

# The Danish Cardiovascular Research Academy and Faculty of Health Sciences, University of Copenhagen

## PhD-course: Cardiovascular Imaging

**Aim and Content:** This course covers important theoretical and practical aspects of methods in Cardiovascular Imaging. The purpose is to provide the participants with knowledge of advantages and pitfalls of these methods during morning lectures and to demonstrate methods during afternoon practical sessions. Complete course program is also available at [www.dacra.dk](http://www.dacra.dk)

**Participants:** 20-30 PhD-students.

**Form:** 28 morning lectures. 14 hours of afternoon demonstrations and practical work. Homework required. Knowledge Review.

**Teaching Language:** English.

### Course Directors:

Birger Hesse, MD, DMSc, Dept Clinical Physiology, Diagnostic Centre,

Rigshospitalet, Univ of Copenhagen. E-mail: [birger.hesse@rh.regionh.dk](mailto:birger.hesse@rh.regionh.dk)

Klaus F Kofoed, MD, DMsC, Dept Cardiology, The Heart Centre, Rigshospitalet, Univ of Copenhagen. E-mail: [kkofloed@dadlnet.dk](mailto:kkofloed@dadlnet.dk)

Mikael Sander, MD, PhD, Dept Cardiology, The Heart Centre, Rigshospitalet, Univ of Copenhagen. E-mail: [mikael.sander@gmail.com](mailto:mikael.sander@gmail.com)

**Teachers:** International and national experts. The experts will lecture and also participate in the afternoon sessions.

**Date:** 5 Days, Monday, November 22nd - Friday, November 26th, 2010.

**ECTS:** 5.0

**Place:** Rigshospitalet and Panum Institute, Copenhagen, Denmark.

**Course Fee:** DKK 12.000. No fee for registered Danish PhD-students.

### Course Secretary:

Mikael Sander, MD, PhD, Aviation Medicine, The Heart Centre, Rigshospitalet, University of Copenhagen, Denmark. E-mail: [mikael.sander@gmail.com](mailto:mikael.sander@gmail.com)

**Registration:** By e-mail or fax to the course secretary before October 1st, 2010.

**Monday November 22nd: Myocardial Perfusion.**

- 08:00 - 08:30 Welcome and coffee.
- 08:30 - 09:30 Physiology and pathophysiology of the coronary circulation.  
Marcello Di Carli  
Harvard, Massachusetts, USA
- 09:30 - 10:15 Myocardial perfusion by SPECT.  
Birger Hesse, MD DMSc,  
Copenhagen, Denmark.
- 10:15 - 10:30 Coffee/Tea.**
- 10:30 – 11:15 Myocardial perfusion by PET.  
Philip Kaufmann  
Zürich, Switzerland
- 11:30 – 12:15 Coronary artery imaging by CT.  
Klaus F Kofoed, MD, DMSc  
Copenhagen, Denmark.
- 12:15 - 12:45 Lunch.**
- 12:45 – 13:30 Invasive coronary artery imaging.  
Thomas Engstrøm, MD, DMSc, PhD  
Copenhagen, Denmark.
- 13:30 – 14:15 Hybrid imaging of coronary arteries.  
Philip Kaufmann  
Zürich, Switzerland
- 14:15 - 14:30 Coffee/Tea.**
- 14:30 -16:30 Video-demonstrations: myocardial SPECT, myocardial PET, CT-angiography, invasive coronary angiography, cardiac MRI.

**Tuesday November 23rd: Myocardial metabolism and innervation.**

- 08:00 - 08:45      Physiology and patophysiology of myocardial metabolism  
Hans-Erik Bødtker  
Århus, Denmark.
- 08:45 - 09:30      Myocardial metabolism by radionuclide imaging techniques.  
Marcello DiCarli  
Boston, USA
- 09:30 - 09:45      Coffee/Tea.**
- 09:45 - 10:30      Myocardial metabolism by MR.  
Thomas Fritz-Hansen, MD, DMSc  
Copenhagen, Denmark.
- 10:30 – 11:15      Myocardial metabolism by invasive methods.  
Hans-Erik Bødtker  
Århus, Denmark.
- 11:15 - 11:30      Coffee/Tea.**
- 11:30 – 12:15      Imaging of cardiac neurones.  
Philip Hasbak, MD  
Copenhagen, Denmark.
- 12:15 – 13:00      Radiation exposure from cardiac imaging  
Claire Fynbo  
Denmark
- 13:00 - 13:30      Lunch.**
- 13:30 - 16:00      Visits to Echo - SPECT – PET – CT angio – invasive angio

