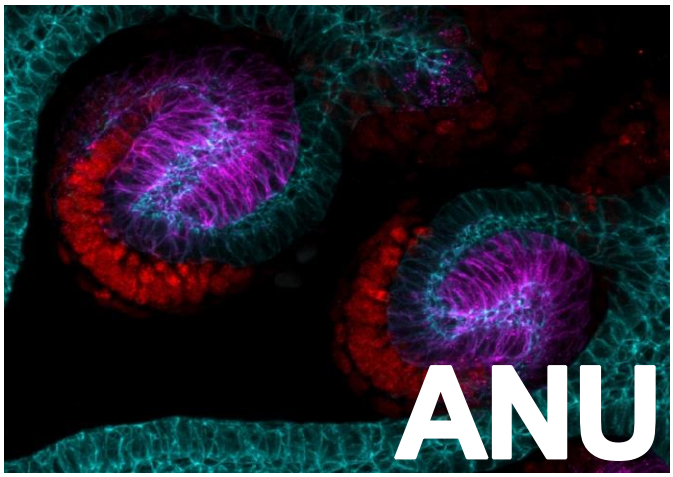
Real Time Aberration Correction in Laser Scanning Systems



This technology is an adaptive optics solution for laser scanning systems that provides rapid removal of up to 50 aberrations across the field of view in milliseconds. This produces diffraction limited performance across the millimetre scale in three dimensions. The system can be retrofitted to any laser scanning device with the utility demonstrated in a laser scanning microscope (Figure 1).

Potential benefits

> **Affordable –** the system is based on a low resolution deformable mirror combined with a triple laser scanning mirror
> **Improved optical performance** – recovery of up to 100% point spread function across the entire field of view
> **High throughput –** increased imaging throughput by up to 2.3 fold relative to conventional systems
> **Versatile** – can be retrofitted to any laser scanning system

Potential applications

> Laser scanning microscopy
> Laser writing applications i.e. laser lithography, laser engraving
> Laser range finding

Opportunity

ANU is seeking industry and customer feedback for this technology, as well as engagement with industry partners/customers to work collaboratively with us to further develop the idea and optimise the adaptive optics design for their specific application and equipment requirement

IP status

Provisional patent filed (AU2019904929; priority date 24 Dec 2019)

Related publications: Raster adaptive optics for video rate aberration correction and large FOV multiphoton imaging. Biomedical Optics Express. https://doi.org/10.1364/BOE.377044

Key research team

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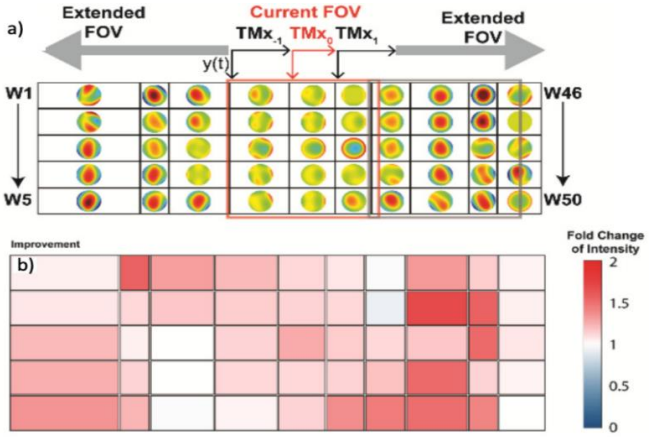

Figure 1: : Demonstration of the ability of the adaptive optics system to project and remove aberrations across the extended field of view (FOV) in a laser scanning microscope. Panel a) outlines the time multiplexing segments of the current and extended FOV defined by the objective and which were updated in 500 milliseconds. The corresponding improvement in intensity across the entire FOV is indicated in Panel b).