

**ELENA SACCO, PhD**

Department of Biotechnology and Biosciences (BtBs), University of Milano-Bicocca (UNIMIB).  
Piazza della Scienza, 2, 20126 Milano, Italy. Phone: +39.02.64483379, E-mail: [elena.sacco@unimib.it](mailto:elena.sacco@unimib.it)

**Present positions**

- Assistant Professor in 05/E1 (Biochemistry) at BtBs, University of Milano-Bicocca
- Member of SIB (Società Italiana di Biochimica e Biologia Molecolare)
- Member of SYSBIO Center of Systems Biology /ISBE.IT (Infrastructure for Systems Biology Europe)
- Member of Best4Food (Bicocca cEnter of Science and Technology for FOOD)
- Member of 3R Center (Center for Replacement, Reduction and Refinement in animal research),
- Member of Center for neuroscience: NeuroMI, University of Milano-Bicocca

**Research topics**

- Cancer metabolism
- Ras transformation and Ras inhibitors

**Research expertise**

- Characterization and targeting of metabolism, redox homeostasis and Ras signaling in 2D and 3D preclinical cellular models of cancer in the perspective of precision medicine.
- Analysis of potency, selectivity and mechanism of action of synthetic or natural compounds, on purified proteins, cell lysates, and 2D and 3D cellular models (synthetic Ras inhibitors and Natural Products including Green coffee, Cacao, Vigna Unguiculata and *Cannabis sativa* derivatives).
- Analysis of cellular bioenergetics, nutrient dependency, mito-toxicity by Seahorse XF analyzer in different 2D and 3D cellular models (cell lines, PBMC, neurons, cardiomyocytes)

**Main research projects ongoing**

- Establishment of reliable advanced cellular models of solid tumors for studying metabolic markers and fragilities (funded by Project PE\_00000019 "HEAL ITALIA" to BtBs)
- Profiling and targeting of metabolism in advanced cellular models of bladder cancer and cholangiocarcinoma by omics and functional data integration (funded by Horizon 2020 AMPLITUDE to Marco Vanoni, and by AIRC to Chiara Raggi)
- Establishment and characterization of Breast Cancer Patient-specific cellular, animal and computational models for developing personalized drug treatment targeting metabolism. (funded by IT:FOC-Information Technology: The future of cancer treatment - FLAG-ERA to Lilia Alberghina)
- Research & Development of Ras inhibitors as anticancer agents (funded by Italian Ministry of University and Research (MIUR) through grants: "Research facilitation fund" (Fondo per le Agevolazioni alla Ricerca-FA), Project AIMS™ AWARDS to Elena Sacco)

**Education**

**Dec 2002:** PhD in Industrial Biotechnology, University of Milano-Bicocca, Italy.

**May 1997:** Master Degree in Biological Sciences (110/110 cum laude), University of Milano, Italy.

**Previous appointments, awards and research positions**

- 2010–present:** permanent position as Assistant Professor at BtBs UNIMIB (Biochemistry); *Multiscale approach for the identification of regulatory biological circuits*
- 2008-2010:** winner of a government post-doc fellowship at BtBs UNIMIB; *Ras signaling: clinical target in proliferative disorders*
- 2007:** Winner of a public contest for 1-year post-doc fellowship as PI in 'Iniziativa Ingenio', FinLombarda Spa, Regione Lombardia, in 2007; *Development of Ras inhibitors*
- 2006:** post-doc fellow of Associazione Levi-Montalcini at BtBs UNIMIB; *Drug design*
- 2002-2005:** Winner of public contest for a 3-years post-doctoral fellowship from FIRC Unicredito Italiano 2003-2005 on cancer research at BtBs UNIMIB; *Ras-dependent carbon metabolism and transformation in mouse fibroblasts*
- 1999-2002:** 3-years PhD Italian government fellowship at BtBs UNIMIB; *Structure/function relationships of Ras-specific GEFs*
- 1997-1999:** fellow of Norpharma Spa/Biopolo at the Dept. of Physiology and Biochemistry, University of Milano; *Protein engineering*

