

Curriculum Vitae

Name Marco Malferrari

Date of birth 04/01/1984

Nationality Italian

Address Via Pablo Neruda, 12
40139 - Bologna, Italy

Telephone 0039 348 0179942

Mail marco.malferrari@gmail.com
marco.malferrari2@unibo.it

Web www.researchgate.net/profile/Marco_Malferrari
<http://it.linkedin.com/in/marcomalferrari>
https://scholar.google.com/citations?hl=en&user=z4whT50AAAAJ&view_op=list_works&ortby=pubdate

Education

2009 – 2011 PhD in Cellular, Molecular and Industrial Biology: Project n.2 “Functional and Molecular Biology”. Supervisor: Prof. G. Venturoli.
Title of the thesis: “The coupling between electron transfer and protein/solvent dynamics in photosynthetic reaction centers: spectroscopic studies in amorphous matrices”.

2006 – 2008 Master Degree in Molecular and Cellular Biology at the University of Bologna (110/110 with honours), classe 6/S BIOLOGIA

2003 – 2006 Bachelor Degree in Biological Sciences at the University of Bologna (110/110 with honours).

Professional experience

27/04/2023 – present date Lavoratore autonomo non occasionale
Project: “Materiale per il confezionamento a barriera di ossigeno”
Department of Chemistry “Giacomo Ciamician”
University of Bologna. Tutor: Prof. Stefania Rapino.
Description of the activity: Characterization of functional materials with physicochemical methodologies.

27/04/2020 – 26/04/2023 Junior assistant professor (fixed-term), Physical Chemistry (CHIM02)
Department of Chemistry “Giacomo Ciamician”,
University of Bologna

January 2019 – present date Member of the exam committee
“*Cultore della materia*” for the course “Physical Chemistry for Biology with laboratory”, at present “Cell Physical Chemistry and Quantitative Biology” (SSD CHIM-02) of the Master Degree in Molecular and Cellular Biology.
University of Bologna.

July 2018 – December 2019
March 2017 – June 2018

Co.Co.Co.

Postdoctoral Research Fellow.

Project: "Acute myeloid leukemia Investigation with functional Device in lieu of Animals: AIDA", founded by the Italian Association for Cancer Research (AIRC). Tutor: Prof. Stefania Rapino. Department of Chemistry "Giacomo Ciamician", University of Bologna. Group of Functional Imaging and Cellular Chemistry (ChiC).

Description of the activity: The objective of the activity was the study of the role played by cell microenvironment in acute myeloid leukemia. Electrochemical techniques, as for example Scanning Electrochemical Microscopy (SECM), were applied to investigate the physicochemical characteristics of advanced cellular cultures which aimed at reproducing key characteristics of the bone marrow niche. Physicochemical approaches were employed to study bidimensional cellular cultures with controlled chemical microenvironment and 3D bioprinted constructs. These innovative cell cultures were performed with cellular lines and primary cells from patients.

Advanced methodologies for data analysis were developed to describe the collective motion of cells under specific characteristics of the culturing microenvironment.

February 2012 – September 2016

Postdoctoral Research Fellow.

Department of Pharmacy and Biotechnology (FaBiT), University of Bologna.

Laboratory of Molecular Biochemistry and Biophysics.

Tutor: Prof. Giovanni Venturoli.

Description of the activity: I investigated intraprotein electron transfer in photosynthetic and respiratory complexes, as well as reactive oxygen species production upon activation of the respiratory chain. I developed and studied methods to modulate at room temperature protein dynamics and function, by describing and exploiting fine tuning of water dynamics in protein-sugar glassy systems. Investigations of the physicochemical properties of these systems were conducted by advanced spectroscopic techniques (time resolved laser flash optical spectroscopy; static, time-resolved, difference FT-IR spectroscopy; FT-NIR spectroscopy; fluorescence spectroscopy; static and pulsed high-resolution/high-field EPR spectroscopy) and by developing *in house* tools for data analysis, to validate physicochemical models for the description of experimental data.

Research periods abroad

June 18th – July 15th, 2013
March – June 2010

Research activity.

Institut de Biologie et Technologies de Saclay IBITeC-S-CEA-Saclay, hosted by Dr. Winfried Leibl (Group of Photocatalysis and Biohydrogen).

"Differential FTIR spectroscopic studies on dehydrated reaction center films". The work was done in collaboration with Dr. Alberto Mezzetti.

November 12nd – 29th, 2014
October 14th – November 2nd, 2013
October 15th – November 3th, 2012
February 12nd – March 5th, 2012
February 7th – 16th, 2011

Research activity.

Max-Planck Institute for Chemical Energy Conversion, Mulheim-an-der-Ruhr (Germany), hosted by Prof. W. Lubitz group.

In collaboration with Prof. K. Möbius and Dr. A. Savitsky high-field EPR measurements have been performed on solid samples containing spin-labeled reaction centers embedded in sucrose and trehalose glassy matrices at controlled hydration content

Teaching experience

Academic Year 2022-2023

Lecturer (*Docente*, 16 hours laboratory, 1 CFU + 40 hours frontal lessons) and *Person in Charge* for the Course: Processes of Cell Matter (CHIM/02)

Master Degree in Photochemistry and Molecular Materials
University of Bologna: School of Sciences

Lecturer (*Docente*, 36 hours, 6CFU) and *Person in Charge* for the Course: Photobiophysics and Photobiology (CHIM/02)

Master Degree in Photochemistry and Molecular Materials, elective learning activity
University of Bologna: School of Sciences

Lecturer (*Docente*, 24 hours, 3CFU): Spectroscopic Methods for the Functional and Structural Characterization of Proteins (CHIM/02)

Master Degree in Molecular and Cell Biology, elective learning activity
University of Bologna: School of Pharmacy, Biotechnology and Sport Sciences

Lecturer (*Docente*, 16 hours laboratory, 1CFU): Chimica Fisica 1 Modulo 4 (CHIM/02)

Bachelor Degree in Chimica e chimica dei materiali
University of Bologna: School of Sciences

Academic Year 2021-2022

Lecturer (*Docente*, 16 hours, 2 CFU): Bioelettronica e Biosensori (CHIM/02)

Master Degree in Molecular and Industrial Biotechnology, elective learning activity
University of Bologna: School of Pharmacy, Biotechnology and Sport Sciences

Academic Year 2020-2021

Lecturer (*Docente*, 18 hours, 3CFU): Photobiophysics and Photobiology (FIS/07)

Master Degree in Photochemistry and Molecular Materials, elective learning activity
University of Bologna: School of Sciences

Academic Year 2019-2020

Academic Tutor: Laboratory of Physical Chemistry.

Academic Year 2018-2019

Master Degree in Molecular and Cellular Biology.

Academic Year 2017-2018

University of Bologna: School of Pharmacy, Biotechnology and Sport Sciences.

Academic Year 2015-2016

Academic Year 2014-2015

Academic Year 2013-2014

Academic Year 2016-2017
Academic Year 2015-2016
Academic Year 2014-2015
Academic Year 2013-2014
Academic Year 2012-2013
Academic Year 2009-2010
Academic Year 2011-2012

Academic Tutor: Laboratory of Biochemistry.
Bachelor Degree in Biological Sciences.
University of Bologna: School of Sciences.

Roles in Academic Bodies/Entities

Role: Representative of postdoctoral researchers in the Council of the Department of Pharmacy and Biotechnologies (FaBiT), University of Bologna.
Period: 2015 - 2016

Role: Member as representative of the assistant professors in the Department Board (*Giunta*) of the Department of Chemistry "Giacomo Ciamician", University of Bologna.
Period: October 2022 - 26/04/2023

Supervisor in Thesis projects

Student: Oscar Menni
Co-supervisor: Prof.ssa Stefania Rapino.
Course: Master Degree in Biotecnologie Molecolari ed Industriali, Dept. of Pharmacy and Biotechnologies, University of Bologna.
Academic Year: 2021-2022
Session: III
Title of the Thesis: Ottimizzazione di microelettrodi per il sensing spazialmente risolto del pH in colture cellulari

Student: Nicolò Quaresima
Co-supervisor: Prof.ssa Stefania Rapino.
Course: Bachelor Degree in Material Chemistry and Chemistry, Dept. of Chemistry "Giacomo Ciamician", University of Bologna.
Academic Year: 2020-2021
Session: I
Title of the Thesis: Studio della motilità cellulare in ambienti chimici micrometricamente controllati

Co-supervisor in PhD Thesis projects

Student: Maila Becconi
Supervisor: Prof.ssa Stefania Rapino.
PhD Course: PhD in Nanoscience for Medicine and Environment, University of Bologna.
PhD cycle: XXXIV
Academic sector : CHIM02, 03/A2
Title of the Thesis: Bioprinting, microstructuration and characterisation of innovative *in vitro* models

