

Alessandro Quadri

Junior Assistant Professor



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📄 SUMMARY

I am currently a **Junior Assistant Professor (RTD-A)** in the **AGRI-04/C – Rural Buildings and Agroforestry Territory** research group at the **Department of Agricultural and Food Sciences (DISTAL), University of Bologna**. My research focuses on structures and systems for plant production, with particular emphasis on protected cultivation, addressing issues related to production efficiency, environmental sustainability, green systems, and nature-based solutions.

🧠 SKILLS

- Data Analysis
- Design of Experiments
- Protected cultivation
- Bioactive Compounds (BCs)
- Agricultural Robotics
- Statistical Analysis
- LED lighting
- Controlled Environment Agriculture
- Field Trials
- Innovation
- Model Fitting
- Indoor Farming
- Plant Science
- Precision Agriculture
- Nature-based solutions (NBS)

🧩 HARD SKILLS

- R/R studio
- Apple MacOS
- Open Office
- GIMP
- CAD
- Xeneth Software
- Fusion
- DIALux evo
- Microsoft Windows
- Apple works
- Lotus Notes
- FLIRTtools
- Redmine
- Kinovea



PROFESSIONAL EXPERIENCE (ACADEMIC AND INDUSTRIAL)

2026
Bologna, Italy

Alma Mater Studiorum - University of Bologna, Department of agricultural and food sciences (DISTAL)

JUNIOR ASSISTANT PROFESSOR

- Within the framework of the project “Design, development and testing of structures and systems for plant production in controlled environments”, the main research activities concern the design and experimentation of innovative structures for plant production in controlled environments, based on solutions and systems aimed at increasing sustainability and production efficiency, also through precision techniques. The activities focus, in particular, on the testing of innovative solutions in relation to performance and sustainability, as well as on the development of engineering structures and systems applicable to greenhouse structures and vertical farming systems.

02/2025 – 01/2026
Bologna, Italy

Alma Mater Studiorum - University of Bologna, Department of agricultural and food sciences (DISTAL)

RESEARCH FELLOW (SCIENTIFIC DISCIPLINARY SECTOR AGRI-04/C)

- Research Fellowship Project
- Engineered LED Biostimulation Systems for the Qualitative and Quantitative Enhancement of Medicinal Plant Cultivation

05/2025 – 05/2025
Freising, Germany

Weihenstephan-Triesdorf University of Applied Sciences (HSWT)

VISITING RESEARCH FELLOW

- Research period (12/05/2025–16/05/2025) at the Applied Science Centre (ASC) for Smart Indoor Farming of HSWT to carry out the following activities:
- Conducting research activities on indoor vertical farming systems aimed at optimizing production performance with particular reference to the secondary metabolites of medicinal and aromatic plants (MAPs).
- Delivering teaching activities (2 hours) on the topic “*Cultivation of Tropical Medicinal and Aromatic Plants (MAPs) in Vertical Farming: Applying Environmental Stimuli to Enhance Bioactive Compound Production*” within the *Tropical Horticulture* module of the Bachelor's Degree Programme in Horticulture at Weihenstephan-Triesdorf University of Applied Sciences (HSWT).

01/2022 – 12/2024
Imola/Bologna, Italy

Alma Mater Studiorum - University of Bologna, Department of agricultural and food sciences (DISTAL)

PHD STUDENT (PHD PROGRAMME IN HEALTH, SAFETY AND GREEN SYSTEMS, SCIENTIFIC DISCIPLINARY SECTOR AGRI-04/C)

- PhD completion date: 31/12/2024; PhD thesis defence and award of the PhD degree: 18/06/2025.
- PhD thesis title: *Resilience and Green Regeneration in Climate Change and Post-pandemic Scenarios: Bioengineered Indoor Farming Systems for Medicinal Plants*.
- The PhD project focused, in particular, on the development and testing of indoor farming systems to enhance the production of bioactive compounds (particularly anticancer compounds) in medicinal and aromatic plants and the biofortification of vegetables through the synergistic use of LED lighting and bioactive elements.
- The research activities were carried out in collaboration with C-LED, an international leader in the production of LED lighting for horticulture, within the framework of an agreement that also included a six-month research period in the company.
- These research activities involved academic collaborations with the Department of Industrial Engineering (DIN), the Department of Pharmacy and Biotechnology (FaBiT), and other research groups within the Department of Agricultural and Food Sciences (Plant Pathology and Applied Mycology).

