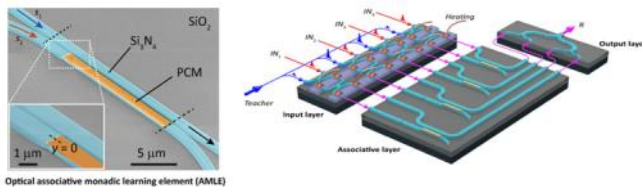


# All optical computing elements using a phase change material

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



## Features

Is a fully optical system

Can connect to existing electronic or optical computing circuitry

‘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

## Benefits

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 be integrated into existing devices

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 |

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### Awaiting patent and Available for

- Co-development
- Consulting
- Licensing

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To find out more, contact [enquiries@innovation.ox.ac.uk](mailto:enquiries@innovation.ox.ac.uk) and quote the project number.

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