



Debora Carrozza

Personal data

Born in Modena on 26/07/1996, 25 anni.
CRRDBR96L66F257E.
Italian nationality.
Driving license B.

Education

1st November 2021

Beginning of **Ph.D.** in the project “*Development of hybrid bio-materials of theranostic applications*”, at the University of Modena and Reggio Emilia.
Tutor: Pr. Gianluca Malavasi
Co-tutor: Pr. Erika Ferrari

23rd October 2020

Master's Degree in Chemical Sciences (LM-54), with a vote of 110/110 *summa cum laude*, at the University of Modena and Reggio Emilia with the thesis entitled “*Synthesis of Ferric-Citrate for pharmaceutical formulations: from laboratory to scale-up*”.
Internship carried out at the University of Modena and Reggio Emilia in collaboration with Biofer S.p.A., focused on the synthesis and characterization of Ferric-Citrate complexes.

20th July 2018

Bachelor's Degree in Chemistry (L-27), with a vote of 110/110, at the University of Modena and Reggio Emilia with the thesis entitled “*Synthesis of curcumin derivatives as radiotracers marked with ⁶⁴Cu for the diagnosis of colon cancer*”.
Internship carried out at the University of Modena and Reggio Emilia, focused on the synthesis of new organic binders derived from curcumin.

4th July 2015

High school diploma, with a vote of 96/100, at the E. Fermi Institute in Modena.

Professional Qualification

16th June 2021

Qualification to the profession of Chemist obtained at the University of Modena and Reggio Emilia, first session 2021.



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Teaching Activity

December 2022 – February 2023

Tutor for *General and Inorganic Chemistry course* (Lecturer: Prof. Erika Ferrari and Dr. Luca Rigamonti, Bachelor's degree in Chemistry - University of Modena and Reggio Emilia). The activity was focused on chemical exercises in preparation for the final assessment. (20 hrs)

May 2022 - June 2022

Tutor in a project financed by the State in DM 752, in the guidance at high school in support of teachers, aimed at approaching the scientific method and university teaching. (35 hrs)

May 2022 - June 2022

Tutor for *Organic Chemistry II course* (Lecturer: Prof. Adele Mucci, Bachelor's degree in Chemistry - University of Modena and Reggio Emilia). The activity was focused on chemical exercises in preparation for the final assessment. (10 hrs)

May 2022 - June 2022

Tutor for *Organic Chemistry I course* (Lecturer: Prof. Emanuela Libertini, Bachelor's degree in Chemistry - University of Modena and Reggio Emilia). The activity was focused on chemical exercises in preparation for the final assessment. (10 hrs)

November 2021 - December 2021

Tutor for *General and Inorganic Chemistry course* (Lecturer: Prof. Erika Ferrari and Dr. Luca Rigamonti, Bachelor's degree in Chemistry - University of Modena and Reggio Emilia). The activity was focused on chemical exercises in preparation for the final assessment. (20 hrs)

