

PERSONAL INFORMATION

Giuffrè Alessandro

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EDUCATION AND TRAINING

19/02/1993 **Degree in Biology cum laude**
Sapienza University of Rome

04/08/1997 **PhD in Biochemistry**
Sapienza University of Rome

Research activity in foreign laboratories

- European Laboratory of Molecular Biology (EMBL), Heidelberg, Germany
(Lab dr. M. Saraste / 18 Nov – 14 Dec 1991)
- University of Essex, Colchester, UK
(Lab prof. M.T. Wilson, Dept. of Chemistry and Biological Chemistry / 24-30 Jun 1991; 11–16 Sep 1994)
- Medical University of Luebeck, Luebeck, Germany
(Lab prof. G. Schaefer, Institute of Biochemistry / 10-23 Oct 1993; 4–11 Mar 1995)
- University of Groningen, Groningen, The Netherlands
(Lab prof. W.N. Konings, Dept. of Microbiology / 5–10 Dec 1994).
- NIH, Bethesda, MD, USA
(Lab prof. E. Henry, Dept. of Health and Human Services / 28 Jun – 7 Jul 1995; 12–22 Feb 1996).
- University of East Anglia, Norwich, UK
(Lab prof. C. Greenwood, School of Biological Sciences / 23–28 Jun 1996).
- University of Frankfurt, Frankfurt, Germany
(Laboratorio prof. B. Ludwig, Institute of Biochemistry / 5-23 Jul 1999; 9–22 Jul 2000).
- University of Helsinki, Helsinki, Finland
(Lab prof. M. Wikström, Institute of Biotechnology / 25 Nov – 4 Dec 2002).
- University of Lisbon, Lisbon - Oeiras, Portugal
(Lab prof. M. Teixeira e dr. J.B. Vicente, Instituto de Tecnologia Quimica e Biologica - Science Faculty / 7–17 May 1997; 29 Sep – 7 Oct 2002; 20–27 Jul 2003; 10–17 Apr 2005; 2–9 Jul 2005; 12–19 Feb 2006; 9–22 Sep 2007; 6–19 Jul 2008; 23 Nov - 3 Dic 2011; 12-19 Jul 2012; 18-29 Nov 2012; 23 Jun- 2 Jul 2013; 1-9 Nov 2013; 20-29 Oct 2014; 7-13 Jun 2015; 1-8 Nov 2015; 14-21 Jun 2016; 2-7 Dec 2016)

Attended Courses

2009: Management course "CoMe Va...la Ricerca ?", on project management, results valorization and dissemination . Rome.

2002: Summer School "Bioinformatics". Maynooth (Ireland).

2002: 4th Course of the Portuguese Biophysical Society. Santarem (Portugal)

1998: Summer School "Spectroscopy and Engineering of Metalloproteins". Oeiras (Portugal)

1996: FEBS course "Oxidative Phosphorylation: Molecular Biology, Biochemistry and

Physiopathology". Bari (I).

1992: EMBO course "Current Methods in Membrane Protein Research". Le Vesinet (Francia) e Heidelberg (Germany).

16/06/2014–Present **National Scientific Abilitation (ASN) to Full Professor (SSD E1/05 - Biochemistry)**

Ministero dell'Istruzione, dell'Università e della Ricerca

WORK EXPERIENCE

01/10/1997–15/12/1998 **Fellowship (Biophysics)**

Centro Linceo Interdisciplinare, Accademia Nazionale dei Lincei

16/12/1998–15/07/2001 **CNR Researcher (ex art.36 L.70/75)**

Centro di Studio sulla Biologia Molecolare - CNR, Roma (Italy)

16/07/2001–Present **CNR Senior Researcher (Primo Ricercatore)**

Istituto di Biologia e Patologia Molecolari di Roma (IBPM) - CNR, Roma (Italy)

