



An AI-driven Automated Platform for High-Throughput 5D Fluorescence Imaging and Data Analysis

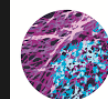
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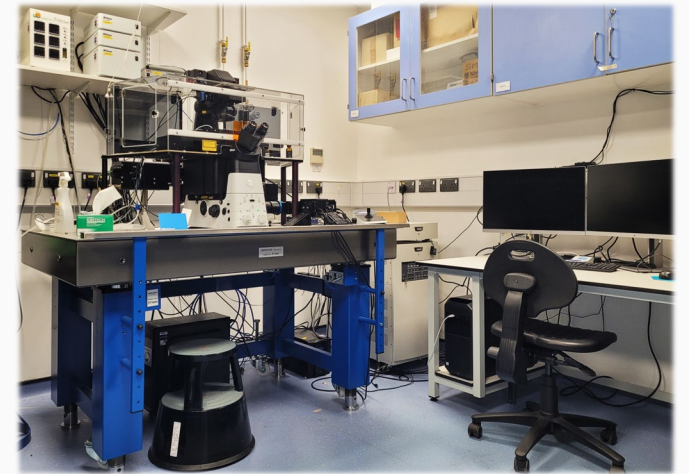
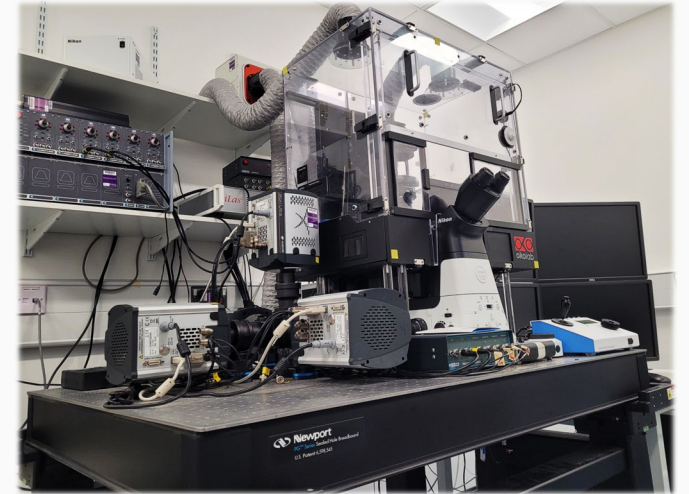
COMPARE
CENTRE OF MEMBRANE PROTEINS AND RECEPTORS

COMPARE Advanced Imaging Facility

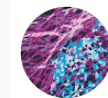
The Centre of Membrane Proteins and Receptors (COMPARE): a unique cross-university research centre between the Universities of Birmingham and Nottingham

Aims: to explore cell communication to develop new therapies for cardiovascular disease, diabetes, and cancer

COMPARE Advanced Imaging Facility: at the core of COMPARE, which houses commercial and custom-built microscopes, and advanced tools for data analysis at the University of Birmingham



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Automated high-throughput Oblique Plane Microscopy (OPM)



In partnership:



UNIVERSITY OF
BIRMINGHAM



UNIVERSITY OF
LEICESTER



University of
Nottingham
UK | CHINA | MALAYSIA



WARWICK
THE UNIVERSITY OF WARWICK



MIDLANDS
INNOVATION

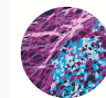


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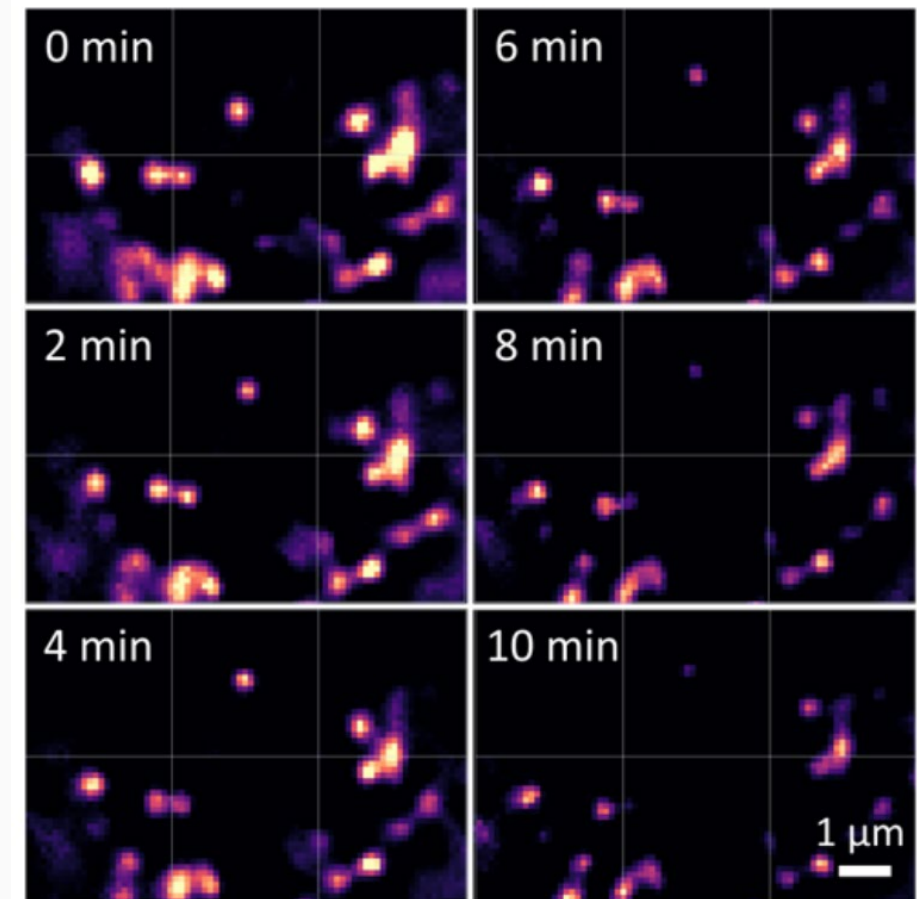
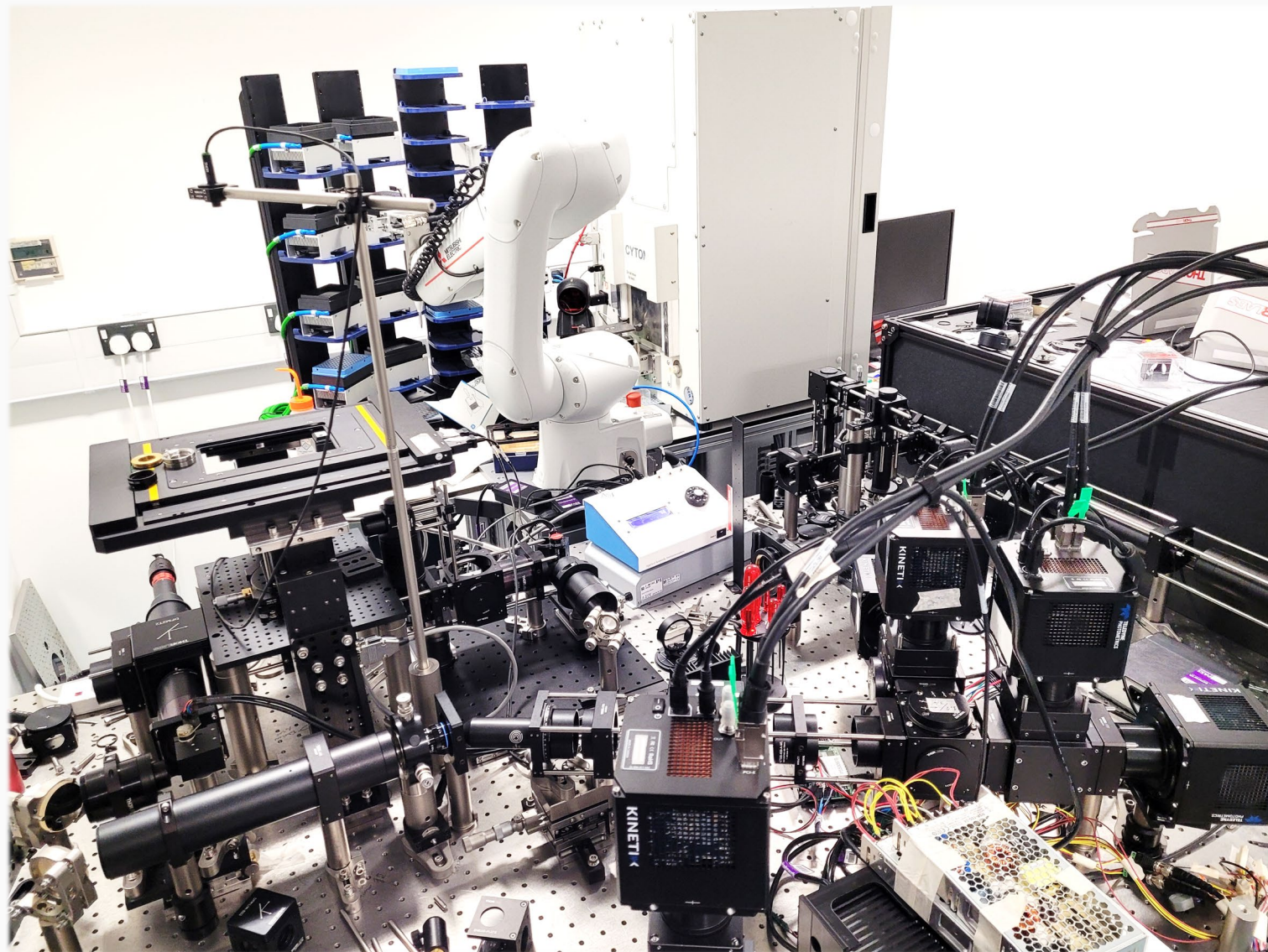
an integrated hardware platform combining
high-spatiotemporal resolution
with **high-throughput** and **automation**