06/2024 – 09/2024
Freising (Munich)

Weihenstephan-Triesdorf University of Applied Sciences HSWT
VISITING PhD STUDENT

- Research period at the **Applied Science Centre (ASC) for Smart Indoor Farming**, Weihenstephan-Triesdorf University of Applied Sciences (HSWT), focused on the effects of LED lighting and soilless cultivation on the production of secondary metabolites, particularly anticancer compounds, in medicinal plants grown in vertical farming systems.

12/2020 – 12/2021
Lugo, Italy

Unitec S.p.A

R&D AGRONOMIST PROJECT COORDINATOR

- Reporting directly to the company's management, I served as **R&D Agronomist Project Coordinator**.
- Coordination of numerous industrial research projects.
- Lecturer and company tutor for the "**Trend in Food Industry LAB**" course (2 ECTS, 20 hours) within the Master's Degree Programme in **Food Engineering** at **Politecnico di Milano**.

10/19 – 03/20
Bologna, Italy

Alma Mater Studiorum - University of Bologna, Department of agricultural and food sciences (DISTAL)

RESEARCH ASSISTANT

Master's degree internship focused on a research project involving several horticultural species cultivated using indoor farming systems, with particular reference to hydroponic systems (Deep Water Culture), growth chambers, and artificial LED lighting. The internship was structured into three main phases: sample preparation, experimental activities, and literature research.

Main activities:

- Studying plant–light interactions under controlled environment conditions.
- Evaluating the effects of LED lighting on plant growth and the production of secondary metabolites.
- Analysing the influence of nutrient solutions on the growth and yield of selected horticultural species.
- Monitoring and analysing environmental conditions in indoor cultivation systems to optimize plant development.
- Using image analysis software (GIMP) to calculate leaf area and assess its correlation with plant growth parameters.

04/2018 – 04/2019
Bologna, Italy

Rijk Zwaan

R&D SPECIALIST IN HORTICULTURAL CROPS

Master's degree internship during which an open-field experimental study was conducted to evaluate the effects of different plant densities on the quality and yield of zucchini (*Cucurbita pepo* L.).

Main activities:

- Monitoring crop cultivation from field transplanting to harvest.
- Evaluating the optimal plant density for zucchini cultivation.
- Assessing and comparing different agronomic techniques applied to the crop.
- Collecting, processing, and analysing qualitative and quantitative data related to the agronomic techniques adopted and the different varieties.
- Performing statistical analysis and interpretation of the experimental data.

04/2016 – 10/2016
Bologna, Italy

Haifa Italia S.r.l. (Haifa Group)

R&D SPECIALIST (PLANT NUTRITION)

Bachelor's degree internship focused on an experimental study on foliar fertilization in grapevine, carried out at Caretti Farm in San Giovanni in Persiceto (Bologna, Italy). The experiment was conducted on two grapevine cultivars, *Grechetto Gentile* and *Moscato Bianco*, with the aim of comparing two fertilization protocols: the Haifa protocol, based on the application of Haifa foliar fertilizers in combination with the farm's standard soil fertilization, and the farm protocol, based on the use of BMS products together with conventional soil fertilization.

Main activities:

- Planning and conducting the field experiment in the vineyard.
- Applying and monitoring two different foliar fertilization protocols.
- Evaluating the effects of the treatments on grape quality, with particular reference to acidity, freshness, and aromatic characteristics.
- Analysing the impact of the fertilization protocols on crop yield.
- Collecting, processing, and interpreting the experimental data for the comparison of the two treatments.

EDUCATION

- 09/2017 – 09/2020 **MASTER'S DEGREE IN AGRICULTURAL SCIENCES AND TECHNOLOGIES**
 Alma Mater Studiorum - University of Bologna
 110/110 CUM LAUDE
 • Master's thesis: Effects of different cultivation densities on the quality and yield of open-field zucchini (*Cucurbita pepo* L.).
- 09/2013 – 12/2016 **BACHELOR'S DEGREE IN LAND AND AGROFORESTRY SCIENCES**
 Alma Mater Studiorum - University of Bologna
 110/110 CUM LAUDE
 • Bachelor's thesis: Foliar fertilization test on grapevine.