ADDITIONAL INFORMATION

International Identifiers

Orcid ID: 0000-0001-5301-0681
Scopus Author ID: 7003270357
WoS Researcher ID: K-4341-2015
Research Gate: Alessandro_Giuffre
Google Scholar: tQwJTEAAA&h

ERC sectors

LS - LIFE SCIENCES

LS1 - MOLECULAR AND STRUCTURAL BIOLOGY AND BIOCHEMISTRY: MOLECULAR BIOLOGY, BIOCHEMISTRY, BIOPHYSICS, STRUCTURAL BIOLOGY, BIOCHEMISTRY OF SIGNAL TRANSDUCTION

Research activity

Main research interests:

- 1) Hydrogen sulfide metabolism: biochemistry and impact on neurodegenerative and oncologic diseases
- 2) Gasotransmitters and cellular bioenergetics
- 3) Energy metabolism and antioxidant defence in microorganisms: looking for drug targets

Main ongoing International collaborations:

- Joao Vicente, Ligia Saraiva, Miguel Teixeira (Instituto de Tecnologia Quimica e Biologica, Oeiras, Portugal)
- Vitaly Borisov (Moscow State University, Russia)

Project coordination

- **PRIN Project (MIUR - 20158EB2CM_003)** 'Hydrogen sulphide as a new player of Amyotrophic Lateral Sclerosis: focus on mitochondrial homeostasis' (05/02/2017 - 04/02/2020)
- **PNR-CNR Ageing Project (MIUR)** 'Role of redox mechanisms and protein accumulation in age-related diseases' (2012-2018).
- **Bilateral CNR-FCT project (Portugal)** 'Hydrogen sulfide metabolism in colon-cancer' (2015 – 2016).
- **Bilateral CNR-FCT project (Portugal)**. 'Interaction between gasotransmitters (H₂S, NO and CO)

and metalloproteins: physiological relevance' (2013 – 2014).

- **FIRB project (Futuro in Ricerca 2008, MIUR - RBF08F41U)**. 'Novel mechanisms of the microbial stress response to oxidative and nitrosative stress' (Dec 2010 – Nov 2013).
- **Bilateral CNR-FCT project (Portugal)**. Titolo: 'Response to oxidative stress in the anaerobic protozoa *Giardia intestinalis* and *Entamoeba histolytica*' (2011 – 2012).
- **Research grant 2009 of the European Society for Microbiology and Infectious Diseases (ESCMID)**. 'Response of the human parasite *Giardia intestinalis* to oxidative and nitrosative stress'. (Mar 2009 – Feb 2011. Risorse attribuite: 20.000 euro)
- **Bilateral CNR-GRICES project (Portugal)**. 'Nitric oxide detoxification in pathogenic microorganisms: structure-function relationships in flavodiiron proteins'. (2005 – 2008).
- **CNR project (commessa a tema libero)**. 'Mechanisms of nitric oxide detoxification in pathogenic microorganisms: role of flavodiiron proteins'. (2005)
- **MIUR project (Giovani Ricercatori – Year 2002)**. 'Cytochrome c oxidase: role of proton transfer pathways in the intramolecular electron transfer'. (Oct 2002 – Oct 2003).

Management

- 02/2010 – 2015: **Scientific Director of the CNR project** 'Structure, function and design of proteins, nucleic acids and supermolecular complexes'. CNR Department of Life Sciences.
- Executive board member of the Italian Group of Bioenergetics and Biomembranes (GIBB) (2005 -2009 e 2014-to date).
- Co-organizer of the following meetings:
 - International Workshop on Biochemistry, Physiology and Pharmacology of Oxidative Stress – Rome 2-4/07/2015
 - 38° GIBB annual meeting. Rome 24-27/05/2011
 - 32° GIBB annual meeting. Rome 13-15/06/2005
 - 29° GIBB annual meeting. Rome 2-4/05/2002
 - International meeting on 'Structure and Function of Terminal Oxidases'. Rome/Rieti - May 1994

