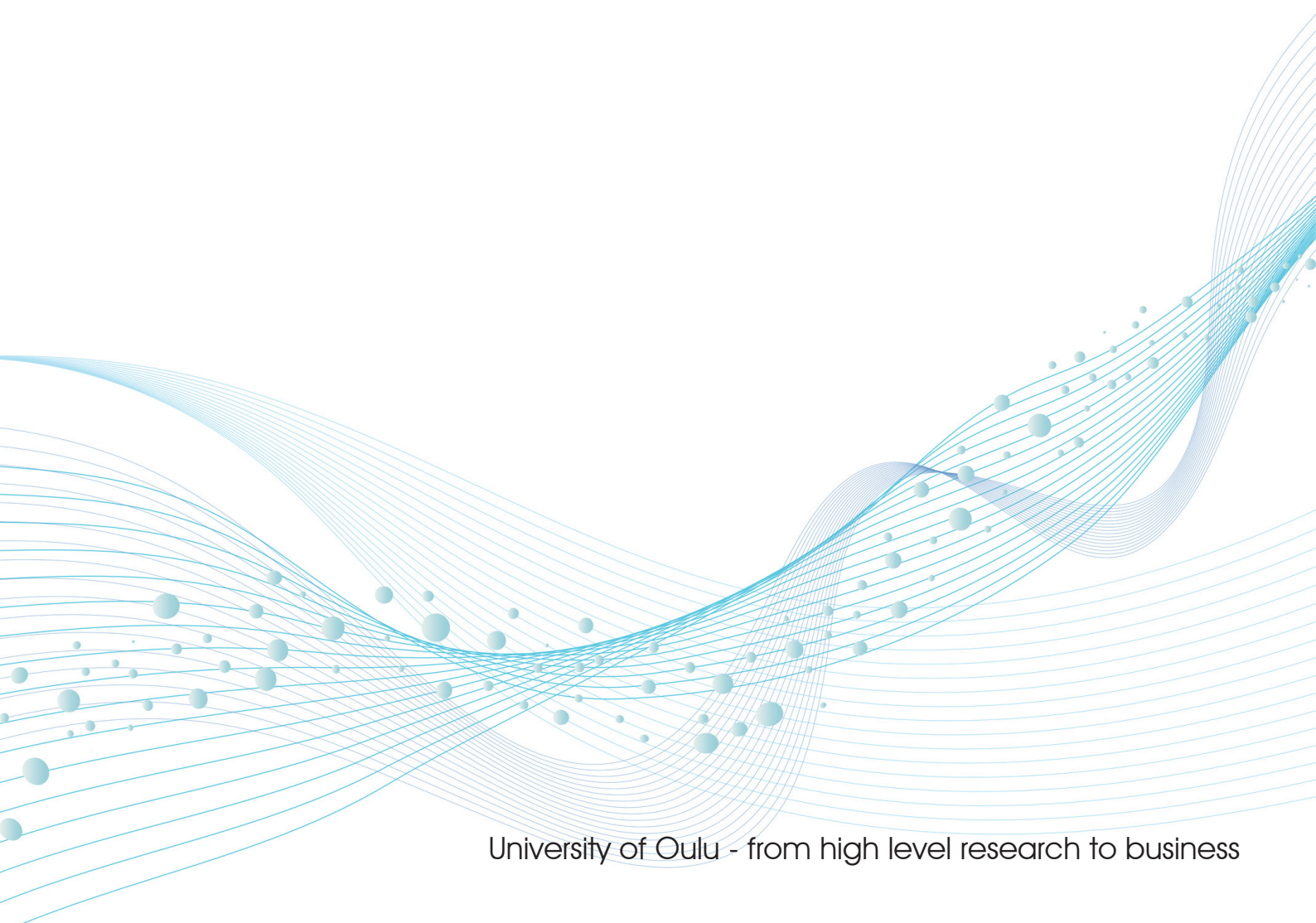


UNIVERSITY of OULU  
OULUN YLIOPISTO



University of Oulu - from high level research to business



# University of Oulu in a nutshell

## Founded in 1958

### 6 faculties

Science	4 000 students
Technology	3 900 students
Humanities	2 300 students
Education	1 800 students
Medicine	1 800 students
Economics and Business Administration	1 600 students

**Total** 16 000 students

2900 employees  
1200 foreign employees and students  
7 FiDiPro-professors

**Total funding** EUR 226 million

Awarded degrees	
Bachelor degrees	1063
Master degrees	1452
Doctoral degrees	141
Scientific publications	2451
Invention disclosures	59
Patent portfolio	23 patent families
Research based start up companies (2001-2010)	40



