



## CURRICULUM VITAE

### **FRANCESCA CAVALIERI**

Born: 27<sup>th</sup> April 1969 in Rome, Italy

Senior Researcher/ Tenured Assistant Professor in Physical Chemistry

*Department of Chemical Sciences and Technologies*

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### **Qualifications:**

Laurea in Industrial Chemistry, *maximum cum laude*, at University of Rome "La Sapienza", Italy, 1995.

PhD in Physical Chemistry (Sonochemistry), University of Melbourne, Australia,

**Current Appointment:** Senior Researcher/Assistant Professor in Physical Chemistry, Department of Chemical Sciences and Technologies, University of Rome "Tor Vergata", Italy. November 2002 (continuing)

### **Relevant Employment History:**

1996 Research Fellow, sponsored by the pharmaceutical company, MENARINI, University of Rome "Tor Vergata", Department of Chemical Sciences and Technologies, Italy:

1997 Research Fellow, Whistler Centre for Carbohydrate Research, Food Science Department, Purdue University, West Lafayette, Indiana (USA).

1998 Research Fellow, University of Trieste, Department of Chemical Sciences and Technologies, Italy.

1998-2002 Researcher and National delegate for the Ministry of Industry at Brussels ENEA, Italian Agency for New Technologies, Environment and Energy, CR Casaccia, Rome, Italy.

2002- Senior Researcher/Aggregate Professor in Physical Chemistry, Department of Chemical Sciences and Technologies, University of Rome "Tor Vergata", Italy.

2007-2008 Research Fellow, University of Melbourne, Department of Biomolecular Engineering, Melbourne, Australia, 2013

### **Teaching**

2003-2014: Lecturer in Polymer Science and Laboratory of Physical Chemistry I (Chemistry and Materials Science School).

Supervisor of 10 Laurea Thesis in Physical Chemistry and 1 Doctorate in "MATERIALS FOR HEALTH, ENVIRONMENT AND ENERGY"

Committee member of Doctorate in Università degli Studi di ROMA "Tor Vergata" "MATERIALS FOR HEALTH, ENVIRONMENT AND ENERGY"

### **Research Areas**

- *Biomaterials for Drug/Gene Delivery*  
Design of artificial biomimetic materials, complex polymer structures, micro- and nanosized gel phases, ultrasound responsive microbubbles and layer-by-layer polymer multilayers and capsules.
- *Self-assembly and Nano-materials*  
Supramolecular assembly of natural and synthetic polymers for controlled drug delivery, and tissue engineering applications.
- *Biocompatible Polymers and Hydrogels*  
Design, synthesis, and structural studies of novel biodegradable and biocompatible polymers

### **Honors and Awards**

1997 Visiting Scholar Fellowship, Whistler Center for Carbohydrate Research, Food Science Dept, Purdue University, Indiana (USA).

1998 Research Fellowship, University of Trieste, Department of Chemical Sciences and Technologies, Italy.

2007 Australian Research Council International Linkage Award 2007: Biodegradable Polymeric Microdevices for Targeted Delivery, University of Melbourne, Melbourne Australia, Prof. Frank Caruso/ Dr. Francesca Cavalieri.

2008 University of Melbourne (AU) Visiting Professor Award., Dr. Francesca Cavalieri/ Prof. Muthupandian Ashokkumar.

2009 JSPS Research Fellowship, Tsukuba March –April 2010.

2010 Victoria State, Global Thinking Research Fellowship, Australia

2014 Endeavour Research Fellowship, Australian Education Minister.

### **RESEARCH FUNDING**

- ✓ PRIN 2012/2013 funded by Ministry of Education and University (Participant)
- ✓ IRSES Marie Curie 2010-2013, 7th UE Framework Programme (COORDINATOR of UNIT)

