

PERSONAL INFORMATION

Maria Romano



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Sex Female | Date of birth 28/04/1987 | Nationality Italian

WORK EXPERIENCE

From 30/09/2019 - present

Permanent Researcher

Institute of Biostructure and Bioimaging of the National Research Council, Naples

The research activities in the protein engineering lab include structural and functional studies, drug discovery and development, by combining structural biology and molecular biology with biochemical and biophysical techniques.

01/02/2021-30/06/2023

MSCA Fellow H2020 - IF (Individual Fellowships)

University of Naples "Federico II", Department of Pharmacy, Italy

HADES project aims to uncover functional mechanism of HBHA protein, a crucial virulence molecule involved in the extrapulmonary dissemination of TB. The activities include nuclear magnetic resonance (NMR) experiments, by combining solution-state and solid-state NMR, as well as biophysical studies.

*During the individual fellowship, the Researcher contract at IBB-CNR was on hold.

05/09/2016 – 29/09/2019

Postdoctoral Research Associate

Imperial College of London, Department of Life Sciences

Functional and structural characterization of membrane proteins, such as ABC-transporters and outer membrane proteins, involved in the transport of drugs across the membranes.

25/06/2015 – 24/06/2016

Research Fellowship

Institute of Biostructure and Bioimaging of the National Research Council, Naples

Structural and functional characterization of new biomarkers. The activities included optimization of recombinant proteins production for high-throughput crystallization screening and in vitro functional analyses.

EDUCATION AND TRAINING

2011-2014

PhD in Cellular and Molecular Biotechnology

University of Campania "Luigi Vanvitelli", Caserta - Italy

The PhD project was mainly focused on the structural and functional characterization of RNase AS (Ribonuclease A-specific), a key virulence factor of *M. tuberculosis* infection. The research activities included the fully characterization of the ribonuclease activity by in vitro functional assays, and structural characterization its three-dimensional structure using X-ray crystallography (Romano et. al 2014).

2009-2011

M.Sc. Genetic Sciences and Technologies - Score: 110/110 cum laude

University of Sannio, Benevento - Italy

For my Master's project at the Oncology lab of the Biogem Consortium, I gained excellent skills in eukaryotic cell cultures, western blot and biochemical assay in vivo and in vitro, with the aim to investigate the effect of the cytoplasmic localization of Cdk inhibitor p27kip1 in tumor progression. Thesis Title: "Cytoplasmic localization of Cdk inhibitor p27kip1 and its implication in tumor progression", supervisor: Prof. Giuseppe Viglietto

2006-2009 **B.Sc. Biotechnology - Score: 110/110 cum laude**

University of Sannio, Benevento - Italy

The undergraduate project aimed to express, purify and crystallize RipA, a protein involved in the M. tuberculosis cell division and resuscitation. Thesis Title: "Preparation and characterization of important biological macromolecules for M. tuberculosis pathogenicity", supervisor: Prof. Giuseppe Graziano

WORK ACTIVITIES

- Awards**
- **Cells 2022 Best Paper Award:** <https://www.mdpi.com/journal/cells/awards/1905>
 - **Cells 2021 Highly Cited Paper Award:** <https://www.mdpi.com/journal/cells/awards/1346>
 - **Project coordinator of a dissemination project "Cristallograficamente"** awarded by the Italian Association of Crystallography (AIC); 2021 – present
 - **Scholarship awarded:** European school of crystallography AIC "Reinforcing Foundations to build the second century of modern crystallography" 31st August 2014 – 6th September 2014, University of Pavia
 - **Scholarship awarded:** Dublin Training School - COST Project BM1003, "Ion transport, airway liquid dynamics & host pathogen interactions in CF lung epithelia", 10th -12th September 2014 – University of Dublin, Ireland
 - **Scholarship awarded:** Autumn Training School – COST BM1003, "The advantages and limitations of methods used in bacteria identification and typing", 23rd -25th September 2013 –University of Wroclaw, Poland
 - **Scholarship awarded:** Winter Training School – COST BM 1003, "Microbial infection from the chemistry perspective: the bottom-up approach", 23rd -25th January 2013 - University CEU San Pablo/CIB-CSIC, Madrid, Spain
 - **Scholarship awarded:** Training School "Assessing bacterial Virulence: a COST Training School", 5th -7th November 2012, University of Tubingen, Germany