Awards and honors

- **Visiting Professor of Instituto de Tecnologia Quimica e Biologica, Università Nuova di Lisbona (Portugal)**. (since 23/11/2005 to date).
- **Vice-President of the Italian Group of Bioenergetics and Biomembranes GIBB**. (2014 to date).
- **Academician of Accademia Medica di Roma**. (since 30/11/2015 to date).
- **CNR award ('Incentivazioni al personale – year 2005')**. (2009)
- **'Maria Teresa Messori Roncaglia e Eugenio Mari' award 2004** from Accademia Nazionale dei Lincei. (May 2004).
- **Mc. Graw-Hill award** conferito from the Italian Society of Biochemistry and Molecular Biology (SIB) (Sep 2002).
- **Fellowship in Biophysics from Centro Interdisciplinare Linceo - Accademia Nazionale dei Lincei**. (Oct 1997 Dec 1998).
- **PhD thesis** from Fondazione Cenci-Bolognetti. (Dec 1997).
- **'Luca Barone' award** from Accademia Nazionale dei Lincei. (Gen 1991).

Review and editorial work

- **Reviewer of grant proposals and academic positions** for the following institutions:
 - MIUR - FIRB 2013 / SIR 2014 / Giovani Montalcini 2017 / VQR 2011-2014 (since 2013 to date);
 - MRC - UK (2014);
 - NWO - The Netherlands (2010);
 - Trent University - Canada (2017);
 - University of Padova, Italy (2016);
 - University of Bordeaux - France (2015).
- **PloS ONE Academic Editor** (since 2013 to date).
- Reviewer for the following journals:

Nature Chemical Biology, The Journal of Biological Chemistry, Biochemistry, Antioxidants & Redox Signaling, Free Radical in Biology & Medicine, Scientific Reports, Biochimica et Biophysica Acta - Bioenergetics, FEBS Letters, Molecular Microbiology, Antimicrobial Agents and Chemotherapy, Microbiology, Journal of Bacteriology, Journal of Parasitology, Experimental Parasitology, Tropical Biomedicine, Parasitology Open, Biochimie, International Journal of Parasitology, Current Opinion in Chemical Biology, Molecular Pharmacology, Trends in Parasitology.

Academic duties

- Teaching Board member of the Sapienza University PhD in Biochemistry (since 2012 to date).
- Visiting Professor at Instituto de Tecnologia Quimica e Biologica, New University of Lisbon (Portugal). (since 23/11/2005 to date).
- Lecturer in charge at the Faculty of Pharmacy and Medicine, Sapienza University of Rome – Degree course in 'Pharmacy' (since 2018 to date)
- Evaluator in PhD thesis defence (5 sessions): University of Stockholm, Sweden (2017) - New University of Lisbon, Portugal (2012, 2008 and 2007)
- Evaluator in mid-term PhD exam: University of Aarhus, Denmark (2018)
- Lecturer in charge at the Faculty of Medicine, Sapienza University of Rome – Degree course in 'Biomedical Laboratory Techniques' (2001-2017)