- ✓ IRSES Marie Curie 2009-2010, 7th UE Framework Programme (COORDINATOR of PROJECT)
- ✓ S.I.G.H.T. Strep 6th Framework Programme (Participant)
- ✓ GEMI grant 2005/2006 funded by Linde gas (Participant)
- ✓ PRIN 2005/2006 funded by Ministry of Education and University (Participant)

Serving as a reviewer for international scientific journals, ACS, RCS, Wiley, Elsevier etc

## RESEARCH OUTPUT

56 articles in ISI peer-reviewed journals

900 citations (**Scopus/ISI Web of Science**)

20 *h*-index ( 13 *hc*-index) (**Scopus/ISI Web of Science**)

1 Chapters of book

4 invited review articles

## Recent significant publications (2005 onwards)

### Scholarly Book Chapters

1. Ultrasound-Assisted Preparation of Nano-and Micro- Polymeric Materials for the Encapsulation of Bioactive Agents. **Cavalieri F.**, Zhou M., Tortora M., Ashokkumar M. Book Chapter Cavitation: A novel energy efficient technique for the generation of nanomaterials, 2013 M. Sivakumar and M. Ashokkumar (Eds.) Pan Standford Publishing 2014.

### Refereed Journal Articles

2. A Comparison of the Physical Properties of Ultrasonically Synthesized Lysozyme- and BSA- Shelled Microbubbles. Vong F., Son Y, Bhuiyan S., Zhou M. **Cavalieri F.**, Ashokkumar M. *Ultrasonics Sonochemistry*, **2014**, 21, 23-28 (IF 3.5).
3. Ultrasound Driven Assembly of Lignin into Microcapsules for Storage and Delivery of Hydrophobic Molecules. Mariarosaria Tortora, Francesca Cavalieri, Pasquale Mosesso, Flavia Ciaffardini, Federica Melone, and Claudia Crestini. **2014**  
**DOI:** 10.1021/bm500015j, 1634-1643.
4. \*Mechanical characterization of ultrasonically-synthesized microbubble shells by flow cytometry and AFM. **Cavalieri F.**, Best J. P., Perez C., Tu J., Caruso F., Matula T. and

Ashokkumar M. *ACS Applied Materials and Interfaces* **2013**. DOI: 10.1021/am403108y (IF 5).

5. \*Influence of the Morphology of Lysozyme-shelled Microparticles on the Cellular Association, Uptake and Degradation in Human Breast Adenocarcinoma Cells. **Cavalieri F.**, Colone M., Stringaro A, Tortora M., Calcabrini A., Zhou M., Ashokkumar M., *Particle & Particle Systems Characterization* **2013**, 30, 695-705. (New Journal)
6. Antimicrobial and Biosensing Ultrasound Responsive Lysozyme-Shelled Microbubbles. **Cavalieri F.\***, Micheli L., Kaliappan S., Teo BM, Zhou M., Palleschi G., Ashokkumar M. *ACS Appl Mater Interfaces* **2013**, 23, 464-71. (IF 5).
7. Electrochemical investigation of the interaction between lysozyme-shelled microbubbles and vitamin C. **Cavalieri F.**, Micheli L., Zhou M., Tortora M., Palleschi G., Ashokkumar M. *Anal. Bioanal Chem.* **2013** DOI 10.1007/s00216-013-6895-0. (IF 3.8).
8. A Comparison of the Physical Properties of Ultrasonically Synthesized Lysozyme- and BSA- Shelled Microbubbles. Vong F., Son Y, Bhuiyan S., Zhou M. **Cavalieri F.**, Ashokkumar M. *Ultrasonics Sonochemistry*, **2013**, doi:pii: S1350-4177(13)00112-0. 10.1016/j.ultsonch.2013.05.004 (IF 3.5)
9. \*Methods of preparation of multifunctional microbubbles and their in vitro / in vivo assessment of stability, functional and structural properties. **Cavalieri F.\***, Zhou M., Tortora M., Baldassarri L. Ashokkumar M. *Currents Pharmaceutical Design* **2012**, 18, 2118-34. (IF 4.4)
10. \*Confinement of acoustic cavitation for the synthesis of protein-shelled nanobubbles for diagnostics and gene therapy. Zhou M., **Cavalieri F.**, Caruso F., Ashokkumar M. *ACS Macro Letters* **2012**, 1, 853-856. (New Journal)
11. Modification of the size distribution of lysozyme microbubbles using a post-sonication technique. Zhou M.; **Cavalieri F.**; Ashokkumar M. *Instrumentation Science & Technology* **2012**, 40, 51-60.