### **Research activities and technical skills**

For years, ES has been involved in research activities in collaboration with Prof. Marco Vanoni and Prof. Lilia Alberghina, driving force for the development of Systems Biology in Italy and Europe. ES has performed: structure/function studies of Ras-specific mammalian GEFs (P1, P4, P6, P8, P12, P16, P30); analysis of Ras signaling and molecular and physiological alterations associated with Ras-transformation, including metabolic rewiring (P3, P5, P7, P9, P22); rational design, development and characterization of Ras inhibitors with anticancer properties (P10, P11, P13, P18, P23, P29, P34), even derived from complex sources as plant extracts. Thanks to her considerable knowledge ES contributed to writing reviews about Ras signaling targeting in cancer (P19, P26). ES has engineered proteases from yeast and archaeobacteria for industrial applications of targeted proteolysis (P2, P14, P15). ES has applied a multi-scale System Biology approach to the study of complex biological networks including the intramolecular interdomain regulatory network of hSos1 (P16), the network regulating DNA replication initiation in yeast and mammals (P17), and the intracellular regulatory and functional network of Whi5 and Rb proteins (P20). She contributed to reviews concerning integrative multi-omics analysis for clinical applications (P24, P25). ES has explored the molecular basis of tunneling nanotubes (P30) and the effect of cannabidiol (P33) in preclinical cellular cancer models. ES has recently focused its research on cancer metabolism profiling and targeting, applying to 2D and 3D cellular models different methodological approaches including Seahorse and high-content confocal analysis, omics, and data integration by biostatistics and mathematical modelling of solid tumors and other diseases (P21, P27, P28, P31, P32). Recently she contributed to a review on the role of progranulin in solid tumors (P35) and another review on tumor heterogeneity and cellular models and approaches to study it (P36).

### **Technical skills**

ES has technical skills in DNA recombinant and molecular biology methods, mammalian cell cultures, protein/protein interaction (Biacore technology) and enzyme assays, FACS analysis; Fluorescence and Confocal Microscopy; Seahorse technology; Use of bioinformatic tools for protein structure modeling, biosequence, protein-protein interaction analysis, modeling and simulation of complex biological systems.

### **Grants**

- Grant European Union's Horizon 2020 research and innovation program n. 871277. AMPLITUDE - Advanced Multimodal Photonics Laser Imaging Tool for Urothelial Diagnosis in Endoscopy From 01-01-2020 to 31-12-2024 (Application driven Photonics components) (PI: Marco Vanoni) Role: participant
- AIMS AWARD: Identification of inhibitors of selectively target Oncogenic mutant RasG13D (2019) Role: PI
- Grant EU FLAG-ERA Information Technology: Future of Cancer Treatment ITFoC 2016, Topic: Digital Medicine for Cancer (PI: Prof Alberghina) Role: participant
- Grant RBPR05ZK2Z of the Italian Government (FIRB) Italbionet -Italian Bioinformatic Network (2007-2013). (Coordinator: Prof. A. Albertini). Subunit UNIMIB (PI: Prof. L. Alberghina). Role: participant.
- Grant EU 7FP UNICELLSYS Eukaryotic unicellular organism biology: system biology of the control of cell growth and proliferation(2008-2013). Partner 10 UNIMIB-Subunit 2 (PI: Marco Vanoni) Role: participant.
- Grant from Creabilis Therapeutics Spa(2007-2008): *Development of RasGRF derivatives as anticancer agents* (PI: Prof M. Vanoni) Role: participant.

### **Publications**

<https://orcid.org/0000-0002-3190-7671>

Total publications: 35 Total citations: 597; H index =13;

31 papers in peer-reviewed international journals, 1 paper not peer-reviewed, 4 scientific book chapters, and several participations in national and international congresses. Corresponding authors

