Post-doctoral positions in Monolayer Amorphous Carbon (MAC)

Post-doctoral positions are available in Prof. Barbaros Özyilmaz's group at the National University of Singapore (NUS) in the field of 2D amorphous materials pioneered by our group.

We demonstrated the first atomically thin amorphous material to be surprisingly stable in our *Nature* publication on the synthesis of a centimetre-scale, free-standing, monolayer amorphous carbon (MAC). Prior to this, 2D materials were expected to be crystals with long range periodic order, and a dimensionally reduced amorphous material would be unstable from the strain of distorted bonds. This can be overcome by considering long range correlations are often overlooked in amorphous materials due to the lack of order. Similar to crystals, long range interactions do play a key role in stabilizing the local structure and influencing the material properties. Therefore, many theories need to be revisited with research to explore this area that was misunderstood.

We created a new CVD-based deposition technique which synthesise high quality MAC at low temperatures on a wide range of substrates. This growth system also allows for high throughput experimentation via a machine learning, Artificial Intelligence (AI) driven, data analytics approach for material creation by identification of new structural compositions. The large area uniform 2D material has equally desirable properties similar to 2D crystals, and yet has the ability to integrate into existing manufacturing processes which makes it attractive for industry. We have multiple industry collaborations in semiconductors, data storage, energy storage and biomedical to demonstrate its viability for industrial applications.

In this aspect, we want to advance the field of 2D amorphous materials. 1) Synthesis of new amorphous materials, engineering of composition and tailoring new materials to novel applications. 2) Explore new mechanisms that are unique to this material system to explain distinctly different properties from existing 2D materials and to predict new phenomenon. 3) Develop use cases by overcoming existing application bottlenecks and by enabling new applications.

We invite suitable post-doctoral candidates who are passionate to develop this exciting research topic to apply.

ELIGIBILITY:

Candidates should hold a PhD in Physics, Material Science, Nanoscience and Nanotechnology, Electronic or Chemical Engineering, or related disciplines.

The ideal candidate will possess the following:

1. Proven track record of excellence in experimental research with 2D materials.
2. Strong command of English language.
3. Excellent communication and collaboration skills.
4. Demonstrate team leadership and project planning.