INVITED PRESENTATIONS

- Webinar "Being Awarded a Marie Curie Fellowship in the Aurora Network", organised by AURORA University network e "Federico II" University – 28th June 2021 (**Invited speaker/oral presentation**)
- 1st AIC-BMM Group Meeting – Fiesole (FI), 20th-21st February 2020 (**Invited speaker/oral presentation:** "Structural basis for antibiotic resistance mediated by bacterial porins")
- Centre of Structural Biology 2019 Open Day – 31st May 2019, Sir Alexander Fleming Building, South Kensington Campus, UK (**Invited speaker/oral presentation:** "Structural basis for antibiotic resistance mediated by bacterial porins")
- UK ABC Meeting, London 22nd January 2019 (**Invited speaker/oral presentation** "Understanding selection and export of natural products by ABC-transporters: McjD-MccJ25 case study").
- Indigo Workshop 2016 – "Molecular scenario behind bacterial infections", 4th-5th May 2016, Imperial College London, Kensington Campus, London, UK (**Invited speaker/oral presentation:** "Structure and function of RNase AS, a novel virulence factor of M. tuberculosis")
- **Science communication and dissemination programmes:** European Biotech week, Futuro Remoto, ERN; Project coordinator of a dissemination project awarded by the Italian Association of Crystallography (AIC).

Grants

- **2023-2025. PI of PRIN 2022 PNRR Research Grant** - Project: ENIGMA-TB: understanding PE_PGRS, vital cell wall proteins promoting Mycobacterial survival in TB"; Funded by EU – Next Generation EU.
Funded amount 225000,00 euro
- **2021-2022. PI of EU Marie Curie Individual Fellowship** - Project: HADES - Functional mechanism of heparin-binding hemagglutinin adhesin from Mycobacterium tuberculosis; Funded by EU under the Marie Skłodowska-Curie Actions Individual Fellowship (H2020-MSCA-IF) programme.
Funded amount 171473,28 euro
- **2014. PI of Short-Term Scientific Mission** - Project: Functional characterisation of key proteins in Burkholderia cepacia infection; Funded by EU under the project COST BM-1003; Centre of Microbial Host Interactions ITT Dublin, Ireland
Funded amount 1666,00 euro

- Project team member**
- 2023-2025. PNRR - Next Generation EU project "National Center for Gene Therapy and Drugs based on RNA Technology" CN3 (funded 320036606,03 euro; 489396,00 for the IBB-CNR unit), Research Coordinator for the IBB-CNR unit: Roberto Improta.
 - 2022-2025. PRIN 2020 "CANNOT-ESKAPE, Targeting bacterial cell envelope of Nosocomial pathogens to ESKAPE resistance" (funded 444051,00 euro; 146051,00 euro for IBB-CNR unit), PI: Flavia Squeglia
 - 2020-2021. POR FESR CAMPANIA 2014-2020 "RECOVER-COVID19" (RicErCa e svilupPOVERsus COVID19 in Campania" (funded 300000,00 euro; 91134,00 euro for IBB-CNR unit), Research Coordinator for the IBB-CNR unit: Rita Berisio
 - 2016-2019. MRC "Understanding the ABCs of multi drug resistance - tying the knot on the antibacterial peptide ABC transporter McjD" (funded 734536,13 euro), PI: Konstantinos Beis
 - 2019-2024. H2020 ITN Marie Skłodowska-Curie Actions "BactiVax - Anti-Bacterial Innovative Vaccines against respiratory diseases" (funded 4009372,56 euro; 261499,68 euro for the IBB-CNR unit), PI: Siobhan Mc Clean, Research Coordinator for the IBB-CNR unit: Rita Berisio
 - 2015-2017. FP7 Indigo Policy Linking Program funded by EU "DRAT - DRug development Against Tuberculosis" (30000,00 euro), PI: Rita Berisio
 - 2015-2017. Bilateral agreement for Scientific cooperation CNR/JSPS (Italy-Japan) "Perception of chitin by pattern recognition receptors as a defense against pathogens" (funded 16000,00 euro), PI: Rita Berisio
 - 2014-2016. Bilateral agreement for Scientific cooperation CNR/PAS (Italy-Poland) "Structure and function of selected enzymes of phage origin" (funded 14000,00 euro), PI: Rita Berisio

ADDITIONAL INFORMATION

total number of publications in peer-review journals: 24
total Impact Factor (IF) (average IF/paper), 136,76 (4.9)
total number of citations: 836 (Scopus)
H index: 17 (Scholar), 14 (Scopus)

