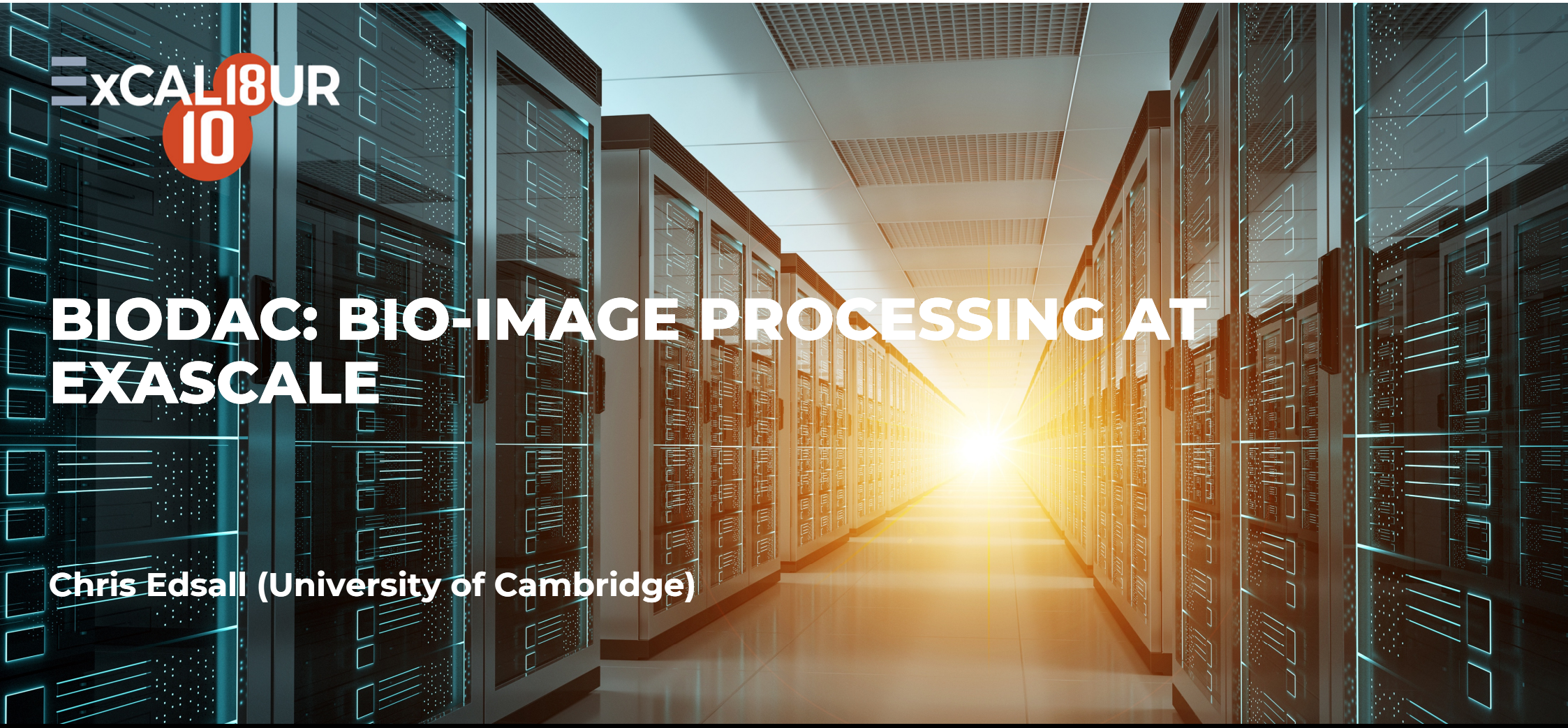


ExCALIBUR 10

BIODAC: BIO-IMAGE PROCESSING AT EXASCALE

Chris Edsall (University of Cambridge)

