

Valentina Villari Curriculum Vitae

Studies and Titles:

- 27/06/1995. Degree in Physics with 110 e lode/110 at Università degli Studi di Messina
- June 1998. "First Certificate in English" of University of Cambridge
- 01/02/1999. PhD in Physics at Università degli Studi di Messina
- 22/02/1999 - 01/04/1999. Attendance of the European Course HERCULES: "Neutrons and Synchrotron Radiation for Physics and Chemistry of Condensed Matter", Grenoble, France.
- Abilitazione Scientifica Nazionale for Full Professor and Associate Professor (until 10/04/2027) in the Scientific Field "Modelli e metodologie per le Scienze Chimiche (03/A2)".
- Abilitazione Scientifica Nazionale for Associate Professor in the Scientific Field "Fisica Sperimentale della Materia (02/B1)" until 30/03/2028.
- Abilitazione Scientifica Nazionale for Associate Professor in the Scientific Field "Fisica Applicata, Didattica e Storia della Fisica (02/D1)" until 10/04/2028.

Job experiences:

- 01/05/1999 – 30/04/2000. CNR grant at Dipartimento di Fisica Università di Messina.
- 01/06/2000 – 31/12/2000. Post-doctoral grant at Dipartimento di Fisica Università di Messina.
- 02/01/2001 – today. Researcher at Istituto per i Processi Chimico-Fisici del Consiglio Nazionale delle Ricerche.

Role of Responsible in Projects:

- 19/06/2009 - 22/06/2009 Responsible of the experiment at ESRF-European Synchrotron Radiation Facility (Grenoble, France) titled "Study of dynamical and structural properties of Metal Bis-Porphyrins in aqueous solutions"- beamline ID10A.
- 22/03/2010 – 22/09/2012. Local Unit Responsible during PRIN 2008 titled "Sonde molecolari chirogenetiche a base porfirinica per il riconoscimento di peptidi e proteine di interesse biologico". Cost of the local unit 25000 euro.
- 01/09/2010 - 07/09/2010. Responsible of the experiment at ESRF-European Synchrotron Radiation Facility (Grenoble, France) titled "Diffusion and hydrodynamic properties of PS-PEO copolymer micelles in a room temperature ionic liquid"- beamline ID10A.
- 28/01/2011 - 01/02/2011. Responsible of the experiment at ESRF-European Synchrotron Radiation Facility (Grenoble, France) titled "Investigation on the structural properties of cationic amphiphilic cyclodextrin vesicles interacting with DNA"- beamline ID02.
- 04/01/2011 – 03/01/2012. Responsible for the research activity during the collaboration with the Dipartimento di Specialità Medico-Chirurgiche Sezione di Oftalmologia del Policlinico Universitario di Catania. Budget 6000 euro.
- 23/09/2011 al 26/09/2011. Responsible of the experiment at ESRF-European Synchrotron Radiation Facility (Grenoble, France) titled "Perturbative effects on structural intramolecular rearrangements of alpha-crystallin in water solution"- beamline ID14-3.

Participation in Projects:

- 09/02/2007 - 09/02/2009. Participant in local unit of PRIN 2006 titled "Complessi porfirinici autoorganizzati su scala nanoscopica: proprietà e applicazioni tecnologiche". Local unit budget 27.500 euro. Coordinator Prof. Angela Agostiano (Univ. di Bari).
- 01/11/2008 - 31/10/2009. Participant in a contract with the pharmaceutical firm MEDIVIS for the study "Ricerca e Studio relativi alla struttura e stabilità colloidale di dispersioni acquose di acidi grassi di interesse oftalmico". Budget 12.000 euro
- 10/12/2011 - 09/12/2012. Participant in a contract with the pharmaceutical firm MEDIVIS for the study "Studio di sistemi colloidali per la veicolazione di farmaci di interesse oftalmico". Budget 12.000 euro
- 01/07/2012 - 31/05/2015 Participant in local unit in PON R&C / MIUR titled "Sviluppo di Micro e Nano-Tecnologie e Sistemi Avanzati per la Salute dell'uomo (HIPPOCRATES)". Local budget 132.910 euro.
- 22/11/2018 - 21/11/2021. Participant in local unit in PON titled "Energie per l'Ambiente TARANTO" Tecnologie e processi per l'Abbattimento di inquinanti e la bonifica di siti contaminati con Recupero di materie prime e produzione di energia T0tally green" (TARANTO). Local budget 775.000 euro. Duration 36 months.
- 29/10/2019 – 28/10/2023. Participant in local unit of PRIN 2017 titled "Mussel-inspired functional biopolymers for underwater adhesion, surface/interface derivatization and nanostructure/composite self-assembly (MUSSEL)". Local unit budget 94.000 euro. Coordinator Prof. Marco d'Ischia (Univ. Federico II (NA)). Duration 36 months.
- 14/01/2020 al 30/06/2022. Participant in local unit in PO FESR Sicilia 2014/2020 titled "NUSTEO: Nuove Strategie Terapeutiche in Oftalmologia: Infezioni batteriche, Virali e Microbiche". Local budget 900.000 euro. Duration 36 months.

