



THE UNIVERSITY OF
MELBOURNE

Melbourne School of Engineering Dean's Seminar

SEMINAR SERIES 2011

Dr Hugh Hunt

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Thursday 7th April, 3.15pm
Mechanical Engineering Lecture Theatre
Level 3, Building 170
Grattan St, Parkville

SPICE: Stratospheric Particle Injection for Climate Engineering.

MORE INFORMATION

For more Mechanical Engineering seminar
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The SPICE project investigates the benefits, risks, costs and feasibility of solar radiation management through the deployment of reflective aerosols in the stratosphere. We propose that particles can be delivered to the stratosphere through a high-pressure pipe suspended by a balloon tethered at an altitude of 20km. An ultra-high pressure pumping system would deliver a particulate slurry to be dispersed at altitude. The resulting particulate cloud would then lead to global cooling by increasing the albedo of the planet in just the same way as the planet cools after a large volcanic eruption. The feasibility of the SPICE system depends upon the long-term deployment globally of a small number of (say 60) balloons each delivering 5kg/s of aerosol - an estimated 10 million tonnes per year (for context, consider that global manmade CO₂ output is 30,000 million tonnes per year). The project falls under the general heading of "Geoengineering", ie how to cool the planet if we fail to control global

CO₂ emissions.

SPICE presents many novel engineering challenges, especially the design of the pipe and pumping systems to withstand pressures up to 4000 bar and tensions up to 500 tonnes. In this presentation a number of these challenges will be discussed, including the challenge of preparing a 1km test-bed to be constructed in November this year. Preliminary wind tunnel test results will also be presented as an illustration of the complexity of the dynamic behaviour of the tether in high winds.

SPICE is funded by the UK Engineering and Physical Sciences Research Council. Our major collaborators are Bristol and Oxford Universities.