

## Lucia Tonucci - Curriculum Vitae

lucia.tonucci@unich.it

### Current position

**Assistant Professor** in the **03 /CHEM-03** sector (General and Inorganic Chemistry, CHEM-03/A) at the University "G. d'Annunzio" of Chieti-Pescara.

**Teacher** at the "G. d'Annunzio" University of: **Transfer of scientific knowledge** (Master's Degree in Pedagogical Sciences); **General Chemistry** (Bachelor's Degree in Health Care); **Environmental Chemistry** (1 module, Degree in Geological Sciences); **Environmental sustainability objectives** and **Green processes for the territory** (Master's Degree in Economics of Tourism and Culture); **Teaching of Green Chemistry and the Environment** (A50 qualification path).

**Public Engagement Referent**, "G. d'Annunzio" University.

**Member of the Academic Senate**, "G. d'Annunzio" University.

**Member Doctoral board** of PhD Ecosystem in Natural sciences, Allianz INGENIUM.

**PhD tutor** in chemistry **joint degree** between the University "G. d'Annunzio" and the University of Rouen-Normandie.

### Main research interests

**Green and sustainable chemistry**: green synthesis of transition metal nanoparticles; oxidation, reduction and hydrogenation reactions in aqueous solvent, catalyzed and photocatalyzed by metal complexes, oxides and nanoparticles; deoxydehydration reactions; photogeneration of singlet oxygen; chemical valorization of by-products and waste of plant origin (lignin, glycerol, CO<sub>2</sub>).

### Training

**PhD in Science** (XV Cycle) - "G. d'Annunzio" University of Chieti-Pescara - final dissertation: "*Oxidation of organic compounds in aqueous phase catalyzed by transition metal complexes*".  
Tutor: Prof. Mario Bressan

State Examination for the **qualification for the profession of chemist** - University of Bologna

**Degree in Chemistry** - University of Bologna - experimental thesis in photochemistry  
("Photophysical and photochemical properties of bichromophoric systems: towards the construction of molecular switches"). Supervisor: Prof. Vincenzo Balzani; co-supervisor: Prof. Luisa De Cola

### Previous scientific activity

September 2010 – February 2011 **Contract of coordinated and continuous** collaboration for research activities at the Department of Science of G. d'Annunzio University on "Selective transformations of intermediates of the shikimic acid pathway (glucose biotransformations) for the obtaining of optically active carbasugars, phenolic derivatives and/or dihydroxylated derivatives with high regioselectivity" (duration: 6 months; project manager: Prof. Mario Bressan). *Contract within the CIPE Project Research Consortium for Technological Innovation, Quality and Food s.c.r.l.: it is a matter of designing and testing chemical transformations of shikimic acid (or its models) in green conditions to give products of industrial interest. la Sicurezza*

November 2009 – April 2010 **Coordinated and continuous collaboration contract** for research activities at the Department of Science of G. d'Annunzio University on "Green Chemistry – Tackifiers from Lignin" (duration: 6 months; project manager: Prof. Nicola d'Alessandro). *Contract as an auxiliary researcher within the framework of the research agreement with Procter & Gamble to test the possibility of obtaining tackifiers or raw material from lignins that can serve as a source of tackifiers through simple oxidative processes.*

November 2008 – October 2009 **Coordinated and continuous collaboration contract** for research activities at the Department of Science of G. d'Annunzio University on "Execution of scientific activity and conduct of research in the field of green chemistry" (duration: 12 months; scientific coordinator: Prof. Mario Bressan) *Contract within the CIPE Project Research Consortium for Technological Innovation, Quality and Food s.c.r.l. to design and test chemical transformations on shikimic acid (or its models) in green conditions to give products of industrial interest. la Sicurezza*

October 2007 – September 2008 **Scholarship for research activities** on "Selective oxidation of natural derivatives" at the Department of Science, G. d'Annunzio University (duration: 12 months; tutor: Prof. Nicola d'Alessandro). *Fellowship to design and perform catalytic,*

