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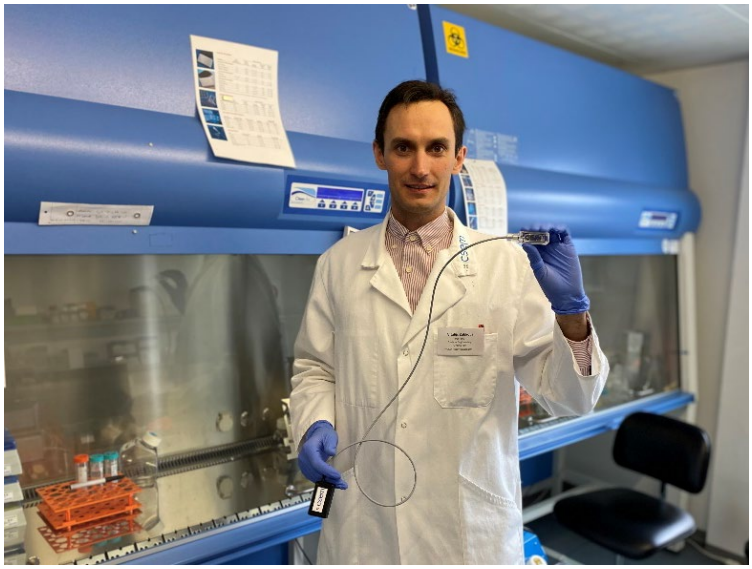
Research in Graubünden

Towards your own start-up

“If it was easy, someone would have done it already”



Vitalijs Zubkovs in the biolaboratory demonstrates one of the earlier prototypes of glucose monitoring sensor devices. Copyright : Reufa Junuzovic

For more than 35 years, the Centre Suisse d'Electronique et de Microtechnique (CSEM), with centers in Neuchâtel, Landquart, Muttenz, Alpnach, and Zurich, has specialized in technology transfer between science and industry. The roughly twenty researchers and engineers at the CSEM center in Landquart are primarily involved in the development of opto-electronic and electrochemical sensors and miniaturized systems. One of them is Vitalijs Zubkovs. A native of Latvia, he was granted a CSEM “Post-doc for Industry” fellowship in 2019 after completing his PhD at the École Polytechnique Fédérale de Lausanne (EPFL). This program allows PhD students from Swiss universities to further develop and valorize their research projects with CSEM. Grantees receive support from CSEM experts to develop a commercial product based on their research findings.

Zubkovs, is a versatile biochemist, has been inspired by the innovative and productive environment at EPFL and now dreams of founding a start-up company: “My project at CSEM Center Landquart started in summer 2019. I am the project leader and work together with three engineers who are involved in the project part-time. I also work with interns, currently Tayfun Tatar, a talented electronics engineer from ETH Zurich. Our project is right in the middle between fundamental research and commercial application. Our goal is to develop a commercial prototype of the first optical glucose sensor based on single-walled carbon nanotubes. Single-walled carbon nanotubes are tiny tubular structures made of carbon atoms that can be visible under an electron microscope. This material has unique optical properties and high stability that puts is above the conventional fluorescent sensors. We plan to create a start-up to establish a production and distribution chain for the optical glucose biosensor.”

“The competitive advantage of this innovative technology is that it can be integrated into miniaturized sensors the size of a peanut. Glucose sensors are used in biotechnology and regenerative medicine, among other biological applications. Glucose is the main source of energy for living organisms and is commonly used as a nutrient in cell cultures. Since glucose is consumed by living cells during their maturation, glucose concentration should be monitored and kept constant during the culturing process. The purpose of this is to maintain normal cell growth and minimize the risk of pathologies in the cells. The manual sampling and analysis of cell cultures is a time consuming and costly process which increases the risk of contamination. On the other hand, current continuous monitoring devices are large and limited their use outside the laboratory environment. We aim to fill this gap by providing a low-cost, miniaturized device for continuous glucose monitoring that can be manufactured at commercial scale.”

“The step-by-step development approach is to gradually minimize the size of the sensor device. This implies several iterations that will allow us to identify potential limitations of the optical and electronic components in the device and its materials early on in the project and solve them without running into high R&D costs.” With self-irony, Zubkovs adds, “If it were easy, someone would have done it already.” His wish: “My goal is to make the research useful for society.”

Vitalijs Zubkovs and Daniela Heinen

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