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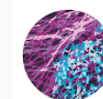
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Labelled mitochondria dynamics;
 resolution **300nm-xy, 800nm-z**, and speed **~500
 ms/vol**, 150x40x8μm³ multi cell volume (cropped)



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Hardware Enhancements: integrate new hardware features (OPSIM) to enhance resolution and performance

Software Development: develop a comprehensive software and user interface for AI-driven microscopy (to find the cell, adjust the imaging parameters, etc.)

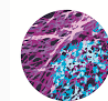
Deep Learning Models: develop deep learning approaches to analyse data and model the dynamics of biological processes

Research Focus:

- *to build dynamic models of cell signalling that can be used to answer key biomedical questions*
- *to engage with the community to develop the next phase of the project*

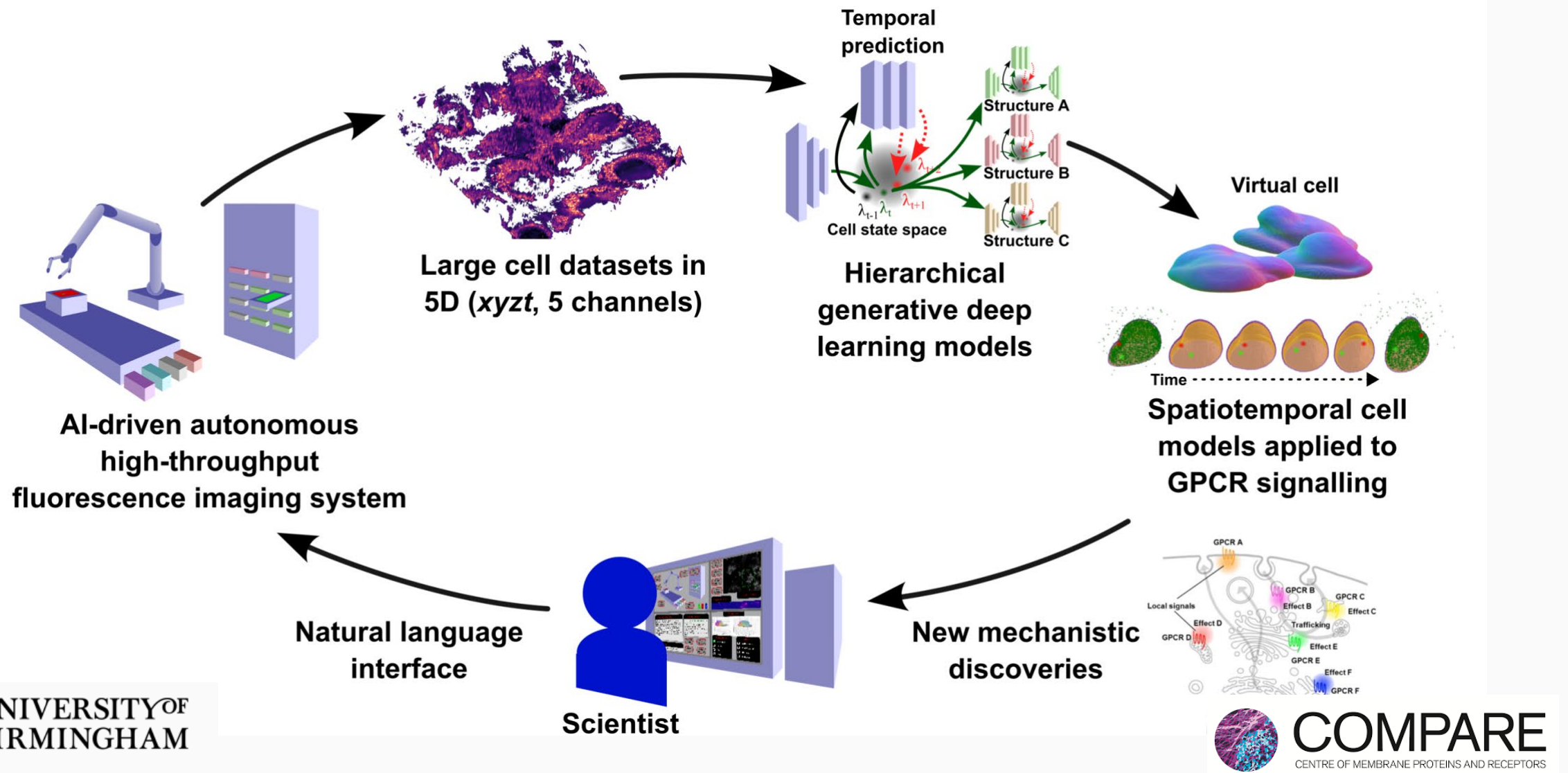


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Two interdisciplinary postdoc opportunities

1. a **computer science**/ technology development researcher interested in hardware control, automation, and machine learning
2. a **biologist** interested in microscopy to investigate G protein-coupled receptor (GPCR) signalling and cellular dynamics



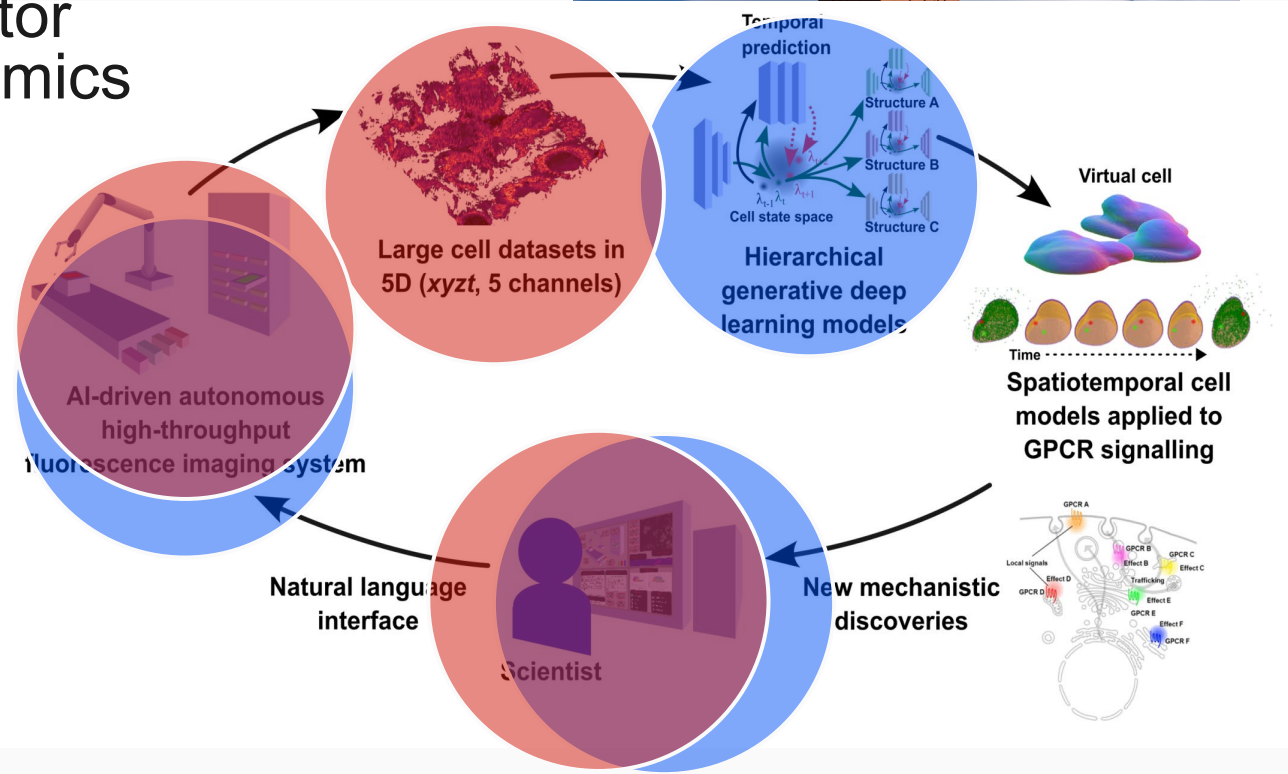
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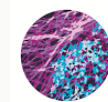
Thank you!

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October 2024



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