Introduction to Aalto University and the School of Science

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Otaniemi campus
Tapio's office
The campus is located in **Otaniemi Technology Hub** in Espoo city, 10 km from the center of Helsinki.
Designed by Alvar Aalto in 1960's.
A unique combination of education, study and business densely packed into a small area by the sea.
Aalto University
School of Science

Aalto University (HUT until 2010)

A merger of three leading Finnish universities in January 2010

University of Art and Design Helsinki
founded 1871

Helsinki School of Economics
founded 1911

Helsinki University of Technology
founded 1849

The first Foundation University in Finland, with an independent board
Initial capital of the foundation 700 M€

Aalto University name celebrates diversity and innovative method

- The name "Aalto University" is a tribute to a courageous, overarching renaissance man, Finnish architect, designer and academic Alvar Aalto
- He distinguished himself in not only the fields of technology and economics, but also art.
- The name has been chosen to reflect the concept, spirit, values and goals of the new university.

Alvar Aalto
Architect

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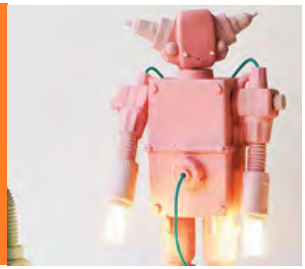
Alvar
Aalto
Architect

Aalto University schools

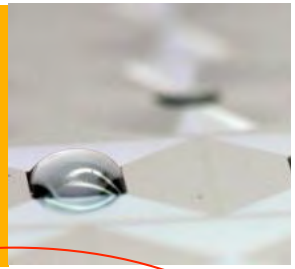
School of Arts, Design and Architecture



School of Business

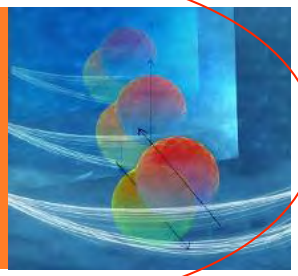
School of Chemical Technology

School of Electrical Engineering



School of Engineering

School of Science



Otaniemi Technology Hub

Otaniemi is home to 5,000 researchers, 20 R&D Centers, 3 universities and 800 companies – including Nokia's global headquarters and Rovio's Angry Birds.

Otaniemi is located in the city of Espoo (Finland's second largest city) and 15 minutes by car from the center of Helsinki (Finland's capital).

Featuring a unique mix of top-level research organizations, academic institutions and technology businesses.
Otaniemi is a community of over 32,000 people that includes 16,000 students and another 16,000 technology professionals.
Our mission is to enhance Otaniemi's competitiveness by supporting close collaboration between its key players and boosting its recognition and exposure around the world.

Otaniemi: R&D - Innovation - Business

Aalto SCI Strategy

Vision

Research and education unit meeting high international standards of excellence, ahead of its time at the forefront of science, boldly expanding the boundaries of scientific knowledge

Goal

Minimum of 12 research groups among international top and all departments meet international standards in research excellence by 2020

Mission

To carry out basic research of high scientific standards in its areas of expertise and develop scientific and technological applications based on the results

Strategic objectives

Research Excellence:
- High international ranking
- New research areas
- International visibility
- Interdisciplinarity
- Infrastructures

Learning and Education:
- Committed students and teachers
- Improvement of Degree programs
- Learning communities
- Diversity

Societal Impact:
- Entrepreneurship
- Influencing decision makers
- International visibility