Teaching activities and training:

- 2009. Professor at Scuola Superiore di Catania (Istituto Superiore di Catania per la Formazione di Eccellenza) for 30 hours a.a. 2008-2009.
- 2009-today. Correlator of triennial and Magistral degrees in Chemistry and Biology (Università di Messina).

- Seminar for PhD students at the International School of Physics "Enrico Fermi" Course CLXXVI "Complex materials in physics and biology", Varenna (CO) 08/07/2010.
- Seminar for PhD students in Physics (Università di Messina) "Aggregation properties of model peptides for the study of the amyloid fibrillogenesis", 16/02/2012.
- Lesson for ECM Event of "Piano formativo 2015. Tecniche e Metodi Innovativi" organized by Fondazione G.B. Bietti IRCCS Roma about "Quantitative analysis of riboflavin concentration in corneal stroma by means of linear and non linear optical techniques" 06/11/2015.
- 2015-2016. Tutor of a research grant (12 months) within the project "Nanotecnologie e nanomateriali per i beni culturali TECLA"-PON03PE_00214_1.
- Seminar for PhD students of the Department of Chemistry and Biochemistry – University of Bern "Supramolecular chirality at the mesoscopic scale induced by chemical and physical perturbations" 07/06/2017.
- Seminar for PhD students in Physics (Università di Messina) "Molecular fluorescence: from simple to complex" 19/12/2019.
- Seminar for PhD students in Physics (Università di Messina) XXXVIII course "Self-assembly and supramolecular systems" 13/06/2023 and 16/06/2023.

Organizing Member for Conferences:

- Member of the Scientific Organizing Committee of the "International Soft Matter Conference 2013" Università La Sapienza, Roma, 15/09/2013 - 19/09/2013.
- Member of the Scientific Organizing Committee of the "4th Italian National Conference CD.TE.C.", Giardini Naxos (Messina), 09/05/2013 al 11/05/2013.
- Member of the Scientific Organizing Committee of the "Second Summer School on Cyclodextrins" Giardini Naxos (Messina), 08/05/2013 - 09/05/2013.

Editorial board:

- Member of the Editorial board of the "International Journal of Molecular Sciences" - Materials Science section.
- Guest Editor of the Special Issue entitled "Molecular and Macromolecular Interactions of Carbon-Based Nanostructures" of the International Journal of Molecular Sciences.
- Topic Associate Editor-in-Chief of the Issue entitled "Carbon-Based Nanomaterials and Their Various Applications" of the International Journal of Molecular Sciences.

Reviewer committee:

- 2010-today. Referee of many Scientific ISI Journal, of 2 FIRB 2013 projects in the preselection step and 2 Ateneo projects ("FIL 2016 - Quota incentivante" Università degli Studi di Parma and "Blue Sky Research" Università di Pavia).
- 2016. Second Supervisor of the research activity for a Marie Curie PhD grant in Chemical Sciences, "action Incipit-Cofund project" in the field "Design, synthesis and characterization of biomimetic systems and metal-binding molecules as theranostic agents for Alzheimer disease".
- 2018. Reviewer of a PhD thesis in Scienze dei Materiali e Nanotecnologie (XXXI Ciclo) - Università degli Studi di Catania.

Awards:

- 1997. Best poster at VIII Convegno SISN (Società Italiana di Spettroscopia Neutronica), Roma 9/10/1997.
- 2000. Young Researcher Award of Società Italiana di Fisica (SIF), Palermo 6/10/2000.

Research activity:

The research activity is devoted to the study of the structural and dynamical properties of nanostructured materials by spectroscopic approaches such as elastic, quasi-elastic and inelastic scattering, time-resolved fluorescence, non-linear optics, circular and linear dichroism and laser Doppler electrophoresis. Nanostructured materials represent a good model for soft matter physics and chemistry and, if properly functionalized, find interesting applications as sensors at nanoscopic scale and photoactive substrates.

The main research topics concerns: Self-assembly; Supramolecular interactions; Supramolecular chirality; Molecular recognition, Spectroscopic-based applied methodologies.

Publications:

More than 130 papers published on international peer-reviewed ISI journals (H-index 36).

