

PERSONAL INFORMATION

Francesco Santoro



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Sex Male | Date of birth 18/05/1983 | Nationality Italian

WORK EXPERIENCE

February 2026-present

Director of the post-graduate school (Scuola di Specializzazione) in Microbiology and Virology (for Medical Doctors), University of Siena

February 2023-present

Director of the post-graduate school (Scuola di Specializzazione) in Microbiology and Virology (for biologists), University of Siena

December 2022-present

Associate Professor in Microbiology and Clinical Microbiology (SSD MED/07)

Department of Medical Biotechnologies, University of Siena, Italy

- Teaching activities in the following courses: Medical Biotechnologies MSc, Laboratory Technician, Medicine and Surgery, Dentistry, Post-graduate school in Microbiology and Virology
- Supervisor for student internships and PhD students
- Research activity: NGS technologies for the study of bacterial genetics and genomics, immune response to infection and vaccination, clinical microbiology

November 2019- November 2022

Senior Lecturer (RTDb) in Microbiology and Clinical Microbiology (SSD MED/07)

Department of Medical Biotechnologies, University of Siena, Italy

- Teaching activities in the Medical Biotechnologies MSc course, Laboratory Technician course, Post-graduate school in Microbiology and Virology
- Supervisor for student internships and PhD students
- Research activity: NGS technologies for the study of bacterial genetics and genomics, immune response to infection and vaccination, clinical microbiology

June 2020-now

Consultant Microbiologist

Microbiology and Virology Unit, Siena University Hospital, Siena, Italy

- Clinical microbiology (bacteriology, serology, virology, molecular microbiology)

February 2019-October 2019

Junior Lecturer (RTDa) in Microbiology and Clinical Microbiology (SSD MED/07)

Department of Medical Biotechnologies, University of Siena, Italy

- Teaching activities in the Medical Biotechnologies MSc course, Laboratory Technician course, Post-graduate school in Microbiology and Virology
- Supervisor for student internships and PhD students
- Research activity: NGS technologies for the study of bacterial genetics and genomics, immune response to infection and vaccination, clinical microbiology

March 2018-February 2019

Post-Doc (assegnista di ricerca), research project "Precision Medicine in the study of immune response to vaccines and in the HIV infection treatment"

Department of Medical Biotechnologies, University of Siena, Italy

July 2012-February 2018

Post-Doc (assegnista di ricerca), research project "Characterization of the bacterial mobilome: host range, nucleotide sequences and analysis by mutagenesis of new mobile genetic elements"

Department of Medical Biotechnologies, University of Siena, Italy

EDUCATION AND TRAINING

- October 2013-April 2017 **PhD in Medical Biotechnologies**
University of Siena
- Thesis title "Functional characterization of the pneumococcal Integrative Conjugative Element Tn5253". Supervisors Prof. Gianni Pozzi, Prof. Francesco Iannelli
- March 2008-March 2012 **Postgraduate degree in Clinical Microbiology and Virology, grade 70/70 *cum laude***
University of Siena
- Thesis title "Sviluppo di un nuovo saggio di PCR-Microarray per l'identificazione di Micobatteri di interesse Clinico", Supervisors Prof. Gianni Pozzi, Prof. Francesco Iannelli
- September 2001-July 2007 **MD degree, grade 110/110 *cum laude***
University of Siena
- Thesis title "Caratterizzazione del trasposone coniugativo Tn5253 dello *Streptococcus pneumoniae*"
Supervisors Prof. Gianni Pozzi, Prof. Francesco Iannelli