## Detailed info from selected faculties

### Faculty of Science

Bachelor's degrees awarded	232
Master's degrees awarded	218
Doctoral degrees awarded	40
Personnel	511
Scientific publications	559

### Faculty of Technology

Bachelor's degrees awarded	213
Master's degrees awarded	508
Doctoral degrees awarded	26
Personnel	682
Scientific publications	548

### Faculty of Medicine

Bachelor's degrees awarded	46
Master's degrees awarded	198
Doctoral degrees awarded	49
Professional postgraduate degrees	69
Personnel	388
Scientific publications	747



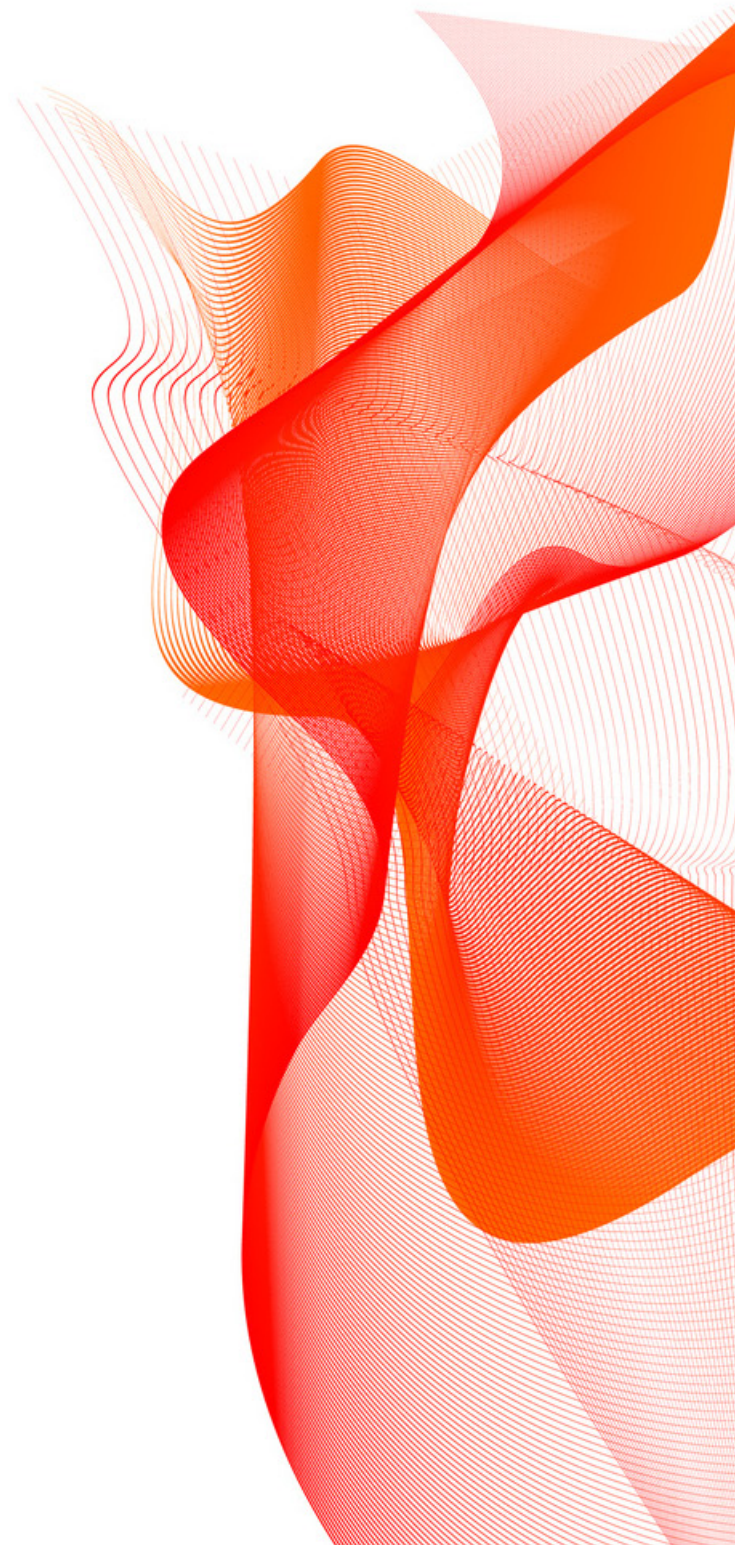
## Multidisciplinary Research

### Four research focus areas:

Biosciences and Health  
Information Technology  
Environment, Natural Resources and Materials  
Cultural Identity and Interaction

