



**Company:** Carl Zeiss Limited

**Knowledge Transfer Partnership:** Advancing deep learning tools for cell and tissue image processing.

Carl Zeiss is a world-leading company specialising in optics and optoelectronics. Its APEER platform helps pharma and biotechnology researchers to automated complex cell and tissue image analysis. Working with Queen Mary, the company wants to expand this deep learning tool to provide a broader service to its customers.

## Challenge

APEER has been developed by Carl Zeiss to support researchers who need to analyse cell and tissue images. The cloud-based solution automates end-to-end image analysis pipelines and can handle large quantities of data, allowing researchers to save time and produce consistent analysis of complex images, including 3D images and video. The system uses 'deep learning' – a form of artificial intelligence that removes the need for coding.

There is, however, a significant gap in the automated analysis of microscopy movies. Carl Zeiss wants to add new functions to APEER, to support those customers who need to analyse 3D images and movies of cells and tissues.

## Process to Solution

Prior to this Knowledge Transfer Partnership (KTP), Carl Zeiss had worked with

David Dang, a PhD student in the Draviam Lab at Queen Mary. David had developed a program called SpinX to track subcellular structures, and took a three-month placement at the company. This was funded by an Engineering and Physical Sciences Research Council-funded Impact Acceleration Award to the Draviam Lab.

David combined deep learning methodology and mathematical modelling to develop SpinX, which generates high-quality image data to automatically track subcellular structures in 3D.

Now, SpinX is being generalised and extended to multicellular structures as an option on APEER – a joint project that forms the KTP.

Through the APEER platform, the KTP aims to make the knowledge accessible to bioscientists without the need for them to have computing expertise. It also has the potential to transform high-throughput

imaging-based drug screens by allowing automated video analysis – a competitive space for pharma and biotech industries.



*APEER is a state-of-the-art tool that offers our customers an easy and intuitive way to analyse complex cell and tissue images. This project to incorporate SpinX into APEER extends our image analysis technology, delivers the latest knowledge to our pharma and biotechnology customers and offers considerable added value to the product."*



**BERNHARD SCHWARZ**  
COMPANY LEAD,  
VICE PRESIDENT DIGITAL  
SOLUTIONS AND STRATEGY,  
CARL ZEISS

### Company Contact:

**Bernhard Schwarz,**  
Company Lead, Vice President Digital  
Solutions and Strategy, Carl Zeiss  
bernhard.schwarz@zeiss.com

### Academic Contact:

**Prof Viji Draviam,**  
Academic Lead/Supervisor,  
School of Biological and Behavioural Sciences (SBBS)  
v.draviam@qmul.ac.uk

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