

## PhD Positions in Host-Pathogen Interactions and Infection-Induced Cellular Senescence

### About the Lab

We are a team of passionate experimental biologists committed to understanding how some of the most persistent and antibiotic-resistant pathogens, such as *Mycobacterium tuberculosis* and *Staphylococcus aureus*, invade, survive, and replicate inside human cells. Our research focuses on intracellular infections and aims to uncover bacterial strategies and host cell pathways enabling persistence. By targeting these interactions, ***we seek to identify novel therapeutic approaches that go beyond antibiotics***—either by weakening the pathogen directly or by empowering the host to eliminate infection from within.

We use cutting-edge tools including advanced microscopy, single-cell analysis, and molecular genetics to study host-pathogen dynamics at high resolution. Our interdisciplinary work bridges molecular microbiology, cell biology, and immunology, offering a vibrant environment for PhD students excited to explore fundamental biology with direct clinical relevance.

### PhD Project Overview and Activities:

The selected students will be involved in a cutting-edge research project investigating how cellular senescence is induced during infection and how this state contributes to chronic bacterial persistence. Our lab is pioneering a novel therapeutic approach that exploits senescence as a therapeutic vulnerability, designing antimicrobial strategies that selectively eliminate senescent, pathogen-harboring cells without harming healthy tissues.

### *You will be involved in:*

- Characterizing senescence signatures in infected cells using high-throughput genomic, metabolic and phenotypic approaches. These include multidimensional imaging and flow cytometry, RNA sequencing and CRISPR gene editing.
- Investigating the mechanisms by which chronic infections induce cellular senescence.
- Working at the interface of infection biology, ageing research, and precision drug delivery systems

### Candidate Profile

#### ***Required:***

- MSc degree (or equivalent) in Biology, Biotechnology, Microbiology, or a related field
- Excellent academic performance at both BSc and MSc level
- Strong motivation for academic research and enthusiasm for host-pathogen biology
- Experience with experimental lab work (cell culture, molecular biology, microbiology)
- Fluency in English (spoken and written)
- Ability to design, conduct, and interpret experimental data
- Independent, organised, and highly collaborative mindset

#### ***Desirable (but not mandatory):***

- Previous experience in infection biology, immunology, or ageing research
- Familiarity with imaging techniques, flow cytometry, or transcriptomic profiling

### To Apply:

Please send your CV, academic transcripts, a motivation letter, and contact details of at least one referee to [Edoardo.scarpa@unimi.it](mailto:Edoardo.scarpa@unimi.it) and [Loris.Rizzello@unimi.it](mailto:Loris.Rizzello@unimi.it).

Make sure to include “PhD position application” in the email subject line.

**Please note:** Due to restrictions related to the starting of the project, only EU/UK citizens or students already residing in Europe will be considered.

Location: Infection Dynamics Lab, University of Milan/National Institute for Molecular Genetics (INGM)

Starting Date: November 1st

Lab Website: <https://infectiondynamics.unimi.it/>