

BIOGRAPHICAL SKETCHNAME: **Laura Marchetti**eRA COMMONS USER NAME (credential, e.g., agency login): **LAURAMARCHETTI**POSITION TITLE: **Associate Professor of Molecular Biology**

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Padua, Padua, Italy	MD	03/2005	Pharmaceutical Biotechnologies
University of Bonn, Bonn, Germany	1-year thesis period	02/2005	siRNA biochemistry
Scuola Normale Superiore, Pisa, Italy	PhD	06/2010	Molecular Biology
Scuola Normale Superiore, Pisa, Italy	Post-doc	07/2015	Molecular Neurobiology
Istituto Italiano di Tecnologia, Pisa, Italy	Senior post-doc	12/2018	Molecular Neurobiology

A. Personal Statement

I am a molecular and cellular biologist with a strong attitude for multidisciplinary approaches. Typically, I focus on the study of the functional mechanisms of biomolecules or processes of interest, combining methods from molecular biology (from the creation of recombinant constructs to computational/bioinformatic analysis), biochemistry (including enzymatic labeling, purifications), biophysics (advanced microscopy) and materials science (use of cell-material or protein-material interfaces). An important part of my activity is the use of quantitative fluorescence measurements to study the localization and dynamics of proteins of interest, or protein-protein or nucleic acid-protein interactions in vitro or in cells. After a 1-year thesis period spent in 2004-5 in the Laboratory of Chemical Biology of the University of Bonn, Germany, I entered a PhD program in Molecular Biology at Scuola Normale Superiore in Pisa, Italy from 2005-2010. I continued as a post-doc at Scuola Normale Superiore (2010-15), and then at Istituto Italiano di Tecnologia in Pisa (2015-18), where I built a strong background and expertise in fluorescence-based techniques applied to molecular and cellular neuroscience. I developed methods to: i) label both neurotrophins and their receptors with controlled stoichiometry and with fluorophores suitable for single-molecule imaging in living cells; ii) control the expression level of the recombinant proteins thus obtained using lentiviral vectors and inducible promoters; iii) monitor, sense and quantify protein and ion dynamics in vitro or in cells by fluorescence-based methods. As a researcher and then professor at the Department of Pharmacy of the University of Pisa, I have integrated this expertise with more translational objectives. I have been developing 3 different projects: i) the design and development of a technology for the encapsulation of RNA drugs within bioinspired and nanostructured vectors for smart delivery applications; ii) the study of the mechanisms underlying

Alzheimer's disease, and their therapeutic targeting; iii) the design and fabrication of biobased sensors for protein sensing. Ongoing projects that I would like to highlight include:

Jan 2025-Dec 2026:

Grant and budget: PoC Proposal Spark Pisa, 25.000 Euro

My role: PI

Title: A novel Therapeutic strategy for Alzheimer's disease via inhibition of Glucose-6-phosphate dehydrogenase (G6PD)-mediated formation of neutrophil extracellular traps (NETs)

Dec 2021-Nov 2025:

Grant and budget: Human Frontiers Science Program, 300.000 Euro

My role: WP leader in the UNIP team (PI Vittoria Raffa) – budget assigned to my WP 55.000 Euro

Title: Structural damage to axons resulting from repetitive mechanical motion

Nov 2022-Feb 2026:

Grant and budget: PNRR - Mission 4, Component 2, Investment Line 1.4, 1.141.375 Euro

My role: Team member

Title: Development of gene therapy and drugs with RNA technology (CN3)

B. Positions, Scientific Appointments, and Honors

Jul 2025: Winner of a short-term mobility SEND “Universities for Innovation” prog. n. 2024-1-IT02-KA131-HED-000225915, for a scientific visit to Eindhoven Institute of Technology

Dec 2024-present: Associate Professor in Molecular Biology, Department of Pharmacy, University of Pisa, Italy

2024: Winner of childcare travel grant (FENS Forum 2024, Wien, Austria)

2023-present: Associate Editor for Regenerative Medicine Reports (Lippincott-Wolters Kluwer) and for Frontiers in Molecular Biosciences (Frontiers)