- P1. M. Vanoni, R. Bertini, **E. Sacco**, L. Fontanella, M. Rieppi, S. Colombo, E. Martegani, V. Carrera, A. Moroni, C. Bizzarri, V. Sabbatini, M. Cattozzo, A. Colagrande, and L. Alberghina (1999) Characterization and properties of dominant negative mutants of the ras-specific guanine nucleotide exchange factor CDC25Mm. *Journal of Biological Chemistry* 274(51): 36656-662
- P2. **E. Sacco**, P. Tortora and M. Vanoni (2004) Archaeal serine proteases. *Handbook of proteolytic enzymes* 2nd Edn 562. 1819-1823
- P3. F. Chiaradonna, C. Magnani, **E. Sacco**, R. Manzoni, L. Alberghina and M. Vanoni (2005) Acquired glucose sensitivity of k-ras transformed fibroblasts. *Biochemical Society Transactions* 33: 297-299

- P4. C. Greco, **E. Sacco**, M. Vanoni and L. De Gioia (2005) Identification and in silico analysis of a new group of double histone fold containing proteins. *Journal of molecular modeling* (Online) 1-9
- P5. F. Magherini, S. Busti, T. Gamberi, **E. Sacco**, G. Raugei, G. Manao, A. Modesti, G. Ramponi, M. Vanoni (2005) In *Saccharomyces cerevisiae* an unbalanced level of tyrosine phosphorylation down-regulates the Ras/PKA pathway. *The International Journal of Biochemistry and Cell Biology* 38 (3): 444-460
- P6. **E. Sacco**, S. Fantinato, R. Manzoni, D. Metalli, L. De Gioia, P. Fantucci, L. Alberghina and M. Vanoni (2005) The isolated catalytic hairpin of the Ras-specific Guanine nucleotide Exchange Factor Cdc25Mm retains nucleotide dissociation activity but has impaired nucleotide exchange activity. *FEBS Letters* 579: 6851-6858
- P7. F. Chiaradonna, **E. Sacco**, R. Manzoni, M. Giorgio, M. Vanoni and L. Alberghina (2006) Ras dependent carbon metabolism and transformation in murine fibroblast. *Oncogene* 25 (39): 5391-5404
- P8. **E. Sacco**, D. Metalli, S. Busti, S. Fantinato, A. D'Urzo, V. Mapelli, L. Alberghina and M. Vanoni (2006) Catalytic competence of the Ras-GEF domain of hSos1 requires intra-REM domain interactions mediated by Phenylalanine 577 *FEBS Letters* 580 (27): 6322-6328
- P9. S. Busti, E. Sacco, E. Martegani and M. Vanoni (2008) Functional coupling of the mammalian EGF receptor to the Ras/cAMP pathway in the yeast *Saccharomyces cerevisiae* *Curr Genet* 53 (3): 153-162.
- P10. A. Palmioli, **E. Sacco**, S. Abraham, C.J. Thomas, A. Di Domizio, L. De Gioia, V. Gaponenko, M. Vanoni, and F. Peri (2009). First experimental identification of Ras-inhibitor binding interface using a water-soluble Ras ligand. *Bioorg Med Chem Lett* 19: 4217-4222. <http://www.sciencedirect.com/science/article/pii/S0960894X09008002>
- P11. A. Palmioli<sup>1</sup>, **E. Sacco**<sup>1</sup>, C. Airoidi, F. Di Nicolantonio, A. D'Urzo, S. Shirasawa, T. Sasazuki, A. Di Domizio, L. De Gioia, E. Martegani, F. Peri and M. Vanoni (2009). Selective cytotoxicity of a bicyclic Ras inhibitor in cancer cells expressing K-Ras(G13D). *Biochemical and biophysical research communications* 386: 593-597. <sup>1</sup>first authors <http://www.sciencedirect.com/science/article/pii/S0006291X09012133>
- P12. **E. Sacco**<sup>1</sup>, M. Farina<sup>1</sup>, C. Greco, S. Busti, D. Spiliotopoulos, L. DeGioia, D. Liberati, L. Alberghina, M. Vanoni (2010). The regulation of hSos1 as an emergent property of its multi-domain structure: molecular and computational analysis. *Biomedical Signal-Image Processing and Modelling 09\_1* <sup>1</sup>first authors. Not peer reviewed journal.
