THE NORWEGIAN ACADEMY
OF SCIENCE AND LETTERS

DRAMMENSVEIEN 78, OSLO
THURSDAY, SEPTEMBER 23, 18:00

THE BIRKELAND LECTURE 2010

DR. CHRISTER FUGLESANG,
Science and Application Division, Human Space Flight
Directorate, European Space Agency (ESA)

"Voyages to the International Space Station"

– a marvellous platform for research and future space exploration

No registration necessary. Free admission

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

The Birkeland Lecture 1987-2008

The University of Oslo has since 1987 arranged a "Birkeland Lecture" in cooperation with the Norwegian Academy of Science and Letters, the Norwegian company Norsk Hydro (from 2004 YARA ASA) and the Norwegian Space Centre (from 2005). Except for the year 2003, when the lecture was presented 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 cooperation between the University of Oslo, the Academy, Norsk Hydro/YARA and the Norwegian Space Centre is above all an endeavor to honor the great Norwegian scientist and entrepreneur Kristian Birkeland. However, it has also given the University the 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.

1987: Hannes Alfven , Kungliga Tekniska Høgskolan , Stockholm, Sverige, and University of California, San Diego, USA::
"The Auroral Research in Scandinavia"
(University of Oslo, 03. 09 1987)

1988: Alex J. Dessler , Rice University, Housten, USA:
"I have it" - Birkeland´s quest for research founding"
(University of Oslo, 16. 09 1988)

1989: T.A. Potemra, The John Hopkins University, Laurel, USA:
"Satelite measurements of Birkeland currents"
and
Naoshi Fukushima, Tokyo University, Japan:
"Birkeland´s work with the geomagnetic disturbances in relation to modern research"
(The Norwegian Science Museum, Oslo, 24.10 1989)

1990: James van Allen , University of Iowa, USA:
"On the future of space science and applications"
(The Norwegian Academy of Science and Letters, Oslo, 10.10 1990)

1991: Syun-Ichi Akasofu , Geophysical Institute, Fairbanks, Alaska:
"Helio-magnetism"
(University of Oslo, 24.10 1991)

1992: W. Ian Axford , Max-Planck Institut, Lindauer, Tyskland:
"The origin of cosmic rays"
(University of Oslo, 24.09 1992)

1993: Takasi Oguti, Solar-Terrestrial Environment Laboratory, Tokyo, Japan:
"Sun-earth energy transfer"
(Tokyo University, Japan, 07.10 1993)

1994: Stanley W.H. Cowley, Imperial College, UK:
"The Solar wind – Magnetosphere-Ionosphere connection"
(The Norwegian Academy of Science and Letters, Oslo, 22.09 1994)

1995: Anthony L. Peratt, Los Alamos National Laboratory, USA:
"The legacy of Birkeland´s plasma torch"
(University College, Notodden, Norway, 21.09 1995)

1996: Gerard Haerendel, Max Planck Institute, Garching, Tyskland:
"Physics along auroral magnetic field lines"
(University of Oslo, Norway, 19. 09 1996)

1998: No lecture, but a ***"Birkeland event"*** at Tokyo University 30. 09 with presentation of a Birkeland bust to Tokyo University, and a mini-seminar at the Norwegian Embassy.

2001: David Southwood, Imperial College, London / Director of Research ESA, Paris:
"Kristian Birkeland, Science Forever, Lessons for Today"
(The Norwegian Academy of Science and Letters, 20.09 2001)

2002: Alain F. Roux, Centre dĚtude des Env. Terrestres et Planetaires, CETP, Paris:
"Role of Kristian Birkeland curents in the dynamics of the geomagnetic tail"
(The Norwegian Academy of Science and Letters, Oslo, 19.09 2002)

2003: Lev M Zelenyi, Space Research Institute, IKI, Moscow, Russia:
"Space Weather"
(The Norwegian Academy of Science and Letters, Oslo, 19.09 2003)

2004: Catherine G. Coleman, NASA, Houston, USA:
"Our Earth seen from Space"
(University of Oslo, 23.09 2004)

2005: Wiliam J. Burke, Air Force Geophysics Laboratory, USA:
"Kristian Birkelands Message from the Sun – Its meaning then and now"
(University of Oslo, 22.09 2005)

2006: Margaret Kivelson, University of California, Los Angeles (UCLA), USA:
"A century after Birkeland: Auroras and related phenomena at moons and planets"
(The Norwegian Academy of Science and Letters, Oslo, 21.09 2006)

2007: Dr: Eigil Friis-Christensen, Danish National Space Center (DTU)
"Unrest on the Sun – storms on the Earth. The magnetic connection"
(The Norwegian Academy of Science and Letters, Oslo, 27.09 2007)

2008 Franz-Josef Lübken, Leibniz-Institut für Atmosphärenphysik, Kühlungsborn, Germany
"Dramatic climate changes in the upper atmosphere"
(The Norwegian Academy of Science and Letters, Oslo, 25.09 2008)

2009 Paul M. Kintner, Jr, School of Electric and Computer Engineering, Cornell University, Ithaca, NY, USA
"Extreme space weather"
(The Norwegian Academy of Science and Letters, Oslo, 24.09 2009)

Dr. Christer Fuglesang,
Science and Application Division, Human Space Flight Directorate, European Space Agency (ESA)

"Voyages to the International Space Station"

- a marvellous platform for research and future space exploration.

