

## Access provider - Tyndall

### Energy Storage - Access description

- Electrochemical energy storage based on the smart materials & test structures expertise developed at Tyndall.



### Technical offering

- Simulation of battery energy storage materials and architectures for hybrid energy storage solutions.
- Processing of simulated materials designs and architectures on coupons or four inch wafer fabrication equipment for energy storage materials processing and cell assembly.
- Characterisation of energy storage performance including nanovisualisation through scanning electron microscopy, transmission electron microscopy and atomic force microscopy characterisation.
- Assessment of the electrical characteristics of as-deposited and post-processing for optimum performance.
- Materials characterisation using x-ray diffraction and Raman spectroscopy to establish the likely outputs of the materials.
- Electrochemical test system to analyse battery characteristics of individual electrodes, electrolytes or full cells for integration in hybrid energy harvesting and storage solutions.

### Main equipment

- Expertise in simulation models for micro and nano-battery materials assessment of chosen architectures.
- BioLogic VSP Potentiostat galvanostat multichannel electrochemical test system:
  - Allows simultaneous test of independent cells controlled with a single PC enabling electrochemical analysis of more than one cell in parallel.
  - Impedance spectroscopy of the energy storage materials can also be assessed with this system.
  - Can control cells with a 100 mA maximum current.
  - Lithium based and oxygen or water sensitive materials can be housed for analysis in the argon environment of the MBraun Labstar glovebox with direct access to the BioLogic test system.
- Quorum Q300T dual sputter deposition tool: DC sputtering of prototype anode and cathode materials.

- Fabrication: 4-inch wafer scale facilities for active material nanoarchitecture fabrication including interdigitated electrode arrays fabricated for analysis of cycling behaviour in well-defined architectures.

## Typical applications

Commercialisation of electrical energy storage solutions to enable energy harvesters as an energy sources for IoT sensors, for example to overcome the intermittent nature of the harvesting source such as solar or vibrational energy.




## Case study

An SME or research team are developing new materials for an ES battery but need access to characterisation equipment to optimise this. EnABLES will provide access to the facilities required.

### Responsible

Dr James Rohan



		
<p><b>MBraun Labstar argon recirculating glove-box</b></p>	<p><b>BioLogic VSP potentiostat/galvanostat for electrochemical test</b></p>	<p><b>Quorum Q300T dual sputter deposition tool</b></p>
<p><b>Keys specifications</b></p>		
<ul style="list-style-type: none"> <li>• Stainless steel 1.4301 (US Type 304) construction</li> <li>• (2/3/4) DN 40 KF feedthroughs included (1) electrical</li> </ul> <p>Fine filter (1) gas inlet, (1) gas outlet, class H13</p>	<ul style="list-style-type: none"> <li>• Current ranging from 1 nA up to 400 mA</li> <li>• 20 V adjustable reference voltage</li> <li>• Resolution: 300 <math>\mu</math>V</li> </ul>	<ul style="list-style-type: none"> <li>• Sputtering of a wide range of oxidising and non-oxidising metals</li> <li>• Film thickness monitor</li> <li>• Adjustable stages</li> </ul>