- P13. **E. Sacco**, S.J. Abraham, A. Palmioli, G. Damore, A. Bargna, E. Mazzoleni, V. Gaponenko, M. Vanoni, F. Peri (2011). Binding properties and biological characterization of new sugar-derived Ras ligands. *Med. Chem. Commun.* 2: 396-401. <http://pubs.rsc.org/en/content/articlelanding/2011/MD/c0md00264j>
- P14. **E. Sacco**, M.E. Regonesi, M. Vanoni. (2011) Archaean serine proteases. *Handbook of proteolytic enzymes 3rd Edn* Chapter 711. pag 3224 Edited by N.D. Rawlings and G.S. Salvesen
- P15. M.E. Regonesi, **E. Sacco**, P. Tortora. (2011) Carboxypeptidase Ss1. *Handbook of proteolytic enzymes 3rd Edn* Chapter 363. pag 1608 Edited by N.D. Rawlings and G.S. Salvesen
- P16. **E. Sacco**<sup>1</sup>, M. Farina<sup>1</sup>, C. Greco, S. Lamperti, S. Busti, L. DeGioia, L. Alberghina, D. Liberati, M. Vanoni (2012). Regulation of hSos1 activity is a system-level property generated by its multi-domain structure. *Biotechnology advances* 30(1):154-68. <sup>1</sup>first authors <http://www.sciencedirect.com/science/article/pii/S0734975011001273>
- P17. **E. Sacco**, M.M. Hasan, L. Alberghina, M. Vanoni (2012). Comparative analysis of the molecular mechanisms controlling the initiation of chromosomal DNA replication in yeast and in mammalian cells. *Biotechnology advances* 30(1):73-98. <http://www.sciencedirect.com/science/article/pii/S0734975011001625>
- P18. **E. Sacco**, D. Metalli, M. Spinelli, R. Manzoni, M. Samalikova, R. Grandori, A. Morrione, S. Traversa, L. Alberghina, M. Vanoni (2012). Novel RasGRF1-derived Tat-fused peptides inhibiting Ras-dependent proliferation and migration in mouse and human cancer cells. *Biotechnology advances.* 30(1):233-43. <http://www.sciencedirect.com/science/article/pii/S0734975011000668>
- P19. **E. Sacco**, M. Spinelli, M. Vanoni (2012) Approaches to Ras signaling modulation and treatment of Ras-dependent disorders: a patent review (2007--present). *Expert Opin Ther Pat.* 22(11):1263-87 <http://www.ncbi.nlm.nih.gov/pubmed/23009088>
- P20. M.M. Hasan, S. Brocca, **E. Sacco**, M. Spinelli, E. Papaleo, M. Lambrugh, L. Alberghina, M. Vanoni (2014). A comparative study of Whi5 and retinoblastoma proteins: from sequence and structure analysis to intracellular networks. *Front Physiol.* 2014, 4:315. doi: 10.3389/fphys.2013.00315. eCollection 2013. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3897220/>
- P21. C. Denise, P. Paoli, M. Calvani, M.L. Taddei, E. Giannoni, S. Kopetz, S.M. Kazmi, M.M. Pia, P. Pettazzoni, **E. Sacco**, A. Caselli, M. Vanoni, M. Landriscina, P. Cirri, P. Chiarugi (2015) 5-Fluorouracil resistant colon cancer cells are addicted to OXPPOS to survive and enhance stem-like traits. *Oncotarget.* 2015 Dec 8;6(39):41706-21. doi: 10.18632/oncotarget.5991.PMID:26527315
- P22. G. De Sanctis, M. Spinelli, M. Vanoni, **E. Sacco** (2016) K-Ras Activation Induces Differential Sensitivity to Sulfur Amino Acid Limitation and Deprivation and to Oxidative and Anti-Oxidative Stress in Mouse Fibroblasts. *PLoS One.* 2016 Sep 29;11(9):e0163790. doi: 10.1371/journal.pone.0163790. eCollection 2016. PMID:27685888

