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Automatic
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The Department of Automatic Control & Systems Engineering
is pleased to announce the following seminar:

And then the Sun went “Bang”: An Overview of Space Weather Research

Professor Craig J. Rodger

Head of Department

Department of Physics, University of Otago

New Zealand

Friday, 2 November 2018 at 14:00

Sir Henry Stephenson Building, LT01

Abstract

The Sun is the main provider of energy for the Earth; without it we would surely die. However, the Sun is not just a huge light bulb sending heat and light to us - it is a gigantic fiery ball of burning gas on which the largest explosions in our solar system take place. The highly dynamic Sun affects the Earth in multiple ways. We are only just starting to understand how the Sun drives “Space Weather” - changes in the environment on and around the Earth which affect our technological systems. In my colloquia I will give an overview of this research field, and provide some specific examples around hazards to Earth-orbiting satellites and electrical transmission networks.

Biography

BSc Hons, PhD(Otago)

Fulbright New Zealand Scholar Award (2015)

University of Otago Excellence in Teaching Award (2011)

University of Otago Early Career Award for Distinction in Research (2004)

Editor's Citation for Excellence in Refereeing for the American Geophysical Union's Journal of Geophysical Research - Space Physics (1998 and 2014)

Inaugural Hatherton Award from the Royal Society of New Zealand (1997)

Professor Craig Rodger's primary focus is in Space Weather. Currently, his main research question focuses on quantifying the level and significance of electron precipitation out of the Van Allen radiation belts into the Earth's atmosphere. He has led the development of modelling tools such that we can understand experimental measurements in terms of the magnitude of the changing precipitation flux levels. He has also gained expertise in working with and understanding satellite measurements of the electrons trapped in the Van Allen belts. Working with close collaborators from the British Antarctic Survey, he has ~15 radio receivers in the Arctic and Antarctic which he uses to undertake long range remote sensing of the Earth's upper atmosphere; and hence detect particle precipitation. He collaborates with other groups, to determine the significance of this precipitation to the chemistry of the atmosphere. While his work is primarily “basic” Space Physics, his work has shown that it links to the wider understanding of the Earth's climate, and hence improving modelling of the climate in a CO₂ dominated future.

His Atmospheric Electricity research currently revolves around global lightning detection. From its very first stages in 2002 I have been part of the World Wide Lightning Location Network (WWLLN), a network of radio receivers scattered around the world but linked by the internet. His research in this area focuses on improving the detection efficiency and location accuracy of the lightning detections provided by the network. The group operates one of the two central processing computers of the WWLLN network at Otago and sensors in Dunedin, Scott Base, and Edmonton (Canada).

Finally, Professor Rodger has recently begun working with a colleague on the problem of carbon emissions from transport (e.g., aviation, cruise liners, etc).