SME Focus

Beyond one size fits all

Bi/ond and the journey to personalised medicine

Cinzia Silvestri

Founded in 2017, Bi/ond is one of the global leaders in organ-on-chip (OOC) technologies that are composed of 3D microfluidic cell cultures embedded into microchips to mimic the behaviour, mechanics and physiological response of organs or organ systems. This innovative start-up was created by biotech researchers Cinzia Silvestri, Nikolas Gaio and William F. Quiros Solano – with more than 24 years of combined experience in applying electronics to biology – and focuses on developing precise, inclusive cures for all.

Respected roots

Ultimately, the company's roots go back to the founders' work on OOC during their PhD studies at Delft University of Technology (TUD), one of Europe's most prestigious institutions. As a spin-off of this vibrant ecosystem, Bi/ond emerged from the European project InForMed, a €48M initiative led by Philips Electronics Netherlands and with €11M in co-funding from ECSEL JU. This sought to establish an integrated pilot line for medical devices, including micro-fabrication and assembly.

"Within this project, we laid the foundation for our unique technology," says Dr Cinzia Silverstri, CEO and co-founder of Bi/ond. "We subsequently raised €2.3M in public funding – including from ECSEL JU, EIT Health and the Horizon Europe collaborative project MAGIC – to finance the development of our first chips and expand our intellectual property." This has since evolved into multiple chip types, such as inCHIPit™ for oncological applications and MUSbit™ for heart and skeletal muscle applications. Bi/ond's versatile platform, validated in respected European medical centres, allows biologists to insert human cells into an environment that replicates the human body and thereby enhance drug development processes.

The missing link

Over time, Bi/ond has become a pioneer in the biotech industry, actively contributing to advancements in drug testing and reducing the reliance on animal testing in pharmaceutical R&D. Having successfully secured €4.8M in both public and private funding, Bi/ond has also grown into a diverse, multidisciplinary team of 11 member with six nationalities. However, their core mission remains the same: the empowerment of biological innovation by engineering microchips to nourish, stimulate and monitor cells.

Team profile

Dr Cinzia Silvestri (CEO and co-founder)
Bi/ond is led by Cinzia Silvestri, PhD, a leader in nanomaterials and silicon microfabrication for biotechnology who has also been acknowledged for advancing diversity in a male-dominated sector. She holds a PhD in novel on-chip cooling strategies from TU Delft and an MSc degree in Electronics Engineering (cum laude) from the University of Roma Tor Vergata (Italy). Under her guidance, Bi/ond has raised €4.8M in dilutive and non-dilutive funding to date. In 2018, she was named as one of the 50 most inspiring women in Italy's technology sector and, in 2022, among the top young talents in the Netherlands by Het Financieele Dagblad. Thanks to her vision, Bi/ond has been included in the Fund Right Initiative both as a women-led company and for the diversity in the team. She is a TEDx speaker.

Dr Nikolas Gaio (CTO and co-founder)
Dr Gaio holds an MSc degree in Biomedical Electronics (cum laude) and a PhD in organ-on-silicon received from TU Delft. Since his PhD, he has been the demo leader of multiple European projects and has gained experience in R&D and the product commercialisation of medical devices. He has an extensive technological network with multiple companies and universities that are now part of the Bi/ond network. He is the inventor of the patents behind the Bi/ond technology and various trade secrets. He is an animal advocate, as shown by the LUSH award he received in 2018, and a board member of the Dutch animal association Young TPI (Transitie Proefdiervrije Innovatie).

Dr Silvestri: "Bi/ond envisions a world in which every person is understood to be unique and in which medicines reflect their individuality. To enable precise treatment options that value diversity and inclusion, we aim to develop lab technology for more accurate drug testing and for simulations of any tissue type. By building the missing link between biology and engineering, we can pave the way towards personalised medical treatments."

Transformative power

Such a breakthrough cannot be achieved alone; Bi/ond therefore collaborates with top institutions and medical centres across Europe to validate its technology and contribute to advancements in cancer and heart muscle tissue research. In the EU market, their primary focus is on introducing the platform to pharmaceuticals, academic hospitals and research institutes. In doing so, they must overcome challenges related to the adoption of new skills, budget allocation and the need for extensive evangelisation in order to showcase the benefits of modernising biological labs and leveraging the advantages that microelectronics can offer to biologists. Additionally, like many other deep-tech start-ups, capital is crucial to their growth trajectory.

"In spite of these challenges, we have a lot to be proud of," says Dr Silvestri. "This goes beyond the technological achievements: it's about the positive impact on patients' lives. Witnessing the transformative power that microelectronics can have on the well-being of individuals is incredibly rewarding for our team. What was once merely an idea in our heads has now come to life, and the realisation that our innovations can make a meaningful difference in the lives of others is the most gratifying experience."

"As we continue on this innovative path, our commitment remains unwavering: to create solutions that not only meet the needs of today but anticipate and adapt to the evolving healthcare demands of tomorrow. Every breakthrough is a testament to our collective vision and determination to positively impact the world through the fusion of microelectronics and biotechnology."