Co-supervisor in Thesis projects

Student: Rosario Alga
Tutor: Prof.ssa Stefania Rapino.
Course: Bachelor Degree in Chemistry, Dept. of Chemistry "Giacomo Ciamician", University of Bologna
Academic Year: 2021-2022
Session: II.
Title of the Thesis: Studio mediante microscopia a scansione elettrochimica dell'interfaccia di polimeri fotoeccitabili con elettrolita e con cellule viventi

Student: Silvia Grillini
Tutor: Prof.ssa Stefania Rapino.
Course: Master Degree in Molecular and Cellular Biology, University of Bologna.
Academic Year: 2020-2021
Session: II.
Title of the Thesis: Biostampa di modelli tridimensionali di cancro al seno

Student: Sara Stagni
Tutor: Prof.ssa Stefania Rapino.
Course: Master Degree in Pharmaceutical Chemistry and Technology
Academic Year: 2019-2020
Session: III
Title of the Thesis: Sviluppo di biosensori per la determinazione di metaboliti in tessuti tumorali

Student: Marzia Santamaria
Tutor: Prof.ssa Stefania Rapino.
Course: Master Degree in Molecular and Cellular Biology, University of Bologna.
Academic Year: 2018-2019
Session: III
Title of the Thesis: Bioprinting e caratterizzazione di colture cellulari 3D

Student: Simona De Zio.
Tutor: Prof.ssa Stefania Rapino.
Course: Master Degree in Chemistry, Dept. of Chemistry "Giacomo Ciamician", University of Bologna.
Academic Year: 2018-2019
Session: II.
Title of the Thesis: Biosensori elettrochimici micrometrici per studi spazialmente risolti di metaboliti.

Student: Francesco Roggiani.
Tutor: Prof.ssa Stefania Rapino.
Course: Master Degree in Chemistry, Dept. of Chemistry "Giacomo Ciamician", University of Bologna.
Academic Year: 2017-2018.
Session: II.
Title of the Thesis: Studio elettrochimico di specie reattive dell'ossigeno prodotte da sistemi biologici e materiali funzionali.

Student: Maila Becconi.
Tutor: Prof.ssa Stefania Rapino.
Course: Master Degree in Chemistry, Dept. of Chemistry "Giacomo Ciamician", University of Bologna.
Academic Year: 2016-2017.
Session: III.
Title of the Thesis: 3D Printing of functional soft materials for cancer research.

Student: Martina Cardi.
Tutor: Prof.ssa Stefania Rapino.
Course: Bachelor Degree in Biotechnology, Dept. of Pharmacy and Biotechnologies, University of Bologna.
Academic Year: 2016-2017.
Session: II.
Title of the Thesis: Studio di tre diverse linee cellulari di leucemia in un microambiente chimicamente controllato.

Student: Caterina Rovegno.
Tutor: Prof.ssa Stefania Rapino.
Course: Bachelor Degree in Chemistry and Materials Chemistry, Dept. of Chemistry "Giacomo Ciamician", University of Bologna.
Academic Year: 2016-2017.
Session: II.
Title of the Thesis: Studio dello stress ossidativo in un modello cellulare di disordine multisistema mediante microelettrodi modificati.

Student: Isaia Vardanega.
Tutor: Prof. Giovanni Venturoli.
Course: Bachelor Degree in Biological Sciences, Dept. Biological, Geological and Environmental Sciences, University of Bologna.
Academic Year: 2015-2016.
Session: III.
Title of the Thesis: Influenza dell'idratazione sulla struttura e sul fotociclo della proteina YtvA LOV di *Bacillus subtilis*.

Student: Andrea Zanotti.
Tutor: Prof. Giovanni Venturoli.
Course: Bachelor Degree in Biological Sciences, Dept. Biological, Geological and Environmental Sciences, University of Bologna.
Academic Year: 2015-2016.
Session: III.
Title of the Thesis: Cinetica del trasferimento elettronico in complessi purificati del fotosistema I inseriti in matrici vetrose di trealosio.

Student: Lorenzo Olivi.
Tutor: Prof. Francesco Francia.
Course: Bachelor Degree in Biotechnology, Dept. of Pharmacy and Biotechnologies, University of Bologna.
Academic Year: 2015-2016.
Session: I.
Title of the Thesis: Studi sul fotorecettore YtvA di *Bacillus subtilis* incorporato in matrici disidratate di trealosio: effetti sul fotociclo.

Student: Silvia Iannamico.
Tutor: Prof. Giovanni Venturoli.
Course: Bachelor Degree in Biological Sciences, Dept. Biological, Geological and Environmental Sciences, University of Bologna.
Academic Year: 2014-2015.
Session: I.
Title of the Thesis: Effetti bioprotettivi di matrici saccaridiche disidratate su centri di reazione fotosintetici. Ruolo della concentrazione proteica.

Student: Marco Trombara.
Tutor: Prof.ssa Aba Losi.
Course: Master Degree in Physics, Dept. of Physics and Earth Sciences, University of Parma.
Academic Year: 2013-2014.
Title of the Thesis: L'idratazione come fattore determinante della dinamica conformazionale e funzionale in un fotorecettore.

Student: Serena Di Noto.
Tutor: Prof. Giovanni Venturoli.
Course: Photochemistry and Molecular Materials, Dept. of Chemistry "Giacomo Ciamician", University of Bologna.
Academic Year: 2012-2013.
Session: III
Title of the Thesis: La relazione tra dinamica conformazionale e trasferimento elettronico in centri di reazione fotosintetici in matrici disaccaridiche amorfe.

Student: Daniele D'Urso
Tutor: Dr.ssa Paola Turina.
Course: Bachelor Degree in Biological Sciences, Dept. of Experimental and Evolutionary Biology, University of Bologna.
Academic Year: 2011-2012.
Session: II.
Title of the Thesis: Studio del trasferimento elettronico foto-indotto in Centri di Reazione fotosintetici incorporati in matrici vetrose di trealosio.

Awards

- 2015 Travel Prize from SIBPA (Società Italiana di Biofisica Pura ed Applicata), for the participation to the European Biophysics Congress EBSA 2015, Dresden, Germany (July 18th-22nd, 2015).
Title of the contribution: "Protein-matrix coupling in photosynthetic reaction centers embedded in trehalose and sucrose glasses".
- 2014 Best postdoctoral presentation.
Annual Meeting of the Italian Group of Biomembranes and Bioenergetics (GIBB) 2014, Matera, May 29th-31st, 2014.
- 2013 EMBO Short term fellowship.
Title of the research project: "Towards a structural and kinetic characterization of light-induced conformational changes in photosynthetic reaction centers: time-resolved differential FTIR spectroscopic studies in reaction center films at different hydration levels", (ASTF 256 – 2013).
- 2012 Best postdoctoral presentation.
Annual Meeting of the Italian Group of Biomembranes and Bioenergetics (GIBB) 2012, Arcavacata (Cosenza), June 21st-23th, 2012.

National Scientific Qualification (art.16 of the law 30 December 2010, n. 240)

Sector 02/D1 FISICA APPLICATA, DIDATTICA E STORIA DELLA FISICA – Seconda Fascia

Marco Malferrari received the National Scientific Qualification (ASN) for Level II (FASCIA II) of the scientific area "02/D1 FISICA APPLICATA, DIDATTICA E STORIA DELLA FISICA" (validity: 13/01/2020 - 13/01/2031)

National Scientific Qualification (art.16 of the law 30 December 2010, n. 240)

Sector 03/A2 MODELLI E METODOLOGIE PER LE SCIENZE CHIMICHE – Seconda Fascia

Marco Malferrari received the National Scientific Qualification (ASN) for Level II (FASCIA II) of the scientific area "03/A2 MODELLI E METODOLOGIE PER LE SCIENZE CHIMICHE" (validity: 12/12/2023 - 12/12/2034)

Responsability and role in international and national competitive research projects

i) Responsibility in competitive research projects

Role: Principal Investigator (239.350,00 euro).

Research Project: "PRIN: progetti di ricerca di rilevante interesse nazionale – Bando 2022": "Photoactivated cancer therapy in controlled cell microenvironment (PHOCA)" (20229LRBJL)

The project has been selected on 07/06/2023 as one of those financed in the PE11 sector.

Role: principal Scientific Investigator of UNIBO unit (90.000,00 euro).