Invited or selected oral communications

2018: XV Congress of the Italian Federation of Life Sciences , Rome (I)
 2018: Bacterial Electron Transfer Processes and their Regulation, Saint-Tropez (F)
 2016: XIX International Conference on Oxygen Binding and Sensing Proteins, Hamburg (D)
 2016: XIV Congress of the Italian Federation of Life Sciences , Rome (I)
 2016: 19th European Bioenergetics Conference, Riva del Garda (I)
 2016: 4th International Conference on the Biology of Hydrogen Sulfide, Napoli (I)
 2015: Bacterial Electron Transfer Processes and their Regulation, Vimeiro (P)
 2015: Conference of the European Network on Gasotransmitters, Athens, (GRE)
 2014: 13th International Conference of Parasitology, Mexico City (MEX)
 2014: 18th European Bioenergetics Conference, Lisbon (P)
 2014: 18th International Conference on Oxygen-Binding and Sensing Proteins, Sheffield (UK)
 2012: IV International Giardia and Cryptosporidium Conference, Wellington (NZ)
 2011: 9th Indo-Italian Workshop on Chemistry and Biology of Antioxidants, New Delhi (IND)
 2008: 19th Annual Molecular Parasitology Meeting, Woods Hole (USA)
 2007: 1st Summer School on Mitochondrial Respiratory Physiology, Schroecken (A)
 2006: Young Researchers Forum, 8th European Biological Inorganic Chemistry, Aveiro (P)
 2005: International Conference on Mitochondria, Bari (I)
 2004: 13th European Bioenergetics Conference, Pisa (I)
 2002: 4th Course of the Portuguese Biophysical Society, Santarem (P)
 2000: Villa Vigoni Conference, Lovenno di Menaggio (I)
 2000: 18th Sigrid Juselius International Symposium, Helsinki (FIN)

Outreach activity

- **Interview to 'Il Venerdì' di Repubblica.** Article entitled: 'Un antibiotico per togliere il respiro ai batteri'. June 3, 2016 (p.63)
- 'How bacteria breath in hydrogen sulfide-rich environments'. The Biochemist, magazine of the Biochemical Society, vol.38, n.5 (October 2016)

Press releases:

Ecco l'arma segreta dei batteri
 CNR (<https://www.cnr.it/it/comunicato-stampa/6907/ecco-l-arma-segreta-dei-batteri>)

Revolutionary antibiotics will save the world

e! Science News

(<http://esciencenews.com/articles/2016/04/26/revolutionary.antibiotics.will.save.world>)

Discovery suggests possible revolutionary antibiotics

Phys.org (<https://phys.org/news/2016-04-discovery-revolutionary-antibiotics.html>)

Discovery suggests possible revolutionary antibiotics

Health Medicinet (<http://healthmedicinet.com/i/discovery-suggests-possible-revolutionary-antibiotics/>)

Revolutionary antibiotics may save the world

Medical News Today (<http://www.medicalnewstoday.com/releases/309587.php>)

Revolutionary antibiotics will save the world

EurekaAlert! (https://www.eurekaalert.org/pub_releases/2016-04/lmsu-raw042516.php)

Revolutionary Antibiotics that Will Save the World?R&D Mag

(<http://www.rdmag.com/news/2016/04/revolutionary-antibiotics-will-save-world>)

Publications and metrics

Full list of publications available on [PubMed](#) e [ResearchGate](#)

Metrics (05 Nov 2018):

- Scopus (N. documents: 85; Citations: 2.814; H-index = 30)

- Google Scholar (N. documents: 144; Citations: 3.593; H-index = 34)

Publications (last 5 years):

