NTNU
100 skapende år

MAN IN EXTREME ENVIRONMENTS
APPLIED PHYSIOLOGY FROM SUBSEA TO SPACE

In honour of Professor Alf O. Brubakk

PROGRAM

Presented by the NTNU Baromedical and Environmental Physiology Group, Trondheim, Norway

Blåhø Auditorium, Øya Helsehus. Thursday 16. and Friday 17. December 2010

THURSDAY 16. DECEMBER 2010

0900-0915 **WELCOMING REMARKS**

Torbjørn Digernes, Rector of NTNU, Norway

Stig Slørdahl, Dean of the Faculty of Medicine, NTNU, Norway

0915-0930 **Paul Rose**, UK. BBC television presenter, expedition leader and polar explorer
Transmits live from Antarctica: **MAN IN EXTREME ENVIRONMENTS**

SESSION A: MEDICAL TECHNOLOGY

Session chairs Svein Erik Måsøy and Lasse Løvstakken, NTNU

0930-1000 **Rune Aaslid**, Hemodynamics, Switzerland
MISSION POSSIBLE: QUANTITATIVE HEMODYNAMIC MEASUREMENTS WITH ULTRASOUND DOPPLER
Director of research at Hemodynamics AG. Co-author of Alf Brubakk's first paper "Dynamic pressure-flow relationship of the human aorta" in Ver Dtsch Ges Kreislaufforschg 1973.

1000-1020 **Ingrid Gribbestad**, NTNU, Norway
MRI - FUNCTIONAL AND METABOLIC POSSIBILITIES
Professor at the NTNU Medical Faculty and Director of the NTNU MR Cancer Group.

1020-1040 **Bjørn Angelsen**, NTNU, Norway
ULTRASOUND IMAGING – FROM EARLY IDEAS TO TODAY'S POSSIBILITIES
Professor of Biomedical Engineering at the NTNU Medical Faculty. Ultrasound based research in noninvasive diagnosis of cardiac function.

1040-1100 *Break*

1100-1130 **Michael L. Gernhardt**, National Aeronautics and Space Administration (NASA), USA
DIVING IN SPACE
NASA Astronaut, manager of environmental physiology laboratory and principle investigator of pre-breathe reduction program, Johnson Space Center. Four times in space including four spacewalks.

1130- 1230 **POSTER SESSION AND LUNCH**
Posters are in the hall outside of the Blåhø auditorium. Buffet lunch at Øya Helsehus cafeteria.

SESSION B: PHYSIOLOGICAL GENOMICS AND SYSTEMS BIOLOGY

Session chairs Ingrid Eftedal and Helge Klungland, NTNU

1230-1330 **Randy Jirtle**, Duke University, USA
EPIGENETICS, IMPRINTING AND DISEASE SUSCEPTIBILITY
Director of the Epigenetics and Imprinting Laboratory at Duke University and a celebrity in epigenetics. Recipient of many professional awards and recognitions; Jirtle has lectured at the Nobel symposium on epigenetic reprogramming and was nominated for Time Magazine's Person of the Year 2007.

1330–1430 **Allen Cowley**, Medical College of Wisconsin, USA
PHYSIOLOGICAL GENOMICS
Chairman of the Department of Physiology at the Medical College of Wisconsin and Director of the Cardiovascular Centre. His molecular genetics approach to understanding the regulation of cardiovascular and renal function and hypertension resulted in the first comprehensive systems biology genetic map of cardiovascular function in Science in 2001.

1430-1450 *Break*

SESSION C: ALTITUDE AND TEMPERATURE

Session chairs Trine Karlsen and Morten Høydal, NTNU

1450-1510 **Russell S. Richardson**, University of Utah, USA
EXERCISE AND OXYGEN AVAILABILITY: THE CELLULAR IMPACT
Professor of Exercise and Sports Science and Internal Medicine, with interest in oxygen transport from air to tissue.

1510-1530 **Hannu Rintamäki**, Finnish Institute of Occupational Health, Finland
PHYSICAL CONSEQUENCES OF EXPOSURE TO COLD
Professor in Applied Physiology with expertise in thermo-physiology and physiological performance in cold conditions.

