

Annual Report 2007

Functional genomics (FUGE) at NTNU



Large-scale Programme
The Research Council
of Norway

 **NTNU**
Innovation and Creativity

FUGE Mid-Norway

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Magne Børset (Department of Cancer Research and Molecular Medicine)
Marit Otterlei (Department of Cancer Research and Molecular Medicine)

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Introduction

By Magne Børset

Head of FUGE committee in mid-Norway



The year 2007 marked the transition from the first FUGE period to FUGE II, a continuation of the national research program for functional genomics. In an international evaluation completed in 2006, the FUGE program, which started in 2002, had been deemed highly successful, and the Government allocated additional money setting 2011 as the new horizon for the program. It was decided that grantees and technology platforms funded in FUGE I would have to submit new proposals in competition with others seeking funding. In this way, existing platforms had to demonstrate their viability, and new technologies were given the possibility to be established. Through this process, in 2007 the FUGE landscape was restructured, with some platforms being closed and others established. One major structural difference was the establishment of platform networks with “nodes”, sub-platforms that are funded directly from The research council of Norway and not, as in FUGE I, through a mother platform.

The FUGE environment in our region, Mid-Norway, came out of the restructuring process with satisfaction. Both in terms of project funding and technology platform funding, our region attracted more money than what could be anticipated from the number of applications and from existing

FUGE-relevant activities in the region. Even so, the majority of our platforms were granted less funding through the FUGE program than needed for the projected services. Therefore, they will be dependent also on local financial support as well as on income from researchers using their services. Through its status as a strategic area for NTNU, FUGE receives an annual allocation of app. 7 mill. NOK in so-called SO-funds from NTNU, most of which is directed to positions for scientists or technicians at the individual platforms.

In the contract negotiations with the platform nodes, the research council wanted the host institutions to make firm commitments for continued institutional funding of the platforms beyond the end of the FUGE II period. However, themselves being dependent on annual budgets allocations from the Government, the institutions were not prepared to make stronger commitments than expressing an intension of continued support for FUGE. They also mentioned the rapid development of FUGE technologies as an argument against long term financing commitments, which could result in spending money on obsolete infrastructure. For most platform nodes the funding situation appears acceptable in the near future, but the lack of firm commitment from the host institutions and the relatively short time span of FUGE II, pose a challenge to the platforms to make their services effective and indispensable.

The local FUGE administration was also granted continued financial support from the FUGE II program for the period 2007 – 2011 with an annual budget of 1 mill. NOK. Due to delay of the start of FUGE II, the funding did not start before the second half of 2007 and will continue into the first half of 2012.

About FUGE in mid-Norway

The successful mapping of the genomes of humans and selected animals, plants and micro-organisms has opened new doors for scientists who study biological processes in the field of functional genomics. FUGE is a national plan designed to enhance the quality and activity of functional genomics research in Norway, funded by the Research Council of Norway.

FUGE's backbone is the technology platforms that offer service and research related to specific technologies that are useful for functional genomics. There are

seven nodes connected to different technology platforms in mid-Norway.

While a portion of the regions functional genomic projects have received funding from the Research Council of Norway, many research groups at NTNU conduct functional genomics research. These groups are found at the Faculty of Medicine, the Faculty of Natural Sciences and Technology, the Faculty of Information Technology, Mathematics and Electrical Engineering, as well as the Faculty of Arts.

FUGE's mid-Norway group is governed by a board and a committee, and has an adviser who coordinates FUGE activities.

