



Case study  
2020  
University of  
Southampton

*Extreme ultraviolet light generated by femtosecond lasers is used by Professor Jeremy Frey (Chemistry) and Dr Bill Brocklesby (ORC) for nanoscale imaging of neurons*

**“** *Being part of the Franklin brings tremendous opportunities to amplify our interdisciplinary capability*

## Creating an interdisciplinary pipeline

Research at the University of Southampton is not restricted by traditional disciplinary boundaries. The University's Institute for Life Sciences, founded in 2011, cuts across all Faculties, bringing together engineering, physics, chemistry, computer scientists, biology and medicine to tackle biomedical challenges. It is this interdisciplinary approach that made membership of the Franklin such an obvious step for the University.

Southampton is a founding member of the Franklin but was not a party to the original concept document. The University joined in 2017 once work on the themes was underway and the concepts to be developed had already taken shape, and this has influenced how Southampton interacts with the Institute. While the University, like other members, is now helping to develop the key technologies within the themes, Southampton feels it can play as important a role in helping to identify the biomedical questions to which those technologies will be applied.

Professor Peter J.S. Smith, Director of the Institute for Life Sciences and Southampton's member representative for the Franklin explains:

"Each of the partners brings in specific capability that is helping to build the instruments within each theme, and Southampton is no exception. But the added value we bring is to catalyse the interdisciplinary collaboration on our campus and be a pipeline to the Franklin, taking new biomedical problems to where they can find a solution."

Southampton is no stranger to the distributed model of the Franklin, where technical capacity will be located both in the hub and spokes. Together with Diamond Light Source, the Franklin's newest member, the University runs the UK National Crystallography Service, a facility that is amongst the most powerful and highest throughput of its type in the world. This expertise, particularly in protein crystallisation, is feeding into the Franklin's Structural Biology theme.

Southampton is also involved in the Correlated Imaging theme, bringing in expertise in label free Raman-based spectroscopy and imaging techniques, such as coherent anti-Stokes Raman scattering (CARS). Research into laser technology, based in Southampton's Optoelectronics Research Centre (ORC), which houses the largest photonics group in the UK, is also feeding into the Imaging with Sound and Light theme.

Work within the School of Chemistry and ORC on ultrafast X-ray or 'soft' x-rays, which aim to bridge the gap between photon and electron-based imaging also relates to the Franklin's Correlated Imaging theme. Physics researchers from Southampton are applying phase retrieval techniques to soft x-ray, developing computer algorithms that enable an image to be generated without the use of an objective lens.

Southampton also hosts the National Biofilms Innovation Centre, which studies the role of biofilms in a variety of fields, including medicine. Southampton sees huge potential for future collaboration between the NBIC and the Franklin, with the new instruments offering the ability to look differently at biofilm structures and study their interaction with drugs such as antibiotics.

"Being part of the Franklin brings tremendous opportunities to amplify our interdisciplinary capability," says Professor Smith. "The technology and assets that are being created within the Institute will provide us with more capability to do ground-breaking science and help us get the funding to do it."



Professor Peter J.S. Smith,  
Director, Institute for Life  
Sciences



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