WORK ACTIVITIES

- Awards** FEMS research fellowship titled "Characterization of novel Tn916-like mobile genetic elements capable of high frequency conjugal transfer", performed in the laboratory of Dr. Adam P. Roberts at the Eastman Dental Institute, University College of London, London, UK
- Editorial activity** Review Editor for Clinical Microbiology for "Frontiers in cellular infection and microbiology" (since 2018)
Editor of the "Genome Notes" section for the "Journal of Global Antimicrobial Resistance" October 2019-December 2024
Recommender for "PCI Microbiology" since April 2022
Recommender for "PCI Infections" since November 2022
Reviewed more than 50 papers for microbiology journals (see [Web of Science](#) profile)
- Invited presentations**
1. Microbiology 2025, XXXV SIMGBM Congress, Rome, Italy. 2025, 19 September. PLENARY SESSION 6 Phage Biology: from basics to applications.
"Liaisons dangereuses: lysogenic phages, antibiotic resistance, virulence and horizontal gene transfer in *Streptococcus pyogenes*"
 2. 51° Congresso Nazionale della Società Italiana Di Microbiologia (SIM) – XXXIV SIMGBM Congress, Cagliari, Italy, 2023 24 Settembre. Joint Meeting Società Italiana di Microbiologia – SIM Società Italiana di Microbiologia generale e Biotecnologie Microbiche- SIMGBM. Sessione plenaria. "Analysis of host-pathogen interaction by dual RNA sequencing: methods and applications."
 3. 45° Congresso Nazionale della Società Italiana Di Microbiologia (SIM), Genova, Italy, 2017, 27-30 September. "Sequencing of mRNA from peripheral blood cells for the evaluation of immune response to vaccines."
 4. Bacteriophages 2017. Online event. <http://lifescienceevents.com/speakers-bacteriophage-2017-17th-19th-jan-2017/>. "Detection of phage ϕ 1207.3 in *Streptococcus pneumoniae* by immunoassays targeting the major capsid protein."
 5. 44° Congresso Nazionale della Società Italiana Di Microbiologia (SIM), Pisa, Italy, 2016, 25-28 September. "Production of mature and functional phage particles by the macrolide resistance-carrying conjugative prophage ϕ 1207.3."
 6. 41° Congresso Nazionale della Società Italiana di Microbiologia (SIM), Riccione, Italy, 2013, 14-16 October. "Caratterizzazione di nuovi elementi genetici in *Streptococcus mitis*."

- Grants** Awarded Grants (last 5 years):
1. Progetto PRIN 2022. "Looking for new anti-infective molecules: evaluation of antibacterial and immunomodulatory properties of antibody-derived peptides" (NAADP: New Antibacterial Antibody-Derived Peptides) - 2022EMAMJE. Research Unit responsible and substitute Principal Investigator. September 2023- September 2025
 2. Progetto PRIN 2022-bando PNRR. "Unraveling the contribution of *Lactobacillus crispatus* and its derivatives to vaginal health: an 'omics' approach (CrispOmics)" - P202228W7E. Research Unit responsible and substitute Principal Investigator. November 2023- November 2025

Participant to research activities in the following projects (last 5 years):

1. "Transition from asymptomatic colonization to disease by human respiratory-tract bacteria as a target for vaccines and antimicrobial therapy: The CoDiCo (colonisation to disease concepts) project" 202089LLEH, PRIN: PROGETTI DI RICERCA DI RILEVANTE INTERESSE NAZIONALE – Bando 2020, April 2022-April 2025
2. Inno4Vac. Innovations to accelerate vaccine development and manufacture. IMI2 - Call 20, Grant agreement number 101007799. September 2021-February 2027.
3. Pediatric phase I/II age de-escalation dose-finding study of a vaccine against invasive non-typhoidal salmonellosis in sub-Saharan Africa, PEDVAC-iNTS. EDCTP grant, Grant agreement: RIA2019AMR-2658, March 2021-February 2025
4. TRANSVAC2. European Vaccine Research and Development Infrastructure. Grant agreement n°730964. Horizon 2020 Framework Programme Research and Innovation action. May 2017-April 2022.
5. VSV-EBOPUS. Systems Analysis of Adult and Pediatric Responses to the VSV-ZEBOV Ebola Vaccine. Grant agreement n°116068. Funded by the Innovative Medicine Initiative 2 Joint Undertaking (IMI 2 JU). April 2016-September 2022.