- P23. A. Palmioli, C. Ciaramelli, R.A. Tisi; M. Spinelli, G. De Sanctis, **E. Sacco**, C. Airoidi (2017) Natural compounds in cancer prevention: effects of coffee extracts and their main polyphenolic component 5-CQA on oncogenic Ras proteins. *Chemistry - An Asian Journal*, 12(18), 2457-2466. PMID: 28719146 DOI: 10.1002/asia.201700844
- P24. G. De Sanctis, C. Damiani, **E. Sacco**, M. Vanoni (2018). Omics and Clinical Data Integration. DOI:10.1002/9781119183952.ch15. pp.248-273. In *Integration of Omics Approaches and Systems Biology for Clinical Applications* - ISBN:9781119181149 Ed. Wiley
- P25. C. Damiani, D. Gaglio, **E. Sacco**, L. Alberghina, M. Vanoni (2020) Systems metabolomics: from metabolomic snapshots to design principles. *Curr Opin Biotechnol*. 2020 Jun;63:190-199. doi: 10.1016/j.copbio.2020.02.013. Epub 2020 Apr 8.
- P26. R. Tisi, V. Gaponenko, M. Vanoni, **E. Sacco** (2020) Natural Products Attenuating Biosynthesis, Processing, and Activity of Ras Oncoproteins: State of the Art and Future Perspectives. *Biomolecules*. 2020 Nov 10;10(11):1535. doi: 10.3390/biom10111535.
- P27. V. Pasquale, G. Ducci, G. Campioni, A. Ventrici, C. Assalini, S. Busti, M. Vanoni, R. Vago, **E. Sacco** (2020) Profiling and Targeting of Energy and Redox Metabolism in Grade 2 Bladder Cancer Cells with Different Invasiveness Properties. *Cells*. 2020 Dec 11;9(12):2669. doi: 10.3390/cells9122669.
- P28. C. Raggi, M. L. Taddei, **E. Sacco**, N. Navari, M. Correnti, B. Piombanti, M. Pastore, J. Jorio, G. Lori, M. Lewinska, J.B. Andersen, M. Ramazzotti, I. Orlandi, P. Chiarugi, F. Marra (2021) Mitochondrial oxidative metabolism contributes to a cancer stem cell phenotype in cholangiocarcinoma *J Hepatol*. 2021 Jun;74(6):1373-1385. doi: 10.1016/j.jhep.2020.12.031. Epub 2021 Jan 21. PMID: 33484774.
- P29. R. Tisi, M. Spinelli, A. Palmioli, C. Airoidi, P. Cazzaniga, D. Besozzi, M.S. Nobile, E. Mazzoleni, S. Arnhold, L. De Gioia, R. Grandori, F. Peri, M. Vanoni, **E. Sacco** (2021) The multi-level mechanism of action of a pan-Ras inhibitor explains its antiproliferative activity on Cetuximab-resistant cancer cells *Frontiers in Molecular Biosciences*, section Molecular Diagnostics and Therapeutics. *Front Mol Biosci*. 2021 Feb 17;8:625979. doi: 10.3389/fmolb.2021.625979. PMID: 33681292; PMCID: PMC7925909.
- P30. A. D'Aloia, E. Arrigoni, B. Costa, G. Berruti, E. Martegani, **E. Sacco**, M. Ceriani (2021) RalGPS2 Interacts with Akt and PDK1 Promoting Tunneling Nanotubes Formation in Bladder Cancer and Kidney Cells Microenvironment. *Cancers (Basel)*. 2021 Dec 16;13(24):6330. doi: 10.3390/cancers13246330. PMID: 34944949; PMCID: PMC8699646.
- P31. A. Sforza, V. Vigorelli, E. Rurali, G. Perrucci, E. Gambini, M. Arici, R. Rinaldi, P. Fiorina, A. Barbuti, A. Raucci, **E. Sacco**, M. Rocchetti, G. Pompilio, S. Genovese & M.C. Vinci (2022) Liraglutide Preserves CD34+ Stem Cells from Dysfunction Induced by High Glucose Exposure *Cardiovascular Diabetology* 21(1):51. doi: 10.1186/s12933-022-01486-9. PMID: 35397526; PMCID: PMC8994898.
- P32. G. Campioni, V. Pasquale, S. Busti, G. Ducci, **E. Sacco**, M. Vanoni (2022) An Optimized Workflow for the Analysis of Metabolic Fluxes in Cancer Spheroids Using Seahorse Technology. *Cells*. 11(5):866. doi: 10.3390/cells11050866. PMID: 35269488; PMCID: PMC8909358.
- P33. A. D'Aloia, M. Ceriani, R. Tisi, S. Stucchi, **E. Sacco\***, B. Costa\* (2022) Cannabidiol Antiproliferative Effect in Triple-Negative Breast Cancer MDA-MB-231 Cells Is Modulated by Its Physical State and by IGF-1. *Int J Mol Sci*. 23(13):7145. doi: 10.3390/ijms23137145. PMID: 35806150; PMCID: PMC9266539. \*co-last authors
- P34. S. Pagliari, R. Celano, L. Rastrelli, **E. Sacco**, F. Arlati, M. Labra, L. Campone (2022) Extraction of methylxanthines by pressurized hot water extraction from cocoa shell by-product as natural source of functional ingredient *LWT* 170, 114115 <https://doi.org/10.1016/j.lwt.2022.114115>.
- P35. E. Ventura, G. Ducci, R.B. Dominguez, V. Ruggiero, A. Belfiore, **E. Sacco**, M. Vanoni, R.V. Iozzo, A. Giordano, A. Morrione (2023) Progranulin Oncogenic Network in Solid Tumors. *Cancers*. 15(6), 1706 <https://doi.org/10.3390/cancers15061706>
- P36. M. Proietto, M. Crippa, C. Damiani, V. Pasquale, **E. Sacco**, M. Vanoni\*, M. Gilardi\* (2023) Tumor heterogeneity: pre-clinical models, emerging technologies and future applications. Submitted to *Frontiers in Oncology*, section Molecular and Cellular Oncology. 13, 1164535 DOI=10.3389/fonc.2023.1164535