- 1) "Hydrogen sulfide biochemistry and interplay with other gaseous mediators in mammalian physiology". **A. Giuffrè**, J.B. Vicente. *Oxid Med Cell Longev.* (2018) 2018:6290931.
- 2) "Substrate-induced conformational change in cytochrome P450 OleP". Parisi G, Montemiglio LC, **Giuffrè A**, Maccone A, Scaglione A, Cerutti G, Exertier C, Savino C, Vallone B. *FASEB J.* (2018), in press
- 3) "The presence of glutamate residues on the PAS sequence of the stimuli-sensitive nano-ferritin improves in vivo biodistribution and mitoxantrone encapsulation homogeneity". E. Falvo, F. Malagrino, A. Arcovito, F. Fazi, G. Colotti, E. Tremante, P. Di Micco, A. Braca, R. Opri, **A. Giuffrè**, G. Fracasso, P. Ceci. *J Control Release.* (2018) 275:177-185.
- 4) "Cytochrome bd and gaseous ligands in bacterial physiology". E. Forte, V.B. Borisov, J.B. Vicente, **A. Giuffrè**. *Adv Microb Physiol.* (2017), 71, 171-234.
- 5) "Nitrosative stress defences of the enterohepatic pathogenic bacterium *Helicobacter pullorum*". M.R. Parente, E. Forte, M. Falabella, I.G. Boneca, M. Teixeira, **A. Giuffrè**, L.M. Saraiva. *Sci Rep.* (2017), 7, 9909.
- 6) "A clinically relevant variant of the human hydrogen sulfide-synthesizing enzyme cystathionine β -synthase: increased CO reactivity as a novel molecular mechanism of pathogenicity?". J.B. Vicente, H.G. Colaço, F. Malagrino, P.E. Santo, A. Gutierrez, T.M. Bandejas, P. Leandro, J.A. Brito, **A. Giuffrè**. *Oxid. Med. Cell Longev.* (2017), 2017:8940321.
- 7) "The terminal oxidase cytochrome bd promotes sulfide-resistant bacterial respiration and growth". E. Forte, V.B. Borisov, M. Falabella, H.G. Colaço, M. Tinajero-Trejo, R.K. Poole, J.B. Vicente, P. Sarti, **A. Giuffrè**. *Sci. Rep.* (2016) 6, 23788.
- 8) "Bioenergetic relevance of hydrogen sulfide and the interplay between gasotransmitters at human cystathionine β -synthase". J.B. Vicente, F. Malagrino, M. Arese, E. Forte, P. Sarti, **A. Giuffrè**. *Biochim Biophys Acta - Bioenergetics* (2016), 1857(8):1127-38 doi:10.1016/j.bbabi.2016.03.030.
- 9) "S-Adenosyl-L-methionine modulates CO and NO \cdot binding to the human H $_2$ S-generating enzyme cystathionine β -synthase". J.B. Vicente, H.G. Colaço, P. Sarti, P. Leandro, **A. Giuffrè**. *J Biol Chem.* 2016 Jan 8;291(2):572-81. doi: 10.1074/jbc.M115.681221
- 10) "Antioxidant defence systems in the protozoan pathogen *Giardia intestinalis*". D. Mastronicola, M. Falabella, E. Forte, F. Testa, P. Sarti, **A. Giuffrè**. *Mol Biochem Parasitol.* (2016) 206:56-66. doi: 10.1016/j.molbiopara.2015.12.002.
- 11) "Evidence for detrimental cross interactions between reactive oxygen and nitrogen species in Leber's hereditary optic neuropathy cells". M. Falabella, E. Forte, M.C. Magnifico, P. Santini, M. Arese, **A. Giuffrè**, K.Radić, L. Chessa, G. Coarelli, M.C. Buscarinu, R. Mechelli, M. Salvetti, P.Sarti. *Oxidative Medicine and Cellular Longevity* 2016, 2016:3187560.
- 12) "Superoxide reductase from *Giardia intestinalis*: structural characterization of the first SOR from a eukaryotic organism shows an iron centre highly sensitive to photo-reduction". C.M. Sousa, P. Carpentier, P.M. Matias, F. Testa, F. Pinho, P. Sarti, **A. Giuffrè**, T.M. Bandejas and C.V. Romão. *Acta Crystallographica Section D* (2015), 71, 2236-47