January 2021 - June 2021

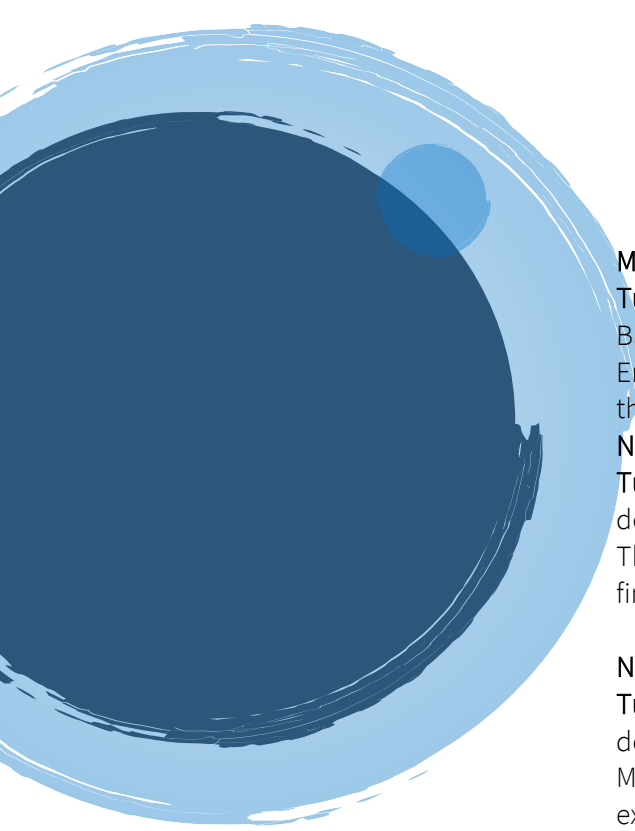
Tutor for *General and Inorganic Chemistry course* (Lecturer: Prof. Gianantonio Battistuzzi, Bachelor's degree in Chemistry - University of Modena and Reggio Emilia). The activity was focused on chemical exercises in preparation for the final assessment. (30 hrs)

December 2020

Tutor for *General and Inorganic Chemistry course* (Lecturer: Prof. Erika Ferrari and Dr. Luca Rigamonti, Bachelor's degree in Chemistry - University of Modena and Reggio Emilia). The activity was focused on chemical exercises in preparation for the final assessment. (30 hrs)

May 2020 - June 2020

Tutor for *Organic Chemistry II course* (Lecturer: Prof. Adele Mucci, Bachelor's degree in Chemistry - University of Modena and Reggio Emilia). The activity was focused on chemical exercises in preparation for the final assessment. (20 hrs)



May 2020 - June 2020

Tutor for *Organic Chemistry I* course (Lecturer: Prof. Emanuela Libertini, Bachelor's degree in Chemistry - University of Modena and Reggio Emilia). The activity was focused on chemical exercises in preparation for the final assessment. (10 hrs)

November 2019 - February 2020

Tutor for *Chemistry* course (Lecturer: Prof. Gianluca Malavasi, Bachelor's degree in Natural Sciences - University of Modena and Reggio Emilia). The activity was focused on chemical exercises in preparation for the final assessment. (30 hrs)

November 2018 - February 2019

Tutor for *Chemistry* course (Lecturer: Prof. Gianluca Malavasi, Bachelor's degree in Natural Sciences and Geological Sciences - University of Modena and Reggio Emilia). The activity was focused on chemical exercises in preparation for the final assessment. (30 hrs)

May 2019 - January 2020

Collaboration with the **Disabled Assistance Service** of the University of Modena and Reggio Emilia for tutoring and study support activities. (10 hrs)

November 2018 - February 2019

Tutor for *Chemistry* course (Lecturer: Prof. Gianluca Malavasi, Bachelor's degree in Natural Sciences and Geological Sciences - University of Modena and Reggio Emilia). The activity was focused on chemical exercises in preparation for the final assessment. (40 hrs)

September 2018 - December 2019

Collaboration with university Professors Gianantonio Battistuzzi and Gianluca Malavasi for the laboratory management of school-work alternation, with students from ITIS Corni in Modena.

September 2015 – Today

Study support through repetition lessons for high school students. Support for study in preparation for university exams through repetitions.