### New Initiatives:

Advanced Steel Research  
International Business  
Mining and Mineral Engineering  
Science-based Education





## Research organizations of University of Oulu

Biocenter Oulu  
Center for Cell-Matrix Research  
Center for Internet Excellence (CIE)  
Centre for Advanced Steel Research (CASR)  
Centre for Health and Technology (CHT)  
Centre for Measurement and Information Systems (CEMIS)  
Centre for Wireless Communications (CWC)  
Giellagas Institute  
Infotech Oulu  
Matti Ahtisaari Institute of Global Business and Economics (MAIGBE)  
Oulu Mining School  
PrintoCent  
Sodankylä Geophysical Observatory  
Thule Institute

## Cell-Extracellular Matrix Research

- Research area range from connective-tissue relate disorders to cell matrix collagen formation.
- **Principal investigators**
  - Myllyharju Johanna** (Faculty of Medicine, Key Enzymes in the Synthesis of Collagens and the Response of Cells to Hypoxia)  
<http://www.biocenter oulu.fi/projects/myllyharju.html>
  - Myllylä Raili** (Faculty of Science, Molecular Biology of Lysyl Hydroxylases and Collagen Glycosyltransferases)  
[http://www.biochem oulu.fi/tutkimus/myllyla/index\\_e.html](http://www.biochem oulu.fi/tutkimus/myllyla/index_e.html)
  - Pihlajaniemi Taina** (Faculty of Medicine, Conserved Collagens in Cell–Matrix Homeostasis)  
<http://www.biocenter oulu.fi/projects/pihlajaniemi.html>
  - Risteli Juha** (Faculty of Medicine, Bone and Soft Tissue Collagen Formation)
- **Research volume**
  - Researchers 60
  - Research funding EUR 2.5 million
- **Key inventions**
  - Production of functional collagenous proteins
  - Diagnosis method of myasthenia gravis
  - Novel pharma molecule to treat metabolic syndrome
  - Bone and tissue markers (commercialized by Orion Diagnostica)

## Cardiovascular Disease Research

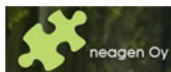
- Research focus on the cardiovascular disease, and metabolic syndrome, from novel pharmacology drugs development, molecular mechanism investigation, to cardiovascular diagnosis.
- **Principal investigators**
  - Huikuri Heikki** (Faculty of Medicine, Prediction and Prevention of Sudden Cardiac Death)  
[http://cc.oulu.fi/~sisawww/cardiology/Huikuri\\_CV.html](http://cc.oulu.fi/~sisawww/cardiology/Huikuri_CV.html)
  - Kesäniemi Antero** (Faculty of Medicine, Molecular Mechanisms of Metabolic Syndrome and Atherosclerosis)  
<http://www.biocenter.oulu.fi/projects/kesaniemiukkola.html>
  - Ruskoaho Heikki** (Faculty of Medicine, Molecular Mechanisms of Cardiac Hypertrophy and Heart Failure)  
<http://www.biocenter.oulu.fi/projects/ruskoaho.html>
  - Savolainen Markku** (Faculty of Medicine, Molecular Determinants of the Metabolic Syndrome)  
<http://www.biocenter.oulu.fi/projects/savolainen.html>
- **Research volume**
  - Researchers 110
  - Research funding EUR 2.7 million
- **Key inventions**
  - Novel small molecules to treat cancer drug toxicity
  - Tools for sudden cardiac death risk classification on the basis of cardiac stress test 12-lead ECG
  - J-Test, new tool for sudden cardiac death risk prediction on the basis of 12-lead ECG
  - Cardiac markers (commercialized)
  - Method for detecting alcohol consumption (commercialized)

## Enzyme Structure and Metabolic Research

- Research area on the enzymology from the metabolism and structural approaches.
- **Principal Investigators**
  - Herzig Karl-Heinz** (Faculty of Medicine, Molecular Physiology)  
<http://cc oulu.fi/~fysiowww/KHHgrouppageready.html>
  - Hiltunen Kalervo** (Faculty of Science, Peroxisomes and Mitochondria in Lipid Metabolism)  
<http://www.biochem oulu.fi/tutkimus/hiltunen>
  - Ruddock Lloyd** (Faculty of Science, Disulphide bond formation in the ER)  
<http://www.biochem oulu.fi/tutkimus/ruddock/>
  - Wierenga Rik K.** (Faculty of Science, Protein Crystallography and Structural Enzymology )  
<http://www.biocenter oulu.fi/projects/wierenga.html>
- Research volume
  - Researchers 60
  - Research funding EUR 2.1 million
- **Key inventions**
  - Novel pharma molecule to treat metabolic syndrome
  - Tools for producing natively folded proteins in a prokaryotic host

