

# Newsletter/Core facilities

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from The Faculty of Medicine

[www.ntnu.edu/dmf/core-facilities](http://www.ntnu.edu/dmf/core-facilities) | [janne.ostvang@ntnu.no](mailto:janne.ostvang@ntnu.no)

## MR Core Facility

**Are you searching for methods for preclinical *in vivo* imaging of small animals or does your research need metabolomic analysis of human tissue samples or body fluids? Then you can benefit from the state-of-the-art MR equipment, services and expertise offered by the MR Core Facility, a facility that is coordinated by Norway's leading MR research community.**

"We want to support and offer services to all good scientific projects that can benefit from our MR technology. Our instrument park and expertise are mainly focused on two areas: *In vivo* MR imaging and spectroscopy in disease models in small animals, and high resolution NMR spectroscopy where we can perform MR metabolomic analysis of human tissue samples and body fluids. Many of these techniques can also be applied in clinical MR, so much of our activities have a great translational potential. However, our instruments are suitable for a wide range of applications within biology, chemistry and physics," says scientific leader Professor Olav Haraldseth.

If you have little or no experience with MR, the staff at the MR Core Facility will be happy to discuss possible experiment setups, and help assess whether your project may benefit from different MR methods.

"The staff at the MR Core Facility has limited capacity to run experiments and analyses for the customers. We are happy, however, to provide training of new users and assist them in to running their own experiments and analysis. We also assist in setting up the MR methods and in analysis and post-processing of data. The expertise and support of the entire MR community are always available to the users," says core manager Marius Widerøe.



The large research community around the MR Core Facility in Trondheim that contributes to a high level of competence, and new cutting-edge MR methods is constantly implemented. It conducts research at a high international level related to cancer, pediatrics and cardiovascular diseases, neuroscience and stem-cell research, metabolomics and functional-MRI. In addition, the MR Core Facility is part of the MI-Lab, which goal is to facilitate cost-effective health care and improved patient outcome through innovation in medical imaging, and to exploit the innovations to create industrial enterprise in Norway.

## Continued – MR Core Facility

Furthermore, the MR Core Facility is involved in a national network through participation in NorMIC, a national programme to strengthen research in imaging technology, and the national graduate school in medical imaging.

MR technology continues to evolve, providing new technology for better research.

"With recent upgrades all our MR instruments are state-of-the-art. We now look forward to the next phase of the infrastructure project NorBrain where we hope to get funding for a clinical 7Tesla MR scanner," says scientific leader Haraldseth. "It will complement our instrument park which is under constant development."

### MR Core Facility participates in two international networks:

1) Euro-BioImaging, <http://www.eurobioimaging.eu/>  
A large-scale pan-European research infrastructure project on the European Strategy Forum on Research Infrastructures (ESFRI) Roadmap. Euro-BioImaging provides access to, and training in, imaging technologies and is hoped to become a driver for European innovation in imaging research and technologies.

2) EATRIS, <http://www.eatris.eu/EATRIS.aspx>  
The European Advanced Translational Research Infrastructure in medicine that aims at advancing translational science in Europe by providing infrastructure to allow a faster and more efficient transfer of research discoveries into new products to prevent, diagnose or treat diseases.

### Links:

MR Core Facility: <http://www.ntnu.edu/dmf/mr-corefacility>

NorMic : <http://www.uib.no/rg/normic>

Forskerringkolen: <http://www.ntnu.edu/medicalimaging>

MR Cancer group: <http://www.ntnu.no/isb/mrcancer>

FUGE Molecular Imaging Center:

[http://www.ntnu.edu/fuge\\_mr](http://www.ntnu.edu/fuge_mr)

The Metabolic Neuroscience Group:

<http://www.ntnu.edu/inm/neurometabolism>

Trondheim fMRI group: <http://www.ntnu.no/isb/fmri>

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<http://www.ntnu.edu/dmf/mr->