### Teaching activity

Teaching activities in the University of Milano-Bicocca:

2016-2023 8h/year Master in Communication of Science and Sustainable Innovation (MaCSIS)

2017-2022 4h/year Master in Bioeconomy in the Circular Economy (Biocirce)

2013-2023 30-40h/year Computational Biology - Laboratory (BIO/10) Master degree in Biological Science

2021- 2022 7h/year Biochemistry for Biotechnologist (BIO/10) 1/6 cfu Bachelor degree in biotechnologies

2018-2019 42h Computational Biology – Theory (BIO/10) Master degree in Biological Science

2011-2019 30h/year LTA-Biochemistry (protein biochemistry and cellular biochemistry (laboratory, 3 cfu) (BIO/10), Bachelor degree in Biotechnologies.

2012-2013 42h Biochemistry II (BIO/10) 6 cfu Bachelor degree in Biotechnologies

2002-2011 30h/year Contract Professor “LTA-Biochemistry” (laboratories, 3 cfu), Bachelor degree in Biotechnologies.

### **Research and Thesis Supervisor Activity**

During her career ES has supervised several undergraduate, graduate, PhD and Postdoc students, gaining experience in human resources management.

- Supervisor of Postdoc (Assegnista di Ricerca)  
-01/12/2021-30/11/2022 (Valentina Pasquale)  
Project title: Integrating multi-parametric imaging and live cell bioenergetics to dissect the metabolic and signaling landscape in cancer spheroids and organoids of different origin and aggressiveness.
- Supervisor of PhD students  
-01/02/2014–27/04/2017 (Gaia De Sanctis)  
PhD Thesis title: An integrated approach to study Ras-dependent cancer metabolic rewiring in mouse fibroblasts  
-01/09/2020–present (Giacomo Ducci)  
Project title: Metabolic stratification of advanced 3D models of human carcinomas
- Tutor of several research fellows
- Supervisor of several Master Thesis students in Industrial Biotechnology, and in Biology
- Supervisor of several Bachelor Thesis students in Biotechnology and in Biological Science
  
- Supervisor traineeship student mobility Erasmus+ from Biomedical Laboratory Sciences student of UC Leuven-Limburg University - Belgium (MOVING MND project)  
-08/02/2018-31/05/2018 Leen Leconte (Supervisor of internship and Bachelor Thesis in Pharmaceutical and biological laboratory technology. Thesis Title: The effects of cannabidiol, a non-psychotropic cannabinoid, on cell proliferation and redox homeostasis on colorectal cancer cells)  
-13/02/2017-02/06/2017 Sarah Bourguignon (Supervisor of internship and Bachelor Thesis in Pharmaceutical and biological laboratory technology. Thesis Title: Dissecting the role of glutamine in sustaining cell growth in Ras-dependent cancer cells)