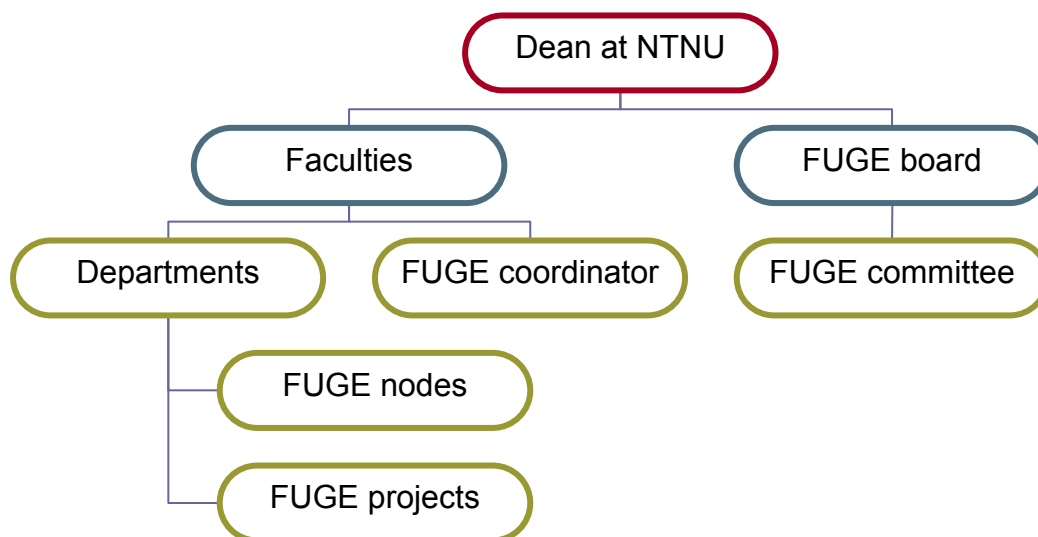


Figure 1. Organisation of the FUGE activity in mid-Norway.

FUGE Mid-Norway is governed by a board and a steering committee. In addition, there is an adviser who coordinates the FUGE activity in Mid-Norway. The technology nodes and the FUGE projects are administrated by different departments at NTNU.

Visit us at <http://www.ntnu.no/fuge> (Norwegian)
<http://www.ntnu.no/research/fuge> (English)

Highlights of 2007

The transition from FUGE I to FUGE II

The focus of spring 2007 was writing grant applications to the Research Council Of Norway (NFR). By the April deadline, mid-Norway had handed in 9 % of the applications for nodes/platforms, and 18.5% of the project applications. The allocation of grants from NFR was announced in September 2007, with mid-Norway awarded 20% of the grants for nodes and platforms, and 22 % of the project grants. This reflects mid-Norway's excellent and growing research environments in functional genomics.

Platforms and nodes funded by NFR in 2007 for the FUGE II period:

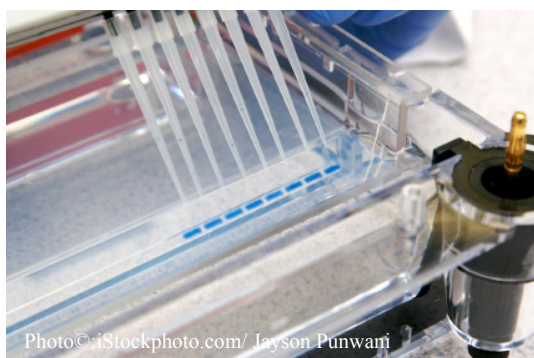
- Bioinformatics node at NTNU by Finn Drabløs (IKM, NTNU)
- Biobanks by Kristian Hveem (HUNT, ISB, NTNU)
- Proteomics node at NTNU by Geir Slupphaug (IKM, NTNU)
- Whole animal imaging by Olav Haraldseth (ISB, NTNU)
- Subcellular interactions and imaging by Catharina de Lange Davies (IFY, NTNU)
- Microarray node at NTNU by Arne Sandvik (IKM, NTNU)
- Plant transcriptional analysis centre by Atle Bones (IBI, NTNU)

Projects funded by NFR in 2007 for the FUGE II period:

- Pål Sætrum, IKM, NTNU
"The roles of microRNAs and transcription factors in gene regulation and tissue specific expression"
- Geir Slupphaug, IKM, NTNU
"The Interactomics of DNA Repair"
- Rigmor Austgulen, IKM, NTNU
"Pathogenesis of complex genetic diseases, using pre-eclampsia as a model"
- Stein Kaasa, IKM, NTNU
"Translational Research in Lung Cancer and Palliative Care – from genomics to symptom control"
- Edvard Moser, INM, NTNU
"Understanding brain systems by cell type-specific changes in gene expression"
- Terje Espevik, IKM, NTNU
"Membrane trafficking in immunity and tumour suppression"
- Ingrid Gribbestad, ISB, NTNU
"Advanced MR imaging, MR metabolomics, proteomics and genetic mapping of breast cancer - Clinical tools for personalized patient treatment"
- Atle Bones, IBI, NTNU
"A systems biology approach to modelling, plant signalling, and host defence"

NFR also awarded FUGE Mid-Norway regional FUGE grants for the FUGE II period.

A new strategy and action plan for the FUGE committee and board was processed for 2008-2012. The plan can be found at our website: <http://www.ntnu.no/fuge/organisasjon>.



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Meetings and Seminars

Functional genomics researchers were invited to suggest speakers for the 2007 FUGE seminar series. The seminar series was intended to develop existing functional genomics contacts and establish new ones both nationally and internationally, and featured both guest lectures and seminars.

Guest lectures 2007

- Professor Matthew J. Farrer, Mayo Clinic, Jacksonville, FL, USA: “Genetics in Parkinson's disease”
- Ola Engelsen, NILU, Tromsø, “The relationship between exposure of ultraviolet radiation and vitamin D status”
- Nigel Burroughs, Warwick Systems Biology Centre/Mathematics Institute, University of Warwick: “Systems biology: using mathematics and statistics to understand complex biologically systems”.
- Per Hammarström, Linköpings Universitet, Sverige: “The Havoc of Protein Misfolding Disease - From Hardened Hearts and Marble Brains to Loss of Sense and Spongy Brains.”

Seminars 2007

- MR and US in small animal imaging – arranged by Olav Haraldseth
- 10th National NMR meeting in Oppdal - arranged by Alex Dikiy
- Genotypes and gene expression in disease - arranged by Rigmor Austgulen

To celebrate the funds received for the FUGE II period, FUGE Mid-Norway arranged a mini-seminar followed by a Christmas lunch. Forty-four researchers attended the seminar, which featured a presentation about selected projects funded as a part of FUGE II:

- Edvard I. Moser
“Understanding brain systems by cell type-specific changes in gene expression”
- Rigmor Austgulen
“Pathogenesis of complex genetic diseases, using pre-eclampsia as a model”
- Pål Sætrum
“The roles of microRNAs and transcription factors in gene regulation and tissue specific expression”



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Seed Funding

As a strategic action for developing and strengthening functional genomics research in mid-Norway, FUGE Mid-Norway announced a variety of grants in 2007.

Travel grants were awarded to enable researchers in mid-Norway to interact with recognized international functional genomics researchers abroad. The grants were awarded to:

- Nina Reitan (IFY, NTNU)
- Øyvind Hauso (IKM, NTNU)
- Endre Anderssen (IKM, NTNU)
- Atle Granlund (IKM, NTNU)
- Vidar Beisvåg (IKM, NTNU)
- Yan Hua Chen (IKM, NTNU)
- Martin Seem (IBI, NTNU)
- Ingerid Arbo (IBI, NTNU)
- Cristopher G. Sørmo (IBI, NTNU)
- Augustin Arukwe (IBI, NTNU)

The FUGE technology platforms offer researchers various services in specific technologies that are important to functional genomics research. To facilitate interaction between researchers and the technology platforms, FUGE Mid-Norway allocated money to research designed to collaborate with and use the technology platforms. To that end, the following research grants were awarded:

- Kirsti Kvaløy (HUNT)
- Pål Sætrom (IKM, NTNU)
- Marit W. Anthonsen (IKM, NTNU)
- Helga Ertesvaag (IBT, NTNU)
- Berit Johansen (IBI, NTNU)
- Kirsti Berg (ISB, NTNU)
- Tone Bathen (ISB, NTNU)
- Atle Bones (IBI, NTNU)
- Henrik Jensen and Bernt-Erik Sæther (IBI, NTNU)
- Ulrik Wisløff and Anja Bye (ISB, NTNU)
- Eva Hofslø (IKM, NTNU)
- Anders Sundan and Thea Våtsveen (IKM, NTNU)
- Terje Espevik and Jørgen Stenvik (IKM, NTNU)
- Carl-Jørgen Arum (IKM, NTNU)



