



## Sofia Sirolli

### ABOUT ME

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I am a PhD student at the Biorobotics Institute of Scuola Superiore Sant'Anna, within the "Regenerative Technologies" Lab.

I am highly curiosity-driven and strongly motivated to test and spend my skills in a stimulating and multidisciplinary environment.

My scientific interest mainly focuses on the field of nanomedicine, especially regarding biomaterials for tissue regeneration and implantable devices.

### WORK EXPERIENCE

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[ 01/10/2022 – Current ]

#### PhD program in Biorobotics

**Sant'Anna School of Advanced Studies** <https://www.santannapisa.it>

**City:** Pisa

**Country:** Italy

**Email address:** [Sofia.Sirolli@santannapisa.it](mailto:Sofia.Sirolli@santannapisa.it)

**Name of unit or department:** Biorobotics Institute

Main activities and tasks:

- chemical synthesis and characterization of drug-loaded microcarriers
- microfluidics
- ultrasound stimulation
- writing of technical reports

Main projects:

- REBORN (Remodeling of the infarcted heart: piezoelectric multifunctional patch enabling the sequential release of therapeutic factors), funded by the European Union's Horizon Europe research and innovation program, grant agreement No 101091852. The project aims to regenerate the myocardial tissue post-infarction by means of an implantable patch integrating ultrasound-responsive drug carriers to achieve non-invasive externally triggered drug delivery. Within the framework of this project, my work focuses on the optimization of the ultrasound stimulation set-up for the drug delivery in vitro tests, and on the investigation of perfluorocarbon microdroplets as ultrasound-triggered drug carriers to be integrated in the patch.

- THE (Tuscany Health Ecosystem Project), funded by European Union - Next Generation EU, in the context of The National Recovery and Resilience Plan, Investment 1.5 Ecosystems of Innovation; Spoke 3, Subproject 10: Epidermal sensing for human interfacing and health monitoring. The project aims to develop an ultra-thin multifunctional wearable patch for diverse applications, such as health monitoring, therapy and assistance in prosthesis wearing. My work focuses on the integration in the patch of a closed-loop therapeutic strategy, with stimuli-responsive drug carriers whose release can be triggered by the physiological data acquired by the integrated sensors.

[ 01/2022 – 07/2022 ]

#### Master thesis

**CNIS Laboratory - Sapienza University of Rome**

**City:** Rome

**Country:** Italy

Main activities:

- synthesis of carbon-based nanomaterials
- aerogel and hydrogel synthesis
- transdermal drug delivery *ex vivo* tests

## EDUCATION AND TRAINING

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[ 27/08/2023 – 09/09/2023 ]

### European School on Nanosciences and Nanotechnologies

**Université Grenoble Alpes** <https://www.esonn.fr/>

**City:** Grenoble

**Country:** France

Nanophysics and Chemistry - Synthesis and characterization of nanomaterials for biological and medical applications

Frontal lectures covered the themes of self-assembly techniques, near field microscopies, biomechanics, drug delivery nanovectors and nanotoxicology.

Hands-on experience on:

- synthesis and characterization of curcumin-loaded lipid nanoparticles for topical delivery
- AFM and STM
- fabrication of a microfluidic device for particle manipulation
- introduction to DNA microarray technology
- micropatterning of animal cells on common culture substrates

[ 09/2020 – 07/2022 ]

### Master of Science in Nanotechnology Engineering

**Sapienza University of Rome** <https://www.uniroma1.it/en/pagina-strutturale/home>

**City:** Rome

**Country:** Italy

**Final grade:** 110/110 cum laude

**Thesis:** Synthesis, characterization and testing of a nanocomposite hydrogel for electrically-controlled drug delivery

Bionanotechnology curriculum

[ 09/2017 – 07/2020 ]

### Bachelor of Science in Electronic Engineering

**Sapienza University of Rome** <https://www.uniroma1.it/en/>

**City:** Rome

**Country:** Italy

**Final grade:** 110/110 cum laude

**Thesis:** Modeling of linear dynamic systems for gait patterning of humanoid robots

[ 17/09/2012 – 05/07/2017 ]

### Scientific high school diploma

**Liceo Scientifico Augusto Righi** <https://www.liceoaugustorighiroma.it/>

**City:** Rome

**Country:** Italy

**Final grade:** 100/100 cum laude

## LANGUAGE SKILLS

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**Mother tongue(s):** Italian

**Other language(s):**

### English

LISTENING C1 READING C1 WRITING C1

SPOKEN PRODUCTION C1 SPOKEN INTERACTION C1

### French

LISTENING B2 READING B2 WRITING B2

SPOKEN PRODUCTION B2 SPOKEN INTERACTION B2

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

## DIGITAL SKILLS

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Microsoft Office | C, C++ | MATLAB and SIMULINK | Comsol MultiPhysics | Image Processing software (ImageJ) | Solidworks software | Illustrator | BioRender (Scientific illustrations) | Social Media / Social Network

## PUBLICATIONS

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[ 2023 ] **Triggerable Patches for Medical Applications**

**Reference:** S. Sirolli, D. Guarnera, L. Ricotti, A. Cafarelli, 2023, Advanced Materials (under review)

Submitted to Advanced Materials - Under review

## CONFERENCES AND SEMINARS

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[ 06/2023 ] **GNB 2023 (Conference of Bioengineering Italian National Group)** Padova, Italy

S. Sirolli, L. Ricotti and A. Cafarelli, Highly controlled ultrasound-mediated drug delivery experiments: an in vitro set-up, 2023, GNB (Conference of Bioengineering Italian National Group), Padova (Italy), June 21-23 2023. Contribution accepted as poster in Track 8 (Design and validation of biomedical devices). I presented the poster during the poster session.

**Link:** <http://gnb2023.it/>

## SOFT SKILLS

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### Personal skills

- Analytical skills
- Problem analysis and problem solving
- Critical thinking
- Organizational and planning skills
- Team-work oriented
- Open and collaborative attitude
- Good communication skills
- Perseverance and consistency

## TECHNICAL SKILLS

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### Job-related skills

- Chemical synthesis of drug-loaded vectors, such as liquid perfluorocarbon-nanodroplets
  - Synthesis and characterization of polymer gels (e.g. alginate hydrogels)
  - Experience with microfluidic setups for particle production
  - Experience in triggered drug delivery tests from responsive materials (e.g. electrically triggered, ultrasonically triggered)
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