PUBLICATIONS

Resilience and Green Regeneration in Climate Change and Post-pandemic Scenarios: Bioengineered Indoor Farming Systems for Medicinal Plants.

Tesi di dottorato. Presentata da: A. Quadri; Supervisore: A. Barbaresi.

Optimizing Target Metabolites Production in *Coleus blumei* Indoor Cultivation: Combined Effects of LED Light and Salinity Stress

Horticulturae

Sambuco B., Barbaresi A., Quadri A., Trenta M., Tassinari P., Mercolini L., Protti M., Torreggiani D.

Bioengineered Indoor Farming Approaches: LED Light Spectra and Biostimulants for Enhancing Vindoline and Catharanthine Production in *Catharanthus roseus*

Horticulturae

Quadri A., Sambuco B., Trenta M., Tassinari P., Torreggiani D., Mercolini L., Protti M., Zambonelli A., Puliga F., Barbaresi A.

FEATURE PAPER: Feature papers represent the most advanced research with significant potential for high impact in the field. Evaluated as a substantial original article that involves several techniques or approaches, provides an outlook for future research directions and describes possible research applications. (scoperta scientifica: presenza vindolina nelle radici e a concentrazioni maggiori rispetto a quella nelle foglie).

EDITOR'S CHOICE: Editor's Choice articles are based on recommendations by the scientific editors of MDPI journals from around the world. Editors select a small number of articles recently published in the journal that they believe will be particularly interesting to readers, or important in the respective research area. The aim is to provide a snapshot of some of the most exciting work published in the various research areas of the journal.

Published

Use of LED light and plasma-activated water (PAW) to stimulate pharmaceutical compound production in *Catharanthus roseus* plants

Acta Horticulturae (ISHS)

Quadri A., Barbaresi A., Tassinari P., Bertaccini A., Contaldo N., Mercolini L., Protti M., Montalbetti R., Laurita R., Torreggiani D.

Published

Enhancing secondary metabolites accumulation in *Coleus blumei* through LED light application

Acta Horticulturae (ISHS)

Sambuco B., Quadri A., Trenta M., Tassinari P., Torreggiani D., Barbaresi A., Mercolini L., Protti M.

Published

Green roof management in Mediterranean climates: evaluating the performance of native herbaceous plant species and green manure to increase sustainability

Buildings

Trenta M., Quadri A., Sambuco B., Perez Garcia C.A., Barbaresi A., Tassinari P., Torreggiani D.

Published

Enhancement of vindoline and catharanthine production in *Catharanthus roseus* by LED light and plasma activated water

PLOS ONE

Quadri A., Barbaresi A., Tassinari P., Bertaccini A., Contaldo N., Mercolini L., Protti M., Montalbetti R., Laurita R., Torreggiani D.

Published

Green roofs: performance of native plant species in a multifunctional perspective for the mitigation of impacts in urban environments

Science of the total environment (STOTEN)

Trenta M.; Quadri A.; Sambuco B.; Perez Garcia C.A.; Torreggiani D.; Tassinari P.; Mercolini M.; Protti M.; Zambonelli A.; Puliga F.; Barbaresi A.

Published

Red Light and Biostimulants Containing Arbuscular Mycorrhizal Fungi Enhance Ajmalicine and Serpentine Production in *Catharanthus roseus* Grown in an Indoor Farming System

Scientific Reports

A. Quadri, B. Sambuco, M. Trenta, P. Tassinari, D. Torreggiani, L. Mercolini, M. Protti, A. Zambonelli, F. Puliga, A. Barbaresi

Published

Engineering Integrates with Biosystems: Harnessing LED Light Spectrum and Plasma-Activated Water to Boost Growth and Anticancer Alkaloid Production in Indoor-Grown *Catharanthus roseus*

PLOS ONE

Quadri A., Trenta M., Sambuco B., Barbaresi A., Tassinari P., Bertaccini A., Mercolini L., Protti M., Tomelleri F., Laurita R., Torreggiani D.