Publications

- **Romano M.**, Squeglia F., Kramarska E., Barra G., Choi H.G., Kim H.J., Ruggiero A., Berisio R. "A Structural View at Vaccine Development against M. tuberculosis" *Cells*. 2023 Jan 14;12(2):317. doi: 10.3390/cells12020317.
- Squeglia F.*, **Romano M.***, Esposito L., Barra G., Campiglia P., Sala M., Scala M.C., Ruggiero A., Berisio R. "Structure-Based Development of SARS-CoV-2 Spike Interactors" *Int J Mol Sci*. 2022 May 17;23(10):5601. doi: 10.3390/ijms23105601. (*equally contributed).
- Squeglia F.*, **Romano M.***, Ruggiero A., Maga G., Berisio R. "Host DDX Helicases as Possible SARS-CoV-2 Proviral Factors: A Structural Overview of Their Hijacking Through Multiple Viral Proteins" *Front Chem* 2020 doi: 10.3389/fchem.2020.602162 (equally contributed).
- Dennehy, Duggan N., Dignam S., McCormack S., Dillon E., Molony J., **Romano M.**, Hou Y., Ardill L., Whelan M.V.X., Drulis-Kawa Z., Ó'Cróinín T., Valvano M.A., Berisio R., McClean S. "Protein with negative surface charge distribution, Bnr1, shows characteristics of a DNA-mimic protein and may be involved in the adaptation of Burkholderia cenocepacia" *Microbiologyopen*. 2022 Feb;11(1):e1264. doi: 10.1002/mbo3.1264.
- Omari K. E., Mohamad N., Bountra K., Duman R., **Romano M.**, Schlegel K., Kwong H.S., Mykhaylyk V., Olesen C., Moller J. V., Bublitz M., Beis K. and Wagner A. "Experimental phasing with vanadium and application to nucleotide-binding proteins" *IUCrJ* 2020. doi: <https://doi.org/10.1107/S2052252520012312>
- Dennehy R., Dignam S., McCormack S., **Romano M.**, Hou Y., Ardill L., Whelan M. X., Drulis-Kawa Z., Cróinín Ó T., Miguel V. A., Berisio R., McClean S. "The DNA mimic protein BCAS0292 is involved in the regulation of virulence of Burkholderia cenocepacia" Pre-print on BioRxiv 2020 doi: <https://doi.org/10.1101/2020.08.06.226779>
- **Romano M.**, Ruggiero A., Squeglia F., Berisio R. "An engineered stable mini-protein to plug SARS-CoV-2 Spikes" Pre-print on BioRxiv 2020 doi: <https://doi.org/10.1101/2020.04.29.067728>
- **Romano M.**, Ruggiero A., Squeglia F., Maga G. and Berisio R. "A Structural View of SARS-CoV-2 RNA Replication Machinery: RNA Synthesis, Proofreading and Final Capping" *Cells* 2020, 9, 1267. doi: 10.3390/cells9051267. (review)
- Wong J., **Romano M.**, Kerry L., Kwong H., Low W., Brett S., Clements A., Beis K., Frankel G. "OmpK36-mediated Carbapenem resistance attenuates ST258 Klebsiella pneumoniae in vivo" *Nat Commun*. 2019 Sep 2;10(1):3957. doi: 10.1038/s41467-019-11756-y.
- Calvanese L., Squeglia F., **Romano M.**, D'Auria G., Falcigno L., Berisio R. "Structural and dynamic studies provide insights into specificity and allosteric regulation of ribonuclease AS, a key enzyme in mycobacteria virulence" *J Biomol Struct Dyn*. 2019 Jul 22:1-13. doi: 10.1080/07391102.2019.1643786.

