



Prof. Dr. Petra S. Dittrich is Professor for Bioanalytics at the Department of Biosystems Science and Engineering, ETH Zürich. She develops microfluidic devices for bioanalytical and diagnostic applications. These devices are hand size chips with channels or chambers where fluids and gases can flow at a very small scale, in the range of micro- or nanometers. Because chambers are so small, the microfluidic devices are extremely sensitive to dust and need to be produced in a special room called a “Cleanroom”. In Petra’s lab these devices are used to study single cells and conduct chemical experiments or, for the AntiResist, to observe the interaction of antibiotics on bacteria.

Petra was born and raised in Lingen (Ems), a small town in the Northwest of Germany. She studied Chemistry at Bielefeld University (Germany) and Universidad de Salamanca (Spain) in 1997. She earned her PhD degree at the Max Planck-Institute for Biophysical Chemistry (MPI Göttingen, Germany) in 2003, followed by a postdoc time at the Institute for Analytical Sciences (ISAS Dortmund, Germany). Always eager to learn from leading scientists around the world, Petra visited Cornell University (Ithaca, USA, in 2002) and the University of Tokyo (Japan, in 2005) for postdoc stays. In 2008, she became Assistant Professor at the Department of Chemistry and Applied Biosciences (ETH Zurich). Petra has been awarded both a Starting Grant from the European Research Council (ERC) as well as the ERC Consolidator Grant.

An interview with Petra Dittrich:

The biggest challenge women scientists/clinicians face today is...

I did not think about differences or obstacles when I studied Chemistry and worked on my PhD thesis (supervised by two female P.I.s in Physics and Physical Chemistry). The first challenge came in my postdoctoral time during pregnancy and with the birth of my son, when I received a lot of unsolicited comments and advice about what mothers should and should not do, e.g. not work full time. Noteworthy, there was not a single female researcher above postdoc level in this environment. It was a process for me to get such feedback out of my head, and find and follow my own plans. Finding the balance of work and family life as well as finding time for my own personal interests outside the academic world is still challenging. It is important for me that I can count on my family - although they think that I spend a crazy amount of my time on my professional work - they give me the highest support whenever an important deadline is approaching soon.

Another challenge is associated with the fact that I often find myself as part of a minority. When I started as Assistant Professor, I hardly met any female peers, and I missed the exchange of experiences and orientation from other female PIs. Although it *should not* matter, how many male or female researchers are meeting together, or building a committee or doing something similar, in reality it *does* matter! I hope that the percent of female researchers in leading position will continue to increase, which will give our voice more weight and normality, within the science world and beyond.

I chose a scientific career because...

... I like to dive deeply into a topic and enjoy the moment of learning - the “aha effect” or “eureka moment”. In my interdisciplinary field, we connect with specialists in many other research fields, which opens our eyes to different approaches and perspectives. I also like the diversity and creativity in my research area and group. We often work with sketches and drawings to illustrate plans, ideas and

methods, and everyone has their own style and mind-set. It is great to experience this diversity and creativity first hand and learn from it, and we are all better scientists because of it.

If I weren't a scientist, I would be...

...an architect. I like the creativity paired with precision in the drawings.

What I like most about being part of the NCCR AntiResist project...

...working in an interdisciplinary environment. We are keen on translating our methods into the clinic, and the NCCR AntiResist provides the framework for this by connecting groups from a wide spectrum of disciplines.

A typical day for me working on the AntiResist project looks like...

...as PI, I am overseeing projects - discussions with team members are the most frequently occurring work task.

What I am most proud of...

... more than 20 PhD students have finished their work and received their doctoral title under my supervision. These are always very satisfying and wonderful moments.

My top two papers or exciting discoveries are:

Every single paper was fun and also hard work and is connected to memories of the project and to the people who wrote the paper. I remember additional stories for each of my papers.

1. My old papers from my PhD and postdoc time have built the foundation of many studies, grants and PhD theses. One study describes the formation of lipid tubules, it happened accidentally and I was immediately fascinated by the super-long tubules formed by self-assembly. This work was the basis for an ERC Starting grant that I received 1.5 years later, in 2007.

Dittrich, Petra S et al. "On-chip extrusion of lipid vesicles and tubes through micro-sized apertures." *Lab on a chip* vol. 6,4 (2006): 488-93. doi:10.1039/b517670k.

(<https://pubs.rsc.org/en/content/articlelanding/2006/lc/b517670k/unauth>)

2. The second paper to list here describes the use of a microfluidic device for filtering extremely rare, so-called circulating tumor cells from full blood samples. We developed the first device – in our lab slang termed the "donut-chip" - almost a decade before, and constant improvements and iterations made it possible to translate this method into a robust and useful system.

Ambrecht, Lucas et al. "Quantification of Protein Secretion from Circulating Tumor Cells in Microfluidic Chambers." *Advanced science* (Weinheim, Baden-Wurttemberg, Germany) vol. 7,11 1903237. 24 Apr. 2020, doi:10.1002/advs.201903237

(<https://onlinelibrary.wiley.com/doi/full/10.1002/advs.201903237>)

Do you/did you have a mentor or role model who inspired you to pursue science?

I received strong support from the director of the institute where I stayed for my postdoctoral time. He supported and encouraged me in the very moment when I struggled to continue in academia (having a baby), and introduced me into his large network.