

Career Sheet: Researcher for an EU institution



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My name is Monica Piergiovanni, I work for the European Commission's Joint Research Centre. I am in the unit of Chemical Safety and Alternative Methods, which incorporates EURL ECVAM, the European Union Reference Laboratory for alternatives to animal testing. I am working in the field of complex *in vitro* methods, specifically with organ-on-chip technology, which are devices designed to reproduce specific features of organs in the lab, providing human-relevant information.

I have a background in Biomedical Engineering. I got my BSc, MSc and PhD from Politecnico di Milano, Italy, where I also worked as a post-doc researcher in the field of design, prototype and testing of microfluidic devices for biological applications.



OVERVIEW OF THE JOB

Organ on chip (OoC) are miniaturised living organs that can be used in the lab to reproduce specific organ functions. This technology combines knowledge from many different fields including microelectronics, engineering, physics, chemistry, and of course biology. Liver-on-chip, heart-on-chip, lung-on-chip, all these human organs have specific features that need to be included in each specific device. Blood in our veins or air in the lungs are reproduced by circulating fluids through micro-channels in the chip; and breathing, beating, intestinal movements or eye blinking through electromechanical forces. This very innovative technology is currently being developed for use in pharmaceutical development, chemical safety and biomedical research, as a promising alternative to animal models.

I have a very diverse job, but with a clear objective: promote the use of OoC technologies as scientifically credible alternatives to animals in science. Keeping this in mind, I carry on different tasks that go from laboratory work to article writing and reviewing, in order to understand and explore practical and possible uses in regulatory and biomedical sciences. This includes scientific writing and data analysis to produce tangible outputs for the whole community. I also need to build networks with OoC developers (including academia and startups!), end users and regulators across the globe, to identify needs and build strategies to increase the use of these technologies.



WHAT INSPIRED YOU

Being a researcher was not my dream when I was a little girl. Actually, I do not think I knew the word. Science, however, was always surrounded by light and colour in my mind, especially if it implied some kitchen experiments or garden dirt. Engineering was for nerdy boys. Who knew I would have ended up mixing all those concepts and build up a career on them?

Looking back at my past, I cannot recollect any unique source of inspiration, I think that my love with STEM was built in time, and it is still evolving and growing, many people and situations contributed to

this, starting from my family that always understood and encouraged my passions, friends (especially those with opposite views and ambitions), books and journals...



TYPICAL WORKING DAY

The experimental activity in the lab is usually the most demanding in terms of time required and tasks to be performed, since you need to accurately follow the study plan and the protocols. Thus, if I have experimental activity planned, it usually defines the rest of the day (the week, actually). I participate in many meetings, that usually tend to be clustered in the central hours of the day, while the early morning and late afternoon are my favourite spots for computer work, processing of data, presentation preparation, writing. In addition, I spend the time between these activities in informing myself, reading scientific papers, blogs and websites, to stay as updated as possible.



STUDY & CAREER PATH

I had a very linear study education, too much, if you ask me now! From a scientific high school, I decided to study Engineering and in the end, I choose the biomedical field even if I was very undecided with Architecture/Civil Engineering until the very end. During the university years, I never gave too many thoughts on my future career and I did not have any internships or abroad periods. This choice I would absolutely change, since I feel that I lost a very precious opportunity to broaden my possibilities.

But it was during the MSc thesis that I decided I wanted to be a researcher and only during the PhD that I got a clear understanding that what really mattered to me was not only the scientific discovery *per se*, but the journey to bring that discovery through the real world.



KEY SKILLS

Analytical skills are for sure the main ones in my everyday work, past and present. Critical thinking and problem solving are necessary to identify creative and feasible solutions to be then refined and developed.

Personality and social skills are crucial in all kinds of jobs and I try to put them in my daily work tasks. Initiative and curiosity are the energy that gives me the spark in the morning, leading me to explore new possibilities. While motivation and resilience keep me going through the afternoon and Fridays, ensuring that projects and activities reach the objectives in the expected timeline.

Starting from a very technical background, I was surprised to see that presentation and storytelling are fundamental pillars to disseminate scientific knowledge and make complex technology easily understandable to a non-technical audience. These are very key skills that need time and a lot of practice to develop, also with the help of professional's trainers.



CAREER PROSPECT

I have to admit that I am quite fortunate with the many types of careers that I could take with my study path. In my specific case I decided to lean on very innovative technologies, at the cutting edge of engineering and biology. Many new technologies integrating in pharmaceuticals, chemicals, cosmetics, but the field is very rapidly evolving in different ways. This is for sure not an easy choice, since it requires very high competences, but it is still a risky in terms of work stability in time. However, the rewarding is super and the works rarely gets boring!

Among the more classical (I intend it in a positive way!) career pathways, a very common choice out of biomedical engineering is starting working in a Medical Device/Diagnostic company, with positions that can vary from R&D, Technical Engineer, Field Engineer, Salesforce, Regulatory affairs.. With the increasing number of high-tech instrumentation and innovative medical procedures including technology, a working in public or private hospitals is also quite frequent.

As for many engineers, consulting is also an attractive option, but I would recommend it to a later stage, when one's professional network is broad and solid.



CHALLENGES

Let's face it: research can be boring. We do not want to talk about it, but it is true! You feel like you are on a roller coaster and keeping up with it, day after day, is not always easy. You need a lot of dedication, many failures, and a bit of luck to get one, precious result. Communicating this (maybe small) result to others and facing the opinion of your peers also takes a lot of courage and preparation.



YOUR ADVICE TO STUDENTS

Be creative, be patient, be curious. Use all the tools and opportunities that you find to explore your possibilities and options. Follow your passion and instincts, take your time to explore and make mistakes, and don't hesitate to ask for more. More information, more time, more knowledge, more experience. And, most important of all, be free!



YOUR ADVICE TO TEACHERS AND PARENTS

One fundamental role is to help children/students in building their love journey with science. Experience of the real world is key to understand that science is all around us. Creating opportunities of gaining practical examples through laboratories, home experiments, field examples out in the nature, these experiences are valuable gifts for them. Even if they steal time from books, it is so much worth it!

STEM is a word used for so many different backgrounds and job profiles, it is complex to navigate among the many different options. Far more difficult is to obtain an honest description of a STEM career, free

of all clichés. And here is where teachers and parents can make a difference in supporting the decision process.



LEARN MORE

Learn more about our work to promote the use of non-animal models in science at EURL ECVAM:

<https://ec.europa.eu/jrc/en/eurl/ecvam>

You can connect with me on LinkedIn!

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