Research Project: "Giovani Ricercatori – Bando Ricerca Finalizzata 2018", Ministero della Salute: "Targeting quiescent cells in melanoma: a model to study tumor niche driving factors promoting quiescence and therapeutic resistance (GR-2018-12367747; 450.000,00 euro). Start: 15/02/2020; end: may 2023. Principal National Investigator: Dr. Lotti Fiorenza.

ii) Participation in competitive research projects

Role: member of the scientific team of the University of Bologna unit; Junior assistant professor (fixed-term)

Project: Lion-Hearted, H2020-FETOPEN-01-2018-2020 (grant agreement number 828984)

Coordinator: Maria Rosa Antognazza, Fondazione Istituto Italiano di Tecnologia (IIT), Milan

Co-scientific investigator of the University of Bologna unit: Prof. Stefania Rapino.

Role: collaborator.

Project: "Proof of Concept (PoC) d'Ateneo" 2021, proposed by the University of Bologna – ALMA MATER STUDIORUM, to enhance the value of the UNIBO patent: "Materiale per il confezionamento a barriera di ossigeno" (38.900,00 euro).

Principal Investigator: Prof. Stefania Rapino.

Role: member of the InSimili S.r.l. team

Project: bando POR-FESR 2014-2020 “BANDO PER L’ATTRAZIONE E IL CONSOLIDAMENTO DI START UP INNOVATIVE”

Team Leader: Prof. Stefania Rapino.

Results: The Project InSimili was selected as one of the 38 start-up receiving a contribution for the actuation of the proposed project (65.000 euro).

Role: member of the InSimili S.r.l. team

Project: I-Tech Innovation Program 2021, Call for Innovation Life Science & Digital Health; promoted by Fondazione Golinelli, G-Factor and CRIF.

Team Leader: Prof. Stefania Rapino.

Results: The Project InSimili was selected as one of the three spin-off that participated to the acceleration program in the Life Science sector, to the Demo Day (1/7/2021) and to the Investor Day (29/10/2021).

Role: collaborator.

Project: “Proof of Concept (PoC) d’Ateneo” 2018, proposed by the University of Bologna – ALMA MATER STUDIORUM, to enhance the value of the UNIBO patent: “Composizioni, dispositivi e metodi per il controllo in vitro del microambiente chimico in colture cellulari” (28.000,00 euro).

Principal Investigator: Prof. Stefania Rapino.

Role: member of the InSimili team.

Project: “Call for Business Plan” 2019, proposed by the University of Bologna – ALMA MATER STUDIORUM.

Responsible: Prof. Stefania Rapino.

Results: The Project InSimili won the first prize, which consists in: (i) a 1-year fellowship (25.000,00 euro); (ii) access to the UNIBO Fabrication Laboratory, ALMALABOR; (iii) a budget of 3.000,00 euro for missions abroad.

Role: member of the *InSimili* team.

Project: business plan competition “Start Cup Emilia-Romagna – Edizione 2019”.

On June 2019, the *InSimili* team was selected as one of the 10 teams that participated at the second phase of the competition. On October 2019, the InSimili team won the first prize (10.000,00 euro) and was selected as one of the four Emilia-Romagna representatives to the *Premio Nazionale Innovazione (PNI) 2019*, November 28th-29th Catania.

Role: member of the *InSimili* team.

Project: *Premio Nazionale Innovazione (PNI) 2019*, 28-29 November 2019, Catania.

The *InSimili* team participated in the *Life Science* category.

Role: team member, Research Fellow.

Project: “Acute myeloid leukemia Investigation with functional Device in lieu of Animals: AIDA”, founded by the Italian Association for Cancer Research (AIRC).

Principal Investigator: Prof. Stefania Rapino.

Role: participant to the research program.

Project: PRIN 2008, “Meccanismi di segnalazione e regolazione redox della fotosintesi”.

Scientific coordinator: Prof. Roberto Bassi.

Scientific responsible: Prof. Paolo Trost.

Role: participant to the research program.

Project: PRIN 2008, “L’accoppiamento tra dinamica conformazionale e trasferimento elettronico nel centro di reazione fotosintetico. Studi in matrici saccaridiche a basso contenuto acquoso”.

Scientific coordinator: Prof. Antonio Cupane.

Scientific responsible: Prof. Giovanni Venturoli.

Invited seminars

- 2023 ASTROTECH INTERNATIONAL SCHOOL
Marie Skłodowska-Curie Innovative Training Network (<http://www.astrotechproject.eu/>)
Astrotech School in Gliophotonics, 25/01/2023: "The photoelectrochemist/device physicist point of view: Biological systems investigated by electrochemical methods"
Istituto Italiano di Tecnologia & Politecnico di Milano
- 2012 *Max-Planck-Institute for Chemical Energy Conversion*, Mülheim-an-der-Ruhr, Germany
(February 28th, 2012): "Electron transfer and protein dynamics coupling in photosynthetic reaction centers embedded in trehalose glassy matrices and in dehydrated films".
- 2010 *Service de Bioénergétique Biologie Structurale et Mécanismes CEA-CNRS*, Saclay, France
(May 10th, 2010): "Electron transfer and protein dynamics coupling in photosynthetic reaction centers embedded in amorphous sugar glassy matrices and in dehydrated RC-detergent films".

Oral communications at scientific congresses

- 2023 XLIX National Congress of Physical Chemistry CDCF 2023, Torino (4-7 September 2023): "Characterization of a 3D Bioprinted Tumor Model by Scanning Electrochemical Microscopy"
- 2022 72st Annual Meeting of the International Society of Electrochemistry, Online, ISE2022 (12-16 September 2022): "Modulation of HL-1 Cardiomyocytes Redox Balance Revealed by Scanning Electrochemical Microscopy"
- 2022 GEI (Giornate dell'Elettrochimica Italiana) 2022, Orvieto (11-15 September 2022): "Scanning Electrochemical Microscopy Reveals Changes of Cardiomyocytes Redox Balance Actuated by Photoactivated Organic Semiconductors".
- 2022 XLVIII Congresso della Divisione di Chimica Fisica, Genova (July 4-7 July 2022): "Modulation of Cell Redox Balance in HL-1 Cardiomyocytes by Photostimulated Organic Semiconductor Films".
- 2021 XXVII Congresso Nazionale della Società Chimica Italiana, SCI2021, online (14-23 September 2021): "Light-Induced Electrochemical Processes at Semiconductor-Films/Water Interface Modulate Cell Redox Balance"
- 2021 72nd Annual Meeting of the International Society of Electrochemistry, Jeju Island, Korea, and online, ISE2021 (29 August – 3 September 2021): "Scanning Electrochemical Microscopy Reveals Modulation of Cellular Processes by Photostimulated Organic Semiconductor Films"
- 2020 71st Annual Meeting of the International Society of Electrochemistry, Belgrade, Serbia, and online, ISE2020 (30 August - 4 September 2020): "Spatially-Controlled Photoinduced Redox Processes at Organic Semiconductor/Liquid Interface Revealed by Scanning ElectroChemical Microscopy"
- 2019 10th International Workshop on SECM and Related Techniques 2019, Fontainebleau, Paris (29th September - 3rd October, 2019): "Photoinduced production of reactive oxygen species by organic copolymers revealed by Scanning ElectroChemical Microscopy".
- 2019 GEI (Giornate dell'Elettrochimica Italiana) 2019, Padova (September 8th-12th, 2019): "Spatially controlled electrochemical monitoring of reactive oxygen species".
- 2019 XLVII Congresso della Divisione di Chimica Fisica, Roma (July 1st-4th, 2019): "Reactive oxygen species production monitored by electrochemical imaging".
- 2018 The 69th Annual Meeting of the International Society of Electrochemistry, ISE2018, Bologna (September 2nd-7th, 2018): "Reactive Oxygen Species Produced by Mitochondrial Respiratory Complexes Monitored with Modified Microelectrodes".