### Spin-Out Companies

(Oulu Ecosystem for Biosciences and Health)





## Genes and the Environment

- Research focus on the genetic factors in heredity predisposition and disorders, as well as the evolutionary genomics.
- **Principal Investigators**
  - Männikkö Minna** (Faculty of Medicine, Genetic Factors in Common Musculoskeletal, Eye and Ear Disorders)  
<http://www.biocenter oulu.fi/projects/mannikkoalakokko.html>
  - Savolainen Outi** (Faculty of Science, Evolutionary Genomics)  
<http://www.biocenter oulu.fi/projects/pamilosavolainen.html>
  - Winqvist Robert** (Faculty of Medicine, Hereditary Predisposition to Breast Cancer)  
<http://www.biocenter oulu.fi/projects/winqvist.html>
- **Research volume**
  - Researchers 50
  - Research funding EUR 1.3 million
- **Key inventions**
  - Diagnosis method of myasthenia gravis
  - New type antimicrobial peptide
  - Method to screen novel metabolites from endophytes
  - Method of detecting a genetic predisposition to osteoporosis (commercialized by Correlagen)

## Other Key Companies

(Oulu Ecosystem for Biosciences and Health)



GE imagination at work



Hormos Medical



MEDIPOLIS GMP

OPTOMED

ORION



ThermoFisher  
SCIENTIFIC

VR valiRx

## Machine Vision and Ubiquitous Computing Technologies

- **Machine Vision Group – MVG** (<http://www.cse.oulu.fi/MVG/Research>)  
Research areas range from generic computer vision methodologies to machine vision applications and vision systems engineering.  
Main sectors are computer vision methods, human-centered vision systems, and vision systems engineering.
- **Principal Investigators**
  - **Heikkilä Janne** (Faculty of Technology, Computational Imaging Refers to Convergence of the Camera and the Computer)  
<http://www.cse.oulu.fi/JanneHeikkilä>
  - **Pietikäinen Matti** (Faculty of Technology, Local Binary Pattern, LBP)  
<http://www.cse.oulu.fi/MattiPietikäinen>
  - **Silvén Olli** (Faculty of Technology, Medical imaging/Color based Grading of Lumber)  
<http://www.ee.oulu.fi/olli/>
- Research volume  
Researchers 50  
Research funding EUR 1.0 million
- **Key inventions**  
Facial expression technology



## Wireless Communications

- **Center for wireless communication**  
(<http://www.cwc oulu.fi/home>)  
Basic research area in signal processing and radio engineering, radio access and network topologies and future wireless internet. In application oriented research security and defense as well as Medical ICT are identified as strong future opportunities. New emerging openings include e.g. smart energy grids and mobile clouds.
- **Principal Investigators**
  - Linatti Jari** (Faculty of Technology, Wireless Medical Communications)  
<http://www.ee oulu.fi/~jj/>
  - Juntti Markku** (Faculty of Technology, Signal Processing for Wireless Systems)  
<http://www.ee oulu.fi/~juntti/>
  - Latva-aho Matti** (Faculty of Technology, Digital Transmission Techniques)  
<http://www.ee oulu.fi/~matla/>
  - Leppänen Pentti** (Faculty of Technology, Radio Telecommunication Engineering and associated Analog Digital Signal Processing)  
<http://www.ee oulu.fi/~pa/>
- **Research volume**
  - Researchers 120
  - Research funding EUR 6.2 million
- **Key inventions**
  - Using host identity protocol (HIP) to provide secure seamless network connectivity
  - Ultra wide band technology

## High-Speed Electronics and Photonics

- **Circuits and Systems Oulu – CAS** (<http://www.infotech.oulu.fi/cas>)  
The primary implementations are based on various ASIC technologies. The main interest of the group is devoted to certain novel circuit topologies and functional units, as well as applications, especially in the field of telecommunications and electronic/optoelectronic measurements.
- **Optoelectronics and Measurement Techniques Laboratory** ([http://www.ee.oulu.fi/research/oemlab/index\\_eng.html](http://www.ee.oulu.fi/research/oemlab/index_eng.html))  
Research is specialized in demanding electronic applications.
- **Principal investigators**
  - Kostamovaara Juha** (Faculty of Technology, Picosecond Laser Pulse Generation and High Speed Switching Techniques)  
<http://www.ee.oulu.fi/~juha/>
  - Myllylä Risto** (Faculty of Technology, Optoelectronics)  
<http://www.ee.oulu.fi/research/oemlab/staff/rmy.html>
  - Rahkonen Timo** (Faculty of Technology, Design of Telecom ICs, Linearisation of RF Power Amplifier)  
<http://www.ee.oulu.fi/~timor/>
- **Research volume**
  - Researchers 60
  - Research funding EUR 2.0 million
- **Key inventions**
  - High power THz semiconductor and image/spectroscopy applications
  - Semiconductor Laser with high-power single pulse and low-cost source
  - Highly dynamic laser and time to digital converter
  - Fluorescence suppression raman radiation and portable detection applications

