

# Tool to detect early-stage tumours

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An optical-fibre sensor that will help detect and diagnose cancers early is being developed by researchers at Swinburne University of Technology. Cancer remains a leading cause of death worldwide, with half of the nation's men - and one-third of women - likely to experience the illness by the age of 85. Finding tumours at early stages - before they spread through the body - makes them easier to be removed or treated and increases a person's chances of survival.

The new technology is the vision of PhD researcher Emma Carland. Inspired by her experience helping sick children in intensive care at The Royal Children's Hospital in Melbourne, Ms Carland decided to use her biomedical engineering skills to give people a better chance against illnesses.

Her work is based on an optical-fibre [touch sensor](#) as fine as a human hair built by her supervisors, Dr Paul Stoddart and Dr Scott Wade, to prevent injuring delicate ear tissues during cochlear implant insertion.

The sensor is built into an optical fibre that sends light between its two ends. Due to its tiny size and fast transmission of signals, [optical fibres](#) are often used in medicine, including endoscopies and 'keyhole' surgeries.

By vibrating the sensor against a particular [tissue](#), the researchers plan to use the device for early detection of tumours. As the sensor nudges and withdraws from an area, the detected signals will alternate between being either high or low.

"A tumour is stiffer than cells from a healthy area," Ms Carland said. "So, the difference between the sensor's signals tells you how stiff the tissue is - a [diseased tissue](#), being firmer, will push back at the sensor with more force, resulting in a larger difference."

"This will enable a fast, accurate assessment of the tumour's stage - and determine the best way to treat it."

The long, thin and flexible structure of the fibre sensor will also allow it to be inserted into [endoscopes](#) that explore small tissue regions, such as ear, nose, throat cavities and the colon.

While endoscopies take tissue samples and send them to the laboratory for analysis, the sensor can be used to obtain very precise measurements of small tissue regions, which allows for the early identification of any abnormal tissue.

Provided by Swinburne University of Technology

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