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Innovation

Innovation is important in functional genomics, as the discipline and its associated technologies are developing rapidly. Many of the FUGE technologies can be used for industrial and commercial development. Three strong business projects were supported by FUGE Mid-Norway in 2007:

- Biosergen AS by Sergey B. Zotchev
 - Biosergen AS was established in 2004 based on the technology of engineered antibiotic biosynthesis developed at NTNU and SINTEF.
- Prostim AS by Trond Erik Vee Aune
 - Prostim AS is a company in its start-up phase that will develop customer-defined processes for the production of proteins based on a patented protein production technology.
- Invivosence AS by Oddrun Gerderaas
 - Invivosence AS is developing disposable invasive sensors for cancer diagnosis and monitoring applications based on patented technology.

Dissertations

The following candidates have received funding from the national or regional FUGE group and successfully defended their theses for a PhD degree at NTNU in 2007:

- Lars Gidskehaug (Bioinformatics):
“Variable selection in high-throughput data problems”.
- Morten Beck Rye (Bioinformatics):
“Image segmentation and multivariate analysis in two-dimensional gel electrophoresis”.
- Arne Skjold (Molecular Imaging):
“Magnetic resonance kinetics of manganese dipyridoxyl diphosphate (MnDPDP) in human myocardium”.
- Toril Sjøbakk (Molecular Imaging):
“MR determined brain metabolic pattern in patients with brain metastases and adolescents with low birth weight”.

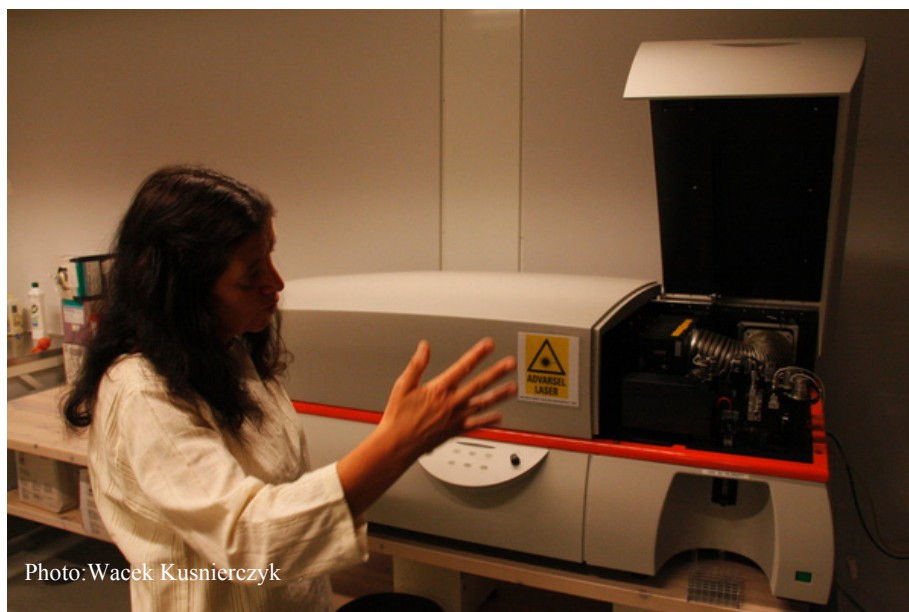


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Annual Report for FUGE Mid-Norway 2007



NTNU – Innovation and Creativity

The Norwegian University of Science and Technology (NTNU) in Trondheim represents academic eminence in technology and the natural sciences as well as in other academic disciplines ranging from the social sciences, the arts, medicine, architecture to fine arts. Cross-disciplinary cooperation results in ideas no one else has thought of, and creative solutions that change our daily lives.

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