- 2018 XLVI Congresso della Divisione di Chimica Fisica, Bologna (June 25th-28th, 2018): “Redox Balance Monitored by Modified Microelectrodes in Cellular Models of a Human Multisystem Disorder”
- 2018 Winter GEI (Giornate dell'Elettrochimica Italiana) 2018, Sestriere (January 21st-25th, 2018): “Production of reactive oxygen species in cellular models of a human multisystem disorder monitored with modified microelectrodes”.
- 2017 First International GIBB Meeting, Catania (June 14th-16th, 2017): “The cytochrome *b* H291L mutation strongly impairs ubiquinol oxidation and proton translocation at the bacterial bc₁ Qo site”
- 2016 European Bioenergetics Conference EBEC 2016, Riva del Garda, Italy (July 2nd-7th 2016): “Charge-recombination kinetics in Photosystem I embedded in trehalose glasses at different hydration levels”.
- 2015 Annual Meeting of the Italian Group of Biomembranes and Bioenergetics GIBB 2015, Udine (June 18th-20th, 2015): “Mutation of cytochrome *b* H291 impairs ubiquinol oxidation at the Qo site of the bacterial cytochrome bc₁ bc₁ complex”.
- 2015 Annual Meeting of the Italian Society of Photobiology SIFB 2015, Bari (June 11st-13th, 2015): “Bacterial photosynthetic reaction centers exposed to high temperatures for weeks retain their native structure and photoactivity when embedded into solid disaccharide matrices”.
- 2015 Frontiers in Water Biophysics 2015, Erice, Italy (September 7th-12nd, 2015): “Protein-matrix coupling in photosynthetic reaction centers embedded in trehalose and sucrose glasses: the effect of protein concentration”.
- 2014 Annual Meeting of the Italian Group of Biomembranes and Bioenergetics GIBB 2014, Matera (May 29th-31st, 2014): “The conformational dynamics of photosynthetic reaction centers in trehalose and sucrose glasses: the effect of protein concentration”.
- 2012 European Bioenergetics Conference EBEC 2012, Freiburg, Germany (September 14th-20th, 2012): “Exploring the coupling between electron transfer and protein dynamics in photosynthetic reaction centers embedded into dehydrated amorphous matrices”.
- 2012 Annual Meeting of the Italian Group of Biomembranes and Bioenergetics GIBB 2012, Arcavacata (June 21st-23th, 2012): “Inhibition of RC dynamics in dehydrated RC films and trehalose glasses”.
- 2011 Annual Meeting of the Italian Group of Biomembranes and Bioenergetics GIBB 2011, Roma (May 24th-27th, 2011): “Effects of dehydration on the stability of primary charge separation in bacterial reaction centers: studies by optical and differential FTIR spectroscopy”.
- 2010 Water Biophysics 2010, Trieste, Italy (May 23th-26th, 2010): “Electron transfer kinetics in films of photosynthetic reaction centers at different hydration levels”.
- 2010 Annual Meeting of the Italian Group of Biomembranes and Bioenergetics GIBB 2010, Bertinoro, Forlì-Cesena (June 10th-12nd, 2010): “The role of bound water molecules in stabilizing the primary charge separation of photosynthetic reaction centers”.
- 2009 Annual Meeting of the Italian Group of Biomembranes and Bioenergetics GIBB 2009, Udine (June 14th-16th, 2009): “Electron transfer kinetics and protein dynamics in wild type and carotenoid-less bacterial reaction centers: studies in trehalose glasses”.

Posters at scientific congresses

- 2020 106° Congresso Nazionale della Società Italiana di Fisica, online (14-18 September 2020): "Light-induced production of reactive oxygen species by organic semiconductors revealed by Scanning ElectroChemical Microscopy"
- 2015 European Biophysics Congress EBSA 2015, Dresden, Germany (July 18th-22nd, 2015): "Protein-matrix coupling in photosynthetic reaction centers embedded in trehalose and sucrose glasses".
- 2012 European Bioenergetics Conference EBEC 2012, Freiburg, Germany (September 14th-20th, 2012): "Exploring the coupling between electron transfer and protein dynamics in photosynthetic reaction centers embedded into dehydrated amorphous matrices".
- 2011 Journées de la Société Française de Photosynthèse, Ecole Normale Supérieure, Paris, France (May 16th-17th, 2011) "Effects of dehydration on the stability of primary charge separation in bacterial reaction centers: studies by optical and differential FTIR spectroscopy".
- 2010 Réunion annuelle organisée conjointement par la Société Française de Photosynthèse, Ecole Normale Supérieure, Paris, France (May 6th-7th, 2010): "Electron transfer kinetics in films of photosynthetic reaction centers at different hydration levels".
- 2009 European Biophysics Congress EBSA 2009, Genova, Italy (July 11th-15th, 2009): "Electron transfer and protein dynamics in photosynthetic reaction centers embedded in sugar glasses".

Citation metrics (updated on 16 January 2024)

SCOPUS

Number of documents: 37
Total number of citations: 519
H-index: 16

Web of Science

Number of documents: 42
Total number of citations: 507
H-index: 15

Google Scholar

Number of documents: 62
Total number of citations: 693
H-index: 18

List of publications

1. Giorgia, P., Beconi, M., Malferrari, M., Aiello, D., Napoli, A., Di Lisa, L., Grilli, S., Rapino, S., Focarete, M.L. (2023) *Development of a tissue construct with spatially controllable stiffness via one-step 3D bioprinting and dual-crosslinking process*, **Materials Advances**, 4 (16), 3491-3505.
2. Papiano, I., De Zio, S., Hofer, A., Malferrari, M., Mínguez Bacho, I., Bachmann, J., Rapino, S., Vogel, N., Magnabosco, G. (2023) *Bioinspired functional porous materials for low-concentration biomarkers detection*, **Materials Horizon**, 10 (10), 4380-4388.
3. Ronchi, C., Galli, C., Tullii, G., Marzuoli, C., Mazzola, M., Malferrari, M., Crasto, M., Rapino, S., Di Pasquale, E., Antognazza, M.R. (2023) *Non-genetic optical modulation of pluripotent stem cells derived cardiomyocytes function in the red spectral range*, **Advanced Science**, 2304303.
4. Criado-Gonzalez, M., Bondi, L., Marzuoli, C., Gutierrez-Fernandez, E., Tullii, G., Ronchi, C., Gabirondo, E., Haritz Sardon, H., Rapino, S., Malferrari, M., Cramer, T., Antognazza, M.R., Mecerreyes, D. (2023)

Poly(3-hexylthiophene) porous thin films as a tool to regulate intracellular ROS balance in endothelial cells, **ACS Applied Materials & Interfaces**, 15 (30), 35973-35985.

5. Becconi, M., De Zio, S., Falciani, F., Santamaria, M., Malferrari, M., Rapino, S. (2023) "Nano-Electrochemical Characterization of a 3D Bioprinted Cervical Tumor Model", **Cancers**, 15 (4), 1327.
6. Malferrari, M., Tullii, G., Ronchi, C., Marzuoli, C., Abdel Aziz, I., Antognazza, M.R., Rapino, S. (2023) "Geneless optical control of cell redox balance in HL-1 cardiac muscle cells", **Electrochimica Acta**, 457, 142249.
7. Isopi, J., Quartapelle Procopio, E., Veronese, L., Malferrari, M., Valenti, G., Panigati, M., Paolucci, F., Marcaccio, M. (2023) "Electrochemical Characterization and CO₂ Reduction Reaction of a Family of Pyridazine-Bridged Dinuclear Mn (I) Carbonyl Complexes", **Molecules**, 28 (3), 1138.
8. De Zio, S., Becconi, M., Soldà, A., Malferrari, M., Lesch, A., Rapino, S. (2023) "Glucose micro-biosensor for scanning electrochemical microscopy characterization of cellular metabolism in hypoxic microenvironments", **Bioelectrochemistry**, 150, 108343.
9. Ragazzon, G., Malferrari, M., Arduini, A., Secchi, A., Rapino, S., Silvi, S., Credi, A. (2023) "Self-Assembly Autonomous Non-Equilibrium Self-Assembly and Molecular Movements Powered by Electrical Energy", **Angewandte Chemie International Edition**, e202214265.
10. Cantelli, A., Malferrari, M., Mattioli, E.J., Marconi, A., Mirra, G., Soldà, A., Marforio, T.D., Zerbetto, F., Rapino, S., Di Giosia, M., Calvaresi, M. (2022) "Enhanced Uptake and Phototoxicity of C60@albumin Hybrids by Folate Bioconjugation", **Nanomaterials**, 12 (19), 3501.
11. Cantelli, A., Malferrari, M., Soldà, A., Simonetti, G., Forni, S., Toscanella, E., Mattioli, E.J., Zerbetto, F., Zanelli, A., Di Giosia, M., Zangoli, M., Barbarella, G., Rapino, S., Di Maria, F., Calvaresi, M. (2021). Human Serum Albumin–Oligothiophene Bioconjugate: A Phototheranostic Platform for Localized Killing of Cancer Cells by Precise Light Activation, **JACS Au**, 1 (7), 925-935.
12. Mamedov, M.D., Milanovsky, G.E., Malferrari, M., Vitukhnovskaya, L.A., Francia, F., Semenov, A.Y., Venturoli, G. (2021). Trehalose matrix effects on electron transfer in Mn-depleted protein-pigment complexes of Photosystem II, **Biochimica et Biophysica Acta (BBA)-Bioenergetics**, 1862 (7), 148413.
13. Möbius, K., Savitsky, A., Malferrari, M., Francia, F., Mamedov, M.D., Semenov, A.Y., Lubitz, W., Venturoli, G. (2020). Soft dynamic confinement of membrane proteins by dehydrated Trehalose matrices: high-field EPR and fast-laser studies, **Applied Magnetic Resonance**, 51 (9), 773-850.
14. Borghese, R., Malferrari, M., Brucale, M., Ortolani, L., Franchini, M., Rapino, S., Borsetti, F., Zannoni, D. (2020). Structural and electrochemical characterization of lawsone-dependent production of tellurium-metal nanoprecipitates by photosynthetic cells of *Rhodobacter capsulatus*, **Bioelectrochemistry**, 133, 107456.
15. Aziz, I.A., Malferrari, M., Roggiani, F., Tullii, G., Rapino, S., Antognazza, M.R.. (2020). Light-triggered electron transfer between a conjugated polymer and cytochrome C for optical modulation of redox signaling, **iScience**, 23 (5), 101091.
16. Palomba, F., Rampazzo, E., Zaccheroni, N., Malferrari, M., Rapino, S., Greco, V., Satriano, C., Genovese, D., Prodi, L. (2020). Specific, Surface-Driven, and High-Affinity Interactions of Fluorescent Hyaluronan with PEGylated Nanomaterials, **ACS applied materials & interfaces**, 12 (6), 6806-6813.
17. Zaffagnini, M., Marchand, C.H., Malferrari, M., Muraild, S., Bonacchi, S., Genovese, D., Montalti, M., Venturoli, G., Falini, G., Baaden, M., Lemaire, S.D., Fermani, S., and Trost, P. (2020) Glutathionylation primes soluble glyceraldehyde-3-phosphate dehydrogenase for late collapse into insoluble aggregates, **P. Natl. Acad. Sci. USA**, 116 (51), 26057-26065.
18. Malferrari, M., Becconi, M., Rapino, S. (2019). Electrochemical monitoring of reactive oxygen/nitrogen species and redox balance in living cells. **Analytical and Bioanalytical Chemistry**, 411 (19), 4365-4374.

