

Diversifying the space sector: developing technology for biological research in microgravity

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The current global space economy is valued at nearly four hundred billion USD, with forecasters estimating growth in the sector to reach 1-3 trillion USD over the next two decades. The industry is currently dominated by communications and Earth observation satellites, as well as the launch vehicles which deliver them to orbit. As launch frequency has increased and the costs associated with small satellites has decreased, opportunities have opened up to utilise space for a much broader range of applications. Over the last two decades, the International Space Station (ISS) has provided a microgravity platform for conducting thousands of research experiments on new materials, fuels, advanced robotics, plant growth, microbiology, human physiology, and an array of other scientific topics. Research conducted in the unique environment of the ISS has led to clinical biomedical applications, innovative manufacturing capabilities, and pharmaceutical developments not possible on Earth. Accessing the ISS is difficult, though, with high costs, limited space and crew resources, and long lead-in times for launching experiments. Advances in small satellite technology have made it possible to provide more accessible and cost-effective platforms for both commercial and academic research applications. Aotearoa New Zealand is uniquely placed to leverage its manufacturing capabilities and frequent domestic launch services to develop world-leading research in microgravity, supporting both the space industry as well as the extensive intellectual and technical capacities within our tertiary institutions, Crown Research Institutes, and commercial industries. With access to microgravity research facilities on CubeSats and other small satellites, our scientists and engineers will have the opportunity to facilitate cutting edge space-based research in a range of industries. In this talk, Sarah will discuss how she and her teams are developing technology for biological research in space to facilitate valuable new opportunities for Aotearoa New Zealand's space sector whilst creating solutions for the biomedical and primary sectors.