September 2015 - May 2017

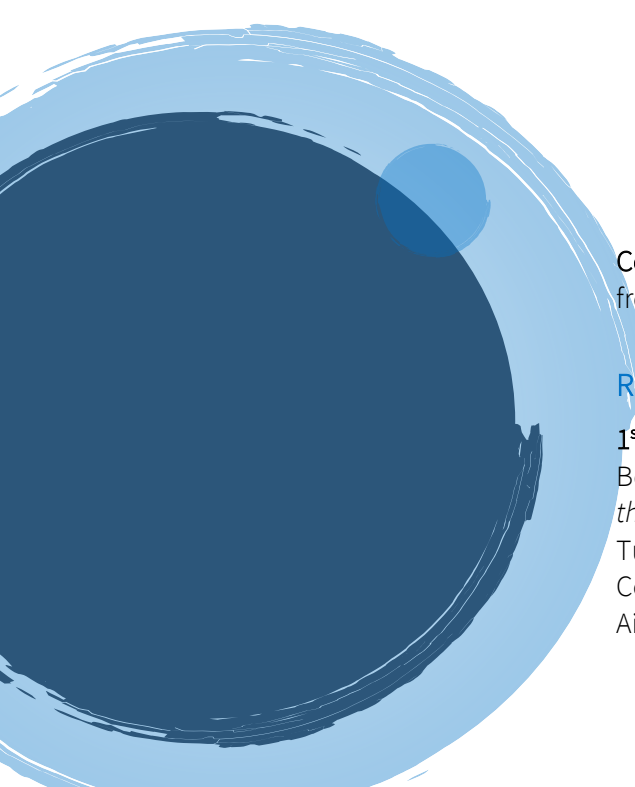
Laboratory analysis at anodizing mechanical parts company.

Supervisor or co-supervisor in thesis

2022

Co-supervisor in a thesis entitled "Synthesis and characterization of porous silica".

Co-supervisor in a thesis entitled "Synthesis and characterization of silica based porous materials for drug delivery".



Co-supervisor in a thesis entitled “Synthesis of Ferric Citrate: scale-up from laboratory to pilot plant”.

Research Experience

1st November 2021 – Today

Beginning of **Ph.D.** in the project “*Development of hybrid bio-materials of theranostic applications*”, at the University of Modena and Reggio Emilia.

Tutor: Pr. Gianluca Malavasi

Co-tutor: Pr. Erika Ferrari

Aims of the project:

- Synthesis of silica materials with large pore structure, suitable for the encapsulation of theranostic substances and their delivery;
- Loading of theranostic substances inside the structures synthesized,
- Covering particles with a smart coating, sensible to variation of electrostatic potential, for an in-situ release;
- Addition of specific targeting vector.

2nd May 2021 – 2nd November 2021

Self-employment contract signed with the Department of Chemical and Geological Sciences (Tutor Prof. Erika Ferrari) as part of the project “*Synthesis of Ferric-Citrate complexes*”.

Aims of the project:

- development of the synthesis;
- purification/characterization of the products;
- optimization of the industrial scale-up for the manufacture of an iron citrate-based product for pharmaceutical usage.

March 2020 – October 2020

Internship under the supervision of Prof. Erika Ferrari and in collaboration with the pharmaceutical company Biofer S.p.A.

Degree Course: Master's Degree in Chemical Sciences

Thesis Title: *Summary of Ferric-Citrate for pharmaceutical formulations: from laboratory to scale-up.*

The internship project was focused on optimizing the synthesis conditions of an iron-oxide-hydroxide precursor to be used for the synthesis of ferric-citrate, an active ingredient used for the clinical treatment of chronic kidney disease and anemia. The work carried out can be divided into the following main phases:

1. *Bibliographical and patent research*. The first phase of the internship was dedicated to in-depth bibliographic and patent research that allowed to update the state of the art in the use and production of iron citrate-based complexes. The research made it possible to design the experimental procedures to be adopted and the variables (physical and chemical) important for the preparation process of the iron-oxide-hydroxide intermediate.



