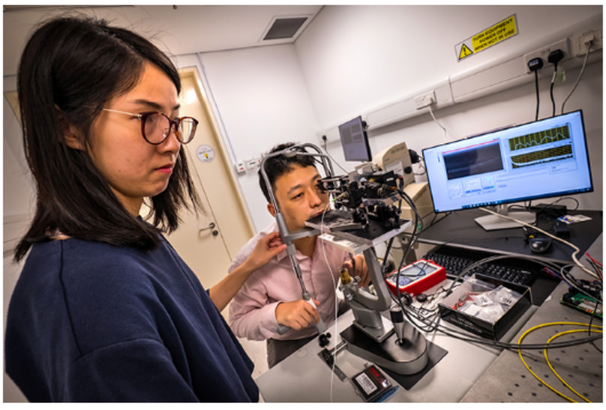
Nanyang Technological University



NTU and SERI Launch Joint Laboratory to Develop Advanced Ocular Imaging Technologies

Nanyang Technological University, Singapore (NTU Singapore), the Singapore National Eye Centre (SNEC), and the Singapore Eye Research Institute (SERI) have launched a joint laboratory that will develop advanced eye imaging technologies and drug delivery systems.



The new **SERI-NTU Advanced Ocular Engineering (STANCE)** Laboratory will develop innovations that use light to image the eye – a technique known as "optical coherence tomography" (OCT).

For example, the joint Lab will perfect a triple-beam OCT imaging prototype that illuminates the eye from three different angles and accurately measure blood flow. This can precisely detect diseases in the eye, such as age-related macular degeneration or glaucoma with greater precision.

Another project involves developing a cost-effective and portable robotic OCT system to perform rapid and automated eye screenings. Powered by artificial intelligence (AI), the system will provide a convenient platform to detect eye conditions earlier, without requiring attendance at a specialised eye clinic or hospital. These projects will be translated, tested and validated, from lab to bedside.

The joint Lab was launched today by Professor Ivy Ng, Group CEO of Singapore Health Services, and it will be located on the NTU Smart Campus where other advanced technologies are being developed in partnership with industry.

Professor Leopold Schmetterer, Director of the STANCE Lab, said, "Eye diseases remain one of the key conditions that an ageing population in Singapore faces, which lead to vision impairment that affects mobility. The STANCE Lab will develop new imaging technologies to detect and diagnose eye conditions, quickly, easily and conveniently.

"The STANCE Lab will also create a multidisciplinary research ecosystem at NTU by housing ophthalmologists, biomedical engineers, and research scientists, who will work on joint research projects addressing new and future healthcare challenges," said Prof Schmetterer, who is also a Professor at NTU and the Scientific Director and Head of Ocular Imaging Research Group at SERI.

Professor Louis Phee, Dean of NTU's College of Engineering, said, "The new STANCE Lab will look into developing innovative healthcare solutions that leverage advanced technologies such as artificial intelligence, machine learning, robotics, and new optical imaging techniques. NTU's collaboration with SERI echoes the university's close working relationship with industry and healthcare institutions, to ensure innovations developed at the lab remain relevant, practical and beneficial to society. These partnerships also underpin NTU's strong track record in translational research excellence, which supports Singapore's vibrant research ecosystem."

Professor Aung Tin, Executive Director, Singapore Eye Research Institute, said, "We hope that this new lab between SNEC-SERI and NTU will be the start of an important programme to utilise engineering solutions to help and improve care of our patients with eye problems."

Three main areas of focus

The launch of the STANCE Lab also sees the start of over ten joint research projects that address three broad themes:

i) Functional extensions of in-vivo optical coherence imaging to extract potential biomarkers for better disease management;

ii) Screening devices that enable diagnostic imaging beyond the clinic into the community and at home;

iii) Multi-modal imaging, which uses different types of ophthalmic imaging, and ocular therapeutics that will spur the development of innovative devices and treatment procedures.

One project will use a robotic arm guided by an AI-powered imaging system to look under the eye surface and detect early signs of eye diseases such as glaucoma and diabetic retinopathy. Using machine learning algorithms, the AI system will suggest if further diagnosis with a specialist is required.

Researchers aim to fully automate the entire procedure under a minute, which would be useful for community-based screening at, i.e. heartlands or community centres, to detect ophthalmic conditions earlier and enable timely interventions.

The STANCE Lab will also collaborate with industry by engaging with various imaging and pharmaceutical companies and nurture spin-off companies to accelerate the development of new technologies.