19. Yanykin, D.V., Malferrari, M., Rapino, S., Venturoli, G., Semenov, A. Yu, Mamedov, M.D. (2019). *Hydroxyectoine protects Mn-depleted photosystem II against photoinhibition acting as a source of electrons*, **Photosynthesis Research** 141: 165-179.
20. Malferrari, M., Ghelli, A., Roggiani, F., Valenti, G., Paolucci, F., Rugolo, M., Rapino, S. (2019). *Reactive Oxygen Species Produced by Mutated Mitochondrial Respiratory Chain of Entire Cells Monitored with Modified Microelectrodes*. **ChemElectroChem**, 6, 627-633.
21. Bartolini, L., Malferrari, M., Lugli, F., Zerbetto, F., Paolucci, F., Pelicci, P.G., Albonetti, C., Rapino, S. (2018). *Interaction of Single Cells with 2D Organic Monolayers: A Scanning Electrochemical Microscopy Study*. **ChemElectroChem** 5, 2975-2981.
22. Nalepa, A., Malferrari, M., Lubitz, W., Venturoli, G., Möbius, K., Savitsky, A. (2017). *Local water sensing: water exchange in bacterial photosynthetic reaction centers embedded in a trehalose glass studied using multiresonance EPR*. **Physical Chemistry Chemical Physics** 19 (41), 28388-28400.
23. Malferrari, M., Savitsky, A., Lubitz, W., Möbius, K., Venturoli, G. (2016). *Protein Immobilization Capabilities of Sucrose and Trehalose Glasses: The Effect of Protein/Sugar Concentration Unraveled by High-field EPR*. **Journal of Physical Chemistry Letters** 7, 4871-4877.
24. Francia, F., Malferrari, M., Lanciano, P., Steimle, S., Daldal, F., Venturoli, G., (2016). *The cytochrome b Zn binding amino acid residue histidine 291 is essential for ubihydroquinone oxidation at the Qo site of bacterial cytochrome bc₁*. **BBA-Bioenergetics** 1857 (11), 1796-1806.
25. Malferrari, M., Savitsky, A., Mamedov, M.D., Milanovsky, G.E., Lubitz, W., Möbius, K., Semenov, A.Y., Venturoli, G. (2016). *Trehalose matrix effects on charge-recombination kinetics in Photosystem I of oxygenic photosynthesis at different dehydration levels*. **BBA-Bioenergetics** 1857 (9), 1440-1454.
26. Malferrari, M., Francia, F., Mezzetti, A., Venturoli, G. (2016). *Kinetics effects in dehydration, rehydration, and isotopic exchange of bacterial photosynthetic reaction centers*. **Biomedical Spectroscopy and Imaging** 5, 185-196.
27. Malferrari, M., Malferrari, D., Francia, F., Galletti, P., Tagliavini, E., Venturoli, G. (2015). *Ionic liquids effects on the permeability of photosynthetic membranes probed by the electrochromic shift of endogenous carotenoids*. **BBA-Biomembranes** 1848 (11), 2898-2909.
28. Malferrari, M., Francia, F., Venturoli, G. (2015). *Retardation of protein dynamics by trehalose in dehydrated systems of photosynthetic reaction centers. Insights from electron transfer and thermal denaturation kinetics*. **The Journal of Physical Chemistry B** 119, 13600-13618.
29. Möbius, K., Savitsky, A., Nalepa, A., Malferrari, M., Francia, F., Lubitz, W., Venturoli, G. (2015). *The magic of disaccharide glass matrices for protein function as decoded by high-field EPR and FTIR spectroscopy*. **Applied Magnetic Resonance** 46 (4), 435-464.
30. Malferrari, M., Turina, P., Francia, F., Mezzetti, A., Leibl, W., Venturoli, G. (2015). *Dehydration affects the electronic structure of the primary electron donor in bacterial photosynthetic reaction center: evidence from visible-NIR and light-induced difference FTIR spectroscopy*. **Photochemical and Photobiological Sciences** 14, 238-251.
31. Malferrari, M., Nalepa, A., Venturoli, G., Francia, F., Lubitz, W., Möbius, K., Savitsky, A. (2014). *Structural and dynamical characteristics of trehalose and sucrose matrices at different hydration levels as probed by FTIR and high-field EPR*. **Physical Chemistry Chemical Physics** 16 (21), 9831-9848.
32. Selva, C., Malferrari, M., Ballardini, R., Ventola, A., Francia, F., Venturoli, G. (2013). *Trehalose preserves the integrity of lyophilized phycoerythrin-antihuman CD8 antibody conjugates and enhances their thermal stability in flow cytometric assays*. **Journal of Pharmaceutical Sciences** 102 (2), 649-659.
33. Malferrari, M., Mezzetti, A., Francia, F., Venturoli, G. (2013). *Effects of dehydration on light-induced conformational changes in bacterial photosynthetic reaction centers probed by optical and differential FTIR spectroscopy*. **Biochimica et Biophysica Acta Bioenergetics**, 1827, 328-339.

34. Malferrari, M., Venturoli, G., Francia, F., Mezzetti, A. (2012). *A new method for D₂O/H₂O exchange in infrared spectroscopy of proteins*. **Spectroscopy: An International Journal**, 27 (5-6), 337-342.
35. Malferrari, M., Francia, F., Venturoli, G. (2011). *Coupling between Electron Transfer and Protein-Solvent Dynamics: FTIR and Laser-Flash Spectroscopy Studies in Photosynthetic Reaction Center Films at Different Hydration Levels*. **The Journal of Physical Chemistry B**, 115(49), 14732-14750.
36. Savitsky, A., Malferrari, M., Francia, F., Venturoli, G., and Möbius, K. (2010). *Bacterial photosynthetic reaction centers in trehalose glasses: coupling between protein conformational dynamics and electron-transfer kinetics as studied by laser-flash and high-field EPR spectroscopies*. **The Journal of Physical Chemistry B** 114, 12729-12743.
37. Francia, F., Malferrari, M., Sacquin-Mora, S., Venturoli, G. (2009). *Charge recombination kinetics and protein dynamics in wild type and carotenoid-less bacterial reaction centers: studies in trehalose glasses*. **The Journal of Physical Chemistry B** 113, 10389-10398.