Competencies

- Light scattering: Photon Correlation Spectroscopy, Laser Doppler electrophoresis, Resonant Raman scattering, Small and Wide Angle scattering (also with X-ray at large scale facilities).
- Linear and circular dichroism, ellipsometry.
- Time-resolved fluorescence spectroscopy.
- Confocal fluorescence microscopy.

Main publications:

- 1) A. Nicosia, P. Mineo, N. Micali, V. Villari (2023). Dopamine-Coated Carbon Nanodots: A Supramolecular Approach to Polydopamine Composite. International Journal of Molecular Sciences, 24, 15384

- 2) V. Villari, M. Gaeta, A. D'Urso, N. Micali (2022). Porphyrin/carbon nanodot supramolecular complexes and their optical properties. *Colloids and Surfaces A: Physicochemical and Engineering Aspects* 648, n.129436
- 3) Pisagatti I, Crisafulli D, Pappalardo A, Trusso Sfrazzetto G, Notti A, Nastasi F, Parisi MF, Micali N, Gattuso G, Villari V. (2022). Photoinduced Electron Transfer in Host-Guest Interactions of a Viologen Derivative with a Didansyl-Pillar[5]arene. *Materials Today Chemistry* 24, n.100841.
- 4) Nicosia A, Vento F, Marletta G, Messina GML, Satriano C, Villari V, Micali N, De Martino MT, Schotman MJG, Mineo PG (2021). Porphyrin-based Supramolecular Flags in the Thermal Gradients' Wind: What, How and Why Breaks the Symmetry. *Nanomaterials* 11, n.1673
- 5) Micali N, Mineo P, Vento F, Nicosia A, Villari V (2019). Supramolecular Structures Formed in Water by Graphene Oxide and Nonionic PEGylated Porphyrin: Interaction Mechanisms and Fluorescence Quenching Effects. *JOURNAL OF PHYSICAL CHEMISTRY. C*, vol. 123, p. 25977-25984, ISSN: 1932-7447, doi: 10.1021/acs.jpcc.9b06800
- 6) Pisagatti I, Barbera L, Gattuso G, Villari V, Micali N, Fazio E, Neri F, Parisi MF, Notti A (2019). Tuning the aggregation of an amphiphilic anionic calix[5]arene by selective host-guest interactions with bola-type dications. *NEW JOURNAL OF CHEMISTRY*, vol. 43, p. 7628-7635, ISSN: 1144-0546, doi: 10.1039/c9nj01198f
- 7) Manganaro N, Pisagatti I, Notti A, Pappalardo A, Patane S, Micali N, Villari V, Parisi MF, Gattuso G (2018). Ring/Chain Morphology Control in Overall-Neutral, Internally Ion-Paired Supramolecular Polymers. *CHEMISTRY-A EUROPEAN JOURNAL*, vol. 24, p. 1097-1103, ISSN: 0947-6539, doi: 10.1002/chem.201703342
- 8) Micali N, Bertoldo M, Buratti E, Nigro V, Angelini R, Villari V (2018). Interpenetrating Polymer Network Microgels in Water: Effect of Composition on the Structural Properties and Electrosteric Interactions. *CHEMPHYSICEM*, vol. 19, p. 2894-2901, ISSN: 1439-4235, doi: 10.1002/cphc.201800707
- 9) Micali N, Vybornyi M, Mineo P, Khorev O, Haner R, Villari V (2015). Hydrodynamic and Thermophoretic Effects on the Supramolecular Chirality of Pyrene-Derived Nanosheets. *CHEMISTRY-A EUROPEAN JOURNAL*, vol. 21, p. 9505-9513, ISSN: 0947-6539, doi: 10.1002/chem.201500932
- 10) Mineo P, Villari V, Scamporrino E, Micali N (2014). Supramolecular chirality induced by a weak thermal force. *SOFT MATTER*, vol. 10, p. 44-47, ISSN: 1744-683X, doi: 10.1039/c3sm52322e
- 11) Villari V, Mazzaglia A, Darcy R, O'Driscoll C M, Micali N (2013). Nanostructures of Cationic Amphiphilic Cyclodextrin Complexes with DNA. *BIOMACROMOLECULES*, vol. 14, p. 811-817, ISSN: 1525-7797, doi: 10.1021/bm3018609
- 12) Mineo P, Micali N, Villari V, Donato M G, Scamporrino E (2012). Reading of protein surfaces in the native state at micromolar concentrations by a chirogenetic porphyrin probe. *CHEMISTRY-A EUROPEAN JOURNAL*, vol. 18, p. 12452-12457, ISSN: 0947-6539, doi: 10.1002/chem.201200784
