Biosketch

Univ.-Prof. Dipl.-Ing. Dr. Peter Ertl

Position in CoE: Key Researcher

Personal Details

Place of birth	Solbad Hall, Austria
Nationality	Austrian
Children	2 (2005, 2006)
Affiliation:	Technische Universität Wien
E-Mail	peter.ertl@tuwien.ac.at
Profile	ReseacherID: ABE-8908-2021
List of publications	ORCID: 0000-0002-7625-2445
Academic age	21 years since PhD

Academic Career and Positions Held

I hold an engineering degree in Biotechnology (BOKU, AT), a **PhD in Chemistry** (University of Waterloo, CAN) and received my **postdoctoral training** as a biophysicist at University of California at Berkeley (US). In 2003, I co-founded **RapidLabs a biotech start-up company**, where I served as **Director of Product Development** in Kitchener (CAN), developing benchtop-sized microbial analysers. In 2006, I moved to Austria where I worked as **Senior Scientist** in the Biosensor Technology unit at the Austrian Institute of Technology (AIT). During my tenure at AIT, I was also granted a **Fulbright Visiting Scholarship** at UC Berkeley and held **Visiting Scientist** positions at Nanyang Technological University, Singapore in 2013 and the Medical Centre of the University of California at San Francisco in 2014. In 2016, I was appointed **Professor** of *Lab-on-a-Chip Systems for Bioscience Technologies* at the Vienna University of Technology, where my research focuses on the development of advanced in vitro diagnostic microsystems. Since 2017, I serve as chair of the Advanced Microfluidic Initiative with the aim of fostering academic-industrial partnerships and since 2018 as Editor of the open access journal "Organs-on-a-chip" (Elsevier). In 2020, I held a **Visisting Researcher** appointment at the Department of Bioengineering of the Imperial College London.

Scientific Achievements and Scientific Contribution to the CoE

Scientific Achievements. My current research effort is focused on **developing advanced lab-on-a-chips systems, organ-on-a-chip systems**, and **biosensor technology**. My research group integrates complex biological systems into microfluidic platforms containing embedded optical and electrical sensors to monitor **dynamic cell-to-cell and cell-to-matrix interactions** following external stimuli. In recent years, we have demonstrated (a) the enhanced toxic effects of perfused nanoparticles on lung barrier function, (b) the beneficial impact of micro physiological growth conditions on tissue development including cartilage, brain and synovium, and (c) established fully perfusable vascular tissue models. Our work has been awarded with the **Herbert Stiller prize** for animal free research in 2019, in 2020 the **Houska prize** as well as the **Austrian States Prize** for the development of alternative animal models in 2021. The quality of our work is also documented with ca. 150 publications including 16 patent applications, 5 book contributions and over 130 articles, of which 87% are published manuscripts in Q1 journals over the last decade.

Scientific Contribution to the CoE. I will contribute to CoE by providing our rapid prototyping technologies and miniaturized analytical platforms to develop **custom-made microfluidic devices** to study (a) dynamic changes of microbial communities during changing environmental conditions and (b) to investigate microbiome-human gut interactions under physiological relevant measurement scenarios.