*photocatalytic, and photosensitized oxidation experiments on model compounds of natural products such as shikimic acid.*

July 2006 – June 2007 **Research grant on** "Selective oxidation of natural derivatives" (disciplinary sector CHIM/03) at the Department of Science, G. d'Annunzio University (duration: 12 months; tutor: Prof. Nicola d'Alessandro). *Research grant to design and perform catalytic, photocatalytic and photosensitised oxidation experiments on model compounds of natural products such as shikimic acid.*

June 2003 – October 2005 (5 months suspension for maternity leave) **Research grant on** "Environmentally compatible synthesis of molecules of biological interest for scale-up in pilot plant" (Disciplinary sector CHIM/03) at the Department of Science, G. d'Annunzio University (duration: 12 + 12 months; tutor: Prof. Mario Bressan). Possible *applications of metal sulfophthalocyanines as catalysts in green conditions (aqueous solvent, low T, oxygen or air as oxidant) to obtain compounds of industrial, pharmaceutical and food interest.*

November 1999 – October 2002 **Attendance of PhD course** in Science at the Department of Science at G. d'Annunzio University (duration: 36 months; tutor: Prof. Mario Bressan). *All the research carried out during the PhD and collected in the final thesis has been published in international scientific journals.*

April 1999 – March 2000 **Research Grant for the collaboration** on "Organo-metallic catalysis of oxidation in water" (duration: 12 months; disciplinary sector C03X) at G. d'Annunzio University of Chieti-Pescara (tutor: Prof. Mario Bressan). *The study was mainly aimed at the oxidation reactions of organic substrates ( $\alpha$ -Cl-olefins and alcohols) in water in the presence of inorganic hydroperoxides and ruthenium and iron complexes.*

November 1998 – February 1999 **Fixed-term employment contract for the execution of activities within the EEC project** at the Istituto Sperimentale per l'Elaiotecnica of Città Sant'Angelo (PE). *Collaboration activities at the chemical laboratory of the Research Institute for the recognition of natural organic substances contained in Abruzzo table olives.*

April 1997 – June 1997 graduated as a **Volunteer attendee** at the Food Laboratory of the provincial section A.R.P.A. (Regional Agency for the Environment of Emilia-Romagna) in Bologna. *Period of voluntary internship carried out by supporting ARPA technicians in the analysis of trace pesticides on fresh and preserved food.*

### Institutional activities - "G. d'Annunzio" University

**Public Engagement contact person**, assisting the University Delegate for the Third Mission, from 2023.

**Member of the Academic Senate**, since 2025.

**PhD tutor in chemistry joint degree** between "G. d'Annunzio" University and University of Rouen-Normandie, from 2025.

**Member of the Steering Committee** for Pedagogical Sciences Degree Course, since 2024.

**Member of the Joint Committee** for Pedagogical Sciences Degree Course, since 2019.

**Member of the Doctoral board of the PhD Ecosystem in Natural sciences** in INGENIUM alliance (European alliance of 10 universities, funded by Horizon), since 2025.

**President and member of the Qualification Commissions for competition class A50** for science teachers in upper secondary schools, from 2024.

**Member of the Research Steering Committee**, assisting the Rector's Delegate, 2019-2023.

**Tutor of RtdA PON** on a defined topic (chemical valorisation of CO<sub>2</sub>), 2021-2024.

**Member of the University Committee** organizing the **European Research Night**, 2017-2019.

**Member of the Credit Recognition Commission** for Pedagogical Sciences Degree Course, 2013-2019.

### Teaching activity - "G. d'Annunzio" University

Since 2012: **Scientific Knowledge Transfer** (CHIM/03, 6 CFU), Master's Degree in Pedagogical Sciences.

Since 2012: **Environmental Chemistry** (CHIM/12, 1 module), Bachelor Degree in Geological Sciences.

Since 2023: **General Chemistry** (CHIM/03, 1 CFU), Bachelor Degree in Health Care.