Dec 2021 – Nov 2024: Senior Researcher in Molecular Biology, Department of Pharmacy, University of Pisa, Italy, with National Scientific Qualification as Second Level Professor in the 05/E2- BIO/11 Molecular Biology sector, obtained on 10/07/2020

2020: Awarded the front cover of Nano Letters journal (<https://pubs.acs.org/toc/nalefd/20/5>)

Jan 2019 – present: Affiliated Researcher at the Italian Institute of Technology (IIT, Center for Nanotechnology Innovation, IIT-CNI Pisa)

Jan 2019 – Nov 2021: Junior Researcher in Molecular Biology, Department of Pharmacy, University of Pisa, Italy

2019-present: Member of the Italian Society of Biochemistry and Molecular Biology and of the European Society for Neurochemistry

2019: Mentioned in research commentary (doi.org/10.1073/pnas.1914583116)

2013: PI, young researchers grant, Scuola Normale Superiore, Pisa

2013: Mentioned in research highlight (J Cell Sci (2013) 126 (19): e1902)

2011: Winner of youth travel fund (FEBS course "Viral Expression Vectors for Basic and Applied Studies", Tartu Institute of Technology, Estonia)

C. Contributions to Science

1. Establish fluorescence-based in vitro approaches to investigate intermolecular interactions, sense ion concentration, and afford precision localization of probes.

M. Hafner, E. Vianini, B. Albertoni, L. Marchetti, I. Grüne, C. Glöckner, M. Famulok "Displacement of protein-bound aptamers with small molecules screened by fluorescence polarization", Nat. Protocols 2008, 3(4), 579-587.

L. Marchetti, L. Comelli, B. D'Innocenzo, L. Puzzi, S. Luin, D. Arosio, M. Calvello, R. Mendoza-Maldonado, F. Peverali, F. Trovato, S. Riva, G. Biamonti, G. Abdurashidova, F. Beltram and A. Falaschi, "Homeotic proteins participate in the function of human DNA replication origins", Nucleic Acids Res. 2010 Dec;38(22):8105-19. doi: 10.1093/nar/gkq688.*

D. Arosio, F. Ricci\$, L. Marchetti\$, R. Gualdani, L. Albertazzi, F. Beltram, "Simultaneous Intracellular Chloride and pH measurements using a GFP based sensor", *Nat. Methods* 2010 Jul; 7(7):516-8. Epub 2010 Jun 27.

Albertazzi L, Storti B, Marchetti L., Beltram F, "Delivery and Subcellular Targeting of Dendrimer-Based Fluorescent pH Sensors in Living Cells", *J Am Chem Soc.* 2010 Dec 29;132(51):18158-67.

Gobbo F, Marchetti L, Jacob A, Pinto B, Binini N, Pecoraro Bisogni F, Alia C, Luin S, Caleo M, Fellin T, Cancedda L, Cattaneo A., "Activity-dependent expression of Channelrhodopsin at neuronal synapses", *Nat Commun*, 2017 Nov 20;8(1):1629. doi: 10.1038/s41467-017-01699-7.

Daniele Montepietra,‡ Lorenzo Germelli,‡ Laura Marchetti*, Valentina Tozzini, Elisa Angeloni, Chiara Giacomelli, Barbara Storti, Ranieri Bizzarri, Elisabetta Barresi, Sabrina Taliani, Giorgia Brancolini*, Eleonora Da Pozzo, "An intramolecular FRET biosensor for the detection of SARS-CoV-2 in biological fluids", *Nanoscale*, 2025,17, 8803-8815

2. Elucidate physiological and pathological mechanisms underneath neurodevelopment and neurodegeneration in advanced neuron cell models.

Callegari A., Luin S., Marchetti L., Duci A., Cattaneo A., Beltram F., "Single particle tracking of Acyl Carrier Protein (ACP)-tagged TrkA receptors in PC12nnr5 cells", *J Neuroscience Methods*, 2012 Feb 15;204(1):82-6. Epub 2011 Oct 28.

Marchetti L., Callegari A., Luin S., Signore G., Viegi A., Beltram F., Cattaneo A., "Ligand signature in the membrane dynamics of single TrkA receptor molecules", *Journal of Cell Science*, 2013 Oct 1.;126(19):4445-56.