10 Most Important Publications (*relevant for the CoE)

1. *Zirath, H.; Spitz, S.; Roth, D.; Schellhorn, T.; Rothbauer, M.; Müller, B.; Walch, M.; Kaur, J.; Wörle, A.; Kohl, Y.; Mayr, T.; **Ertl, P.** Bridging the Academic–Industrial Gap: Application of an Oxygen and PH Sensor-Integrated Lab-on-a-Chip in Nanotoxicology. *Lab Chip* **2021**, *21* (21), 4237–4248. *https://doi.org/10.1039/D1LC00528F*.
2. *Eilenberger, C.; Rothbauer, M.; Selinger, F.; Gerhartl, A.; Jordan, C.; Harasek, M.; Schädl, B.; Grillari, J.; Weghuber, J.; Neuhaus, W.; Küpcü, S.; **Ertl, P.** A Microfluidic Multisize Spheroid Array for Multiparametric Screening of Anticancer Drugs and Blood–Brain Barrier Transport Properties. *Advanced Science* **2021**, *8* (11), 2004856. *https://doi.org/10.1002/advs.202004856*.
3. *Ferreira, D. A.; Rothbauer, M.; Conde, J. P.; **Ertl, P.**; Oliveira, C.; Granja, P. L. A Fast Alternative to Soft Lithography for the Fabrication of Organ-on-a-Chip Elastomeric-Based Devices and Microactuators. *Adv. Sci.* **2021**, *8* (8), 2003273. *https://doi.org/10.1002/advs.202003273*.
4. *Rothbauer, M.; Höll, G.; Eilenberger, C.; Kratz, S. R. A.; Farooq, B.; Schuller, P.; Olmos Calvo, I.; Byrne, R. A.; Meyer, B.; Niederreiter, B.; Küpcü, S.; Sevelda, F.; Holinka, J.; Hayden, O.; Tedde, S. F.; Kiener, H. P.; **Ertl, P.** Monitoring Tissue-Level Remodelling during Inflammatory Arthritis Using a Three-Dimensional Synovium-on-a-Chip with Non-Invasive Light Scattering Biosensing. *Lab Chip* **2020**, *20* (8), 1461–1471. *https://doi.org/10.1039/C9LC01097A*.
5. *Charwat, V.; Olmos Calvo, I.; Rothbauer, M.; Kratz, S. R. A.; Jungreuthmayer, C.; Zanghellini, J.; Grillari, J.; **Ertl, P.** Combinatorial in Vitro and in Silico Approach To Describe Shear-Force Dependent Uptake of Nanoparticles in Microfluidic Vascular Models. *Anal. Chem.* **2018**, *90* (6), 3651–3655. *https://doi.org/10.1021/acs.analchem.7b04788*.
6. *Sticker, D.; Rothbauer, M.; Ehgartner, J.; Steininger, C.; Liske, O.; Liska, R.; Neuhaus, W.; Mayr, T.; Haraldsson, T.; Kutter, J. P.; **Ertl, P.** Oxygen Management at the Microscale: A Functional Biochip Material with Long-Lasting and Tunable Oxygen Scavenging Properties for Cell Culture Applications. *ACS Appl. Mater. Interfaces* **2019**, *11* (10), 9730–9739. *https://doi.org/10.1021/acsami.8b19641*.
7. *Rothbauer, M.; Charwat, V.; Bachmann, B.; Sticker, D.; Novak, R.; Wanzenböck, H.; Mathies, R. A.; **Ertl, P.** Monitoring Transient Cell-to-Cell Interactions in a Multi-Layered and Multi-Functional Allergy-on-a-Chip System. *Lab Chip* **2019**, *19* (11), 1916–1921. *https://doi.org/10.1039/C9LC00108E*.
8. *Rothbauer, M.; Rosser, J. M.; Zirath, H.; **Ertl, P.** Tomorrow Today: Organ-on-a-Chip Advances towards Clinically Relevant Pharmaceutical and Medical in Vitro Models. *Current Opinion in Biotechnology* **2019**, *55*, 81–86. *https://doi.org/10.1016/j.copbio.2018.08.009*.
9. *Sticker, D.; Lechner, S.; Jungreuthmayer, C.; Zanghellini, J.; **Ertl, P.** Microfluidic Migration and Wound Healing Assay Based on Mechanically Induced Injuries of Defined and Highly Reproducible Areas. *Anal. Chem.* **2017**, *89* (4), 2326–2333. *https://doi.org/10.1021/acs.analchem.6b03886*.
10. *Rothbauer, M.; Küpcü, S.; Sticker, D.; Sleytr, U. B.; **Ertl, P.** Exploitation of S-Layer Anisotropy: PH-Dependent Nanolayer Orientation for Cellular Micropatterning. *ACS Nano* **2013**, *7* (9), 8020–8030. *https://doi.org/10.1021/nn403198a*.