Metrics of publications (updated on 28 June 2023)

N	Title	Authors	Editor	Year Month Volume Issue Pages	First author	Corresponding author	2022 IF	5 years IF	Citations SCOPUS	Citations ISI W.O.S
1	Development of a tissue construct with spatially controllable stiffness via one-step 3D bioprinting and dual-crosslinking process	Giorgia, P., Beconi, M., Malferrari, M., Aiello, D., Napoli, A., Di Lisa, L., Grilli, S., Rapino, S., Focarete, M.L.	Materials Advances	2023 4 16 3491-3505						
2	Bioinspired functional porous materials for low-concentration biomarkers detection	Papiano, I., De Zio, S., Hofer, A., Malferrari, M., Mínguez Bacho, I., Bachmann, J., Rapino, S., Vogel, N., Magnabosco, G.	Materials Horizon	2023 10 10 4380-4388						
3	Non-genetic optical modulation of pluripotent stem cells derived cardiomyocytes function in the red spectral range	Ronchi, C., Galli, C., Tullii, G., Marzuoli, C., Mazzola, M., Malferrari, M., Crasto, M., Rapino, S., Di Pasquale, E., Antognazza, M.R.	Advanced Science	2023 2304303						

N	Title	Authors	Editor	Year Month Volume Issue Pages	First author	Corresponding author	2022 IF	5 years IF	Citations SCOPUS	Citations ISI W.O.S
4	Poly(3-hexylthiophene) porous thin films as a tool to regulate intracellular ROS balance in endothelial cells	Criado-Gonzalez, M., Bondi, L., Marzuoli, C., Gutierrez-Fernandez, E., Tullii, G., Ronchi, C., Gabirondo, E., Haritz Sardon, H., Rapino, S., Malferrari, M., Cramer, T., Antognazza, M.R., Mecerreyes, D.	ACS Applied Materials & Interfaces	2023 15 30 35973-35985						
5	Geneless optical control of cell redox balance in HL-1 cardiac muscle cells	Malferrari, M., Tullii, G., Ronchi, C., Marzuoli, C., Abdel Aziz, I., Antognazza, M.R., Rapino, S. (2023)	Eletrochimica Acta	2023 --- 457 --- 142249	✓	✓	6.6	6.0	---	---
6	Nano-Electrochemical Characterization of a 3D Bioprinted Cervical Tumor Model	Beconni, M., De Zio, S., Falciani, F., Santamaria, M., Malferrari, M., Rapino, S.	Cancers	2023 --- 15 4 1327		✓	5.2	5.6	---	---
7	Electrochemical Characterization and CO ₂ Reduction Reaction of a Family of Pyridazine-Bridged Dinuclear Mn (I) Carbonyl Complexes	Isopi, J., Quartapelle Procopio, E., Veronese, L., Malferrari, M., Valenti, G., Panigati, M., Paolucci, F., Marcaccio, M.	Molecules	2023 --- 28 3 1138			4.6	4.9	---	---
8	Glucose micro-biosensor for scanning electrochemical microscopy characterization of cellular metabolism in hypoxic microenvironments	De Zio, S., Beconni, M., Soldà, A., Malferrari, M., Lesch, A., Rapino, S.	Bioelectrochemistry	2023 --- 150 108343			5.0	4.9	1	1

N	Title	Authors	Editor	Year Month Volume Issue Pages	First author	Corresponding author	2022 IF	5 years IF	Citations SCOPUS	Citations ISI W.O.S
9	Autonomous Non-Equilibrium Self-Assembly and Molecular Movements Powered by Electrical Energy	Ragazzon, G., Malferrari, M., Arduini, A., Secchi, A., Rapino, S., Silvi, S., Credi, A.	Angewandte Chemie International Edition	2023 --- --- e2022142 65			16.6	15.3	2	---
10	Enhanced Uptake and Phototoxicity of C60@albumin Hybrids by Folate Bioconjugation	Cantelli, A., Malferrari, M., Mattioli, E.J., Marconi, A., Mirra, G., Soldà, A., Marforio, T.D., Zerbetto, F., Rapino, S., Di Giosia, M., Calvaresi, M.	Nanomaterials	2022 --- 12 19 3501			5.3	5.4	5	6
11	Human Serum Albumin–Oligothiophene Bioconjugate: A Phototheranostic Platform for Localized Killing of Cancer Cells by Precise Light Activation	Cantelli, A., Malferrari, M., Soldà, A., Simonetti, G., Forni, S., Toscanella, E., Mattioli, E.J., Zerbetto, F., Zanelli, A., Di Giosia, M., Zangoli, M., Barbarella, G., Rapino, S., Di Maria, F., Calvaresi, M.	JACS Au	2021 July 1 7 925-935			8.0	8.0	12	13
12	Trehalose matrix effects on electron transfer in Mn-depleted protein-pigment complexes of Photosystem II	Mamedov, M.D., Milanovsky, G.E., Malferrari, M., Vitukhnovskaya, L.A., Francia, F., Semenov, A.Y., Venturoli, G.	Biochimica et Biophysica Acta (BBA) - Bioenergetics	2021 July 1862 7 148413			4.3	4.1	4	3

N	Title	Authors	Editor	Year Month Volume Issue Pages	First author	Corresponding author	2022 IF	5 years IF	Citations SCOPUS	Citations ISI W.O.S
13	Soft dynamic confinement of membrane proteins by dehydrated Trehalose matrices: high-field EPR and fast-laser studies	Möbius, K., Savitsky, A., Malferrari, M., Francia, F., Mamedov, M.D., Semenov, A.Y., Lubitz, W., Venturoli, G.	Applied Magnetic Resonance	2020 August 5 9 773-850.			1.0	0.9	14	11
14	Structural and electrochemical characterization of lawsone-dependent production of tellurium-metal nanoprecipitates by photosynthetic cells of <i>Rhodobacter capsulatus</i>	Borghese, R., Malferrari, M., Brucalè, M., Ortolani, L., Franchini, M., Rapino, S., Borsetti, F., Zannoni, D.	Bioelectrochemistry	2020 June 133 107456	✓		5.0	4.9	18	17
15	Light-triggered electron transfer between a conjugated polymer and cytochrome C for optical modulation of redox signaling	Aziz, I.A., Malferrari, M., Roggiani, F., Tullii, G., Rapino, S., Antognazza, M.R.	iScience	2020 May 23 5 101091	✓		5.8	5.8	16	17
16	Specific, Surface-Driven, and High-Affinity Interactions of Fluorescent Hyaluronan with PEGylated Nanomaterials	Palomba, F., Rampazzo, E., Zaccheroni, N., Malferrari, M., Rapino, S., Greco, V., Satriano, C., Genovese, D., Prodi, L.	ACS applied materials & interfaces	2020 12 6 6806-6813			9.5	9.6	4	3

N	Title	Authors	Editor	Year Month Volume Issue Pages	First author	Corresponding author	2022 IF	5 years IF	Citations SCOPUS	Citations ISI W.O.S
17	Glutathionylation primes soluble glyceraldehyde-3-phosphate dehydrogenase for late collapse into insoluble aggregates	Zaffagnini, M., Marchand, C.H., Malferrari, M., Muraild, S., Bonacchi, S., Genovese, D., Montalti, M., Venturoli, G., Falini, G., Baaden, M., Lemaire, S.D., Fermani, S., Trost, P.	P. NATL. ACAD. SCI. USA	2019 December 116 51 26057- 26065			11.1	12.0	21	23
18	Electrochemical monitoring of reactive oxygen/nitrogen species and redox balance in living cells	Malferrari, M., Beconi, M., Rapino, S.	ANALYTICAL AND BIOANALYTICAL CHEMISTRY	2019 July 411 19 4365- 4374	✓		4.3	4.0	18	18
19	Hydroxyectoine protects Mn-depleted photosystem II against photoinhibition acting as a source of electrons	Yanykin, D.V., Malferrari, M., Rapino, S., Venturoli, G., Semenov, A.Yu, Mamedov, M.D.	PHOTOSYNTHESIS RESEARCH	2019 August 141 2 165-179			3.7	3.6	4	5
20	Reactive Oxygen Species Produced by Mutated Mitochondrial Respiratory Chain of Entire Cells Monitored with Modified Microelectrodes	Malferrari, M., Ghelli, A., Roggiani, F., Valenti, G., Paolucci, F., Rugolo, M., Rapino, S.	CHEMELECTROCHEM	2019 February 6 3 627-633	✓		4.0	4.0	11	11
21	Interaction of Single Cells with 2D Organic Monolayers: A Scanning Electrochemical Microscopy Study	Bartolini, L., Malferrari, M., Lugli, F., Zerbetto, F., Paolucci, F., Pelicci, P.G., Albonetti, C., Rapino, S.	CHEMELECTROCHEM	2018 October 5 20 2975- 2981			4.0	4.0	15	14
22	Local water sensing: water exchange in bacterial photosynthetic reaction centers embedded in a trehalose glass studied using multiresonance EPR	Nalepa, A., Malferrari, M., Lubitz, W., Venturoli, G., Möbius, K., Savitsky, A.	PHYSICAL CHEMISTRY CHEMICAL PHYSICS	2017 November 19 41 28388- 28400			3.3	3.3	16	14