2. Improvement of synthesis conditions using a computational approach and exploiting experimental drawing (DoE). After outlining the synthesis to be prepared and the main process parameters, I had the opportunity to use the computational approach of experimental drawing and deepen my knowledge of this technique, which has been applied for the improvement of synthesis conditions. The use of experimental design and chemometric techniques has made it possible to optimize the synthetic strategy and to define the most relevant experimental variables for synthesis.
3. Process design and set-up. During the project, I dealt with the synthesis and set-up of analytical methods of characterization and quantification of products. I have gained experience in numerous solid-state characterization techniques (Elementary analysis, optical ICP analyzer, dust diffractometry (XRDP), surface area (BET).
4. Main final results. At the end of the internship, the main objective was achieved to define the experimental conditions, which can be implemented in an industrial scale-up, for the synthesis of the precursor of ferro-oxide-hydroxide to be used in the synthesis of ferric citrate. The project also made it possible to optimize the analytical procedures of product characterization.

February 2018 - July 2018

Internship at the Department of Chemical and Geological Sciences,
Supervisor: Prof. Erika Ferrari

Degree Course: Bachelor's Degree in Chemistry

Thesis Title: *Synthesis of curcumin derivatives as radiotracers marked with ^{64}Cu for the diagnosis of colon cancer.*

During the internship during my bachelor's degree in Chemistry, I dedicated myself to the synthesis and characterization of organometallic complexes between copper ion and tetrapyrrolic binders, with the aim of optimizing synthesis and obtaining complexes that could be used for imaging (PET, positron emission tomography).

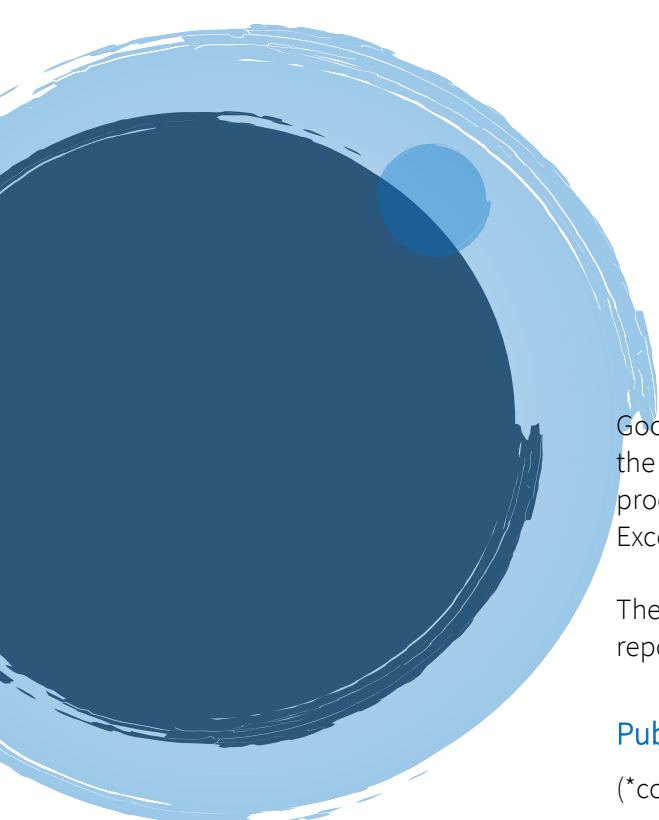
In addition to the main organic synthesis techniques aimed at obtaining binders, the internship allowed me to deepen different purification and characterization techniques (flash column chromatography, mass spectrometry coupled with liquid chromatography (LC-MS), nuclear magnetic resonance imaging ($^1\text{H}/^{13}\text{C}$ -NMR), UV-Vis spectroscopy).

Chemical Expertise

Excellent skills in Organic/inorganic synthesis

Very good knowledge of several analytical techniques:

- Scanning electron microscopy (SEM-FEG);
- Spectroscopy (UV-Vis, Fluorescence, FT-IR, ICP-OES, NMR);
- Chromatography (LC-MS, LC-MS/MS, GC-MS);

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- Diffractometry (X-Ray Diffraction on Powder - XRD);
 - Thermal analysis (TG, DTA, DSC);
 - Textural analysis (N₂ adsorption/desorption).

Good knowledge of chemometric analysis techniques (PCA, PLS) and in the design and experimental setup of organic and inorganic synthetic procedures.