Under review

 CONFERENCES

08/2026 – 08/2026

IHC2026: II International Symposium on Advances in Vertical Farming

Kyoto, Japan

Oral presentation title (Abstract accepted, speaker/presenter): A Novel Strategy to Enhance Ajmalicine and Serpentine Production in *Catharanthus roseus*: Led Light Spectra and Plasma-Activated Water in Controlled Indoor Cultivation

08/2026 – 08/2026

IHC2026: International Symposium on Medicinal, Aromatic Plants and Natural Colorants

Kyoto, Japan

Poster title (Abstract accepted, speaker/presenter): LED light treatment effect on *Coleus blumei* luteolin accumulation

06/2026 – 06/2026	CIGR–EurAgEng World Congress 2026, themed “Emerging Technologies and Innovation in Biosystems Engineering.” Turin, Italy Oral presentation title (contribution): Sustainable Management of Green Roofs: Assessment of Green Manure for Low-maintenance, Herbaceous Plant Species
02/2024 – 02/2024	International Horticultural Expo 2023 Doha, Qatar Oral presentation title: LED biostimulation and digital simulations in greenhouse and vertical farming
07/2024 – 07/2024	AgEng2024 Athens, Greece Oral presentation title (speaker/presenter): Enhancing alkaloid production in <i>Catharanthus roseus</i> through synergistic effects of LED lights and mycorrhizae-based biostimulant in a vertical farming system.
09/2024 – 09/2024	International Symposium on Protected Cultivation, Nettings and Screens for Mild Climates Athens, Greece Oral presentation title (speaker/presenter): Use of LED light and biostimulants to enhance Alkaloid production in <i>Catharanthus roseus</i> grown in an Indoor Farming systems.
05/2025 – 05/2025	Shedding Light on Medicinal Plants: Indoor Cultivation Experience and Pharmaceutical Applications Rimini, Italy Oral presentation title (speaker/presenter): Indoor cultivation of medicinal plants: LED biostimulation to increase bioactive compounds production.
05/2024 – 05/2024	LightSym 2024 - X International Symposium on Light in Horticulture Seul, South Korea • Oral presentation title (speaker/presenter): Use of LED light and plasma-activated water (PAW) to stimulate pharmaceutical compound production in <i>Catharanthus roseus</i> plants. • Titolo della presentazione orale (speaker/presenter): Enhancing secondary metabolites accumulation in <i>Coleus blumei</i> through LED light application.
09/2025 – 09/2025	II International Symposium on Growing Media, Compost Utilization and Substrate Analysis for Soilless Cultivation Freising, Germany Poster presentation: Natural Alginate based hydrogel as an alternative hydroponic substrate for indoor farming systems.

RESEARCH PROJECTS AND COLLABORATIONS

10/2024 – present	Research project under agreement (Harpo Verdepensile company) Department of Agricultural and Food Sciences (DISTAL) Research group coordinator: Prof. Alberto Barbaresi.
09/2024 – present	PRIN Project: DiAGreen - Digital twin of Agricultural Greenhouses University of Bologna Research Unit National coordinator: Prof. Enrico Fabrizio. Local research unit coordinator: Prof. Stefano Benni.

06/2024 – present	Indoor Farming Research Group Applied Science Centre (ASC) for Smart Indoor Farming, Weißenstephan-Triesdorf University of Applied Sciences (HSWT) Research group coordinator: Prof. Heike Mempel.
01/2024 – present	Research project in collaboration between Agricultural Engineering and Plant Biology and Applied Mycology laboratories Department of Agricultural and Food Sciences (DISTAL) Research group coordinator: prof. Alberto Barbaresi.
11/2023 – present	PRIN 2022 PNRR Project:: Urban green systems - GRACE (Green for climate resilience) University of Bologna Research Unit National coordinator: Prof. Daniele Torreggiani. Local research unit coordinator: Prof. Daniele Torreggiani.
01/2023 – present	Research project in collaboration with PTA Lab Department of Agricultural and Food Sciences (DISTAL) & Department of Pharmacy and Biotechnology (FaBiT) Research group coordinator: Prof. Daniele Torreggiani.
01/2023 – present	Research project in collaboration with the Department of Industrial Engineering (DIN) Department of Agricultural and Food Sciences (DISTAL), Research group coordinator: Prof. Daniele Torreggiani.
01/2022 – present	AGRI-04/C Research Group Department of Agricultural and Food Sciences (DISTAL), Research group coordinator: Prof. Patrizia Tassinari.
01/2022 – present	Research project under agreement (C-LED S.r.l. Company) Department of Agricultural and Food Sciences (DISTAL), Research group coordinator: Prof. Patrizia Tassinari.
01/2022 – 03/2024	Research project under agreement (Fortini Ortofrutticoli S.r.l. Company) Department of Agricultural and Food Sciences (DISTAL), University of Bologna Research group coordinator: Prof. Alberto Barbaresi.
01/2022 – 12/2023	Plant Pathology Research Group Department of Agricultural and Food Sciences (DISTAL), University of Bologna Coordinator: Prof. Assunta Bertaccini.