N	Title	Authors	Editor	Year Month Volume Issue Pages	First author	Corresponding author	2022 IF	5 years IF	Citations SCOPUS	Citations ISI W.O.S
23	Protein Immobilization Capabilities of Sucrose and Trehalose Glasses: The Effect of Protein/Sugar Concentration Unraveled by High-field EPR	Malferrari, M., Savitsky, A., Lubitz, W., Möbius, K., Venturoli, G.	JOURNAL OF PHYSICAL CHEMISTRY LETTERS	2016 December 7 23 4871-4877	✓		5.7	6.0	41	36
24	The cytochrome b ₆ Zn binding amino acid residue histidine 291 is essential for ubiquinol oxidation at the Q _o site of bacterial cytochrome bc ₁	Francia, F., Malferrari, M., Lanciano, P., Steimle, S., Daldal, F., Venturoli, G.	BIOCHIMICA ET BIOPHYSICA ACTA-BIOENERGETICS	2016 November 1857 11 1796-1806			4.3	4.1	4	3
25	Trehalose matrix effects on charge-recombination kinetics in Photosystem I of oxygenic photosynthesis at different dehydration levels	Malferrari, M., Savitsky, A., Mamedov, M.D., Milanovsky, G.E., Lubitz, W., Möbius, K., Semenov, A.Y., Venturoli, G.	BIOCHIMICA ET BIOPHYSICA ACTA-BIOENERGETICS	2016 September 1857 9 1440-1454	✓		4.3	4.1	30	28
26	Kinetics effects in dehydration, rehydration, and isotopic exchange of bacterial photosynthetic reaction centers	Malferrari, M., Francia, F., Mezzetti, A., Venturoli, G.	BIOMEDICAL SPECTROSCOPY AND IMAGING	2016 --- 5 2 85-196	✓		0.48	---	---	2
27	Ionic liquids effects on the permeability of photosynthetic membranes probed by the electrochromic shift of endogenous carotenoids	Malferrari, M., Malferrari, D., Francia, F., Galletti, P., Tagliavini, E., Venturoli, G.	BIOCHIMICA ET BIOPHYSICA ACTA-BIOMEMBRANES	2015 November 1848 11 2898-2909	✓		3.4	3.5	11	10
28	Retardation of protein dynamics by trehalose in dehydrated systems of photosynthetic reaction centers. Insights from electron transfer and thermal denaturation kinetics.	Malferrari, M., Francia, F., Venturoli, G.	JOURNAL OF PHYSICAL CHEMISTRY B	2015 October 119 43 13600-13618	✓		3.3	3.0	22	23

N	Title	Authors	Editor	Year Month Volume Issue Pages	First author	Corresponding author	2022 IF	5 years IF	Citations SCOPUS	Citations ISI W.O.S
29	The magic of disaccharide glass matrices for protein function as decoded by high-field EPR and FTIR spectroscopy.	Möbius, K., Savitsky, A., Nalepa, A., Malferrari, M., Francia, F., Lubitz, W., Venturoli, G.	APPLIED MAGNETIC RESONANCE	2015 April 46 4 435-464			1.0	0.9	6	5
30	Dehydration affects the electronic structure of the primary electron donor in bacterial photosynthetic reaction center: evidence from visible-NIR and light-induced difference FTIR spectroscopy.	Malferrari, M., Turina, P., Francia, F., Mezzetti, A., Leibl, W., Venturoli, G.	PHOTOCHEMICAL & PHOTOBIOLOGICAL SCIENCES	2015 February 14 2 238-251	✓		3.1	3.4	16	17
31	Structural and dynamical characteristics of trehalose and sucrose matrices at different hydration levels as probed by FTIR and high-field EPR	Malferrari, M., Nalepa, A., Venturoli, G., Francia, F., Lubitz, W., Möbius, K., Savitsky, A.	PHYSICAL CHEMISTRY CHEMICAL PHYSICS	2014 June 16 21 9831-9848	✓		3.3	3.3	38	38
32	Trehalose preserves the integrity of lyophilized phycoerythrin-antihuman CD8 antibody conjugates and enhances their thermal stability in flow cytometric assays	Selva, C., Malferrari, M., Ballardini, R., Ventola, A., Francia, F., Venturoli, G.	JOURNAL OF PHARMACEUTICAL SCIENCES	2013 February 102 2 649-659	✓		3.8	3.7	10	10
33	Effects of dehydration on light-induced conformational changes in bacterial photosynthetic reaction centers probed by optical and differential FTIR spectroscopy	Malferrari, M., Mezzetti, A., Francia, F., Venturoli, G.	BIOCHIMICA ET BIOPHYSICA ACTA-BIOENERGETICS	2013 March 1827 3 328-339	✓		4.3	4.1	24	24
34	A new method for D2O/H2O exchange in infrared spectroscopy of proteins	Malferrari, M., Venturoli, G., Francia, F., Mezzetti, A.	SPECTROSCOPY-AN INTERNATIONAL JOURNAL	2012 --- 27 5-6 337-342	✓		0.48	---	13	13

N	Title	Authors	Editor	Year Month Volume Issue Pages	First author	Corresponding author	2022 IF	5 years IF	Citations SCOPUS	Citations ISI W.O.S
35	Coupling between Electron Transfer and Protein-Solvent Dynamics: FTIR and Laser-Flash Spectroscopy Studies in Photosynthetic Reaction Center Films at Different Hydration Levels	Malferrari, M., Francia, F., Venturoli, G.	JOURNAL OF PHYSICAL CHEMISTRY B	2011 December 115 49 14732- 14750	✓		3.3	3.0	27	29
36	Bacterial photosynthetic reaction centers in trehalose glasses: coupling between protein conformational dynamics and electron-transfer kinetics as studied by laser-flash and high-field EPR spectroscopies.	Savitsky, A., Malferrari, M., Francia, F., Venturoli, G., Möbius, K.	JOURNAL OF PHYSICAL CHEMISTRY B	2010 October 114 39 12729- 12743			3.3	3.0	30	26
37	Charge recombination kinetics and protein dynamics in wild type and carotenoid-less bacterial reaction centers: studies in trehalose glasses	Francia, F., Malferrari, M., Sacquin-Mora, S., Venturoli, G.	JOURNAL OF PHYSICAL CHEMISTRY B	2009 July 113 30 10389- 10398			3.3	3.0	26	25

Proceedings

Venturoli, G., Malferrari, M. (2009). La strategia dei viventi per la sopravvivenza in assenza di acqua. L'energia e i vegetali, atti del convegno del 16 maggio 2009, pag. 277. Società Torricelliana di Scienze e Lettere, Faenza.

Preprints

Hesgrove, C.S., Nguyen, K.H., Biswas, S., Childs, C.A., Shraddha, K.C., Medina, B.X., Alvarado, V., Sukenik, S., Yu, F., Malferrari, M., Francia, F., Venturoli, V., Martin, E.W., Holehouse, A.S., Boothby, T.C.. (2021). *Molecular Swiss Army Knives: Tardigrade CAHS Proteins Mediate Desiccation Tolerance Through Multiple Mechanisms*, doi: 10.1101/2021.08.16.456555.

Submitted research articles

Hesgrove, C.S., Nguyen, K.H., Biswas, S., Childs, C.A., Shraddha, K.C., Medina, B.X., Alvarado, V., Sukenik, S., Yu, F., Malferrari, M., Francia, F., Venturoli, V., Martin, E.W., **Protein science**, *under review*.

Patents

i) Patent: “Materiale per il confezionamento a barriera di ossigeno”; application presented on 04/04/2018 in Italy, n. 102018000004195 (granted in Italy on 14/07/2020). PCT/IB2019/052720.

ii) Patent: “Digital printing and coating of functional materials”, application presented on 22/07/2022 in Italy, n. 102022000019404.

Spin-off

Marco Malferrari is one of the co-founder of the spin-off InSimili S.r.l. (founded on 22/02/2021, VAT number 03928771207). At present, Marco Malferrari is Vice-President of the CDA of InSimili S.r.l.

Website: www.insimili.com

Personal skills

Physicochemical experimental skills and data analysis expertises

- Scanning Electrochemical Microscopy (SECM): characterization of functional biocompatible devices; production of ROS and RNS species by human cells; monitoring of metabolites (e.g. glucose, lactate) in biological samples.
- Quantitative analysis of SECM data.
- Simulation of physicochemical systems with COMSOL Multiphysics
- Quantitative analysis of Scanning Electrochemical Microscopy data with MIRA software.
- Quantitative analysis of images and timelapse with *ad-hoc* developed routines in MATLAB.
- Quantitative analysis of AFM images of cell shape by gaussian decomposition of distribution of cell geometrical parameters
- Experience in 3D printing technology: 3D model preparation (Blender), G-code (Slic3r, Repetier-Host), setting up of biocompatible materials for Extrusion Based Bioprinting
- Immunofluorescence.
- Good experience in the preparation of protein-sugar glassy samples for high-field EPR spectroscopy.
- Redox titration of membrane protein cofactors (protein complexes of oxidative phosphorylation and photosynthesis).
- Quantitative analysis of time-resolved optical signals with non linear best-fitting strategies.
- Spectral decomposition into gaussian components of absorption spectra.
- UV-VIS spectroscopy (static, time-resolved).
- FT-NIR spectroscopy.
- FT-IR spectroscopy (static, time-resolved, differential).
- Fluorescence optical microscopy, on fixed samples or living cells.
- Good experience in the utilization and maintenance of non commercial apparatus for laser-flash time-resolved optical spectroscopy.
- Quantitative analysis of raw and secondary data from flow cytometric measurements.
- Bacterial cells cultures.
- Human cell cultures.
- Purification of membrane protein complexes.
- Gel filtration and ionic exchange chromatography.
- Cell vitality assay (MTT).
- SDS-PAGE and Western blot.

