



## Protocells and holograms: building and imaging artificial cells

Lecture by

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### Abstract

We self-assemble and characterise model primitive cells (protocells) with the aim of trying to understand the properties of chemical systems that could have led to life as we know it.

On early Earth, lipid bilayers would have been readily assembled from amphiphilic molecules of abiotic origin. In lab, we work with a fatty acid system and find that the dynamic nature of the membranes can lead to interesting properties such as stable hemifusion diaphragms and pH-dependent mechanical properties.

I will also introduce holographic microscopy, a valuable tool for capturing 3D information. Unlike confocal microscopy, the imaging system contains no moving parts. The information about the third dimension is captured in a single shot in interference fringes, enabling label-free imaging in real-time. We apply this to quantifying vesicle loading, and measuring the effects of crowding and confinement on diffusion.

### Biography

Dr Anna Wang is a Scientia Senior Lecturer in the School of Chemistry at UNSW Sydney, and an Assistant Director for the Australian Centre of Astrobiology. Prior to UNSW she completed a PhD in Applied Physics from Harvard University and a NASA Postdoctoral Program Fellowship in Astrobiology. She and her team research lipid membrane self-assembly in the context of the origins of life. They also work on holographic microscopy and machine learning to improve 3D imaging.

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