Marchetti L., De Nadai T., Bonsignore F., Calvello M., Signore G., Viegi A., Beltram F., Luin S., Cattaneo A., "Site-Specific Labeling of Neurotrophins and Their Receptors via Short and Versatile Peptide Tags", *PLoS One*, 2014; 9(11): e113708.

T. De Nadai, L. Marchetti, C. Di Rienzo, M. Calvello, G. Signore, P. Di Matteo, F. Gobbo, S. Turturro, S. Meucci, A. Viegi, F. Beltram, S. Luin, A. Cattaneo, "Precursor and mature NGF live tracking: one versus many at a time in the axons", *Scientific Reports*, 2016 Feb 1;6:20272.

Di Matteo P., Calvello M., Luin S., Marchetti L., Cattaneo A., "An Optimized Procedure for the Site-Directed Labeling of NGF and proNGF for Imaging Purposes", *Front Mol Biosci*, Feb 2017, DOI: 10.3389/fmolb.2017.00004

Marchetti L.*, \$, Bonsignore F\$, Gobbo F\$, Amodeo R, Calvello M, Jacob A, Signore G, Schirripa Spagnolo C, Porciani D, Mainardi M, Beltram F, Luin S*, Cattaneo A*, "Fast-diffusing p75NTR monomers support apoptosis and growth cone collapse by neurotrophin ligands", *PNAS* 2019 Sept 12, 2019, doi: 10.1073/pnas.1902790116

Amodeo R*, Nifosì R, Giacomelli C, Ravelli C, La Rosa L, Callegari A, Trincavelli ML, Mitola S, Luin S, Marchetti L.*, "Molecular insight on the altered membrane trafficking of TrkA kinase dead mutants", *BBA-Molecular Cell Research*, 2019 Nov 21;1867(2):118614. doi: 10.1016/j.bbamcr.2019.118614

Pacifico P, Testa G, Amodeo R, Mainardi M, Tiberi A, Convertino D, Arevalo JC, Marchetti L, Costa M, Cattaneo A, Capsoni S, "Human TrkA R649W mutation impairs nociception, sweating and cognitive abilities: a mouse model of HSAN IV", *Human Molecular Genetics Open Access Volume* 32, Issue 8, Pages 1380 - 140015 April 2023

Russo L, Giacomelli C, Fortino M, Marzo T, Ferri G, Calvello M, Viegi A, Magri A, Pratesi A, Pietropaolo A, Cardarelli F, Martini C, Rizzarelli E, Marchetti L*, La Mendola, Diego*, Trincavelli ML, "Neurotrophic Activity and Its Modulation by Zinc Ion of a Dimeric Peptide Mimicking the Brain-Derived Neurotrophic Factor N-Terminal Region", *ACS Chemical Neuroscience* 13, 23, 3453 - 34637 December 2022

Piccarducci R, Giacomelli C, Bertilacchi MS, Benito-Martinez A, Di Giorgi N, Daniele S, Signore G, Rocchiccioli S, Vilar M, Marchetti L*, Martini C, "Apolipoprotein E ϵ 4 triggers neurotoxicity via cholesterol accumulation, acetylcholine dyshomeostasis, and PKC ϵ mislocalization in cholinergic neuronal cells", *Biochimica et Biophysica Acta (BBA) - Molecular Basis of Disease*, 1869, 7, October 2023, 166793

Germelli L, Angeloni E, Da Pozzo E, Tremolanti C, De Felice M, Giacomelli C, Marchetti L, Muscatello B, Barresi E, Taliani S, Da Settimo Passetti F, Trincavelli ML, Martini C, Costa B, "18 kDa TSPO targeting drives polarized human microglia towards a protective and restorative neurosteroidome profile", 82, 34, (2025)

3. Explore the neuron regenerative potential of graphene and other biomaterials/nanomaterials.

Talarico L, De Vincentiis S, Giacomelli C, Vitolo S, Da Palmata L, Marchetti L, Ferraro E, Trincavelli ML, Raffa V, "Force induces axon growth in inhibitory conditions", *Engineered Regeneration Volume 6*, 2025, Pages 133-145