### **Editorial activities**

- 2022 to present Member of the Editorial Board (Review Editor) of *Frontiers in Oncology*, section Cancer Metabolism section led by Professor Michael P Lisanti, MD-PhD, FRSA, FRSB, FRSC and Ubaldo Emilio Martinez-Outschoorn.
- Invited Reviewer for international scientific journals: *Biomolecules*, *Cancers*, *European Journal of Cell Biology*, *Histology and Histopathology*, *International Journal of Molecular Science*, *Molecular Diversity*, *Frontiers in oncology*, *Life Science*, *Molecules and Pharmaceuticals*, *Journal of Clinical Medicine*.
- External member of the evaluation committee (external referee) of PhD in Doctoral School in Life and Health Sciences PhD Program in Complex System for Life Sciences, University of Torino (2022); PhD School in Biochemistry and Molecular Biology BIBIM 2.0, University of Siena (2021); PhD course in Biochemistry and Molecular Biology, University of Firenze (2020)
- Evaluator of national and international Projects:  
2014 Scientific Independence of young Researchers (SIR).  
2017 Young researchers' excellence programme NKFIH: FK project-48months (Hungary)

### **Third mission activities**

- 2017 to present: Teaching activities in the context of “Piano Lauree Scientifiche di Biologia e Biotecnologie”  
2017-2020 Laboratory of Cell Biology and Biochemistry 15h, 2 sessions/year, except 2020 (1 session)  
2021-2022 Online Course of Laboratory of Cell Biology and Biochemistry (OpenBicocca - Bicocca Life Long Learning; <https://open.elearning.unimib.it/>)  
2019 to present Orienteering activity co-designed with School Teachers: Advanced preclinical cellular models in cancer research.  
06/2022 Promoter and Member of the Organizing Committee of the Summer School “Antropocene”
- 2022-2023. Promoter and Member of Organizing committee of the Science Theatre Festival of Milano-Bicocca (<https://www.unimib.it/servizi/studenti-e-laureati/bicocca-orienta/iniziativa-orientamento/iniziativa-studenti-delle-scuole-superiori/laboratorio-teatro-scienza>)
- 2023 Promoter and participant of Workshop “Communicate Science” aimed to realize a Science show involving several members of BtBs (Title: Talent in Science. <https://www.unimib.it/eventi/talento-nella-scienza-raccontisciencia-giovani-ricercatori-del-dipartimento-biotecnologie-e>)

### **Administrative role and position responsibility**

- 2019 to present: Referent for the University of Milano-Bicocca of the National Project of orienteering “Piano Lauree Scientifiche” (PLS) (<https://www.btbs.unimib.it/it/offerta-formativa/piano-lauree-scientifiche-pls>)
- 2012 to present: Member of several examining boards for various positions in the Dept. BtBs, University of Milano-Bicocca.
- 2022 to present:       Disciplinary committee member, University of Milano-Bicocca  
                          Instrument Committee member, Dept. BtBs, University of Milano-Bicocca.  
                          Visibility and Communication Committee member, Dept. BtBs, University of Milano-Bicocca.  
                          CHRONOS LID of Multicellular Advanced models Committee member, Dept. BtBs, University of Milano-Bicocca.
- 2017-2019: Didactic committee member of Biotechnology Degrees. University of Milano-Bicocca.
- 2019 Tendering committee for provision of strategic infrastructure of Dept. BtBs, University of Milano-Bicocca
- 2013-2016 Member of Ph.D. Course in Industrial Biotechnology, University of Milano-Bicocca
- 2012-2013 Member of Ph.D. Course in Life Science, University of Milano-Bicocca

**Significant interruptions**

Maternity: from March 2002 to August 2002 included

Maternity: from April 2008 to September 2008 included

Maternity: from December 2011 to May 2012 included

Milano, 20/11/2023

