THE NORWEGIAN ACADEMY OF SCIENCE AND LETTERS

DRAMMENSVEIEN 78, OSLO
THURSDAY 15 JUNE, 18:00

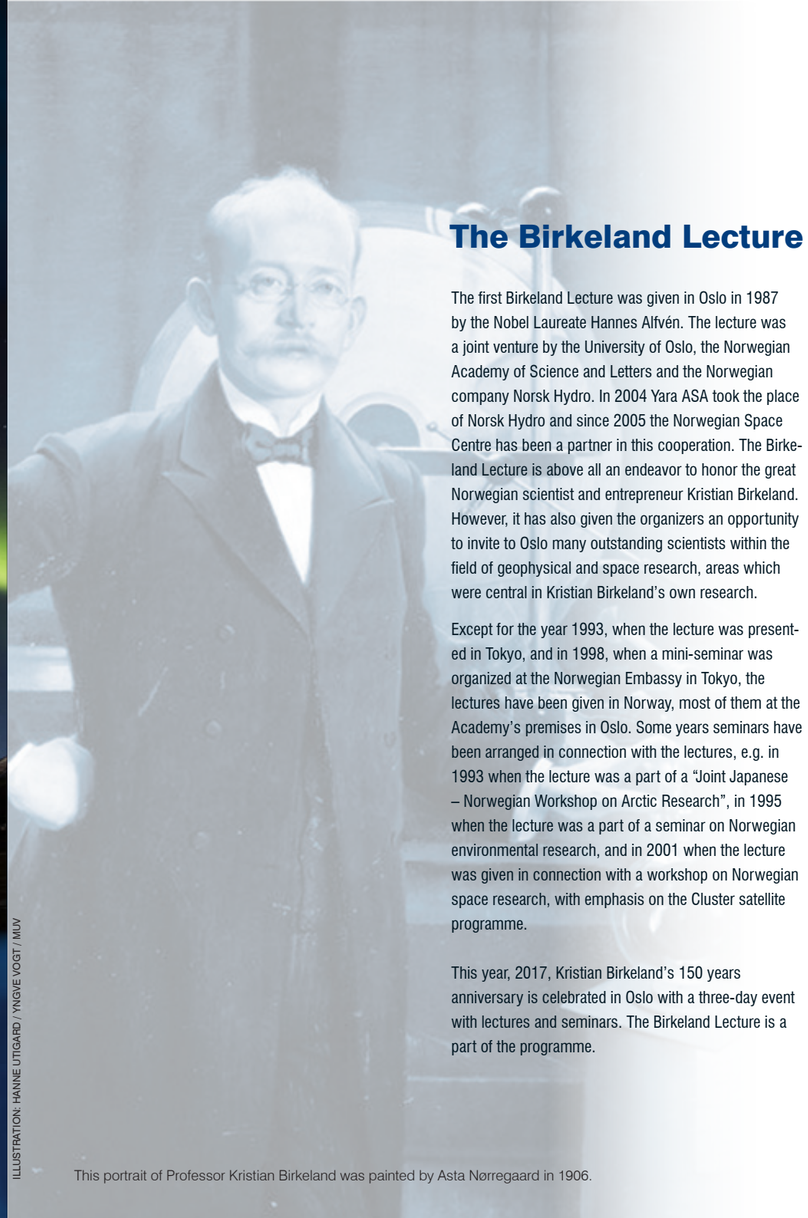
The Birkeland lecture 2017

The Birkeland Anniversary 2017 13–15 June

Professor **David Southwood**,
Imperial College, London, UK

– Kristian Birkeland and the Slow Dawn of Space Weather Understanding

ILLUSTRATION: HANNE UTIGARD / YNGVE VOGT / MUV



This portrait of Professor Kristian Birkeland was painted by Asta Nørregaard in 1906.

The Birkeland Lecture

The first Birkeland Lecture was given in Oslo in 1987 by the Nobel Laureate Hannes Alfvén. The lecture was a joint venture by the University of Oslo, the Norwegian Academy of Science and Letters and the Norwegian company Norsk Hydro. In 2004 Yara ASA took the place of Norsk Hydro and since 2005 the Norwegian Space Centre has been a partner in this cooperation. The Birkeland Lecture is above all an endeavor to honor the great Norwegian scientist and entrepreneur Kristian Birkeland. However, it has also given the organizers an opportunity to invite to Oslo many outstanding scientists within the field of geophysical and space research, areas which were central in Kristian Birkeland's own research.

