

2016 National Research Infrastructure Roadmap Capability Issues Paper

Name	Professor Sean Li
Title/role	Professor and ARC Future Fellow,
Organisation	University of New South Wales

Thank you for the opportunity to respond to the 2016 National Research Infrastructure Roadmap Capability Issues Paper. In response, I have addressed the question around my research area.

Advanced Physics, Chemistry, Mathematics and Materials

Question 21: Are the identified emerging directions and research infrastructure capabilities for Advanced Physics, Chemistry, Mathematics and Materials right? Are there any missing or additional needed?

I work in making unique layered electronic and magnetic and devices using advanced manufacturing techniques.

I am a lead scientist of the \$100M TORCH initiative at UNSW that depends on the latest generation of electron microscopy. The Torch initiative at UNSW represents a major advance for Australia's research and development landscape. It would significantly boost Australia's research capacity through major investments from Chinese companies with the capacity, capital and market access needed to translate Australian research breakthroughs and technologies into new products, processes and services.

Central to this work is the development of novel graphene-core power transmission cables with greatly improved conductivity and grid-scale supercapacitors with nanoimprinted graphene electrodes. The alignment and packing behavior of the graphene flakes are critical to the performance enhancement.

The properties of our devices depend on the precise arrangement of atoms and defects that can only be understood by high resolution transmission microscopy (TEM). Access to the latest generation aberration-corrected transmission electron microscopy (TEM) will be essential for our research. Currently we have to travel overseas for aberration corrected TEM access which is a really bottleneck and limitation for our research.

The AMMRF proposal for the latest generation aberration-corrected transmission electron microscopy (TEM) and Focused Ion Beam for sample preparation will be essential for our future research. I fully support NCRIS renewed investment in the AMMRF and have strongly benefitted from the previous generation of AMMRF equipment.