Laboratory for Molecular Photonics

Department of Chemistry, University of Miami, USA

1301 Memorial Drive, Coral Gables, Florida 33146-0431 fraymo@miami.edu

Prof. A. Fin (Postdoc Advisor) Associate Professor of Organic Chemistry

Department of Chemistry, University of Turin, Italy

Via Giuria 7, Turin, 10125 andrea.fin@unito.it

17/09/2023