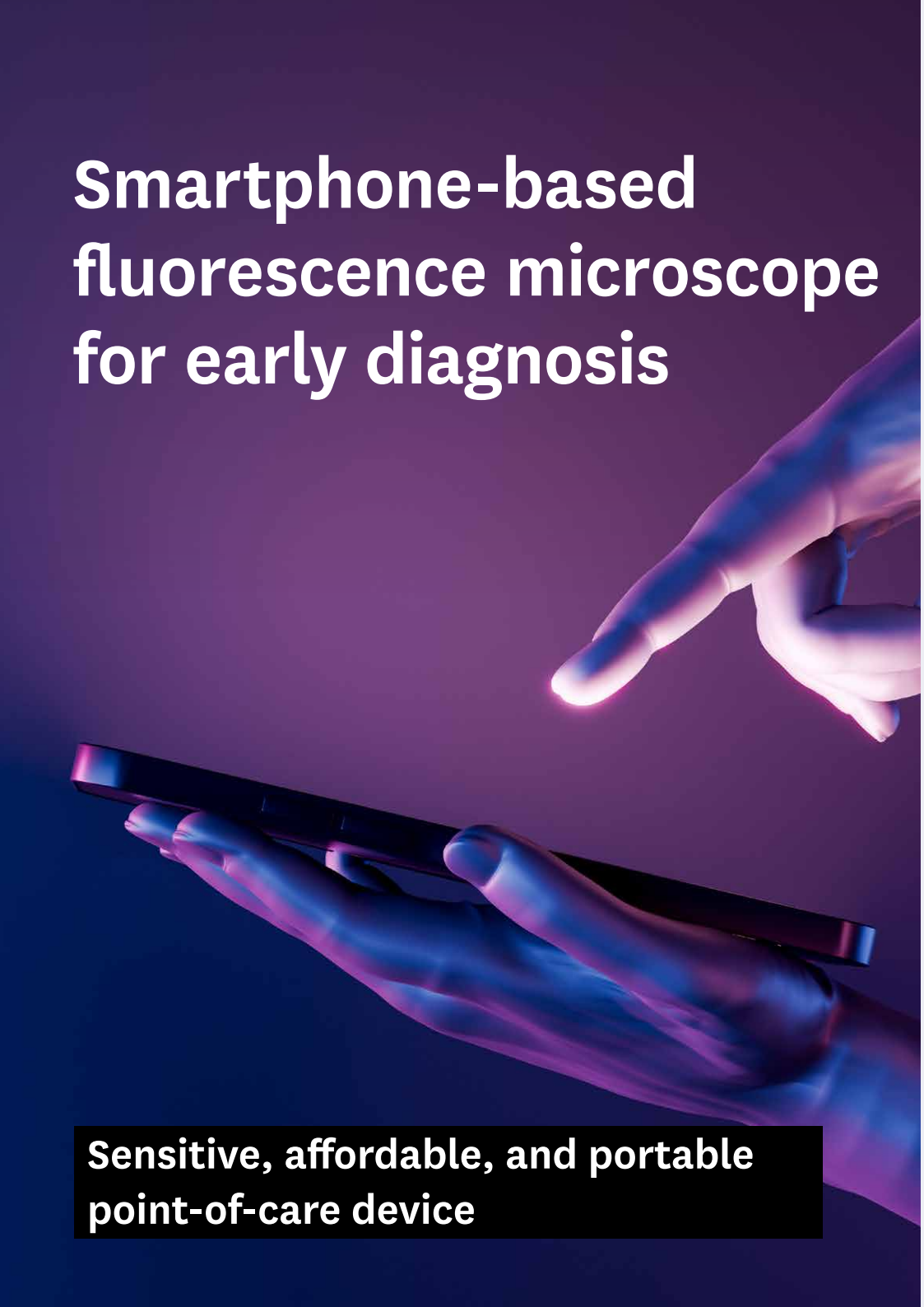
Smartphone-based fluorescence microscope for early diagnosis



Sensitive, affordable, and portable point-of-care device

WHAT IS THIS ABOUT?

Affordable and portable point-of-care devices are in high demand, particularly in the context of pandemics or in the field. Benchtop fluorescence microscopes are highly sensitive but costly and require trained operators. In contrast, Smartphone-based ones are accessible but are less sensitive and often designed for a single-phone model. We have successfully developed a smartphone-based fluorescence microscope that is inexpensive, portable, usable with multiple smartphone models, and capable of detecting a single fluorescent molecule like a benchtop microscope.

WHAT'S THE INNOVATION?

Our fluorescent microscope can directly detect a single molecule without the use of additional enhancement elements. Such sensitivity is similar to a state-of-art of benchtop microscope. Reaching this sensitivity would help provide early disease diagnosis even before the development of symptoms. Moreover, our device can be used with different smartphone models without any modification or the need for realignment of optical components.

WHAT ARE OUR PLANS?

Our plan is to prove the concept of our microscope, through a diagnostic assay, and show that our device can achieve at least a sensitivity comparable to current state-of-the-art tests. Subsequently we will apply for funding, from BRIDGE or INNOSUISSE to create a fully functionally point-of-care device. Eventually, we aim to establish a spin-off and commercialize the device.

WHO WE ARE?

The development of this microscope is a project of the Photonic Nanosystems group in the Physics department of Fribourg University. The portable and inexpensive version of the microscope is developed by Morgane Lorétan in the framework of her PhD thesis under the supervision of Prof. Guillermo Acuña, and with the help of Nathan Fuchs. The project was first started as a benchtop version at LMU of München by Prof. Guillermo Acuña and continued at the University of Fribourg by Morgane Lorétan, and Dr. Mathias Lakatos.

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