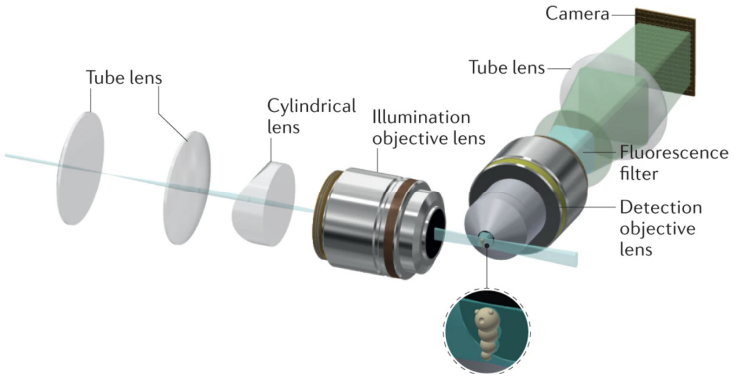
Engineer's House, 11-12 October 2023

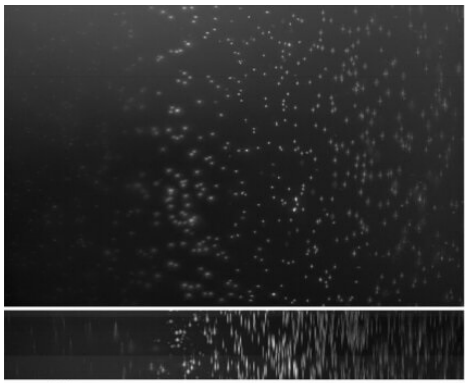
Met Office

UK Research and Innovation

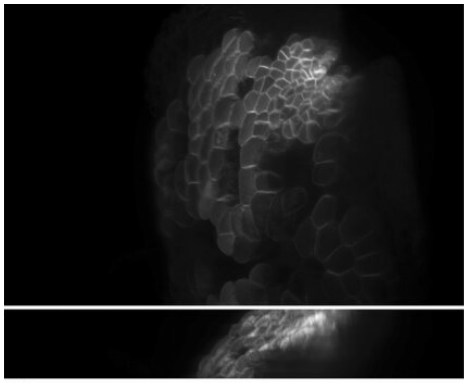
UK Atomic Energy Authority

Project Status





(a) 0.5μm multi-colour Tetraspeck microspheres (slice)



(b) Membrane labelled Marchantia (maximum intensity projection)

Lightsheet imaging examples

- Light sheet microscopy is a gentle, fast imaging technique, able to image large volume samples during long periods of time (e.g. days). The only limitation is the readout speed of the camera.
- Imaging results in big amounts of data.
- Lightsheet image reconstruction relies on specific models.
- The data management and downstream analysis can be easily extended to a broad range of different microscopy techniques.
- Matt Archer (RSE) and Anita Karsa (PDRA) joined the team. Leila Muresan (PI), Chris Edsall and Hugh Robinson (co-I).
- First results:
    - Deep learning 3d segmentation model,
    - image reconstruction is being adapted to HPC.

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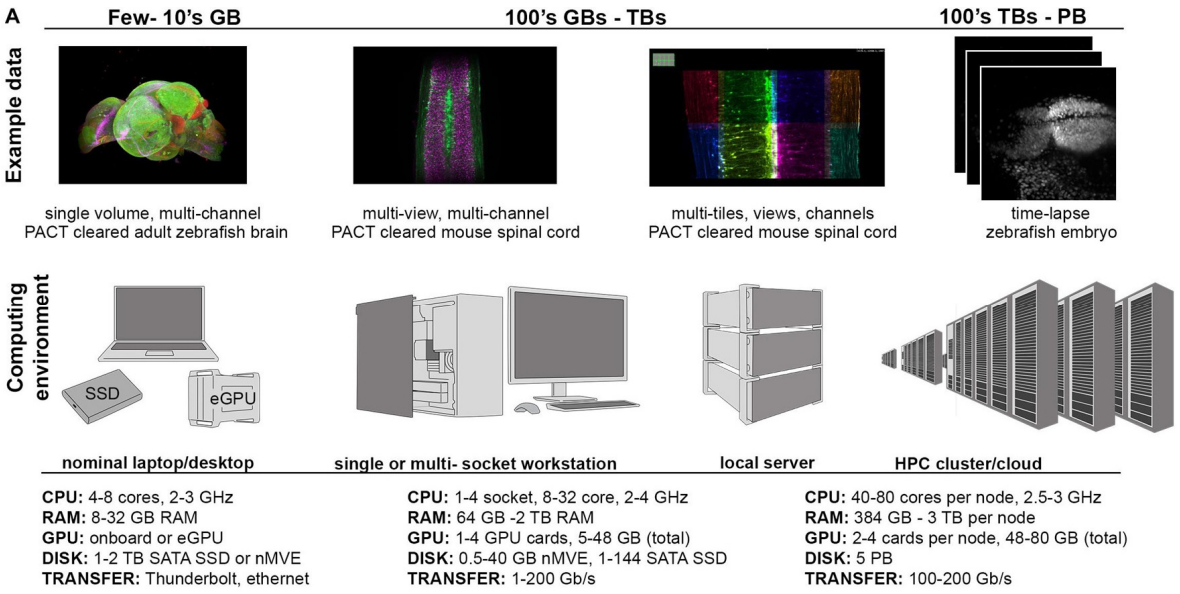
Current Challenges

The amount of data makes image processing and analysis the main bottleneck to fully exploit the technique.



Gibbs Holly C.,…,Perez Lisa M., Frontiers in Cell and Developmental Biology, 9, 2021, 10.3389/fcell.2021.739079

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