Except for the year 1993, when the lecture was presented in Tokyo, and in 1998, when a mini-seminar was organized at the Norwegian Embassy in Tokyo, the lectures have been given in Norway, most of them at the Academy's premises in Oslo. Some years seminars have been arranged in connection with the lectures, e.g. in 1993 when the lecture was a part of a "Joint Japanese – Norwegian Workshop on Arctic Research", in 1995 when the lecture was a part of a seminar on Norwegian environmental research, and in 2001 when the lecture was given in connection with a workshop on Norwegian space research, with emphasis on the Cluster satellite programme.

This year, 2017, Kristian Birkeland's 150 years anniversary is celebrated in Oslo with a three-day event with lectures and seminars. The Birkeland Lecture is a part of the programme.

Organizing committee:

Professor Jan A. Holtet, Department of Physics, University of Oslo
Professor Alv Egeland, Department of Physics, University of Oslo
Øyvind Sørensen, Chief Executive, the Norwegian Academy of Science and Letters
Svein Flatebø, Senior Adviser, Yara International ASA
Pål Brekke, Senior Advisor, Norwegian Space Centre

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A list of former Birkeland lecturers is found on
http://www.dnva.no/artikkel/vis.html?tid=44857

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Det Norske Videnskaps-Akademi
The Norwegian Academy of Science and Letters

Norsk Romsenter
NORWEGIAN SPACE CENTRE

YARA
Knowledge grows

Professor **DAVID SOUTHWOOD**
Imperial College, London, UK

David, a planetary scientist, has an abiding interest in the aurora and in the history of solar terrestrial physics. He knows Norway well and has often lectured on cruise ships sailing to northern Norway to see the northern lights.

He is chairman of the Steering Board of the UK Space Agency and Senior Research Investigator at Imperial College. He had an academic career as a space scientist in Britain and USA, eventually becoming head of Physics at Imperial College, London.

In 1997, he left academia for the European Space Agency to draw up what has become the current architecture of European Earth Observation space programmes (Living Planet and Copernicus).

In 2001 he made another major change in career and became Director of Science at ESA, taking responsibility for all Astronomy and Space science missions, overseeing projects as diverse as Mars Express, the Rosetta comet probe and the Herschel infra-red observatory. Later, Robotic Exploration was added to his responsibilities. He retired from ESA in 2011, returned to an emeritus position at Imperial College in London and to join the Steering Board of the new UK Space Agency, becoming chair in 2016. He is a past president of the Royal Astronomical Society (2012-2014), a fellow of the Royal Aeronautical Society, and a visiting professor at the Universities of Plymouth and Lancaster, and a Distinguished Visiting Scientist at the NASA Jet Propulsion Laboratory, USA.

He is vice-chair of the EU Horizon 2020 Space Expert Advisory Group and patron of the British Science Fiction Foundation. He comes from Devon in the South West of England where he is patron of Plymouth Astronomical Society, honorary president of the Bristol Astronomical Society and a trustee of the Sir Alister Hardy Foundation for Ocean Science.

David himself remains an active space scientist. A space magnetometer he built at Imperial and that was launched in 1997 still operates day in day out in orbit around the planet Saturn aboard the NASA Cassini spacecraft.

Aurora seen from the International Space Station. Courtesy Astronaut Tim Peake and ESA/NASA

Professor **DAVID SOUTHWOOD,** Imperial College, London, UK

– Kristian Birkeland and the slow dawn of space weather understanding

In the years just before its full independence in 1905, Norway produced some of its best known sons, Henrik Ibsen, Edvard Munch, Edvard Grieg, Fridtjof Nansen and Roald Amundsen.

Just as creative and remarkable in many ways was the scientist, Kristian Birkeland. He was the man who not only would have the key insight that would open up our understanding of how solar and earth environment directly interlink but also a man who believed in applying science to immediate problems. He was a polar explorer and yet also co-founder of what was to become the largest company in Norway, Norsk Hydro, as well as an inventor of popular renown. He died at 50 years of age, precisely 100 years ago.

The auroral polar light displays in Northern and Southern hemispheres now are seen as the most dramatic visual feature of a whole new science called space weather. Birkeland would not have been surprised but nearly all his scientific contemporaries 100 years ago would have been amazed. Ironically, it would take another 50 years for his greatest insight that the polar aurorae were due to electrically charged particles hitting the upper atmosphere to become firmly proven by an American spacecraft and for his insights to be become generally accepted.

Why did it take so long? Partly, it was due to having ideas almost before their time and partly it was due to prejudice by a scientific establishment who were rather fixed in their way of thinking.

I hope to make amends for what was largely a British establishment. We'll explore what Birkeland found, why it took so long for him to be understood and most importantly, why he really deserves to have his picture, not only on the tail of a Norwegian airplane, but also on the 200Kr banknote.