Information technology skills

- Good experience in developing computer routines in C, for the quantitative analysis of scientific data.
- Good experience in the utilization of spectropic apparatus for static, time-resolved and differential FT-IR measurements.
- Excellent knowledge of Windows (XP, 7, 10).
- Good knowledge of Ubuntu (Linux).
- Excellent knowledge of Microsoft Office.
- Excellent knowledge of LibreOffice.
- Basic knowledge of Adobe Photoshop.
- Excellent knowledge of OriginLab.
- Excellent knowledge of MATLAB.
- Good knowledge of Mathematica.
- Good knowledge of C and IDE Eclipse.
- Excellent knowledge of molecular visualization programs (RasMol, RasTop, Chimera, DeepView).

Courses

- 2021 I-Tech Innovation Program 2021, Call for Innovation Life Science & Digital Health; promoted by Fondazione Golinelli, G-Factor and CRIF. April-November 2021.
- 2019 StartCup 2019 – Emilia Romagna; June – October 2019.
- 2019 Academy Advanced Entrepreneurship, June – October 2019, University of Bologna.
- 2018 Introduction to Python programming; September 24th-25th, 2018, CINECA-Bologna.
- 2015 High Performance Molecular Dynamics; November 18th-20th 2015, CINECA - Bologna.
- 2015 Introduction to Scientific and Technical Computing in C, May 4th-6th 2015, CINECA – Bologna.
- 2010 ASTER DOC 2010, organized by ASTER (High Technology Network Emilia-Romagna), July 5th-10th 2010, Bologna, Italy.
- 2010 5th Italian Course “Introduction to Photochemistry”, September 13th-15th 2010, University of Bologna, Department of Chemistry “G. Ciamician”.
- 2009 - 2011 PhD Course in Cellular, Molecular and Industrial Biology:
(i). Laboratory of proteomic analysis/recombinant proteins methodologies.
Dr. Simona Romagnoli and Dr. Enzo Spisni. February 23th-27th, 2009.
(ii). Radioisotopes in Biology.
Dr. Alberto Danielli. April 28th-30th, 2009.
(iii). Risk identification in a biologic laboratory – Rules for a correct behaviour.
Dr. Simona Rossi. September 2009.
(iv). Calorimetry and Light scattering.
Dr. Barbara Zambelli. October 24th-28th, 2011

Other activities and information

1. Reviewer for the following scientific journals:

Physical Chemistry Chemical Physics – PCCP.

Photochemical and Photobiological Sciences.

Photosynthesis Research.

New Journal of Chemistry.

Chemical Communications.

BBA – Proteins and Proteomics

Journal of Photochemistry and Photobiology B: Biology

MDPI: Molecules, International Journal of Molecular Sciences, Photochem

2. Member of the following scientific societies:

(i). GIBB, Gruppo Italiano di Bioenergetica.

(ii). SCI, Società Chimica Italiana (Divisions: Chimica Fisica, Elettrochimica).

(iii). ISE, International Society of Electrochemistry.

(iv). SIBPA, Società Italiana di Biofisica Pura ed Applicata.

(v). SIF, Società Italiana di Fisica.

3. Member of the UNIBO committee for the Admission to the 38th Cycle of the PhD programme of Nanoscience for Medicine and Environment:

- Regular Call, deadline 09/06/2022;

- Next Generation EU – NRRP plan Call, deadline 22/08/2022;

- Next Generation EU – NRRP plan Call n.2, deadline 14/12/2022.

Research interests

My research interests are focused on the physico-chemical description of biological systems with different level of complexity, from purified proteins to human cells.

Protein dynamics plays a main role in determining protein activity: I studied the interplay between solvent and protein dynamics in photoexcitable membrane proteins. During my PhD and postdoctoral activity from 2012 to 2016 I investigated intraprotein electron transfer in photosynthetic and respiratory complexes, as well as reactive oxygen species production upon activation of the respiratory chain (Francia, BBA-Bioenergetics 2016, 1857 (11), 1796-1806; Malferrari, BBA-Bioenergetics, 2016, 1857 (9), 1440-1454; Mamedov, BBA-Bioenergetics, 2021, 1862 (7), 148413). I developed and studied methods to modulate at room temperature protein dynamics and function, by describing and exploiting fine tuning of the physicochemical properties of water dynamics in protein-sugar glassy systems (Malferrari, J Phys Chem B, 2011, 115 (49), 14732-14750; Malferrari, PCCP, 2014, 16 (21), 9831-9848; Malferrari, Photochem, Photobiol, Scien., 2015, 14, 238-251; Malferrari, J Phys Chem Lett, 2016, 7, 4871-4877).

These investigations were performed by a variety of advanced spectroscopic techniques (time resolved laser flash optical spectroscopy; static, time-resolved, difference FT-IR spectroscopy; FT-NIR spectroscopy; fluorescence spectroscopy; static and pulsed high-resolution/high-field EPR spectroscopy) and by developing *in house* tools for data analysis, to validate physicochemical models for the description of experimental data (Malferrari, BBA Bioenergetics, 2013, 1827, 328-339; Nalepa, PCCP, 2017, 19 (41), 28388-28400). Additionally, this combination of spectroscopic approaches and advanced data analysis was fruitfully applied to investigate toxicity of ionic liquids (Malferrari, BBA-Biomembranes, 2015, 1848 (11), 2898-2909) and oxidation induced aggregation of glycolytic enzymes (Zaffagnini, P. Natl. Acad. Sci. USA, 2020, 116 (51), 26057-26065.)

The study of the physicochemical basis of sugar glasses hindering of protein dynamics led to applications connected to the bioprotection of protein complexes at room temperature: for example, conservation of antibodies, protein complexes and protein fluorophores for biomedical applications, as HIV diagnostic tools (Selva, J. Pharm. Scien. 2013, 102 (2), 649-659; Malferrari, 2015, J Phys Chem B 119, 13600-13618).

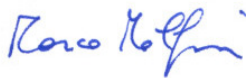
From 2017 to 2019, in the framework of a postdoctoral fellow on the research project "Acute myeloid leukemia Investigation with functional Device in lieu of Animals: AIDA", founded by the Italian Association for Cancer Research (AIRC), I studied the role played by cell microenvironment in acute myeloid leukemia. Electrochemical techniques such as scanning electrochemical microscopy (SECM), were applied to investigate the physicochemical characteristics of advanced cellular cultures, as bidimensional cellular cultures with controlled chemical microenvironment and 3D Bioprinted constructs with cellular lines (Beconi, Cancers, 2023, 15 (4), 1327) or primary cells from patients.

I additionally applied SECM imaging and electrochemical methodologies to study other biological systems and processes: the role of reactive oxygen species in normal cells and cellular models of mitochondrial diseases (Malferrari, ChemElectroChem, 2019, 6, 627-633); biotechnological applications of photosynthetic bacteria for the bioremediation of tellurite water pollution and tellurite nanoparticle production (Borghese, Bioelectrochemistry, 2020, 133, 107456); I developed data analysis strategies for the description of AFM images of cellular populations attached to different materials (Bartolini, 2018, ChemElectroChem 5, 2975-2981).

From 2020 to 2023, in the framework of the European Project Lion-Hearted, H2020-FETOPEN-01-2018-2020, I studied the photoinduced ROS production in aqueous media by organic polymers and the effects exerted on the proliferation of cardiac muscle cell models. In view of apply photosensitive organic copolymers to cardiac tissues regeneration, I investigated with SECM and modified microelectrodes the physicochemical events taking place upon photoexcitation at the electrolyte-polymer interface (Aziz, iScience, 2020, 23 (5), 101091; Malferrari, Electrochimica Acta, 2023, 457, 142249) as well as the effects on cellular parameters as redox balance, glucose uptake, lactate release and oxygen consumption.

I authorize the treatment of my sensible and personal data, in compliance with Italian law in force D. Lgs. /2003.

Bologna, 16/01/2024.



Marco Malferrari.