1530-1550 **Torkjel Tveita**, University of Tromsø, Norway
EFFECTS OF HYPOTHERMIA AND REWARMING ON CARDIOVASCULAR FUNCTION
Professor and anesthesiologist who treats victims of hypothermia, including fishermen who have fallen into the frigid Norwegian waters and cross-country skiers marooned in bad weather.

1550–1610 **Godfrey Smith**, University of Glasgow, UK
THE EFFECT OF HYPOTHERMIA AND REWARMING ON THE ELECTRICAL ACTIVITY OF THE HEART: ECG PRECURSORS AND ARRYTHMOGENIC MECHANISMS
Professor of Cardiovascular Physiology examining excitation-contraction coupling in cardiac muscle in health and disease.

1610-1700 **Bengt Saltin (pending confirmation)**, University of Copenhagen, Denmark
ADAPTATION AND SURVIVAL AT HIGH ALTITUDE
A leading human physiologist who has devoted his life to researching the effects of physical exercise on health and performance. Saltin coined and proved the term 'humans were meant to move' from the level of gene expression to heart and muscle function.

EVENING PROGRAM FOR INVITED SPEAKERS AND PARTICIPANTS WHO HAVE REGISTERED FOR THIS OPTION: LAVVO DINNER AT FRØSET GÅRD

Departure for Frøset at Byneset by bus from Bakeriet Hotel at 1830.

FRIDAY 17. DECEMBER 2010

SESSION D: ENVIRONMENTAL PHYSIOLOGY, PART 1

Session chairs Michael L. Gernhardt, NASA and Andreas Møllerløkken, NTNU

0900–0930 **David Elliott**, UK
IS SATURATION DIVING SAFE? FACTS AND MYTHS
The Civilian Consultant in Diving Medicine to the Royal Navy. Elliott has been President of the Undersea Medical Society in USA, President of the European Undersea Biomedical Society and Chairman of the Diving Medical Advisory Committee for the North Sea. He is also the man behind the book "Bennett and Elliott's Physiology and Medicine of Diving", of many considered the "Bible" of diving research.

0930-0955 **Wayne Gerth**, Navy Experimental Diving Unit, USA
DECOMPRESSION MODELING AND DIVE COMPUTERS
A research physiologist at the U.S. Navy Experimental Diving Unit and an Adjunct Assistant Research Professor of Anesthesiology at Duke University Medical Center. He is the developer of the U.S. Navy Thalmann Algorithm Dive Planner and decompression tables for helium-oxygen diving with the U.S. Navy MK 16 Mod 1 underwater breathing apparatus.

0955-1020 **Stephen Thom**, University of Pennsylvania Medical Center, USA
DECOMPRESSION SICKNESS IS AN INFLAMMATORY DISEASE
Professor of Emergency Medicine specialized in Emergency Medicine and Hyperbaric Therapy. Chief of Hyperbaric Medicine Institute for Environmental Medicine, and Medical Director of the Pennstar Flight Program University of Pennsylvania Philadelphia.

1020-1045 **Richard Moon**, Duke University Medical Center, USA
HOW DOES DIVING AFFECT PULMONARY GAS EXCHANGE?
Professor of Anesthesiology, Associate Professor of Medicine and Chief Division of General, Vascular, and Transplant Anesthesia at Duke University. Moon is also Medical Directo of the, Hyperbaric Center with interest in physiology of extreme environments, altitude and diving, perioperative respiratory function and monitoring of organ function during hypovolemia.

1045-1100 *Break*

SESSION E: ENVIRONMENTAL PHYSIOLOGY, PART 2

Session chairs Richard Moon, Duke Univ. and Matthew Swiergosz, Office of Naval Research

1100-1125 **Željko Dujić**, University of Split School of Medicine, Croatia
CARDIOPULMONARY EFFECTS OF BREATHHOLD DIVING
Professor of Physiology, with interest in human integrative physiology, cardiovascular physiology, respiratory physiology, diving and exercise physiology.

1125-1150 **Igor Mekjavic**, Jozef Stefan Institute, Slovenia
HUMAN THERMOREGULATORY FUNCTION DURING EXERCISE AND DIVING
Professor of Environmental Physiology and Senior Scientist at the Department of Automation, Biocybernetics and Robotics.