ADDITIONAL INFORMATION
National and international collaborations

Over the years, Francesco Santoro has developed collaborations with (i) prof. Adam P. Roberts (Liverpool School of Tropical Medicine) on the analysis of mobile genetic elements of the Tn916 family, (ii) prof. Karolin Hijazi (University of Aberdeen) for the study of the microbiome of patients with oral diseases and for the sequencing and characterization of bacterial genomes, (iii) prof. Paul Kaye (University of York) for the characterization of the human immune response to the adenoviral vaccine ChAd63-KH against PKDL (Post Kala-azar Dermal Leishmaniasis) by blood transcriptome analysis, (iv) prof. Claire-Anne Siegrist (University of Geneva) for the characterization of the immune response to the rVSV-ZEBOV Ebola vaccine, (v) prof. Marco Rinaldo Oggioni (University of Bologna) for the study of the pathogenesis of pneumococcal pneumonia and sepsis, (vi) prof. Simone Furini (University of Bologna) for the computational analysis of "big data".

Statement of Research Interests

The main research interests of Francesco Santoro are: (i) the characterization of mobile genetic elements, with particular regard to those bearing clinically relevant antibiotic resistance determinants, (ii) sequencing and analysis of bacterial genomes, using novel sequencing technologies and developing protocols for both sequencing and data analysis, (iii) development and application of molecular assays for the detection of clinically relevant bacteria, and (iv) the characterization of the immune response to vaccines and infections by transcriptomic analysis.

Publications

The full publication profile can be accessed on [Scopus](#) or [Google Scholar](#)

Selected publications (last 10 years)

