

PERSONAL INFORMATION

Family name, First name: Valle, Francesco

Researcher unique identifier(s): <http://orcid.org/0000-0001-5793-7206>

URL web site:

https://www.ismn.cnr.it/index.php?option=com_cnrprofile&view=profile&profileid=747&lang=it

• CURRENT POSITION

Nov. 2020 – present Senior Scientist / Consiglio Nazionale delle Ricerche (CNR) / Istituto per lo Studio dei Materiali Nanostrutturati (ISMN) / Italy

• PREVIOUS APPOINTMENTS

2010 – 2020 Scientist / Consiglio Nazionale delle Ricerche (CNR) / Istituto per lo Studio dei Materiali Nanostrutturati (ISMN) / Italy

2008 – 2010 Fixed term researcher/ Consiglio Nazionale delle Ricerche (CNR) / Istituto per lo Studio dei Materiali Nanostrutturati (ISMN) / Italy

2005 – 2007 Post Doc researcher / Department of Biochemistry / University of Bologna “Alma Mater Studiorum” / Italy

2003 – 2004 Post Doc researcher / Ecole Polytechnique Federale de Lausanne (EPFL) / Institute of Complex Matter Physics / Switzerland

• EDUCATION

2000 – 2003 PhD (*Docteur es sciences*) in Physics/ University de Lausanne (EPFL) / Institute of Condensed Matter Physics / Lausanne / Switzerland

1992 – 1999 Master Degree in Physics/ University of Rome “La Sapienza” / Department of Physics / Rome / Italy

• Area of Research Interest OR RESEARCH SUMMARY

My research activity is mainly dealing with the application of Scanning Probe Microscopy to the study of biomolecules and cells as well as with micro- and nano-fabrication of scaffolds for tissue regeneration. I am always been involved in multidisciplinary biophysical projects. As a biophysicist I started to work with large biological complexes in solutions using mainly scattering techniques as: Dynamic Light Scattering and Small Angle Neutron Scattering (SANS). I performed several SANS experiments to study the hydration of large supramolecular aggregates. Experimentally I then shifted towards the Scanning Probe Microscopy used both as an imaging tool and as a chemical/mechanical characterization one. I have worked on the application of Atomic Force Microscopy (AFM) to study the conformational changes of large proteins such as chaperonins and the topology of entangled DNA molecules.

The Atomic Force Microscopy was then used, in the following years, to mechanically manipulate proteins, nucleic acids and polymers for measuring the energy profiles that govern their three dimensional folding and the inter- and intra-molecular specific interaction. A research line where I am presently involved is the interaction of carbon nanoparticles (fullerenes, CNTs) with proteins. In the last few years, due to the participation in two EU projects, my activity has become more and more focussed on the nano mechanical characterization of extracellular vesicles, in this field I have contributed to developing novel high throughput methods to measure the stiffness of membrane enclosed nanoparticles.

• HONORS AND AWARDS

2008 Nicolò Copernico Prize for Physics (<https://preminattacopernico.com/i-premiati-edizione-2008>), awarder by Comitato Fondatore dei Premi “Nicolò Copernico e Giulio Natta”.

2006 NanoBio Prize, awarded by Trieste Synchrotron and Consortium of Biomolecular Medicine

2000 Roche Fellowship (N. 2000-190), Roche Research Foundation.

• SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

2010–2020 Supervisor and co-supervisor of 12 master students of the second cycle degree program (LM) in Photochemistry and Molecular Materials, University of Bologna

2010 – 2016 Co-supervisor of 2 PhD students at the PhD program in Chemical Sciences, University of

Bologna.

2018 – present Co-supervisor of 1 PhD student, CSGI, University of Florence, Italy

• **TEACHING ACTIVITIES**

2013 – now Professor in Science of Nanostructured Materials, Second cycle degree programme (LM) in Photochemistry and Molecular Materials, University of Bologna/Italy

2013 – now Professor in Nanotechnology for Forensic Sciences, Forensic Chemistry and Criminal Investigations, Professional Master programme in Forensic Chemical and Chemical-Toxicological Analyses / University of Bologna/Italy

• **ORGANISATION OF SCIENTIFIC MEETINGS**

2015 Member of the Organizing Committee 21st International Symposium on Fluorine Chemistry/ Italy

2014 Member of the Organizing Committee / 1st International Symposium on Halogen Bonding / Italy

2014 Member of the local Organizing Committee / 2nd Nanomedicine Symposium Series@politecnico / Italy

2013 Member of the local Organizing Committee / 1st Nanomedicine Symposium Series@politecnico / Italy

• **INSTITUTIONAL RESPONSIBILITIES**

2016 – now Team Leader of the Microscopy Facility SPM@ISMN/ Institute of Nanostructured Materials/ CNR/Italy

2015 – now worker security responsible / research Area of Bologna/ CNR/ Italy

• **COMMISSIONS OF TRUST**

2008–present Peer-Reviewer for 4 PhD thesis of SISSA PhD program in Neurobiology, Nanotechnology, Statistical and Biological Physics.

2005–present Peer-Reviewer for many ISI journals in the field of biophysics, nanotechnology and nanomedicine. Last year I reviewed about 20 papers.

