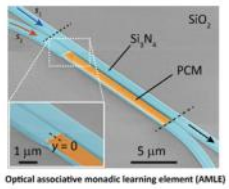
PROJECT NUMBER

16759, 18853

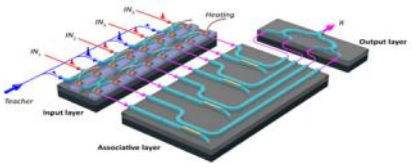
All optical computing elements using a phase change material

An on-chip optical processor using light to detect similarities in datasets up to 1,000 times faster than conventional machine learning algorithms running on electronic processors.

Applications: Computing, AI, Machine Learning, Memory



Optical associative monadic learning element (AMLE)



Features	Benefits
Is a fully optical system	The energy requirements to run an optical system are far lower than for the same number of electrical connections. The amount of information that can be transmitted simultaneously is far higher optically. A more efficient system to run at high speeds
Can connect to existing electronic or optical computing circuitry	Can be integrated into existing devices
‘Learns’ associations between optical inputs to alter operations and outputs, mimicking neuro-biological learning. The training process involves storing information on a phase change material	Switching of biostable structural states of a PCM replaces the large number of electrical connections to do the same work electronically. Has been shown to ‘learn’ pattern and image recognition very efficiently

Features	Benefits
Optical on-chip matrix that creates photonic content addressable memory	Using wavelength division multiplexing with distinct optical wavelengths, one can run parallel search operations for faster data retrieval

Awaiting patent and Available for

- Co-development
- Consulting
- Licensing

To find out more, contact enquiries@innovation.ox.ac.uk and quote the project number.