12. \*Molecular Properties of Lysozyme-Microbubbles: Towards the Protein and Nucleic Acid Delivery. Melino S., Zhou M., Tortora M., Paci M., **Cavalieri F\***, and Ashokkumar M. *Amino Acids* **2012**, *43*, 885–896. (IF 4)
13. \*One-pot ultrasonic synthesis of multifunctional microbubbles and microcapsules using synthetic thiolated macromolecules. **Cavalieri F.**, Zhou M., Caruso F. and Ashokkumar M. *Chem Comm.* **2011**, *47*, **4096-4098**. (IF 6.4).
14. \*Tailoring the properties of ultrasonically synthesised microbubbles Zhou M., **Cavalieri F\*** Ashokkumar M. *Soft Matter* **2011**, *7*, **623-630**. (IF 4)
15. <sup>1</sup>H-NMR analysis of water mobility in cultured phototrophic biofilms. Di Pippo F.; Bohn A.; **Cavalieri F.**, P. Albertano et al. *Biofouling*, *27*, *3*, 327-336, **2011**. (I.F. 3.4)
16. \*Redox-Active Polymer Microcapsules for the Delivery of a Survivin-Specific siRNA in Prostate Cancer Cells. Becker AL, Orlotti NI, Folini M, **Cavalieri F**, Zelikin AN, Johnston AP, Zaffaroni N, Caruso F. *ACS Nano*, **2011**, *5* (2), pp 1335–1344 (IF 12)
17. \*Thin multilayer films and microcapsules containing DNA quadruplex motifs. **Cavalieri F**, Ng SL, Mazzuca C, Jia Z, Bulmus V, Davis TP, Caruso F. *Small*. **2011** Jan 3;7(1):101-11 (IF 7.8)
18. \*The influence of Salt Concentration on the Assembly of DNA Multilayer Films. Lillian Lee, **Francesca Cavalieri**, Angus P. R. Johnston, and Frank Caruso. **2010** *Langmuir* 3415- 3422. (IF 4.3)
19. Sonochemical Synthesis of Liquid-encapsulated Lysozyme Microspheres. Zhou M., Leong T.S.H, Sonia Melino, **Cavalieri F**, Kentish S., Ashokkumar M *Ultrasonics Sonochemistry* **2010**;17(2): 333-337. (IF 3.5)
20. \*The Design of Multifunctional Microbubbles for Ultrasound Image-Guided Cancer Therapy **Francesca Cavalieri\***, Meifang Zhou, Muthupandian Ashokkumar *Current Topics in Medicinal Chemistry* 2010 Number 12, **2010** , pp. 1198-1210(13). (IF 4.5)