- 13) Villari V, Gattuso G, Notti A, Pappalardo A, Micali N (2012). Self-Assembled Calixarene Derivative as a Supramolecular Polymer. *JOURNAL OF PHYSICAL CHEMISTRY. B, CONDENSED MATTER, MATERIALS, SURFACES, INTERFACES & BIOPHYSICAL*, vol. 116, p. 5537-5541, ISSN: 1520-6106, doi: 10.1021/jp300848n
- 14) Villari V, Mineo P, Scamporrino E, Micali (2012). Spontaneous self-assembly of water-soluble porphyrins having poly(ethylene glycol) as branches: Dependence of aggregate properties from the building block architecture. *CHEMICAL PHYSICS*, vol. 409, p. 23-31, ISSN: 0301-0104, doi: 10.1016/j.chemphys.2012.09.022
- 15) Villari V, Mineo P, Scamporrino E, Micali N (2012). Role of the hydrogen-bond in porphyrin J-aggregates. *RSC ADVANCES*, vol. 2, p. 12989-12998, ISSN: 2046-2069, doi: 10.1039/c2ra22260d
- 16) Capici C, Cohen Y, D'Urso A, Gattuso G, Notti A, Pappalardo A, Pappalardo S, Parisi MF, Purrello R, Slovak S, Villari V (2011). Anion-Assisted Supramolecular Polymerization: From Achiral AB-Type Monomers to Chiral Assemblies. *ANGEWANDTE CHEMIE. INTERNATIONAL EDITION*, vol. 50, p. 11956-11961, ISSN: 1433-7851, doi: 10.1002/anie.201104357
- 17) Castriciano MA, Romeo A, De Luca G, Villari V, Scolaro LM, Micali N (2011). Scaling the Chirality in Porphyrin J-Nanoaggregates. *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*, vol. 133, p. 765-767, ISSN: 0002-7863, doi: 10.1021/ja110028g
- 18) van Hameren R, van Buul AM, Castriciano MA, Villari V, Micali N, Schon P, Speller S, Scolaro LM, Rowan AE, Elemans JAAW, Nolte RJM (2008). Supramolecular porphyrin polymers in solution and at the solid-liquid interface. *NANO LETTERS*, vol. 8, p. 253-259, ISSN: 1530-6984, doi: 10.1021/nl072563f
- 19) Villari V, Mineo P, Micali N, Angelini N, Vitalini D, Scamporrino E (2007). Uncharged water-soluble porphyrin tweezers as a supramolecular sensor for alpha-amino acids. *NANOTECHNOLOGY*, vol. 18, ISSN: 0957-4484, doi: 10.1088/0957-4484/18/37/375503
- 20) Micali N, Villari V, Castriciano MA, Romeo A, Scolaro LM (2006). From fractal to nanorod porphyrin J-aggregates. Concentration-induced tuning of the aggregate size. *JOURNAL OF PHYSICAL CHEMISTRY. B, CONDENSED MATTER, MATERIALS, SURFACES, INTERFACES & BIOPHYSICAL*, vol. 110, p. 8289-8295, ISSN: 1520-6106, doi: 10.1021/jp060730e
- 21) Angelini N, Micali N, Mineo P, Scamporrino E, Villari V, Vitalini D (2005). Uncharged water-soluble Co(II)-porphyrin: A receptor for aromatic alpha-amino acids. *JOURNAL OF PHYSICAL CHEMISTRY. B, CONDENSED MATTER, MATERIALS, SURFACES, INTERFACES & BIOPHYSICAL*, vol. 109, p. 18645-18651, ISSN: 1520-6106, doi: 10.1021/jp052408u
- 22) Castriciano MA, Romeo A, Villari V, Micali N, Scolaro LM (2004). Nanosized porphyrin J-aggregates in water/AOT/decane microemulsions. *JOURNAL OF PHYSICAL CHEMISTRY. B, CONDENSED MATTER, MATERIALS, SURFACES, INTERFACES & BIOPHYSICAL*, vol. 108, p. 9054-9059, ISSN: 1520-6106, doi: 10.1021/jp048712p
- 23) Castriciano MA, Romeo A, Villari V, Micali N, Scolaro LM (2003). Structural rearrangements in 5,10,15,20-tetrakis(4-sulfonatophenyl)porphyrin J-aggregates under strongly acidic conditions. *JOURNAL OF PHYSICAL CHEMISTRY. B, CONDENSED MATTER, MATERIALS, SURFACES, INTERFACES & BIOPHYSICAL*, vol. 107, p. 8765-8771, ISSN: 1520-6106, doi: 10.1021/jp0273880