TEACHING ACTIVITIES

02/2027 – 06/2027 Bologna (Imola), Italy	Green Infrastructures (Module 2) Bachelor's Degree Programme in Science and Technologies for Green Areas and Landscape (University of Bologna)
05/2025 – 05/2025	Tropical Horticulture course, Bachelor's degree programme in Horticulture Weißenstephan-Triesdorf University of Applied Sciences (HSWT) Lecture delivered on 06/05/2025 (2 hours) entitled "Cultivation of Tropical Medicinal and Aromatic Plants (MAPs) in Vertical Farming: Applying Environmental Stimuli to Enhance Bioactive Compound Production", addressed to students enrolled in the Tropical Horticulture course within the Bachelor's Degree Programme in Horticulture.

11/2021 – 12/2021

Trend in Food Industry LAB, Master's degree in Food Engineering

Politecnico di Milano - Unitec S.p.A

As lecturer, company tutor, and project leader, I was responsible for a team of 13 students throughout the entire duration of the course (2 ECTS – 20 hours). Activities included the initial project presentation in the classroom, weekly and monthly tutoring meetings, a technical lecture at Politecnico di Milano, participation in the Company Day, and the final project presentation and evaluation.

The assigned Project Work focused on the technical and technological upgrading of a machine for the processing and quality classification of table grapes.

ATTESTATI E CORSI

01/2026

Vertical Farming Course (Wageningen University & Research)

Course for professionals

A 4-week, 60-hour course for professionals on vertical farming, designed for industry specialists and researchers interested in sustainable, high-tech crop production. Led by world-leading academics, the programme provided a comprehensive understanding of technological, physiological, economic, and sustainability aspects.

The programme covered:

Week 1: vertical farming introduction, photobiology, LED costs & efficiency, environmental effects on quality, resource use efficiency

Week 2: Micro-climate, temperature & CO₂

plant response, energy balance, cooling & dehumidification, roots & nutrients

Week 3: Sensors, autonomous farms, dashboard tutorials

Week 4: Mechatronic automation, business strategies

09/2023

Applied Research and Innovation in the Food and Industrial Hemp Supply Chain

Conference certificate of participation (Department of Agricultural and Food Sciences DISTAL, Alma Mater Studiorum - University of Bologna).

12/2022

Let's Start from the Soil: Biocontrol, Biostimulation, Microorganisms, and Microalgae for an Innovative and Sustainable Agriculture

Webinar Certificate of Participation.

03/2021

Cold Plasma Workshop for the decontamination of food and food packaging

Conference certificate of participation (CIRI Agro-food - Alma Mater Studiorum - University of Bologna).

11/2015

Haifa U Seminar

NUTRIGATION: OPTIMIZING WATER-MINERAL NUTRITION OF THE CROPS.

Letter of confirmation for guest lecture

Confirmation letter for the delivery of a guest lecture at Weihenstephan-Triesdorf University of Applied Sciences (HSWT) entitled: *"Cultivation of Tropical Medicinal and Aromatic Plants (MAPs) in Vertical Farming: Applying Environmental Stimuli to Enhance Bioactive Compound Production."*



AWARDS AND HONORS

2022

ISA Doctoral Prize

Institute of Advanced Studies (University of Bologna)

Award for excellence in interdisciplinary research for PhD students at the University of Bologna.

AFFILIATIONS AND SCIENTIFIC SOCIETIES

03/2025 – present	Italian Association of Agricultural Engineering (AIIA) Member
03/2025 – present	European Society of Agricultural Engineers (EurAgEng) Member
03/2025 – present	Commission Internationale du Génie Rural (CIGR) Memnber

LANGUAGES

English

Full Professional Proficiency

Italian

Native or Bilingual Proficiency