Excellent skills in scientific bibliographic and patent research.

These skills have been acquired during internship activities, which are reported below.

Publications and posters

(*corresponding author; presenting author)

May 2023

"Very large pores mesoporous silica as new candidate for delivery of big molecules, such as pharmaceutical peptides".

Debora Carrozza, Gianluca Malavasi * and Erika Ferrari.

Published in: International Journal of Molecular Sciences.

January 2023

"Alginate Beads Containing Cerium-Doped Mesoporous Glass and Curcumin: Delivery and Stabilization of Therapeutics".

Debora Carrozza, Gianluca Malavasi*, Erika Ferrari and Maria Cristina Menziani.

Published in: International Journal of Molecular Sciences.

16th – 19th October 2022

"Autumn Meeting for Young Chemists in Biomedical Sciences – AMYC BIOMED 2022"

"Large pore mesoporous silica (LPMS) suitable for therapy application in the drug delivery of unconventional large molecules".

Debora Carrozza, Gianluca Malavasi, and Erika Ferrari. (Accepted as Poster Communication)

6th – 9th September 2022

"XLVIII Italian Conference of Inorganic Chemistry – INORG 2022"

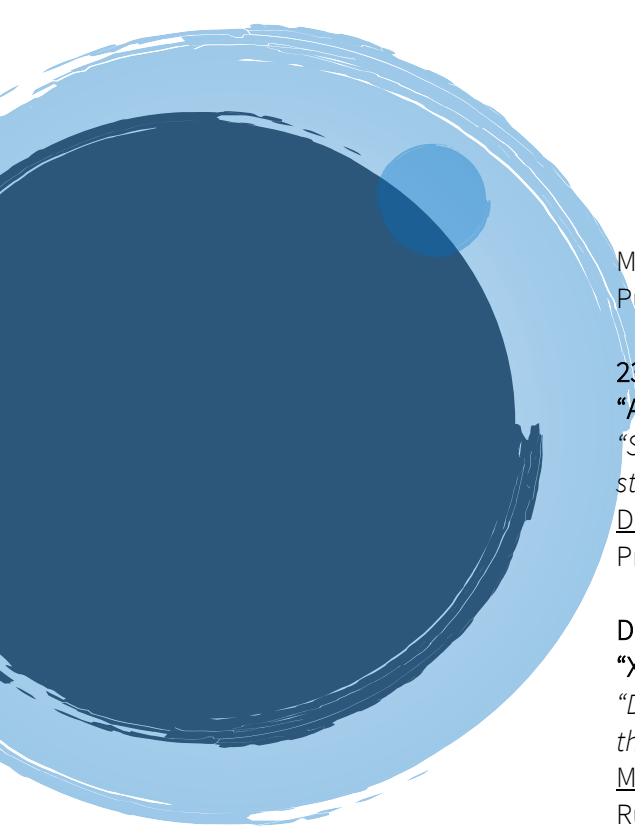
"Large pore mesoporous silica (LPMS) as an appropriate carrier for large therapeutic molecules"

Debora Carrozza, Gianluca Malavasi, and Erika Ferrari. (Accepted as Oral Presentation)

July 2022

"Curcumin-Based - Diketo Ligands for Ga³⁺: Thermodynamic Investigation of Potential Metal-Based Drugs".

Matteo Mari, Debora Carrozza, Gianluca Malavasi, Ettore Venturi, Giulia Avino, Pier Cesare Capponi, Michele Iori, Sara Rubagotti, Silvia Belluti,



Mattia Asti and Erika Ferrari.
Published in: Pharmaceuticals.

