



Simone Scalise

Nationality: Italian | **Email:** simone.scalise@uniroma1.it

● EDUCATION AND TRAINING

11/2023 – CURRENT Roma, Italy

PHD IN PHYSICS La Sapienza, Università di Roma

In my doctoral project, I am developing a microfluidic device, a system through which it is possible to work with micron sizes, to study the proliferation mechanisms of leukaemia cancer cells.

During the first year, I acquired knowledge of microfabrication and soft lithography for device production and the microscopy techniques to perform time-lapse measurements.

Field of study Physics

2020 – 2022 Roma, Italy

MASTER DEGREE IN PHYSICS Sapienza Università di Roma

Master Thesis

I worked on my Master's thesis under the supervision of Prof. Giancarlo Ruocco.

The aim of my thesis work was to study the proliferation of a cancer cell line in an attempt to determine the dynamics of growth and division and to identify which size control mechanism is adopted by the cells and how it changes under varying growth conditions. To do this, an ad hoc experimental protocol with flow cytometry measurements was developed to follow cell proliferation and compare it to the predictions of a minimal theoretical model.

During my thesis work, I carried out training in cell culture techniques during which I acquired skills to work safely and effectively with cell lines. The training included management and maintenance of sterile culture environments, cell transplantation and sub-culture techniques, monitoring and evaluation of cell viability and growth. This training has provided me with a solid foundation of knowledge and skills that allow me to work confidently and competently in the field of cell culture.

Master Course

During my master's studies, I acquired a good knowledge of several topics in biophysics.

I have acquired a solid background in the theoretical foundations of the physics of biological systems and the most important experimental techniques of biophysics and soft matter. I have also attended courses in Molecular Biology, Biochemistry and Medical Applications of Physics. All courses were held in English.

Master Internship

During my Physics Laboratory II internship, I carried out experimental research on the interaction of the drug Isoniazid with lipid bilayers using the fluorescent probe DPH to study antitubercular drug delivery, using spectroscopy techniques such as Fluorescence anisotropy.

Field of study Physics | **Final grade** 110/110 cum Laude |

Thesis Measuring the cancer cell growth dynamics in different environmental conditions

2016 – 2020 Roma, Italy

BACHELOR DEGREE Sapienza Università di Roma

Bachelor Thesis

I worked on my Bachelor's thesis under the supervision of Prof. Francesco Collamati.

The aim of the dissertation was to study the effects of ionising radiation used in different types of IORT (Intraoperative radiation therapy) and their biological effectiveness in the treatment of localised tumours.

Bachelor course

During my studies, I acquired detailed knowledge of classical and modern physics both from theoretical and experimental points of view.

Field of study Physics | **Final grade** 98/110 |

Thesis IORT (Intra-Operative Radiation Therapy): Effetti delle radiazioni ionizzanti ed efficacia biologica

2011 – 2016 Roma, Italy

HIGH SCHOOL DEGREE IIS Liceo Evangelista Torricelli, Roma

Final grade 100/100

● WORK EXPERIENCE

01/08/2023 – CURRENT Roma, Italy

JUNIOR RESEARCH SCHOLARSHIP DEPARTMENT OF PHYSICS, LA SAPIENZA, UNIVERSITÀ DI ROMA

Winner of a merit-based Junior scholarship with the Department of Physics during which I worked on a research project titled "Study of Interactions among Biomolecules Involved in Cell Growth and Division Mechanisms".

11/2022 – 01/2023 Roma, Italy

SPECIFIC TUTORING FOR OFA REMEDIATION FACULTY OF MATHEMATICAL, PHYSICAL AND NATURAL SCIENCES, LA SAPIENZA UNIVERSITÀ DI ROMA, ITALY

Winner of a merit-based tutoring scholarship induced by the Faculty of Mathematical, Physical and Natural Sciences at the University of Rome 'La Sapienza'. The grant provided for the preparation of teaching materials and the provision of basic mathematics courses for students with OFA (Added Formative Obligation) debts.

03/2022 – 10/2022 Roma, Italy

COLLABORATIVE ACTIVITIES WITH THE B. PONTECORVO LABORATORIES DEPARTMENT OF PHYSICS, LA SAPIENZA, UNIVERSITÀ DI ROMA

Winner of a merit-based collaboration scholarship with the Department of Physics. I worked as a scholarship holder in the B. Pontecorvo laboratories. I assisted the professors in preparing and carrying out laboratory experiments for the first year of the Bachelor in Physics.

Roma, Italy

PRIVATE TUITION

While still in university, I started giving private tutoring to middle school, high school and university students. As a result, I was able to gain important experience in tutoring and preparing for academic exams and catching up on school years.

● CONFERENCES & SEMINARS

03/06/2024 – 07/06/2024 ICTP Trieste

International Physics of Living Systems Annual Meeting 2024

Short talk "Homeostatic control of cell size in leukaemia cells under nutrient starvation"

01/07/2024 – 12/07/2024 URJC Madrid

XII GEFENOL Summer School on Statistical Physics of Complex Systems

I attended the 12th Summer School organised by the Topical Group on Statistical and Non Linear Physics (Grupo Especializado en Física Estadística y No Lineal, GEFENOL) of the Real Sociedad Española de Física.

● PUBLICATIONS

2024

[**A size-dependent division strategy accounts for leukemia cell size heterogeneity**](#)

Heterogeneity in the size distribution of cancer cell populations is linked to drug resistance and invasiveness. However, understanding how such heterogeneity arises is still damped by the difficulties of monitoring the proliferation at the typical timescales of mammalian cells. Here, we show how to infer the growth regime and division strategy of leukemia cell populations using live cell fluorescence labeling and flow cytometry in combination with an analytical model where

cell growth and division rates depend on powers of the size. We found that the dynamics of the size distribution of Jurkat T-cells is reproduced by (i) a sizer-like division strategy, with (ii) division times following an Erlang distribution and (iii) fluctuations up to ten percent of the inherited fraction of size at division. Overall, our apparatus can be extended to other cell types and environmental conditions allowing for a comprehensive characterization of the growth and division model different cells adopt.

Miotto, Scalise, Leonetti, Ruocco, Peruzzi, & Gosti (2024). Communications Physics, 7(1), 248.

● **LANGUAGE SKILLS**

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	B1	B2	B1	A2	B2

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user

● **DIGITAL SKILLS**

Good knowledge of Python | R, Rstudio | Good knowledge of the text editors Overleaf and LaTeX | FlowJo analysis of flowcytometric data | Molecular Dynamics Simulation Software: GROMACS | Comsol Multiphysics software basic level | Mastery of the Office package (Word, Excel, PowerPoint ecc) | Good knowledge of programming languages C/ C++ | Windows | Microsoft Office

with publication purpose