Daily manager Marius Widerøe

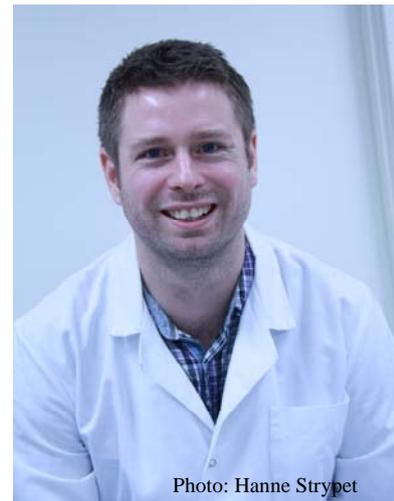


Photo: Hanne Strypet



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## Official opening of the MR Core Facility

**The official opening of the MR Core Facility will take place on 23. October.**

“We have been operating as a core facility since February and have used this time to establish ourselves as a well-run facility. Now, after the major upgrade of our 7Tesla small animal MR scanner in September and with all technical staff in place, we are ready to take on new users and projects,” says core manager Marius Widerøe.

The opening will be marked by a seminar, where Professor Jim Delikatny from University of Pennsylvania is especially invited to talk about the detection of metabolic changes in response to therapy using MR spectroscopy. There will also be presentations displaying the use and prospects of high-field MR methods for both *in vivo* and *ex vivo* applications. The seminar will end with a lab tour with demonstrations of the MR instruments and presentations of previous and on-going projects.

“I think this opening and seminar will be inspiring not only to the MR community, but for all potential users,” says Marius Widerøe and welcomes everyone to attend and to explore the possibilities.

## Upgrade of the 7Tesla small animal MR scanner



**The 7Tesla Bruker Biospec will go through a major upgrade from 8. September to 6. October and be unavailable to the users in that period.**

All electronics will be upgraded to the Avance III platform, and a new shim and gradient system will be installed alongside multiple receiver channels. In addition, several new coils, including multi array coils for mouse and rat brain imaging and mouse heart imaging, and coils for phosphorous and fluorine MR, will be available. With the new system, including coils and software upgrade, images can be acquired faster and with increased signal-to-noise; *in vivo* NMR spectroscopy will be improved and a new range of novel MR methods and applications will be available and easier to perform, including functional imaging such as diffusion MRI

and BOLD f-MRI.

**All current and new users will have to go through user training on the new system, which will take place on 2. October.**

Contact core manager Marius Widerøe ([marius.wideroe@ntnu.no](mailto:marius.wideroe@ntnu.no)) if you want to participate or have any questions.

## Introduction to MR Imaging



**The Department of Circulation and Medical Imaging will be holding an introduction course to MR imaging in the autumn of 2012. This course is intended for PhD students or medical research students, and covers the basics of MR physics, with emphasis on imaging.**

The following topics are included: Phenomenon of nuclear magnetic resonance, spin physics, Fourier transformation, basic pulse sequences, contrast in MR, MR hardware, practical considerations, general clinical applications of MRI, including new methods such as functional MRI, perfusion and diffusion MRI, and clinical MR spectroscopy. Investigative procedures for MRI of the brain, heart and cancer, and the use of MR in biomedical and biotechnological research will also be covered.

There will be group exercises and practical assignments.

For more information, contact Øystein Risa ([oystein.risa@ntnu.no](mailto:oystein.risa@ntnu.no))

## Seminar on MR and prostate cancer

**The MR Cancer group organizes a seminar on MR and prostate cancer 24. September in conjunction with Kirsten Margrete Selnæs' public PhD defence on the 25. September. The main speaker will be Dr. Geoffry Payne from The Institute of Cancer Research and Royal Marsden NHS Foundation Trust, UK, who will give an introduction to functional imaging in the prostate and application to radiotherapy planning.**

Other invited speakers are: Dr. Arend Heerschap, Radboud University of Nijmegen Medical Center, The Netherlands; Dr. Agnes Katrine Lie, Department of pathology, Norwegian Radium hospital; and Dr. Anders Angelsen, Department of Urology, St. Olavs Hospital.

When: 24. September, 2012, 13.00-15.00

Where: Room LS42, Laboratory Center, St. Olavs Hospital.