23rd – 24th June 2022

“Advanced Inorganic Materials - AIM 2022”

“Synthesis and characterization of large-pore mesoporous silica structures”

Debora Carrozza, Gianluca Malavasi, and Erika Ferrari. (Accepted as Flash Presentation)

December 2021

“XX Giornata della Chimica dell’Emilia Romagna 2021 (GdC-ER 2021)”

“Development of a new ligand based on Amino-pyrimidine Curcumin for theranostic applications”

Matteo Mari, Debora Carrozza, Michele Iori, Pier Cesare Capponi, Sara Rubagotti, Mattia Asti, Erika Ferrari (Accepted as Poster Communication).

September 2021

“XXVII Congresso Nazionale della Società Chimica Italiana”

“Cerium-containing mesoporous silica systems with enzymatic-like activity for Curcumin delivery”.

Debora Carrozza, Matteo Mari, Erika Ferrari, Gigliola Lusvardi, Gianluca Malavasi * (Accepted as Poster Communication).

September 2021

“XXVII Congresso Nazionale della Società Chimica Italiana”

“Amino-pyrimidine Curcumin derivative: metal ligand for theranostic applications”.

Matteo Mari, Debora Carrozza, Michele Iori, Pier Cesare Capponi, Sara Rubagotti, Mattia Asti, Erika Ferrari (Accepted as Poster Communication).

June 2021

“Applications of radiolabelled curcumin and curcumin derivatives in medicinal chemistry”.

Matteo Mari, Debora Carrozza, Erika Ferrari, Mattia Asti
Published in: International Journal of Molecular Sciences.

June 2021

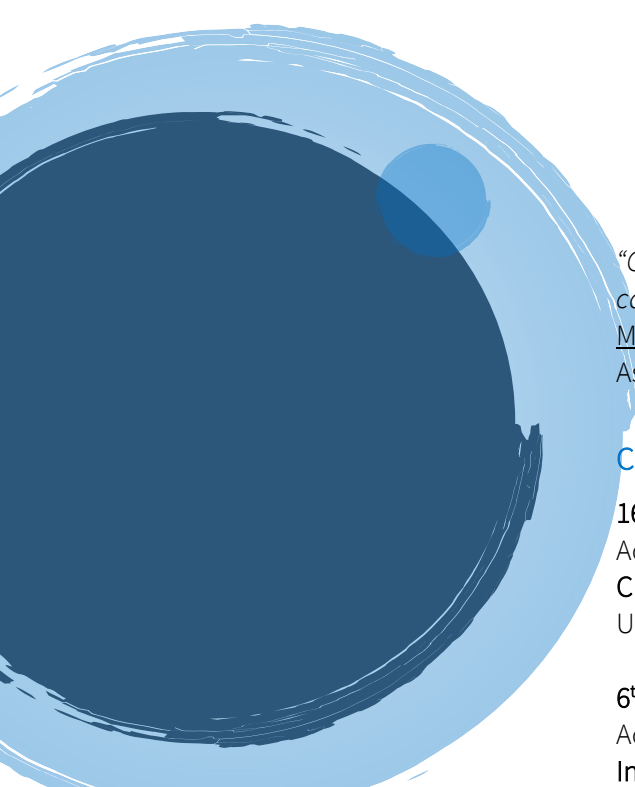
“International Symposium on Thermodynamics of Metal Complexes ISMEC 2021”

“Curcumin-based β -diketo ligands for Ga^{3+} : on the way to develop new antineoplastic agents”.

Debora Carrozza, Matteo Mari, Michele Iori, Pier Cesare Capponi, Sara Rubagotti, Mattia Asti, Erika Ferrari (Accepted as Poster Communication).

June 2021

“International Symposium on Thermodynamics of Metal Complexes ISMEC 2021”



“Curcumin derivatives as Platinum (II) coordination system for colon-rectal cancer therapy”

Matteo Mari, Debora Carrozza, Michele Iori, Pier Cesare Capponi, Mattia Asti, Erika Ferrari (Accepted as Poster Communication).

Congresses, courses and seminars

16th – 19th October 2022

Accepted, with a poster communication, to “Autumn Meeting for Young Chemists in Biomedical Sciences – AMYC BIOMED 2022”, organized by University of Naples Federico II.