- Wang L., Bateman B., Zanetti-Domingues L.C., Moores AN., Astbury S., Spindloe C., Darrow MC., **Romano M.**, Needham SR., Beis K., Rolfe DJ., Clarke DT., Martin-Fernandez ML. "Solid immersion microscopy images cells under cryogenic conditions with 12nm resolution" *Commun. Biol.* 2019 Feb 21;2:74. doi: 10.1038/s42003-019-0317-6. eCollection 2019.
- Husada F., Bountra K., Tassis K., de Boer M., **Romano M.**, Rebuffat S., Beis K., Cordes T. "Conformational dynamics of the ABC transporter McjD seen by single-molecule FRET" *EMBO J.* 2018 Nov 2;37(21). pii: e100056. doi: 10.15252/embj.2018100056. Epub 2018 Sep 20.
- **Romano M.**, Fusco G., Choudhury H.G., Mehmood S., Robinson C.V., Zirah S., Hegemann J.D., Lescop E., Marahiel M.A., Rebuffat S., De Simone A., Beis K. "Structural Basis for Natural Product Selection and Export by Bacterial ABC Transporters" *ACS Chem Biol.* 2018 Jun 15;13(6):1598-1609. doi: 10.1021/acscchembio.8b00226. Epub 2018 May 18
- Squeglia F., **Romano M.**, Ruggiero A., Berisio R. "Molecular Players in Tuberculosis Drug Development: Another Break in the Cell Wall" *Curr Med Chem.* 2017 Nov 24;24(36):3954-3969. doi: 10.2174/0929867324666170208150016. (review)
- Majkowska-Skrobek G., Łątka A., Berisio R., Maciejewska B., Squeglia F., **Romano M.**, Lavigne R., Struve C., Drulis-Kawa Z. "Capsule-Targeting Depolymerase, Derived from Klebsiella KP36 Phage, as a Tool for the Development of Anti-Virulent Strategy" *Viruses.* 2016 Dec 1;8(12). pii: E324.
- Dennehy R, **Romano M.**, Ruggiero A, Mohamed YF, Dignam SL, Mujica Troncoso C, Callaghan M, Valvano MA, Berisio R, McClean S. "The Burkholderia cenocepacia peptidoglycan-associated lipoprotein is involved in epithelial cell attachment and elicitation of inflammation" *Cell Microbiol.* 2017 May;19(5). doi: 10.1111/cmi.12691. Epub 2016 Nov 25
- Ruggiero A, Squeglia F, **Romano M.**, Vitagliano L, De Simone A, Berisio R. "Structure and dynamics of the multi-domain resuscitation promoting factor RpfB from Mycobacterium tuberculosis" *J Biomol Struct Dyn.* 2017 May;35(6):1322-1330. doi: 10.1080/07391102.2016.1182947. Epub 2016 Jul 15.
- Ruggiero A, Squeglia F, **Romano M.**, Berisio R. "Use of Hydrolytic Enzymes for Algal Biomass Treatment" *Current Biotechnology* Volume 5, Issue 4, 2016 doi: 10.2174/2211550105666160518143432 (review)
- Casey W., Spink N., Cia F., Collins C., **Romano M.**, Berisio R., Gregory J. Bancroft & McClean S. "Identification of an OmpW homologue in Burkholderia pseudomallei, a protective vaccine antigen against melioidosis", *Vaccine.* 2016. doi:10.1016/j.vaccine.2016.03.088
- Ruggiero A., Squeglia F., **Romano M.**, Vitagliano L., De Simone A., Berisio R. "The structure of Resuscitation promoting factor B from M. tuberculosis reveals unexpected ubiquitin-like domains", *Biochim Biophys Acta.* 2016 Feb;1860(2):445-51. Epub 2015 Nov 5.
- **Romano M.**, Squeglia F., Berisio R. "Structure and function of RNase AS: A novel virulence factor from mycobacterium tuberculosis", *Curr Med Chem.* 2015;22(14):1745-56. (review)
- Squeglia F., Ruggiero A., **Romano M.**, Vitagliano L. and Berisio R. "Mutational and structural study of RipA, a key enzyme for Mycobacterium tuberculosis cell division: evidence for the L- to D-inversion of configuration of the catalytic cysteine", *Acta Crystallogr D Biol Crystallogr.* 2014 Sep;70(Pt 9):2295-300. Epub 2014 Aug 29.
- **Romano M.**, van de Weerd R., Brouwer F.C.C., Roviello G., Lacroix R., Vandenbroucke-Grauls C.M.J.E, Sparrius M., Brink-van Stempvoort G., Maaskant J.J., van der Sar A.M., Appelmelk B.J., Geurtsen J.J., Berisio R. "Structure and function of RNase AS, a polyadenylate-specific exoribonuclease affecting mycobacterial virulence in vivo" - *Structure.* 2014 May 6;22(5):719-30. doi: 10.1016/j.str.2014.01.014. Epub 2014 Apr 3.
- Squeglia F., Bachert B., **Romano M.**, Lukomski S., Berisio R. "Crystallization and preliminary X-ray crystallographic analysis of the variable domain of Scl2.3, a streptococcal collagen-like protein from invasive M3-type Streptococcus pyogenes", *Acta Crystallogr Sect F Struct Biol Cryst Commun.* 2013 Sep;69(Pt 9):1023-5.
- Squeglia F, **Romano M.**, Ruggiero A, Vitagliano L, De Simone A, Berisio R. "Carbohydrate Recognition by RpfB from Mycobacterium tuberculosis Unveiled by Crystallographic and Molecular Dynamics Analyses", *Biophys J.*, 2013 Jun 4;104(11):2530-9.