The International Space Station has been assembled in orbit, 350 km above Earth, since 1998 and is now all but complete. It has been permanently inhabited for ten years. ISS is a fabulous wonder, which has been as politically and socially challenging to build as technologically demanding. But now it offers a multitude of research potentials to many scientific communities around the world. Most of them exploit the weightlessness (or micro-gravity, to be specific) in orbit to perform experiments in fundamental physics, material science, fluid physics, biology and physiology. However the space station also offers an outstanding platform to look both down towards Earth and out into space. AMS, e.g., is a unique instrument that will detect particles, and anti-particles, from outer space for at least ten years on the outside of ISS. A full program is being studied on how to best utilize the space station for research on climate change. Last, but not least, from ISS one can do wonderful observations of auroras and related phenomena in the upper atmosphere, the favourite field of Kristian Birkeland.

The speaker have had the great fortune and privilege to take part in the construction of ISS in space during two space shuttle missions and has also performed some experiments there related to radiation in space. Part of that personal story will be presented together with the scientific potential of ISS and a vision of future space exploration.

Yara's Birkeland Prize in Physics and Chemistry

Yara's Birkeland Prize in Physics and Chemistry will be awarded to a Ph. D. candidate from a Norwegian university who has carried out a scientific study that is in accordance with the innovative spirit of Kristian Birkeland. The prize will focus on the environment and technology, and encourage research across the traditional borders. The prize will alternate between physics and chemistry, with chemistry in years with odd numbers and physics in years with even numbers.

The award ceremony will take place in connection with the Birkeland lecture. The prize was awarded for the first time in 2009.

Dr. Christer Fuglesang

ASTRONAUT,
HEAD OF SCIENCE AND APPLICATION DIVISION, HUMAN SPACE FLIGHT DIRECTORATE,
EUROPEAN SPACE AGENCY (ESA)

Born in Stockholm, Sweden. Received a Master of Science in engineering physics from the Royal Institute of Technology (KTH), Stockholm, in 1981, and a Doctorate in experimental particle physics in 1987. In 1988, he became a Fellow of CERN, and Senior Fellow in 1989. In November 1990, Fuglesang obtained a position at the Manne Siegbahn Institute of Physics, Stockholm, working towards the new Large Hadron Collider (LHC) project in CERN. He became a Docent in particle physics at the University of Stockholm in 1991. He was appointed Affiliated Professor at KTH in 2006.

Fuglesang was selected to join the European Astronaut Corps, based at the European Astronaut Centre (EAC) in Cologne, Germany in 1992. He followed the introductory training programme at EAC and a training programme at the Gagarin Cosmonaut Training Centre (GCTC) in Russia. He completed basic training at EAC in 1993. He was then selected for the Euromir 95 mission and commenced training at GCTC in preparation for flight engineer tasks, extravehicular activities (spacewalks) and operation of the Soyuz spacecraft. In March 1995, he was selected as member of Crew 2 for the Euromir 95 mission. During the mission Fuglesang was the prime Crew Interface Coordinator (CIC).

Fuglesang entered the Mission Specialist Class at NASA's Johnson Space Center, Houston, in 1996. In 2002, he was assigned as a Mission Specialist to the STS-116 Space Shuttle mission, and in 2008 as Mission Specialist on the STS-128 Space Shuttle mission to the International Space Station. From 9 to 22 December 2006, Christer Fuglesang flew as Mission Specialist on Space Shuttle Discovery to the International Space Station. He became the first Swedish astronaut to fly in space. During this mission he conducted three spacewalks, to attach new hardware to the ISS and to reconfigure the Station's electrical power system.

Fuglesang participated in his second spaceflight from 29 August to 12 September 2009 as Mission Specialist to the International Space Station. During this mission Fuglesang made two spacewalks. He also undertook experiment, educational and public relations activities as part of this mission.

In May 2010 Fuglesang took up the position as Head of Science and Application Division in the Human Space Flight directorate of ESA. He is now stationed at ESTEC in The Netherlands.

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
Rune Ingels, Vice President, Yara International ASA
Bo Andersen, Director General, Norwegian Space Centre

The Birkeland Lecture is open for everybody. There is no registration. Free admission.

For more information about the Birkeland Lecture 2010:
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