6th – 9th September 2022

Accepted, with an oral contribution, to “XLVIII Italian Conference of Inorganic Chemistry – INORG2022”, organized by the Italian Chemical Society (SCI).

23rd – 24th June 2022

Accepted with a Flash Presentation to “Advanced Inorganic Materials - AIM 2022”. Organized by the Universities of Padova and Bari.

21st-25th February 2022

Accepted, with the grant, as an attendee to the “Conventional and high-energy spectroscopies for inorganic, organic and biomolecular surfaces and interfaces - CHESS 2022”. Organized from the University of Milan.

15th-18th December 2021

Accepted as an attendee to the “International School on Inorganic Materials – Synthesis, modeling and characterization - INOMAT 2022”. Organized by the Universities of Torino and Padova and the Inorganic Chemistry Division of the Italian Chemical Society.

25th November 2021

Webinar “Wonder drugs, magic bullets and miracle cures: From Salvarsan to Covid vaccine, and between science and magic”. Speaker Dr. Viviane Quirke, Oxford Brookes University.

19th November 2021

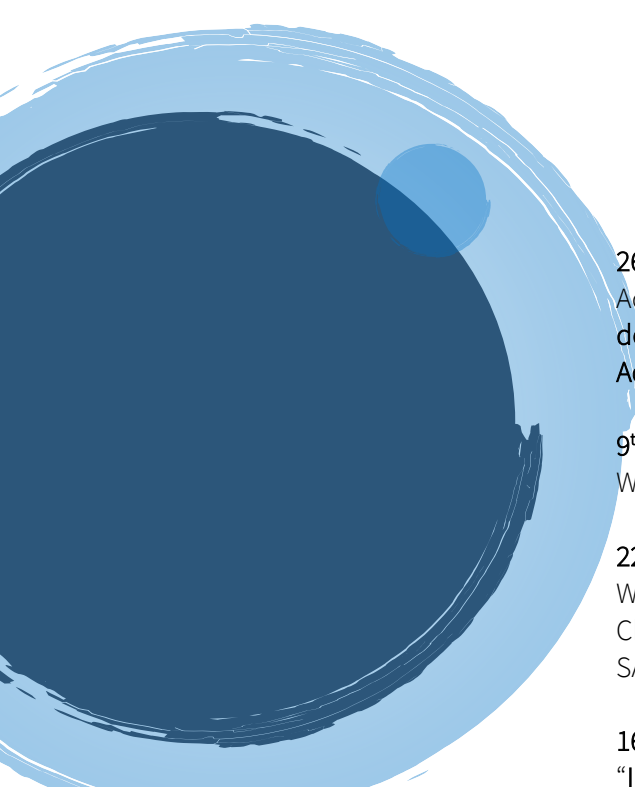
Webinar “Stimuli-responsive hybrid nanoconstructs for efficient theranostic applications in nanomedicine”. Speaker Prof. Valentina Caudia, University of Milan Department of Chemistry.

17th-30th November 2021

Attendance to “XIII scuola di ricerca educativa e didattica chimica “Ulderico Segre”, organized from Italian Chemical Society.

1st-3rd September 2021

Accepted as an attendee to the “XIIIth International School of Organometallic Chemistry – ISOC 2021”.



26th-28th July 2021

Accepted as an attendee to the “1st ISMEC-NECTAR training school on the determination, analysis and use of thermodynamic data. SOLvE – Advances in SOLution Equilibria”.

9th July 2021

Webinar “Circular economy and catalysis”.

22nd-26th June 2020

Webinar “Smarter experimentation for chemists” organized from Chemistry Word. Speaker del webinar Dr. Phil Kay, analytics Consultant, SAS JMP.

16th-18th June 2021

“International Symposium on Thermodynamics of Metal Complexes – ISCMEC 2021”, Bialystok (Polonia).

