RESEARCH PRESENTATION SEMINAR
HOSTED BY THE OUR WORLD AND UNIVERSE RESEARCH THEME

The first of a series of events showcasing the exciting research being undertaken and developed by our members.

See summaries of our talks below.

If you'd like to be involved in our next event, **sign up to our theme by clicking here** or contact Victoria Smith via victoria.smith@auckland.ac.nz

**LIFE IN EXTREME ENVIRONMENTS**

Kathy discussed her involvement in an exciting new collaboration to perform a "grab-and-go" sample return mission to Mars. No more expensive rovers, this mission will be directed to land and return to Earth a sample from a specific area chosen by Kathy and her team.
Global biodiversity and biogeography

Mark presented research being undertaken by his biogeography group in Marine Science, which overturned some of the conventional thinking around biodiversity, and the links between species abundance, variance and size.

Artificial life

Matthew spoke about his current research investigating how the metabolic-organization of living systems (whereby they are constantly falling apart, but rebuilding themselves) relates to other properties that we associate with living organisms. To do so, Matthew develops a variety of computational models of dissipative structures and investigates how they can respond and adapt to environments so as to persist.
In-space plasma propulsion

Electric propulsion is a novel solution to in-space satellite and probe dynamics. Félicien discussed the use of different satellite propulsion systems and his planned research to investigate their properties and performance. Part of Félicien’s work involves collaborations with Australian National University, Stanford University and the European Space Agency for CubeSat propulsion.

DARCEY GRAHAM

Getting to Venus

No longer the sole domain of multi-billion dollar research teams, the exploration of our solar system is becoming a possibility for smaller, more modest space craft. Darcey spoke about her work optimising space craft trajectories to other planets in our solar system, which leverage off novel electric propulsion engines under research at UoA.

FÉLICIEN FILLEUL
Dr. John Cater

Generating power from super-winds

The search for sustainable power generation has spawned a number of exciting research projects. John presented work in which real or artificially generated tornadoes can be used to generate wind energy.

Dr. Nicholas Demaraís

Laboratory astrochemistry

What is our universe made of? How and where were these complex molecules formed? What other molecules might exist? Do they follow the same chemical logic as those created in the lab? To probe these questions, Nicholas examines chemical reactions in the gas-phase in the laboratory, working in a multidisciplinary network with the hope of utilising the University's developing capacity for space science and engineering.
STEVEN TURNBULL

Complex network analysis
How individuals, their characteristics and their actions inter-relate falls within the work that Steven is doing. The complex networks that exist between individuals can be analysed with increasingly sophisticated analysis methods. As part of his PhD research, Steven is utilising these methods to explore why students chose to study in STEM-related fields.

MELTING IN EXTREME ENVIRONMENTS

Melting in extreme environments
Materials under extreme pressures and in strong magnetic fields have remarkably different properties to those the same materials display in more moderate physical environments. Elke is examining the fundamental reasons why this is the case.

DR ELKE PAHL
Information systems and mixed reality

How we visualise data is now being taken into another dimension with the advent of augmented and virtual realities. David described his work in creating a collaborative virtual environment in which data can be explored by teams of people.

Extra-solar planet detection and the search for life

Discovering alien worlds through the technique of gravitational microlensing is about to get a huge boost with the launch of the WFIRST space telescope. Nick described the performance and expected returns from this new instrument.