From 2024: **Didactics of Green and Environmental Chemistry** (CHIM/03, 3 CFU) for the A50 qualification course for science teachers.

From 2025: **Environmental Sustainability Objectives** and **Green Processes for the Territory** (CHIM/03, 6 CFU), Master's Degree in Economics of Tourism and Culture.

From 2024: **Green Strategies for Sustainability and Waste Valorization** (2 CFU), PhD in Geosciences.

A.Y. 2024-2025: **Sustainability and Territorial Development** (CHIM/03), Master's Degree in Economics and Finance of Businesses and Ecosystems.

A.Y. 2011/12 - 2015/16: **Applied Chemistry** (CHIM/03, 6 CFU), Bachelor's Degree in Building Engineering (L-23).

A.Y. 2008/2009 and 2009/2010: **Applied Chemistry** (CHIM/03, 6 CFU), Degree Course in Building Techniques (L-23), Faculty of Architecture.

A.Y. 2008 / 2009: **Environmental Chemistry** (CHIM/12, 3 CFU), Bachelor Degree in Geological Sciences, Faculty of Sciences MM FF NN.

A.Y. 2007 / 2008: **Commissioner for the final exam** of the II Level Master "*Waste Disposal, Water Resources and Environmental Emergency*" Faculty of Sciences MM FF NN.

A.Y. 2007 / 2008: Professor of **Environmental Chemistry** within the II Level Master "*Waste Disposal, Water Resources and Environmental Emergency*" Faculty of Sciences MM FF NN.

April 2007 – June 2007 assignment for the preparation of material for the **teaching of Chemistry** as part of the intervention "Development and experimentation of widespread activities of orientation to technical-scientific paths for the entire five-year period of high schools" - POR Abruzzo Project - Objective 3.

A.Y. 2005/2006 and 2006/2007 assignment for the **teaching support course in Chemistry** (CHIM/03; 30 hours), Bachelor's Degree in Geological Sciences, Faculty of Sciences MM FF NN.

A.Y. 2002/2003 - 2004/2005 assignment - substitute teaching of **General and Inorganic Chemistry** (CHIM/03; 3.5 CFU) and **Organic Chemistry** (CHIM/06; 4 CFU), Bachelor Degree in Prevention Technician in the Environment and in the Workplace, Faculty of Medicine and Surgery.

**Supervisor** of over 100 Master's Degree theses in Pedagogical Sciences and 6 Bachelor's Degree theses in Building Engineering. **Co-supervisor** of over 80 experimental and compilative degree theses for the Bachelor's degree course in Geological Sciences, 1 in Industrial Chemistry and over 40 Master's degree theses in Pedagogical Sciences.

Member of the **Examination** and Degree Commissions for **Geological Sciences** and **Pedagogical Sciences**.

### Project activity

Project "Advanced HYbrid Deep eutectic solvent/polymeR mEmbrAnes for CO<sub>2</sub> capture - HYDREA" winner of a PhD scholarship in chemistry, joint University "d'Annunzio" – University of Rouen-Normandie, in **the Programme stratégique de l'Université de Rouen Normandie – INGENIUM** (role: co-PI and co-tutor; 2025-2028)

Project "STEMPower – Training those who train, inspire those who learn" winner of the **Call Department of Equal Opportunities of the Presidency of the Council of Ministers - STEM UNIVERSITY 2024** (role: member, 2025-2027)

Project "ReDesigning Textile Business in the Age of Global Sustainability: The Case of Upcycling" winner of the **China-CEE Institute** call (role: member, 2025-2026)

Project "Development of innovative clathrate- and graphene-based means for hydrogen storage with low energy requirement, high net energy content, and low environmental impact – HYDRAGRAPH" winner **of the PNRR Green Revolution and Ecological Transition** (role: member, 2025-2026)

Project "Use of bioconverted agricultural by-products with MICROrganisms for the improvement of PATate crops – MICROPAT" winner **of the PNRR Innovation Ecosystems** (role: member, 2024-2025)