## **Wednesday November 24th: Imaging and invasive measurements in heart failure**

- 08:00 - 08:45 Pathophysiology of heart failure  
Jeroen J Bax  
Leiden, Holland
- 08:45 - 09:30 Echo imaging in systolic heart failure  
Lars Køber, MD, DMSc  
Rigshospitalet, Denmark
- 09:30 - 09:45 Coffee/Tea.**
- 09:45 - 10:30 Echo imaging in diastolic heart failure  
Jacob Møller, MD, DMSc  
Rigshospitalet, Denmark
- 10:30 – 11:15 Nuclear imaging in heart failure  
Jeroen J Bax  
Leiden, Holland
- 11:15 - 11:30 Coffee/Tea.**
- 11:30 – 13:00 Invasive measurements in heart failure and work-up for  
candidates for heart transplantation.  
Finn Gustaffson, MD, DMSc  
Rigshospitalet, Denmark
- 13:00 - 13:30 Lunch.**
- 13:30 - 15:00 Demonstration A: Invasive diagnostics in heart failure
- 15:00 – 16:30 Demonstration B: Echo in heart failure

## **Thursday November 25th: Molecular imaging of the cardiovascular system.**

- 08:00 - 08:45      Background for molecular imaging  
Sam Gambhir  
Stanfor, California, USA
- 08:45 - 09:30      Imaging of the vulnerable plaque - FDG and beyond.  
Andreas Kjær, MD, DMSc  
Rigshospitalet, Denmark
- 09:30 - 09:45      Coffee/Tea.**
- 09:45 - 10:30      Imaging of VEGF receptors.  
Jens Kastrup, MD, DMSc  
Rigshospitalet, Denmark
- 10:30 – 11:15      Imaging of angiogenesis and apoptosis.  
Andreas Kjær, MD, DMSc  
Rigshospitalet, Denmark
- 11:15 - 11:30      Coffee/Tea.**
- 11:30 – 13:00      Animal models of atherosclerosis  
Lars Bo Nielsen, MD, DMSc  
Rigshospitalet, Denmark
- 13:00 - 13:30      Lunch.**
- 13:30 - 15:00      Demonstration A: Near infrared spectroscopy
- 15:00 – 16:30      Demonstration B: New ultrasound techniques
- 19:00 – 00:30      Course-dinner.**

## **Friday November 26th: Newer imaging techniques in non-cardiac tissue.**

- 08:00 - 08:45 Control of flow and metabolism in skeletal muscle.  
Bengt Saltin, MD, DMSc  
Copenhagen, Denmark
- 08:45 - 09:30 MRI arterial spin labeling.  
Russell Richardson, PhD  
Veterans Hospital, Salt Lake City, Utah
- 09:30 - 09:45 Coffee/Tea.**
- 09:45 - 10:30 MRI spectroscopy.  
Russell Richardson, PhD  
Veterans Hospital, Salt Lake City, Utah
- 10:30 – 11:15 PET skeletal muscle flow during rest and exercise  
Pirjo Nuutila, MD  
Turku, Finland
- 11:15 - 11:30 Coffee/Tea.**
- 11:30 – 12:15 Near infrared spectroscopy.  
Robert Boushel, PhD  
Copenhagen, Denmark.
- 12:15 – 13:00 New ultrasound based technique for flow measurements.  
Kristoffer Lindskov Hansen  
Dept Radiology, Rigshospitalet, Denmark
- 13:00 - 13:30 Lunch.**
- 13:30 – 16:30 Examination – Knowledge Review – Course Certificates.