- 13) "Cytochrome *bd* protects bacteria against oxidative and nitrosative stress: a potential target for next-generation antimicrobial agents." V.B. Borisov, E. Forte, S.A. Siletsky, M. Arese, A.I. Davletshin, P. Sarti, **A. Giuffrè**. *Biochemistry (Mosc)*. (2015), 80(5):565-75.
- 14) "Antigiardial activity of novel triazolyl-quinolone-based chalcone derivatives: when oxygen makes the difference." V. Bahadur, D. Mastronicola, A.K. Singh, H.K. Tiwari, L.P. Pucillo, P. Sarti, B.K. Singh, **A. Giuffrè**. *Front Microbiol*. (2015), 6, 256.
- 15) "Cytochrome *bd* from *Escherichia coli* catalyzes peroxyxynitrite decomposition". V.B. Borisov, E. Forte, S.A. Siletsky, P. Sarti, **A. Giuffrè**. *Biochim Biophys Acta – Bioenergetics* (2015), 1847, 182-8.
- 16) "Flavodiiron oxygen reductase from *Entamoeba histolytica*: Modulation of substrate preference by tyrosine 271 and lysine 53". V.L. Gonçalves, J.B. Vicente, L. Pinto, C.V. Romao, C. Frazao, P. Sarti, **A. Giuffrè**, M. Teixeira. *J. Biol. Chem* (2014), 289, 28260-70.
- 17) "Engineering the internal cavity of neuroglobin demonstrates the role of the heme sliding mechanism". G. Avella, C. Ardiccioni, A. Scaglione, T. Moschetti, C. Rondinelli, L.C. Montemiglio, C. Savino, **A. Giuffrè**, M. Brunori and B. Vallone. *Acta Crystallographica Section D* (2014) 70, 1640-8.
- 18) "NO binds human cystathionine β -synthase quickly and tightly". J.B. Vicente, H.G. Colaço, M.I. Mendes, P. Sarti, P. Leandro, **A. Giuffrè**. *J. Biol. Chem.* (2014) 289, 8579-87
- 19) "Cytochrome *bd* oxidase and bacterial tolerance to oxidative and nitrosative stress". **A. Giuffrè**, V.B. Borisov, M. Arese, P. Sarti, E. Forte. *Biochim Biophys Acta*. (2014), 1837, 1178-87. doi: 10.1016/j.bbabi.2014.01.016
- 20) "Functional Characterization of Peroxiredoxins from the Human Protozoan Parasite *Giardia intestinalis*". D. Mastronicola, M. Falabella, F. Testa, L.P. Pucillo, M. Teixeira, P. Sarti, L.M. Saraiva and **A. Giuffrè**. *PloS Negl. Trop. Dis.* (2014) 8(1): e2631
- 21) "O₂-Dependent Efficacy of Novel Piperidine/Piperazine-Based Chalcones against the Human Parasite *Giardia intestinalis*". V. Bahadur, D. Mastronicola, H.K. Tiwari, Y. Kumar, M. Falabella, L.P. Pucillo, P. Sarti, **A. Giuffrè**, B.K. Singh. *Antimicrob. Agents Chemother.* (2014), 58, 543-9. doi: 10.1128/AAC.00990-13.
- 22) "Cytochrome *bd* Oxidase and Hydrogen Peroxide Resistance in *Mycobacterium tuberculosis*". E. Forte, V.B. Borisov, A. Davletshin, D. Mastronicola, P. Sarti, **A. Giuffrè**. *mBio* (2013) 4(6):e01006-13. doi:10.1128/mBio.01006-13.
- 23) "Characterization of mitochondrial dysfunctions in the 7PA2 cell model of Alzheimer's Disease". N. Krako, M.C. Magnifico, M. Arese, G. Meli, E. Forte, A. Lecci, A. Manca, **A. Giuffrè**, D. Mastronicola, P. Sarti and A. Cattaneo. *J. Alzheimers Dis.* (2013), 37, 747-758
- 24) "Cytochrome *bd* Oxidase from *Escherichia coli* displays high catalase activity: an additional defense against oxidative stress". V.B. Borisov, E. Forte, A. Davletshin, D. Mastronicola, P. Sarti and **A. Giuffrè**. *FEBS Lett.* (2013), 587, 2214-8
- 25) "Functional dissection of the multi-domain di-Heme cytochrome *c*(550) from *Thermus thermophilus*". S. Robin, M. Arese, E. Forte, P. Sarti, O. Kolaj-Robin, **A. Giuffrè**, T. Soulimane. *Plos One* (2013), 8, e55129.