Project "BEAST. Biogas Enrichment via Advanced Separation Techniques" winner **of the PNRR National Centers** (role: member, 2024-2025)

Progetto "Up2Green. Upcycling of wastes and by-products to green chemicals and energy" vincitore **INGENIUM** Joint Research Group (ruolo: PI, 2024-2025)

Project "Valorization of CO<sub>2</sub>: from waste to high value-added resource through chemical reactions in green conditions" winner **MIUR Green Action IV.6, DM 106 / 10.8.2021** (role: head and scientific tutor of RTDA PON, 2021-2024)

Progetto "Switching from petro- to bio-based chemistry: deoxydehydration reaction as versatile tool for the production of olefins from natural polyols" vincitore **PRIN 20223R3ZPF – 2022** (ruolo: membro)

Project "SANI Saper nutrire" winner **POR FESR Abruzzo** (2018, role: member)

### Valorisation of knowledge

2026 – "**Global Women's Breakfast: Many voices, one science. Overcoming challenges, planning the future**". Organizer of the IUPAC international conference

2026 – "**Incontro di Formazione "Chemistry in the Classroom: from naïve knowledge to scientific knowledge"**". Trainer for primary school teachers, Istituto Comprensivo "F. P. Michetti", Francavilla al Mare (CH)

2026 - "**Metacognition and feedback in teaching/learning**"; activities in collaboration with the chemistry teachers of the three-year period of the IIS A. Volta School in Pescara

2025 - "**Unraveling the misknowledge of chemistry - age 7-8 years**"; workshop activity at primary school, Francavilla al Mare (CH): 4 meetings of 2 hours with the second classes during school hours, in the presence of the teachers

2025 - **PNRR STEM orientation project**, Tinozzi Pescara Secondary School: "Discovering, creating and innovating: chemistry for the future of the Planet": 15 hours of afternoon lessons/workshops for students

2025 - "**Feedback activities in teaching/learning**"; activities in collaboration with the chemistry teachers of the three-year period of the IIS A. Volta School in Pescara

2025 - "**Global Women's Breakfast. Accelerating Equity in Science: Training the new generations through science education**". Organizer and speaker of the IUPAC international event for the creation of networks between women of science and for the training of the younger generations

2025 - "**The dark side of science and technology**", round table on the use of chemical agents for war purposes with discussion between science, history and ethics, aimed at the last two years of high school.

2024 - "**Innovative chemistry lessons**"; activities in collaboration with the chemistry teachers of the three-year period of the IIS A. Volta School in Pescara. After a teacher training meeting

on metacognitive activities, a teaching unit was designed together (chemistry laboratory on conductometry, followed by a lecture), including tools such as 3-2-1-Bridge and One Minute Paper

2024 – "**Talk on marine sustainability**" in collaboration with Associazione STEM@IT

2024 - "**Global Women's Breakfast. Catalyzing Work & Family**". Organizer of the IUPAC international event for the creation of networks between women of science and for the training of the younger generations

2024 - "**In search of Science. The little chemists**". Chemistry laboratory created for children of the kindergarten of Chieti.

2023 and 2025 - "**Lecture on advanced analytical instrumentation**"; activities in collaboration with the chemistry teachers of the three-year period of the IIS A. Volta School in Pescara

2019 - "**Laboratory lessons – POR Licei abruzzesi Project**": 5 lessons of 3 hours held in the Chemistry laboratory of the G. d'Annunzio University in the afternoon for 15 students selected from the high schools of Chieti and Pescara on the use of nuclear magnetic resonance

2019 - "**The Chemistry Walks**": historical-scientific dissemination activity aimed at an adult audience

2015 - "**Let's have fun with science**": dissemination (3 hours) with chemistry experiments for students of 2 classes in lower secondary school

From 2014 to today - **Researchers' Night** with laboratories and hands-on chemistry activities (5-19 years)