2015 Peer-Reviewer for PhD thesis of PhD program in Materials for Health, Environment and Energy, University of Tor Vergata

2020 Peer-Reviewer for PhD thesis of PhD program in PHD School in Physics, Astrophysics and Applied Physics, University of Milano

• **MEMBERSHIPS OF SCIENTIFIC SOCIETIES**

2010 Member of the Italian Society for Microscopical Sciences (SISM)

2018 Member of the Italian Society for extracellular Vesicles (EVita)

• **FUNDING**

1. FET-OPEN Research grant funded by EU, “The extracellular vesicles foundry” (evFOUNDRY). € 600000 (2017-2021, **member of the coordination unit CSGI**)

2. FET-proactive Research grant funded by EU, “Biogenic Organotropic Wetsuit” (BOW). € 750000 (2017-2021, **PI of ISMN CNR**)

3. Bilateral Research grant CNR-Hungarian Academy of Sciences “A nanotechnology approach to shed light on the Hofmeister effect” (2013-2015, **PI - CNR**)

4. Bilateral Research grant CNR-Hungarian Academy of Sciences “Functionalized surfaces for bioelectronic application” (2010-2012, **Co-PI - CNR**)

5. EUROCORES program research grant funded by European Science Foundation (10-EuroBioSAS-FP-009) “Intelligent Cell Surfaces (ICS)” € 150000 (2011-2014, **Member of the Coordination Unit, CNR**)

Dissemination of research and citation metrics

Summary: co-author of 80 articles published in international peer-reviewed multi-disciplinary scientific journals, several Conference Proceedings and chapters in international books.(Bibliometry: h-index=21, tot citations: 1653, source: Scopus).

Selected publications relevant to the project

1. AFM-based high-throughput nanomechanical screening of single extracellular vesicles. A. Ridolfi, M. Brucale, C. Montis, L. Caselli, L. Paolini, A. Borup, A.T. Boysen, F. Loria, MJC van Herwijnen, M. Kleinjan, P. Nejsun, N. Zarovni, MHM Wauben, D. Berti, P. Bergese, **F. Valle***, **Analytical Chemistry**, 2020, 92, 10274-10282 (Cit. 10, IF=6.785)
2. Gold nanoparticles interacting with synthetic lipid rafts: an AFM investigation A. Ridolfi, L. Caselli, C. Montis, G. Mangiapia, D. Berti, M. Brucale, **F. Valle**, **J. of Microscopy**. 2020, 280, 194-203 (Cit. 3, IF = 1.575)
3. Biogenic supported lipid bilayers as a tool to investigate nano-bio interfaces C. Montis, A. Salvatore, **F. Valle**, L. Paolini, F. Carlà, P. Bergese, D. Berti **Journal of Colloid and Interface Science**, 2020, 570, 340-349. (Cit. 3, IF=7,489)
4. Biogenic Supported Lipid Bilayers from Nanosized Extracellular Vesicles P. Bergese, C. Montis, S. Busatto, **F. Valle**, A. Zandrini, A. Salvatore, Y. Gerelli, D. Berti **Advanced Biosystems** 2018, 2, 1700200 (Cit. 13, IF=not yet available)
5. Size distribution of extracellular vesicles by optical correlation techniques. C. Montis, A. Zandrini, **F. Valle**, S. Busatto, L. Paolini, A. Radeghieri, A. Salvatore, D. Berti, P. Bergese, **Colloids and Surfaces B: Biointerfaces** 2017, 158, 331-338.(Cit. 21, IF= 4.04)
6. Applications of dewetting in micro and nanotechnology D. Gentili, G. Foschi, **F. Valle**, M. Cavallini, F. Biscarini **Chemical Society Reviews** 2012, 41, 4430-4443. (Cit. 181, IF= 40.443)
7. Micro-and nanopatterning by lithographically controlled wetting. M. Cavallini, D. Gentili, P. Greco **F. Valle**, F. Biscarini **Nature Protocols** 2012, 7, 1668-1676 (Cit. 76, IF= 10.419)

Selected Invited Seminars

1. University of Cambridge, Cambridge, UK. (June 2012)
2. Ecole Polytechnique Federale de Lausanne – EPFL, Switzerland. (June 2010)
3. Autoimmune Diseases, Novartis Laboratories, Basilea, Switzerland. (Sept. 2010)

Selected Invited Talks

1. ECIS2016, 30th conference of the colloid and interface society, Rome, 4-9 September 2016
2. Structure and Stability of Biomacromolecules, SSB15, 2015 Kosice, Slovak Republic.
2. 8th European Biophysics Congress, Budapest, Hungary, 23-27 August, 2011.
3. Second Conference on Nanotechnology for Biological and Biomedical Applications (Nano-Bio Med2013), International Center for Theoretical Physics, Trieste, Italy, 14-18 October 2013.
4. 2nd Collaboration Meeting on Theoretical Physics Methods for Biology European Center for Theoretical Studies in Nuclear Physics and related Areas, ICTP, Trento, Italy, 28-30 June 2010
5. N&N09, LNF, INFN Frascati, 19-22 October 2009.
6. Structure and Stability of Biomacromolecules, SSB09, 2009 Kosice, Slovak Republic, 9-11 September 2009.
7. Molecular Informatic and Bioinformatic, International Symposium 2009 Collegium Budapest - Institute for Advanced Study, Budapest, Hungary, 17-19 Much 2009.
8. Workshop on Intrinsic Structural Disordered Proteins: Functional and Pathological Implications. Consorzio di Biomedicina Molecolare, Trieste, Italy, 12 November 2007.
9. Recent Advances in Modeling DNA and RNA: From Quantum to Coarse Grain; CECAM, Lyon, France, 15-18 October 2006.
10. Memorial Symposium on Molecular Informatics 2004 Memorial University of Newfoundland, St. John's, Newfoundland, Canada, 23-26 June 2004
11. Knots, random walks and biomolecules; Les Diablerets, Switzerland, 15-17 July 2003