

# RGI NEWS

Volume 13. No 1. 27.9.2006

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## Ragnar Granit Institute 30 years

### Invitation

On the 17th of November 2006 Ragnar Granit Institute celebrates its 30 years' history. This issue of the RGI News includes an abstract of the history of the Institute and an invitation to the IX Ragnar Granit Symposium arranged in the name of the 30 years anniversary.

### Laboratory and Institute of BME

Tampere University of Technology started as a subsidiary to Helsinki University of Technology in 1965. On the 1st of August 1976 Dr. **Jaakko Malmivuo** was appointed to the new post Associate Professor of Biomedical Engineering (Bioelectronics) in the Department of Electrical Engineering of Tampere University of Technology. This was the first professor chair in Finland in Biomedical Engineering. The history of the Ragnar Granit Institute is considered to have started from this Laboratory of Biomedical Engineering.

The position of Associate Professor in Biomedical Engineering was upgraded to full Professor in 1985. In 1987 the Institute of Biomedical Engineering was established.

### Ragnar Granit Institute

The Finnish Nobel Prize Laureate **Ragnar Granit** was born on the 30th of October 1900 in Helsinki (then the parish of Helsinge outside the city of Helsinki). On the 31st of March 1990 he died in Stockholm in the age of 89.

In Finland Ragnar Granit was not at that time generally remembered as a Finnish Nobelist.

Therefore we wanted to honor his memory by appointing the Institute of Biomedical Engineering as the Ragnar Granit Institute. In 1992 Professor Michael Granit, Ragnar Granit's son answered to our request that it would have certainly delighted his father if a scientific institute had been named after him.

Ragnar Granit made his research for the Nobel Prize by recording the bioelectric signals of the retina of laboratory animals. He made this with very thin microelectrodes which he had developed and with a self made signal amplifier. With these signals, called electroretinogram, ERG, he studied the mechanism of color vision, the main topic of his Nobel Prize in 1967. Thus, Ragnar Granit was a pioneer in Bioelectromagnetism. Bioelectromagnetism is the central topic of the research of the Ragnar Granit Institute of Tampere University of Technology.

### Personnel

In 1995 the Institute received another professorship in biomedical engineering and Dr **Hannu Eskola** was appointed to this post for a period of 5 years. After him Dr. **Jari Hyttinen** was appointed to this post. In 2006 Professor Jari Hyttinen received a tenure.

In addition to the professorships, the Institute has two Assistant Professor posts: **Juha Nousiainen** and **Jari Viik**, Laboratory Engineer/Researcher **Pasi Kauppinen** and Laboratory Technician **Mikko Hiltunen**. Ms. **Soile Lönnqvist** has the post of Institute Secretary. The post of Senior Researcher in Neuroinformatics is vacant. The total number of the personnel is about 35.

[www.rgi.tut.fi/](http://www.rgi.tut.fi/) ➔ Personnel



**IX Ragnar Granit symposiumi**  
**Ragnar Granit instituutti 30 vuotta**

**Perjantai, 17.11.2006 klo 13.00**  
**Tampereen teknillinen yliopisto**  
**Festia-sali**

*Ohjelma*

**Pehr Henrik Nordgren: Pelimannimuotokuvia op. 26**

**1. Näpsyttäjä, 2. Tuumiskelija**  
Helsingin lapsijouset, johtaja Géza Szilvay

**Ragnar Granit instituutti 30 vuotta**

Professori Jaakko Malmivuo, Ragnar Granit instituutti

**Ragnar Granit, an Eminent Neuroscientist and Nobel Laureate**

Professor Sten Grillner, Karolinska Institutet

**Modeling of Cardiac Electric Fields**

Professor Frank Sachse, University of Utah

**Lääketieteellisen tekniikan asema terveydenhuollossa**

Tekn. lis. Petri Pommelin, Pirkanmaan sairaanhoitopiiri

**Pehr Henrik Nordgren: Pelimannimuotokuvia op. 26**

**3. Vanhan miehen menuetti, 4. Pelimannin elämäkappale**  
Helsingin lapsijouset, johtaja Géza Szilvay

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Cocktails  
Tervehdykset, onnittelut

Kutsun kaikki Ragnar Granit instituutin ystävät, tukijat ja suosijat osallistumaan instituutin 30-vuotisjuhlaan.

*Jaakko Malmivuo*

Kutsu kahdelle

Osallistumisesta pyydetään ilmoittamaan 10.11.2006 mennessä:  
Sihteeri Soile Lönnqvist, puh.: 03-3115 2524, 040-533 1246  
s-posti: [soile.lonnqvist@tut.fi](mailto:soile.lonnqvist@tut.fi)

Ajo-ohje ja lisätietoja: [www.rgi.tut.fi/30](http://www.rgi.tut.fi/30)

**IX Ragnar Granit Symposium**  
**Ragnar Granit Institute 30 years**  
Friday, 17.11.2006 13.00 hrs  
Tampere University of Technology  
Festia-Hall

