## PERSONAL INFORMATION

# Daniele Malferrari

University of Modena and Reggio Emilia
Department of Chemical and Geological Science (DSCG)
Via Campi 103, 41125 Modena
+39 059 2058473
daniele.malferrari@unimore.it
https://personale.unimore.it/rubrica/dettaglio/dmalf

*Sex* Male | *Date of birth* 23/07/1972 | *IT*

**LAST UPDATE: NOVEMBER 2023**

## WORK EXPERIENCE

01/05/2021 – to present **Associate Professor in Mineralogy**

University of Modena and Reggio Emilia (UniMORE)

- Member of the UniMORE Commission for Patens and Spin-Off pre-evaluation and revision.
- Member of the interdepartmental research centres BIOGEST-SITEIA and CRICT.
- Member of the Council and the Security Commission of the Chemical and Geological Sciences Department.
- Member of the Academic Board of the PhD Course in Models and Methods for Materials and Environmental Sciences.
- Head and participant of National and International Research Project.
- Teaches "Mineralogy" to the Bachelor degree in Natural Sciences and "Analytical and Applied Mineralogy" to the Master degree in Chemical Sciences. Secretariat of the Natural Science degree.
- Secretary of the Interclass Council L-32/LM-60 (Bachelor of Science in Natural Sciences and Master of Science in Teaching and Communication of Sciences), member of the Teaching and Tutoring Commissions, part of the working groups for the preparation of annual reports, responsible for orientation activities and web pages of the courses.
- Studies: i) the recovery of glass from differentiated waste collection for the synthesis of nanoparticles for heavy metals remediation; ii) the employment of mineral based nanoparticles mixture to reduce the use of irrigation water and chemical fertilizers; iii) the modelling and synthesis of hybrid materials (mineral/organometallic complex) able to capture volatile smelling and/or pollutant compounds.

01/09/2008 – 30/04/2021 **Researcher in Mineralogy**

University of Modena and Reggio Emilia (UniMORE)

- Trained mineralogy in several undergraduate and master's degree programs.
- Member of the Academic Board of the PhD Course in Multiscale Modelling, Computational, Simulations and Characterization in Material & Life Sciences.
- Head and participant of National and European Research Project.

01/01/2003 – 30/08/2008 **Post Ph-D positions**

University of Modena and Reggio Emilia (UniMORE)

## EDUCATION AND TRAINING

01/01/2000 – 31/12/2002 **Ph-D in "Mineralogy, Petrology and Crystallography" (XV cycle)**

- Advanced knowledge on layer silicates, soil mineralogy, classical and innovative analytical methods.

01/09/1994 – 17/12/1999 **Master Degree in Geology** (five years course)

- Discussed a thesis on the application of smectites for the removal of heavy metals.

**WORK ACTIVITIES**

| | |
|---|---|
| **Editorial activity** | ▪ Member of the Editorial Board of "Applied Clay Science".<br>▪ Reviewer for several international Journals. |
| **Invited presentations** | Last five years: i) Collegio Periti Agrari Bologna (April 13, 2019), technical event about the use of zeolites in the biological defense. ii) SPEVIS DAY (December 18, 2019). Technical event of the members of the Experimental Station for Viticulture (SPEVIS), invited to give the talk "Micronized mineral powders in organic viticulture". iii) XVII Technical Horticultural Field Exhibition 2020 (January 23, 2020), invited to hold the seminar "Zeolites in horticulture". iv) TSD 2021 - Toward Sustainable Development (Tech Share Day 2021, online event, 05-07 May 2021), invited as Opinion Leader presenting the webinar "Natural and modified zeolites in agriculture: a brief practical guide. |
| **Main grants** | LIFE+2010; PRIN-MIUR 2010-11 and 2017; FFABR; POR-FESR; PNRR, SPOKE-1, PRIN2022. |
| **Patents** | 1) Italian patent 0001421341 (march 14, 2016): Plant to treat organic substances and produce a fertilizer material.<br>2) European Patent A1 EP3238541 (November 11, 2017 - Bulletin 2017/44): Product for defending and feeding plants and respective preparation. |

**PERSONAL SKILLS**

| | |
|---|---|
| **Mother tongue(s)** | Italian |
| **Other language(s)** | English (advanced) |
| **Job-related skills** | Instrumental skills and analytical knowledges concern X-ray diffraction (powder and single crystal), chemical analyses (mass spectrometry, elemental analyses, optical absorption spectroscopy), atomic force microscopy, and thermogravimetric and thermodifferential analyses also coupled with evolved gasses detection. |
| **Digital skills** | Software for scientific and statistical data processing, consultation of scientific databases, graphic processing, MS Window and Office and related tools. |
| **Other skills** | Developed knowledge of local area nature, use of common mechanical tools, competitive sports activity (cycling), car and motorcycle license. |

| | |
|---|---|
| **Publications** | Please see my public profile at:<br>ORCID: 0000-0002-0879-1703<br>SCOPUS ID: 7801383625<br>WoS ID: GDN-2939-2022<br>https://www.researchgate.net/profile/Daniele-Malferrari |
| **Other Information** | Collaborates with companies in the agro-technical field with which he has developed researches and patents. |

## RESEARCH ACTIVITY (*)

The scientific research activity, mainly set to the characterization and/or use of minerals belonging to the phyllosilicate group and, recently, of zeolites and bioapatites, makes use of field observation, traditional and advanced laboratory methodologies, and the creation of mathematical models useful for interpreting the relationships between crystal topology, spectroscopic characteristics, chemical and physical properties, and crystallization and phase transformation environments. In particular, the research activity can be schematized in the following two main directions.

**1) Geomaterials related to technological development and eco-sustainability.**

1.1) Minerals and reactions at the solid/liquid interface. Studies developed in this area have as a common denominator interaction at the solid/liquid interface between minerals and solutions containing cations and/or complex molecules.

1.2) Minerals and reactions at the solid/gas interface. The most recently developed strand of research includes studies concerning the possibility of employing smectites, suitably intercalated with synthetic organometallic complexes, in catalysis reactions at the solid-gas interface for the uptake of toxic/smell gaseous compounds even at low concentrations.

1.3) Use of zeolites in agriculture and related fields. Conducted large-scale (open field) studies on the possibility of employing zeolites in conventional and organic agriculture in order to save water and fertilizer, to promote the growth and development on poultry slurry of insects for use as protein sources, and to reduce the use of copper as an antimycogen agent.

**2) Structural studies of minerals, biominerals and the environments of crystallization and diagenetic transformation.**
2.1) Systematic, analytical mineralogy and the study of genetic environments. This line of research includes studies, purely experimental, aimed at relating the crystallochemistry and crystallography (bulk and/or surface) of the mineral studied to particular application properties or to the crystallization environment. He has also carried out research of a purely methodological character in the field of analytical mineralogy and is co-author of an internationally circulated book chapter on the structure and properties of phyllosilicates.
2.2) Apatite and bioapatite. This is the most recently implemented strand. It focused in the beginning on the crystal-chemical study of apatite and their possible applications in the environmental field. Current is the study of bioapatites using an extremely innovative experimental approach that sees the use of methodologies typical of mineralogy to the characterization of mineralized parts of phosphate matrix fossils.
2.3) Crystallochemistry and crystallography of micas. Includes, primarily, research pertaining to the crystallochemistry and crystallography of micas and the development of mathematical models aimed at describing the relationships between crystallochemistry, spectroscopic properties, magnetic properties, and genetic environments.

*(*) The above description is not exhaustive of the activities carried out and is essentially intended as a guide for Students who want to learn about the research activities of the teacher and try information for choosing internship and/or dissertation paths.*