1. **The novel pseudo-compound transposon Tn7086 carries aminoglycoside resistance genes in *Enterococcus faecalis*.**
Colombini L, Tirziu M, De Giorgi S, Cuppone AM, Sangiorgio G, Bonomo C, Bongiorno D, Stefani S, Ricci S, Pozzi G, [Santoro F*](#), Iannelli F. *Microb Genom*. 2026 Apr;12(4):001680. doi: 10.1099/mgen.0.001680.
2. **Global spread of *Streptococcus pyogenes*: A genomics-supported narrative review.**
Arcari G, Colombini L, Castelli M, Novazzi F, Clementi N, [Santoro F](#), Mancini N. *FEMS Microbiol Rev*. 2025 Jan 14;49:fuaf058. doi: 10.1093/femsre/fuaf058.
3. **Transcriptomic analysis after SARS-CoV-2 mRNA vaccination reveals a specific gene signature in low-responder hemodialysis patients.**
Lucchesi S, Montesi G, Polvere J, Fiorino F, Pastore G, Sambo M, Lusini M, Montagnani F, Ciabattini A, [Santoro F*](#), Garosi G, Medaglini D. *Front Immunol*. 2025 Apr 30;16:1508659. doi: 10.3389/fimmu.2025.1508659.
4. **Analysis of the utility of a rapid vesicle isolation method for clinical strains of *Pseudomonas aeruginosa*.**
Henriquez T, [Santoro F](#), Medaglini D, Palleschi L, Clemente I, Bonechi C, Magnani A, Paccagnini E, Gentile M, Lupetti P, Marvasi M, Pini A, Bracci L, Falciani C. *Microbiol Spectr*. 2024 Oct 3;12(10):e0064924. doi: 10.1128/spectrum.00649-24.
5. ***Streptococcus pyogenes* Φ1207.3 is a temperate bacteriophage carrying the macrolide resistance gene pair *mef(A)*-*msr(D)* and capable of lysogenizing different *Streptococci*.**
[Santoro F*](#), Pastore G, Fox V, Petit MA, Iannelli F, Pozzi G. *Microbiol Spectr*. 2023 Jan 10:e0421122. doi: 10.1128/spectrum.04211-22.
6. **Immune memory after respiratory infection with *Streptococcus pneumoniae* is revealed by in vitro stimulation of murine splenocytes with inactivated pneumococcal whole cells: evidence of early recall responses by transcriptomic analysis**
Moscardini IF, [Santoro F*](#), Carraro M, Gerlini A, Fiorino F, Germoni C, Gholami S, Pettini E, Medaglini D, Iannelli F, Pozzi G. *Front Cell Infect Microbiol*. 2022 Jun 20;12:869763. doi: 10.3389/fcimb.2022.869763.
7. **Genome sequence typing and antimicrobial susceptibility testing of infertility-associated *Enterococcus faecalis* reveals clonality of aminoglycoside-resistant strains.**
De Giorgi S, Ricci S, Colombini L, Pinzauti D, [Santoro F](#), Iannelli F, Cresti S, Piomboni P, De Leo V, Pozzi G. *J Glob Antimicrob Resist*. 2022 Mar 26;29:194-196. doi: 10.1016/j.jgar.2022.03.017.
8. **DNA isolation methods for Nanopore sequencing of the *Streptococcus mitis* genome.**
Pinzauti D, Iannelli F, Pozzi G, [Santoro F*](#). *Microb Genom*. 2022. Feb;8(2). doi: 10.1099/mgen.0.000764. PMID: 35171093
9. **Whole-Genome Sequence of SARS-CoV-2 Isolate Siena-1/2020.** Maria Grazia Cusi, David Pinzauti, Claudia Gandolfo, Gabriele Anichini, Gianni Pozzi, [Francesco Santoro*](#). *Microbiol Resour Announc*. 2020 Sep 24;9(39):e00944-20. doi: 10.1128/MRA.00944-20.
10. **Oral Bacterial Diversity Is Inversely Correlated With Mucosal Inflammation.**
Karolin Hijazi, Roderick W Morrison, Indrani Mukhopadhyay, Brennan Martin, Matthew Gemmell, Sophie Shaw, [Francesco Santoro](#). *Oral Dis*. 2020 May 17. doi: 10.1111/odi.13420
11. **Safety and immunogenicity of ChAd63-KH vaccine in post kala azar dermal leishmaniasis patients in Sudan**
Younis BM, Osman M, Khalil EAG, [Santoro F](#), Furini S, Wiggins R, Keding A, Carraro M, Musa AEA, Abdarahaman MAA, Mandefield L, Bland M, Aebischer T, Gabe R, Layton AM, Lacey CJN, Kaye PM, Musa AM. *Mol Ther*. 2021 Jul 7;29(7):2366-2377. doi: 10.1016/j.ymthe.2021.03.020.
12. **Human Transcriptomic Response to the VSV-Vectored Ebola Vaccine**
[Francesco Santoro*](#), Alessia Donato, Simone Lucchesi, Sara Sorgi, Alice Gerlini, Marielle C Haks, Tom HM Ottenhoff, Patricia Gonzalez-Dias, Helder I Nakaya, Angela Huttner, Claire-Anne Siegrist, Donata Medaglini, Gianni Pozzi. *Vaccines (Basel)*. 2021 Jan 20;9(2):67. doi: 10.3390/vaccines9020067.
13. **Genomics and Genetics of *Streptococcus pneumoniae*.**
[Francesco Santoro](#), Gianni Pozzi and Francesco Iannelli. *Microbiol Spectr*. 2019 May;7(3). doi: 10.1128/microbiolspec.GPP3-0025-2018.
14. **Vaccination in the elderly: The challenge of immune changes with aging.**
Annalisa Ciabattini, Christine Nardini, [Francesco Santoro](#), Paolo Garagnani, Claudio Franceschi and Donata Medaglini. *Semin Immunol* 2018 Dec;40:83-94. doi: 10.1016/j.smim.2018.10.010.
15. **Excision and Circularization of Integrative Conjugative Element Tn5253 of *Streptococcus pneumoniae*.**
[Francesco Santoro](#), Alessandra Romeo, Gianni Pozzi and Francesco Iannelli. *Front Microbiol*. 2018 Jul 31;9:1779. doi: 10.3389/fmicb.2018.01779.
16. **Type M Resistance to Macrolides is Due to a Two-Gene Efflux Transport System of the ATP-Binding Cassette (ABC) Superfamily.** Francesco Iannelli, [Francesco Santoro](#), Maria Santagati, Jean-Denis Docquier, Elisa Lazzeri, Gabiria Pastore, Marco Cassone, Marco Rinaldo Oggioni, Gian Maria Rossolini, Stefania Stefani and Gianni Pozzi. *Front Microbiol*. 2018 Jul 31;9:1670. doi: 10.3389/fmicb.2018.01670.

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