For more information, contact May-Britt Tessem ([may-britt.tessem@ntnu.no](mailto:may-britt.tessem@ntnu.no))

## New senior engineer joins the MR Core Facility

Trygve Andreassen started in his new job as senior engineer at the MR Core Facility in August. He has a PhD in organic chemistry and has up until recently worked at the MR lab at NTNU - Gløshaugen. He will be working primarily on metabolomic studies using high resolution instruments.

## PhD-defences and publications associated with the MR Core Facility:

### Up-coming:

Kirsten Margrete Selnæs: *MR imaging and spectroscopy in prostate and colon cancer diagnostics*. 25. September

### Congratulations to the following candidates with a PhD degree:

- Siver Andreas Moestue: *Molecular and functional characterization of breast cancer through a combination of MR imaging, transcriptions and metabolomics*.
- Maria Dung Cao: *MR metabolomic characterization of locally advanced breast cancer – treatment effects and prognosis*.
- Marius Widerøe: *Magnetic resonance imaging of hypoxic-ischemic brain injury development in the newborn rat – manganese and diffusion contrasts*.

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Widerøe M, Havnes MB, Morken TS, Skranes J, Goa PE, Brubakk AM. Doxycycline treatment in a neonatal rat model of hypoxia-ischemia reduces cerebral tissue and white matter injury: a longitudinal magnetic resonance imaging study. *Eur J Neurosci*. 2012 Jul;36(1):2006-16. doi: 10.1111/j.1460-9568.2012.08114.x.

Smeland OB, Meisingset TW, Borges K, Sonnewald U. Chronic acetyl-L-carnitine alters brain energy metabolism and increases noradrenaline and serotonin content in healthy mice. *Neurochem Int*. 2012 Jul;61(1):100-7.

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Brekke EM, Walls AB, Schousboe A, Waagepetersen HS, Sonnewald U. Quantitative importance of the pentose phosphate pathway determined by incorporation of (13)C from [2-(13)C]- and [3-(13)C]glucose into TCA cycle intermediates and neurotransmitter amino acids in functionally intact neurons. *J Cereb Blood Flow Metab*. 2012 Jun 20. doi: 10.1038/jcbfm.2012.85.

Smeland OB, Meisingset TW, Sonnewald U. Dietary supplementation with acetyl-L-carnitine in seizure treatment of pentylenetetrazole kindled mice. *Neurochem Int*. 2012 Jun 16.

Bertilsson H, Tessem MB, Flatberg A, Viset T, Gribbestad I, Angelsen A, Halgunset J. Changes in gene transcription underlying the aberrant citrate and choline metabolism in human prostate cancer samples. *Clin Cancer Res*. 2012 Jun 15;18(12):3261-9.

## Norwegian Molecular Imaging Consortium

- Meeting in Bergen 25.-26. October



On behalf of NorMIC, this year's host, The Molecular Imaging Center (MIC), has the pleasure of welcoming you to the **fifth NorMIC-symposium in Bergen on 25.-26. October, 2012**. We have an exciting programme with two invited international speakers (Melike Lakadamyali and Ben Giepmans) scientific talks from the five nodes and demonstrations of state-of-the-art confocal microscopes.

For more information see:

<http://www.uib.no/rg/mic/nyheter/2012/05/annual-normic-meeting-2012>

## MedIm – Norwegian Research School in Medical Imaging

This autumn, a range of PhD courses in the field of medical imaging are offered all over Norway. Below, you will find a list of courses that are organized in compact sessions. MedIm will provide grants towards travel, as well as hotel accommodation, for PhD Candidates travelling within Norway to participate in these courses. Some limits apply please consult our website for further information:

<http://www.ntnu.edu/medicalimaging/phdcourses/available>

- BMED 360 In vivo imaging and physiological modelling
- Research on Biomedical Imaging Techniques (Forskning om biomedisinske bildeteknikker)
- MEDT8002 Ultrasound Imaging
- MEDT8011 Introduction to MR Imaging (4 ECTS)
- MEDT8009 Magnetic Resonance Imaging (7.5 ECTS)
- TK8105 Ultrasound imaging in heterogeneous, non-linear tissue



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