Falconieri A, De Vincentiis S, Cappello V, Convertino D, Das r, Ghignoli S, Figoli S, Luin S, Català-Castro F, Marchetti L, Borello U, Krieg M, Raffa V, "Axonal plasticity in response to active forces generated through magnetic nano-pulling", *Cell Reports* 42 (1), 111912, JANUARY 31, 2023

Convertino D.*, Fabbri F., Mishra N., Mainardi M., Cappello V., Testa G., Capsoni S., Albertazzi L., Luin S., Marchetti L.*, and Coletti C.*, "Graphene Promotes Axon Elongation through Local Stall of Nerve Growth Factor Signaling Endosomes", *Nano Letters*, 2020, 20, 5, 3633–3641

Convertino D\$, Nencioni M\$, Russo L\$, Mishra N, Hiltunen VM, Bertilacchi MS, Marchetti L, Giacomelli C, Trincavelli ML, Coletti C, "Interaction of graphene and WS2 with neutrophils and mesenchymal stem cells: implications for peripheral nerve regeneration", *Nanoscale*, 2023, 16(4), pp. 1792–1806

Domenica Convertino*, Maria Letizia Trincavelli, Chiara Giacomelli, Laura Marchetti*, Camilla Coletti*, "Graphene-based nanomaterials for peripheral nerve regeneration", *Front. Bioeng. Biotechnol.*, 18 December 2023, Sec. Nanobiotechnology, Volume 11 – 2023

Micalizzi, Simone, Russo, Lara, Giacomelli, Chiara, Montemurro, Francesca, de Maria, Carmelo, Nencioni, Martina, Marchetti, Laura, Trincavelli, Maria Letizia, Vozzi, Giovanni, "Multimaterial and multiscale scaffold for engineering entheses organ", *International Journal of Bioprinting Open Access Volume 9, Issue 52023*

Convertino D., Neeraj M., Marchetti L., Calvello M., Viegi A., Cattaneo A., Fabbri, F., Coletti C., "Effect of Chemical Vapor Deposition WS2 on Viability and Differentiation of SH-SY5Y Cells" *Frontiers in neuroscience*, Volume: 14, Article Number: 592502, DOI: 10.3389/fnins.2020.592502, Published: OCT 30 2020

Convertino D., Luin S., Marchetti L.*, Coletti C.*, "Peripheral Neuron Survival and Outgrowth on Graphene", *Front Neurosci.* 2018 Jan 22;12:1. doi: 10.3389/fnins.2018.00001. eCollection 2018.

4. Develop a new technology to build biological carriers for the delivery of small non coding RNA therapeutics.

Ceccarelli, Lorenzo, Marchetti, Laura*, Rizzo, Milena, Moscardini, Aldo, Cappello, Valentina, Da Pozzo, Eleonora, Romano, Miriam, Giacomelli, Chiara*, Bergese, Paolo, Martini, Claudia, "Human Microglia Extracellular Vesicles Derived from Different Microglia Cell Lines: Similarities and Differences", ACS Omega Open Access Volume 7, Issue 27, Pages 23127 - 2313712 July 2022

Piccarducci, Rebecca; Germelli, Lorenzo; Falleni, Alessandra; Luisotti, Lucrezia; Masciulli, Benedetta; Signore, Giovanni; Migone, Chiara; Fabiano, Angela; Bizzarri, Ranieri; Piras, Anna Maria; Giacomelli, Chiara; Marchetti, Laura*; Martini, Claudia, "GFP farnesylation as a suitable strategy for selectively tagging exosomes", ACS Applied Bio Materials, accepted on the 25th November 2024

Luisotti, Lucrezia; Germelli, Lorenzo; Piccarducci, Rebecca*; Giacomelli, Chiara; Marchetti, Laura*; Martini Claudia "Extracellular vesicles as vehicles for small non-coding RNA therapeutics: standardization challenges for clinical translation", accepted manuscript on Extracellular Vesicles and Circulating Nucleic Acids (EVCNA), July 2025

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All publications available at:

https://scholar.google.com/citations?view_op=list_works&hl=it&hl=it&user=wJxnObQAAAAJ&sortby=pupdate