*Programme*

**Pehr Henrik Nordgren: Portraits of Country Fiddlers, Op. 26**  
**1. The Plucker, 2. The Thinker**  
The Helsinki Children's Strings, conductor Géza Szilvay

**Ragnar Granit Institute 30 years**  
Professor Jaakko Malmivuo, Ragnar Granit Institute

**Ragnar Granit, an Eminent Neuroscientist and Nobel Laureate**  
Professor Sten Grillner, Karolinska Institute

**Modeling of Cardiac Electric Fields**  
Professor Frank Sachse, University of Utah

**Importance of Biomedical Engineering in Health Care**  
Lic.Tech. Petri Pommelin, Pirkanmaa Hospital District

**Pehr Henrik Nordgren: Portraits of Country Fiddlers, Op. 26**  
**3. The Old Man's Minuet, 4. The Fiddler's Favourite Tune**  
The Helsinki Children's Strings, conductor Géza Szilvay

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Cocktails  
Greetings, Congratulations

I am pleased to invite all the friends, promoters and supporters of the Ragnar Granit Institute to participate the 30th Anniversary Symposium.

*Jaakko Malmivuo*

Invitation for two persons

Please, inform of your participation before 10.11.2006 to:  
Secretary Soile Lönnqvist, tel.: +358-3-3115 2524, +358-40-533 1246  
e-mail: [soile.lonnqvist@tut.fi](mailto:soile.lonnqvist@tut.fi)

More information at: [www.rgj.tut.fi/30](http://www.rgj.tut.fi/30)

## International Education Program

In 1990 all the education at the Ragnar Granit Institute was overnight changed to be given in English. Important motivation for this was to educate the Finnish students so as to become more international. Accepting international students into the program further strengthened this target. A great deal of the education of the Institute has been given abroad on intensive courses and as visiting professorship lectures.

[www.rgi.tut.fi/edu/bem](http://www.rgi.tut.fi/edu/bem)

## International Master's Degree Program in BME

In 2005 the Ministry of Education in Finland launched a call for International Master's Degree Programs in Finnish universities. From Tampere University of Technology, altogether six applications were made. From these, four programs were accepted by the Ministry of Education. One of these is Biomedical Engineering. This autumn about 15 new international students started in the program.

[www.rgi.tut.fi/master](http://www.rgi.tut.fi/master)

## International Graduate School

Because there was an apparent need for a joint graduate school in biomedical engineering for the Finnish universities, discussions on a Graduate School were initiated by the *Finnish Society for Medical Physics and Medical Engineering* in 2005. The universities participating in these discussions were Tampere University of Technology, Helsinki University of Technology, University of Turku, University of Kuopio and the University of Oulu. It was accepted that the application to the call of Ministry of Education and Academy of Finland should be made by the Ragnar Granit Institute.

The *International Graduate School in Biomedical Engineering and Medical Physics* was appointed by the Ministry of Education to start in January 2007. The Ministry will fund 8 PhD student positions in the School.

[www.rgi.tut.fi/graduate](http://www.rgi.tut.fi/graduate)

## European Virtual Campus on BME

In addition to education and research we do research on education. We have a two-year European project: *European Virtual Campus on Biomedical Engineering*, EVICAB under the coordination of the RGI. Its purpose is to establish a curriculum on BME to the Internet for the use of the European universities. Because the

curriculum will be open source, it will actually be available worldwide. The co-operating partners are, in addition to Finland, from Sweden, Estonia, Lithuania and Czech Republic.

[www.evicab.eu](http://www.evicab.eu)

## Research

The main area of research in the Institute is Bioelectromagnetism, i.e. bioelectric and biomagnetic signals, stimulation and properties of the living body. The research has included both theoretical issues and experimental work.

The main contributions in the theoretical work have been in the development of the lead field theory. It has been the method in the research on the relationship between bioelectric and biomagnetic phenomena, the information content of biomagnetic signals and comparison of the sensitivities of electro- and magnetoencephalography, EEG and MEG.

In electrocardiology the central research topic has been in diagnosing coronary artery disease. The latest activities include the development of wearable and implantable ECG-recorders for continuous monitoring of the cardiac function. The electric activity of the heart has also been recorded by detecting the magnetic field it generates, the magnetocardiogram, MCG.

The research on the electric activity of the brain also includes both theoretical and experimental work. The theoretical studies include calculation of the measurement sensitivity distribution and spatial resolution of EEG and MEG. Theoretical work has also been done on developing new EEG leads for recording deep sources in the brain. Experimental work includes developing the high resolution EEG and recordings with a 256-channel instrument. In one ongoing project there is being developed instrumentation for recording EEG in emergency site and developing methods and criteria for the clinical usefulness of emergency EEG recordings.

Electric and magnetic stimulation of the central nervous system has also included both theoretical and experimental studies.

Many of our experimental projects have been based on our research on the modeling of the electric fields of the body. In this research both the theory of computational methods and 3D imaging and image analysis have been important subjects of research.

New openings in our research include application of our expertise of modeling and bioelectromagnetism in general in cell culturing and tissue engineering.

Most of our research projects are made in close co-operation with the hospitals and biomedical engineering industry.