Curriculum Vitae

Name Marco Malferrari

Date of birth 04/01/1984

Nationality Italian

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https://scholar.google.com/citations?hl=en&user=z4whT50AAAAJ&view_op=list_works&sortby=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

April 2020 – present date
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).

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.

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-Plank 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 (36 hours, 6CFU): Photobiophysics and Photobiology (CHIM/02) Master Degree in Photochemistry and Molecular Materials, elective learning activity University of Bologna: School of Sciences Lecturer (24 hours, 3CFU): Spectroscopic Methods for the Functional and Structural Characterization of Proteins (CHIM/02) Master Degree in Photochemistry and Molecular Materials, elective learning activity University of Bologna: School of Sciences Lecturer (16 hours laboratory, 1 CFU + 24 hours frontal lessons): Processes of Cell Matter (CHIM/02) Master Degree in Photochemistry and Molecular Materials University of Bologna: School of Sciences Lecturer (16 hours laboratory): 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 (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 (18 hours, 3CFU): Photobiophysics and Photobiology (FIS/07) Master Degree in Molecular and Cell Biology, elective learning activity University of Bologna: School of Sciences

Academic Year 2020-2019 Academic Year 2018-2019 Academic Year 2017-2018 Academic Year 2015-2016 Academic Year 2014-2015 Academic Year 2013-2014	Academic Tutor: Laboratory of Physical Chemistry. Master Degree in Molecular and Cellular Biology. University of Bologna: School of Pharmacy, Biotechnology and Sport Sciences.
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.

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 dalla 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 partecipation to the European Biophysics Congress EBSA 2015, Dresden, Germany (July 18th-22nd, 2015). Title of the contribuion: "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)
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 - 13/01/2029)

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

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 2021): “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”.XLVI Congresso della Divisione di Chimica Fisica, Bologna (June 25th-28th, 2018): “Redox Balance Monitored by Modified Microelectrodes in Cellular Models of a Human Multysistem Disorder”

2018 XLVI Congresso della Divisione di Chimica Fisica, Bologna (25t-28 July 2018): “Redox Balance Monitored by Modified Microelectrodes in Cellular Models of a Human Multysistem 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 multystem 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 bc_1 Q_O 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 bc_1 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 Journees de la Sociètè 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 Rèunion annuelle organisèe conjointement par la Sociètè 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 04 April 2023)

SCOPUS
Number of documents: 32
Total number of citations: 427
H-index: 14

Web of Science
Number of documents: 37
Total number of citations: 419
H-index: 13

Google Scholar
Number of documents:53
Total number of citations: 563
H-index: 15

List of publications

1. Isopi, J., Quartapelle Procopio, E., Veronese, L., Malferrari, M., Valenti, G., Panigati ,M., Paolucci ,F., Marcaccio, M. (2023) "*Electrochemical Characterization and CO_2 Reduction Reaction of a Family of Pyridazine-Bridged Dinuclear Mn (I) Carbonyl Complexes*", **Molecules**, 28 (3), 1138.

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. 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.

12. 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.

13. 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.

14. 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.

15. 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.

16. 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.

17. 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.

18. 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* bc_1. **BBA-Bioenergetics** 1857 (11), 1796-1806.

19. 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.

20. 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.

21. 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.

22. 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.

23. 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.

24. 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.

25. 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.

26. 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 citometric assays*. **Journal of Pharmaceutical Sciences** 102 (2), 649-659.

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29. 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.

30. 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.

31. 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.

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.

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

Role and participation to international and national competitive research projects

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.

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: 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 partecipated 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 partecipated 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 partecipated 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: partecipant 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: partecipant 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.

Personal skills

Bio-physicochemical skills

- 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.
- Immunofluorescence.
- 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.
- 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.
- Experience in 3D printing technology: 3D model preparation (Blender), G-code (Slic3r, Repetier-Host), setting up of biocompatible materials for Extrusion Based Bioprinting.
- Quantitative analysis of images and timelapse with *ad-hoc* developed routines in MATLAB.
- 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.

I authorize the treatment of my sensible and personal data, in compliance with Italian law in force D. Lgs. /2003.
Bologna, 04/04/2023.

Marco Malferrari.