Participation in conferences, lectures, and presentation of the poster entitled “*Curcumin-based β -diketo ligands for Ga³⁺: on the way to develop new antineoplastic agents*”.

October 2018

Seminar “*Introduction to Radiochemistry: from basics to clinics*”. (16 hrs).

October 2015

FADsicurMore project according to legislative decree 81/08, for safety in laboratories.

Membership

May 2021-today

Member of SCI (Italian Chemical Society), in the Inorganic Chemistry Division.

Softwares

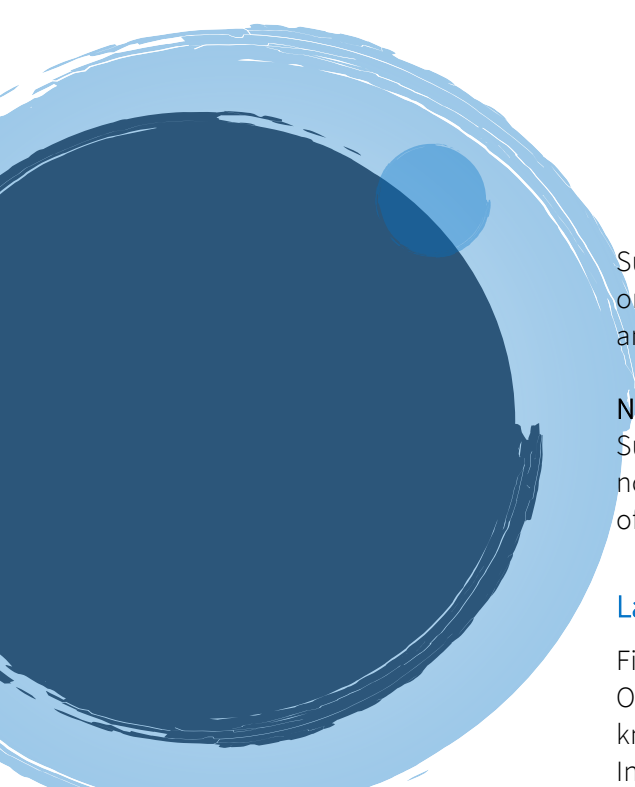
Excellent knowledge and use of:

- Office package programs (Word, Excel, PowerPoint, Outlook);
- MatLab;
- programs for the management of instruments and data processing;
- HTTP browsers (Chrome, Internet Explorer, Firefox).

June 2023

Successfully completed “Excel Skills for Business: Intermediate II”, an online non-credit course authorized by Macquarie University (Sydney) and offered through Coursera.

January 2022



Successfully completed “**Excel Skills for Business: Intermediate I**”, an online non-credit course authorized by Macquarie University (Sydney) and offered through Coursera.

November 2021

Successfully completed “**Excel Skills for Business: Essentials**”, an online non-credit course authorized by Macquarie University (Sydney) and offered through Coursera.

Languages

First language: Italian.

Other languages: English spoken and written good; French school knowledge.

In the academic years 2017/2018 and 2019/2020 I took two university courses, held by Italian professors, in English.

January 2022 – February 2022

Successfully completed **Spanish A1** course. Online course organized by CLA (Centro Linguistico di Ateneo) of the University of Modena and Reggio Emilia.

Transversal skills

Excellent communication, collaborative, organizational and relational skills acquired thanks to the possibilities offered by the university and personal experiences.

Good autonomy and resourcefulness in carrying out activities, good problem-solving skills.

Flexibility and adaptability to situations. Determination to achieve goals and to learn continuously.



Contacts for References

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University of Modena and Reggio Emilia
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Erika Ferrari, PhD

Associate Professor of Inorganic Chemistry
Department of Chemical and Geological Sciences
University of Modena and Reggio Emilia
Via G. Campi 103 - 41125, Modena (MO)
Telephone: 059 205 8631 –8692; 347 4549492
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