## Biomedical Engineering

- Biomedical Engineering Research Group – BME (<http://www.cse.oulu.fi/bme>)  
Develop, apply and evaluate novel biomedical measurement technologies in health and wellbeing. Based on linking technology and medicine, with an aim to utilize electrical engineering, information engineering, signal and image processing, pattern recognition, biophysics, applied mathematics, simulation, biomedicine and clinical medicine.
- **Principal investigators**
  - **Jämsä Timo** (Faculty of Medicine, Measurement and biosignal processing applications)  
<http://cc.oulu.fi/~tjamsa/>
  - **Seppänen Tapio** (Faculty of Technology, Biomedical engineering, intelligent signal analysis and pattern recognition, multimedia signal processing)  
<http://www.ee.oulu.fi/~tapio/>
- **Research volume**
  - Researchers 40
  - Research funding EUR 2.5 million
- **Key inventions**
  - Tools for sudden cardiac death risk classification on the basis of cardiac stress test 12-lead ECG
  - J-Test, new tool for sudden cardiac death risk prediction on the basis of 12-lead ECG
  - Heart rate and exercise monitors (Commercialized by Polar Electro)

## Information Systems and Software

- **Intelligent Systems Group – ISG** (<http://www.ee.oulu.fi/research/isg/>)  
ISG develops autonomous, adaptive, and context-aware components for smart environments by scrutinising the issue from the viewpoints of context-aware and embedded computing, data mining, robotics and secure programming.  
**Media Team Oulu** (<http://www.mediateam.oulu.fi/>)  
MediaTeam Oulu conducts research on the features, use, and applications of multimedia and digital media types (image, sound, video, text) in information and communication systems, special focus on mobility and wireless features as well as future generations of communication technology
- **Principal Investigators**
  - Ojala Timo** (Faculty of Technology, Multimedia/Texture Analysis)  
<http://www.cse.oulu.fi/TimoOjala>
  - Riekk Jukka** (Faculty of Technology, Interactive Spaces/Intelligent Systems)  
<http://www.cse.oulu.fi/JukkaRiekk>
  - Röning Juha** (Faculty of Technology, Data Mining/Robotics/Neural Networks Research/Secure Programming)  
<http://www.cse.oulu.fi/JuhaRöning>
  - Ylianttila Mika** (Faculty of Technology, Multimedia Communication in Mobile and Ubiquitous Information Network Systems)  
<http://www.ee.oulu.fi/~over/>
- Research volume  
Researchers 90  
Research funding EUR 3.6 million

Spin-Out Companies



Other Key Companies



## Material Sciences

- Mass and heat transfer process, microelectronics and materials physics, electron spectroscopy. **Department of physics** (<http://physics oulu.fi/>)  
**Microelectronics and Materials Physics Lab** (<http://www.ee oulu.fi/research/miklab>)  
Mass and Heat Transfer Process Lab ( <http://www oulu.fi/pyolam/>)
- **Principal investigators**
  - Aksela Helena** (Faculty of Science, Synchrotron radiation physics, electron spectroscopy)  
<http://cc oulu.fi/~elsp/henkilot/haksela.html>
  - Jantunen Heli** (Faculty of Technology, Microelectronics, Nano technology)  
<http://www.ee oulu.fi/research/miklab/personnel/HeliJantunen.htm>
  - Keiski Riitta** (Faculty of Technology, Mass and heat transfer, fluid dynamics, separation processes, etc)  
<http://www oulu.fi/pyolam/keiski.html>
  - Lappalainen Jyrki** (Faculty of Technology, Microelectronics and materials physics)  
<http://www.ee oulu.fi/research/miklab/personnel/JyrkiLappalainen.htm>
- **Research volume**
  - Researchers 130
  - Research funding EUR 4.0 million
- **Key inventions**
  - Functionalized films and biosensor applications
  - Nanofiber photocatalyst for smart coatings and hydrogen production
  - Catalytic purification technology



Spin-Out Companies



Other Key Companies





UNIVERSITY of OULU  
OULUN YLIOPISTO

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