21. \* Assembly and Functionalization of DNA-Polymer Microcapsules. **Francesca Cavalieri**, Almar Postma, Lillian Lee, and Frank Caruso. **2009**, *ACS Nano*, 3, 234. (IF 12).
22. Ultrasonic Synthesis of Stable Functional Lysozyme Microbubbles **Francesca Cavalieri**, Muthupandian Ashokkumar, Franz Grieser, Frank Caruso. *Langmuir* 2008, 24, 10078 ((**IF** 4).
23. In situ Imaging of Gas-filled Microballoons by soft X-Ray Spectromicroscopy.
24. Tzevetkov G, Fernandes, Fery A., **Cavalieri F.** Paradossi G., Fink R. , *Soft Matter* 2008, 4, 510. (IF 4.9)
25. Ashokkumar, M.; **Cavalieri, F.**; Grieser, F. "Ultrasonic Synthesis of Enzyme Coated Microbubbles." *J. Acoust. Soc. Am.* 2008, **123**, 3560.
26. Novel PVA-Based Hydrogel Microparticles for Doxorubicin Delivery. **Cavalieri, F.**; Chiessi, E.; Villa, R.; Viganò, L.; Zaffaroni, N.; Telling, M. F.; Paradossi, G. *Biomacromolecules* 2008, 9, 1967.
27. Polymer Microbubbles as Diagnostic and Therapeutic Gas Delivery Device. **Cavalieri F**, Finelli I., Tortora, M, Mozetic P., Chiessi E., Polizio F., B.Brismar T.,Paradossi G. 2008 *Chemistry of Materials*, 2008, 20, 3254-3258. (IF 5.0)
28. Chaperone-Like Activity of Nanoparticles of Hydrophobized Poly(vinyl alcohol). **Francesca Cavalieri**, Ester Chiessi, Gaio Paradossi. *Soft Matter*, 2007, 2, 718 – 724
29. Michael-Type Addition Reactions for the In Situ Formation of Poly(vinyl alcohol)-Based Hydrogels. Mariarosaria Tortora, **Francesca Cavalieri**, Ester Chiessi, Gaio Paradossi *Biomacromolecules*; 2007; 8(1) pp 209 - 214;
30. Water and Polymer Dynamics in Chemically Cross-Linked Hydrogels of Poly(vinyl alcohol): A Molecular Dynamics Simulation Study  
Chiessi E., **Cavalieri F.** Paradossi *J. Phys. Chem. B*, 111(11), 2820-2827 (2007).
31. Ligands Tethering to Biocompatible Ultrasound Active Polymeric Microbubbles Surface.

**Francesca Cavalieri**, Ali El Hamassi, Ester Chiessi and Gaio Paradossi, Raffaella Villa, Nadia Zaffaroni. *Macrom. Symp.* 2006, 234, 94-101

32. Soft Condensed Matter in Pharmaceutical Design. Gaio Paradossi, **Francesca Cavalieri**, Ester Chiessi. *Current Pharmaceutical design* 2006, 12, 1403-1419. (IF 4.4)
33. Tethering Functional Ligands onto Shell of Ultrasound Active Polymeric Microbubbles  
**Francesca Cavalieri**, Ali El Hamassi, Ester Chiessi and Gaio Paradossi, Raffaella Villa, Nadia Zaffaroni. *Biomacromolecules.* 2006, 7, 604-611.(IF 4.1)
34. Water, Solute, and Segmental Dynamics in Polysaccharides Hydrogel. **F. Cavalieri**, E. Chiessi, I. Finelli, F.Natali, G. Paradossi, M.F. Telling. *Macrom. Bioscience*, 6, 2006, 579-589.
35. Stable Polymeric Microballoons as Multifunctional Device for Biomedical Uses: Synthesis and Characterization. **Francesca Cavalieri**, Ali El Hamassi, Ester Chiessi and Gaio Paradossi. *Langmuir* 2005, 21, 8758-8764.
36. Proton Fluctuations and Water Diffusion in Dextran Chemical Hydrogels Studied by Incoherent Elastic and Quasielastic Neutron Scattering. Gaio Paradossi, **Francesca Cavalieri**, Ester Chiessi. *Carbohydrate Research.* 2005, 340, 921-927.
37. Supercooled Water in PVA Matrixes: II A Molecular Dynamic Simulation Study and Comparison with QENS Results. Ester Chiessi, **Francesca Cavalieri** and Gaio Paradossi. *J. Physical Chemistry B*, 2005, 109, 8091-8096.

### **Other Publications**

38. International Patent 2010, US20100158813, Paradossi G. Cavalieri F. Microbubbles as drug delivery device.