1150-1215 **Michael A. Lang**, Smithsonian Institution, USA
THE REVOLUTION OF SCIENCE THROUGH SCUBA
Director of the Smithsonian Marine Science Network. Expertise in polar science, diving physiology and promotion of underwater research. Lang is a 1991 DAN/Rolex Diver of the Year, 2008 AAUS Conrad Limbaugh Award recipient, 2009 DEMA Reaching out Award/Diving Hall of Fame member and 2010 NOGI for Science recipient.

1215-1240 **Michael A. Lang**, Smithsonian Institution, USA
TRAINING SCUBA DIVERS: A FATALITY AND RISK ASSESSMENT
(Presentation prepared by PADI-president Drew Richardson)

1240-1340 **POSTER SESSION AND LUNCH**

Posters are mounted in the hall outside of the Blåhø auditorium. Buffet lunch at Øya Helsehus cafeteria.

SESSION F: EXERCISE PHYSIOLOGY

Session chairs Anne D. Hafstad, University of Tromsø and Øyvind Ellingsen, NTNU

1340-1405 **Steve L. Britton**, University of Michigan, USA

AEROBIC CAPACITY IS THE MAJOR DETERMINANT OF THE CONTINUUM BETWEEN HEALTH AND DISEASE

Professor of Anesthesiology and of Molecular and Integrative Physiology with interest in aerobic capacity and its relation to health and disease.

1405–1430 **Martin Halle**, University of München, Germany

THE FUTURE OF HEALTH CARE

Professor Martin Halle is the Director of the Department of Prevention, Rehabilitation and Sports Medicine, Technische Universität München. Specialist in Internal Medicine, Cardiology and Sports Medicine.

1430–1455 **Martin Gibala**, McMaster University, Canada

HIGH INTENSITY INTERVAL EXERCISE

Chair of the Department of Kinesiology at McMaster University in Hamilton, Canada. Gibala is an award-winning professor who studies energy metabolism, nutrition and exercise research.

1455–1515 **Ulrik Wisløff**, NTNU, Norway

AIMING AT THE HEART THROUGH EXERCISE

Professor of Cardiovascular Physiology and Head of the Cardiac Exercise Research Group, NTNU with interest in Cellular Exercise Cardiology.

CONCLUSIONS AND CLOSING REMARKS

1515-1535 **Alf O. Brubakk**, NTNU, Norway

IT'S NEVER TOO LATE TO GIVE UP

As a professor in Environmental Physiology, he has focused his research on physiological responses to extreme environments and development of biomedical instrumentation for the last two decades. His main activities have been related to decompression from dives or to altitude / space, comprising both experimental and clinical work. Professor Brubakk has managed numerous research contracts from the Norwegian Petroleum Directorate, Health and Safety Executive (UK), Norwegian Space Centre, Philips Petroleum, Statoil, Hydro, British Gas and the Norwegian Research Council. He has been awarded the Behnke Award by the Undersea & Hyperbaric Medical Society in 1995 and the Statoil Award for Scientific Achievement, Statoil Norway in 2001.

1535-1550 **Andreas Møllerløkken**, NTNU, Norway

CLOSING REMARKS

Post doc and physiologist at the Baromedical and Environmental Physiology Group with research interest in translational models of decompression sickness.

FOR LECTURERS AND PARTICIPANTS WHO HAVE REGISTERED FOR THIS OPTION, A TAPAS BUFFET WILL BE SEVERED IN THE CAFETERIA AT ØYA HELSEHUS FROM 1600

EXPLORER'S NIGHT; HOW TO FACE THE EXTREMES IN A PRACTICAL WAY

1800-2200 **This session has separate registration and is held at Studentersamfundet; The red, round house across the street from Øya Helsehus.**

Doors will open at 1700.

Herbert Nitsch	The deepest man on Earth
Tanja Streeter	The deepest woman on earth
Børge Ousland	Crossing the poles
Sir Chris Bonington	On top of the world
Jay Buckey	When the world is not enough – Going into space

WE THANK OUR SPONSORS FOR HELPING US MAKE THIS SEMINAR POSSIBLE: