



**Title: Better breast cancer surgery through improved intra-operative guidance**

**Chief Investigators:**

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This project is developing a new type of imaging probe to help surgeons perform more successful and safer breast cancer surgery.

A lumpectomy is a special type of breast cancer surgery where the surgeon only removes the cancer, sparing the remainder of the patient's breast. Residual cancerous tissue can lead to recurrence, so the surgeon also removes a thin margin of healthy tissue around the tumour to make sure that no cancerous tissue remains. Unfortunately, it can be very difficult to accurately judge exactly where to cut. Approximately one quarter of patients will need to undergo the trauma of returning for additional surgery to remove small traces of cancer that have been missed.

We are working to develop a new type of handheld, intra-operative probe that will help guide the surgeons, allowing them to perform more accurate surgery and remove all of the cancerous tissue the first time. The probe is a special type of highly miniaturized optical imaging device. The unique aspect of this high resolution probe is that it is so small that it can be encased within a hypodermic needle – a 'microscope-in-a-needle'. This allows the surgeons to insert the needle probe deep into the tissue during surgery to identify the edge of the cancerous tissue.

With funding from the Pink Ribbon Gala Ball, we are developing the next generation of probe, capable of finding small traces of cancer far more clearly than has previously been possible. We are developing a special type of fluorescent imaging agent which will mark the cancerous cells, making them stand-out from healthy tissue. Combined with a new type of optical probe that can detect this fluorescent signature, this technique will greatly increase the accuracy with which we can see cancer.

Work on this new type of imaging probe has been pioneered here in Western Australia. Funding for this research will enable us to take these probes to the next stage of development, and the next step closer to use in hospitals.