

INFOTECH OULU RESEARCH GROUPS

The research of Infotech Oulu is carried out in groups. The research groups mainly operate in those laboratories and departments where their directors are working. The selection of Infotech Oulu research groups is for a four-year period, and it is based on external scientific evaluation of the research presented by the applicants. For the period 2010–2013, five groups were selected as full members, and three groups as associate members. Some of them are joint groups at the University of Oulu and VTT Technical Research Centre.

The following groups were selected to Infotech Oulu as full members:

- Circuits and Systems Group (CAS - Oulu)
- Intelligent Systems Group (ISG)
- Center for Machine Vision Research (CMV), former Machine Vision Group (MVG)
- MediaTeam Oulu
- Wireless Communication Systems Group (WICS)

and as associate members:

- Biomedical Engineering Research Group (BME)
- Electronic Materials, Packaging and Reliability Techniques (EMPART)
- Human Interaction with Advanced Mobile Services and Intelligent Environments (INTERACT)

The associate members did not received direct funding from Infotech Oulu, but the doctoral students in these groups could apply for doctoral program positions. In addition, all the groups could apply for special funding from the University of Oulu through Infotech Oulu.

Information technology is designated as one of the four focus research areas of the University of Oulu, including machine vision and ubiquitous computing, wireless communications, high-speed electronics and photonics, bio-medical engineering, and information systems. The main research areas of Infotech Oulu are

- electronics
- communications engineering
- computer science and information engineering

Funding

Infotech Oulu umbrella organization

The University of Oulu provided special funding of EUR 400 000 for Infotech Oulu in 2013. About 75% of this was directed to support for the full member groups. For the year 2013, EUR 750 000 was originally granted by the Ministry of Education and Culture to the Infotech Oulu Doctoral Program for its 25 student positions. The University of Oulu granted an additional EUR 38 000 for its coordination. The Academy of Finland granted EUR 430 000 for the years 2010–2013 for arranging courses given by visiting experts, and for covering traveling costs of doctoral students when taking part in conferences or working abroad. EUR 108 000 was awarded for the year 2013. The total funding was EUR 1 296 000 in 2013. During the past

few years, Infotech Oulu has been able to apply for special funding from the University of Oulu (funding for infrastructure and for international recruitment of researchers). Adding this special funding, the total funding was EUR 1 686 000. The table below shows the funding in 2013, excluding any funding that the research groups may have been awarded in their own right.

Source	EUR
University of Oulu; basic funding	400 000
- doctoral program coordination	38 000
Ministry of Education and Culture	750 000
Academy of Finland	108 000
total	1 296 000
University of Oulu; infrastructure	390 000
all total	1 686 000

Research groups

The research groups are mainly funded externally. The total sum of annual external funding for the full members was EUR 14.0 million in 2013. Total external research funding, including that for the associate members, was EUR 17.5 million. Only about a quarter of the research work is financed through internal funding in the form of salaries of professors, research assistants, etc., excluding their estimated time used for teaching. The main source of financial support is Tekes, the Finnish Funding Agency for Technology and Innovation, representing almost half of our external funding.

The following table shows the total external funding of the research groups in 2013. All the funding of the full member groups is channeled through the University, whereas the total funding includes also some funding channeled through VTT. The external research funding increased 16.5% from the previous year.

Source	full members	all
Academy of Finland	3 349 000	3 887 000
Ministry of Education and Culture (doctoral programs)	785 000	986 000
Tekes	6 918 000	8 287 000
other domestic public	503 000	615 000
domestic private	1 556 000	2 031 000
international	844 000	1 737 000
total	13 955 000	17 543 000

Personnel

The number of personnel in the full member research groups of Infotech Oulu was 269 at the end of 2013. The total number of personnel, including the associate members, was 361. There was a small increase from the previous year. Personnel from abroad represented 34.1% (+3.0%) of the total staff, and 37.3% (+3.6%) of the doctoral stu-

dents. The table below shows the total number of personnel in different positions. The number of professors also includes acting professors, FidiPro professors and VTT's research professors. The number of University nominated professors participating in the activities of the groups was about 25. The category "others" includes Master's level students, secretaries and other support staff. Almost 97% of the personnel worked at the University of Oulu, and the others at VTT. One of the groups had an associate director from VTT.

Position	full members	all
professor	23	35
other senior or post-doctoral researcher	64	91
doctoral student	129	177
other	53	58
total	269	361
person years	226	276

Publications

The number of the publications of the research groups in 2013 are represented in the following table.

Publication	full members	all
journal article (refereed), original research	100	169
conference article (refereed)	200	244
review article, literature review, systematic review	0	2
book section, chapters in research books	3	5
non-refereed scientific articles	7	19
scientific books (monograph)	1	1
publications intended for professional communities	2	2
patents and invention disclosures	37	38

In addition, the publications have been classified based on their quality, according to the Publication Forum Project (<http://www.tsv.fi/julkaisufoorumi>). The total number of top level journal articles is 41, leading level 51, basic level 68 and not listed 9. Corresponding figures for conference proceedings are 8 in the leading level, 149 in the basic level and 87 not listed.

Infotech Oulu Evaluation

Evaluation of Infotech Oulu was arranged in 2013. The purpose of the evaluation was to select the research groups of Infotech Oulu for the period 2014-2017.

The application period for Infotech Oulu ended in spring. In the second phase, the evaluators came to Oulu in the autumn, and the evaluation panel interviewed the research groups. The final choice of membership in Infotech Oulu was made by the Infotech Oulu Board based on the proposal of the evaluators.

The evaluators are internationally renowned scientists in information technology: Professor Hans Burkhardt, Department of Computer Science, Albert-Ludwigs-University Freiburg, Germany; Dr. Mark Craig Reed, University of New South Wales, and Australian Defence Force Academy, Canberra, Australia; Professor Hannu Tenhunen, Royal Institute of Technology, Stockholm, Sweden, and Professor Bernard C.Y. Tan, National University of Singapore (took part only in remote evaluation).

For the following four year period, the following nine groups were selected for Infotech Oulu:

- Biomedical Engineering (BME)
- Biomimetics and Intelligent Systems (BISG)
- Center for Machine Vision Research (CMV)
- Circuits and Systems (CAS)
- Communications Signal Processing (CSP)
- Electronic Materials, Packaging and Reliability Techniques (EMPART)
- Networking (NET)
- New Generation Optoelectronics for Measurement Applications (NeGOMA)
- Radio Access Technologies (RAT)