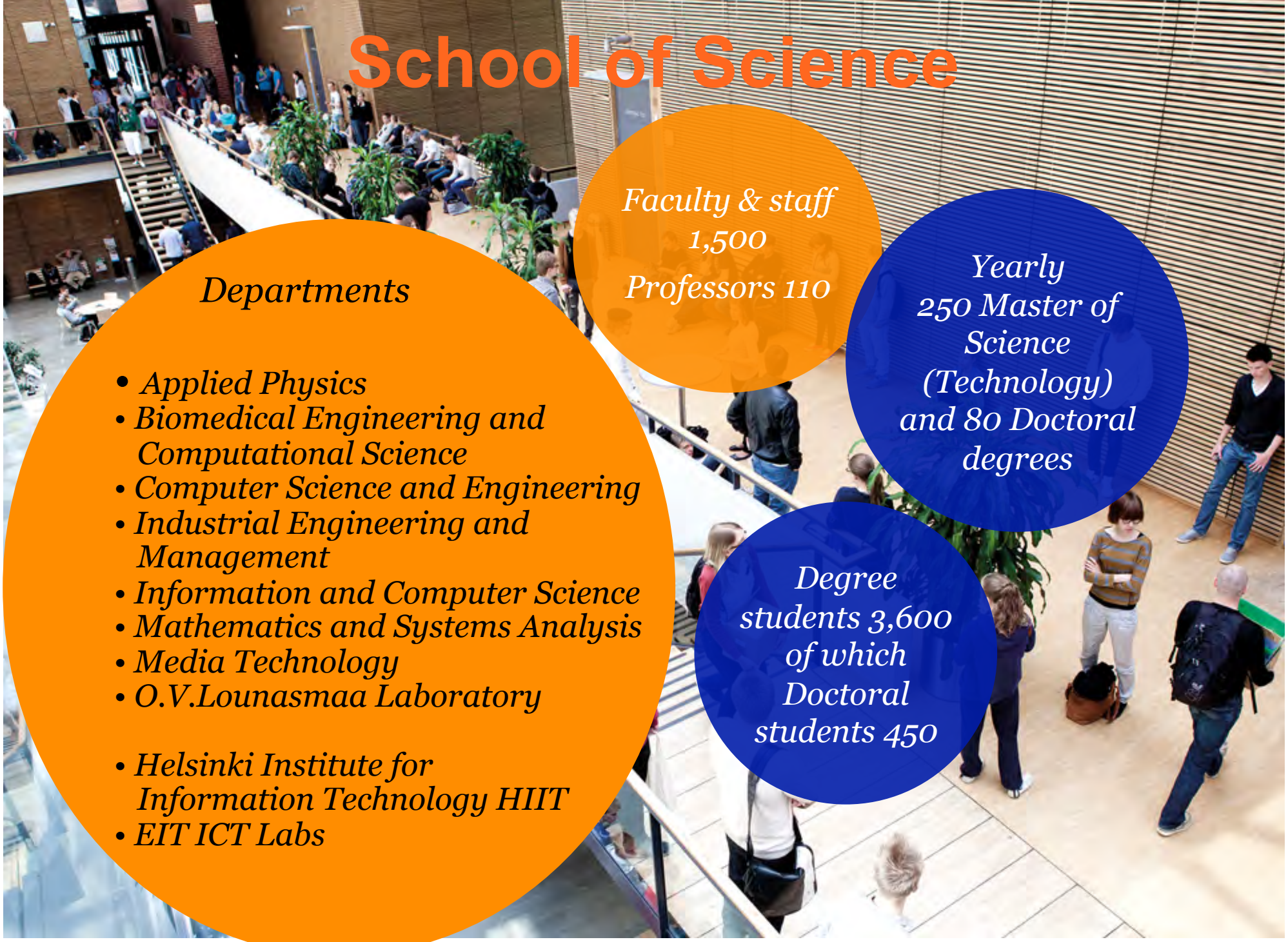
KPIs

Publication quality, International refereed publications, Doctoral, Master's and Bachelor's Degrees, Average number of credits, Total income from non-academic partners, Competitive research funding

Strategic enablers

Faculty & staff, Infrastructure, Funding, Support services, Internationalization

School of Science



Faculty & staff 1,500

Professors 110

Yearly 250 Master of Science (Technology) and 80 Doctoral degrees

Degree students 3,600 of which Doctoral students 450

Departments

- *Applied Physics*
- *Biomedical Engineering and Computational Science*
- *Computer Science and Engineering*
- *Industrial Engineering and Management*
- *Information and Computer Science*
- *Mathematics and Systems Analysis*
- *Media Technology*
- *O.V.Lounasmaa Laboratory*

- *Helsinki Institute for Information Technology HIIT*
- *EIT ICT Labs*

School of Science *ranking*

	World	Finland
Academic Ranking of World Universities 2013 (Shanghai Jiao Tong University), Field: Engineering/Technology and Computer Sciences	151-200	1
Performance Ranking of Scientific Papers for World Universities (National Taiwan University Ranking 2012), Engineering	147	1
QS World University Rankings by Subject 2013: Mathematics	101-150	1
QS World University Rankings by Subject 2013: Computer Science & Information Systems	151-200	2
QS World University Rankings by Subject 2013: Physics & Astronomy	151-200	2
Leiden Ranking Collaborative publications with industry indicator	10	1

Aalto University
School of Science


Education

European Bologna model

as applied in Finland

Doctor of Science (D.Sc.)
40 cr + dissertation (4 yr)

Master of Science (M.Sc.)
120 cr (2 yr)

includes M.Sc. thesis (30 cr)

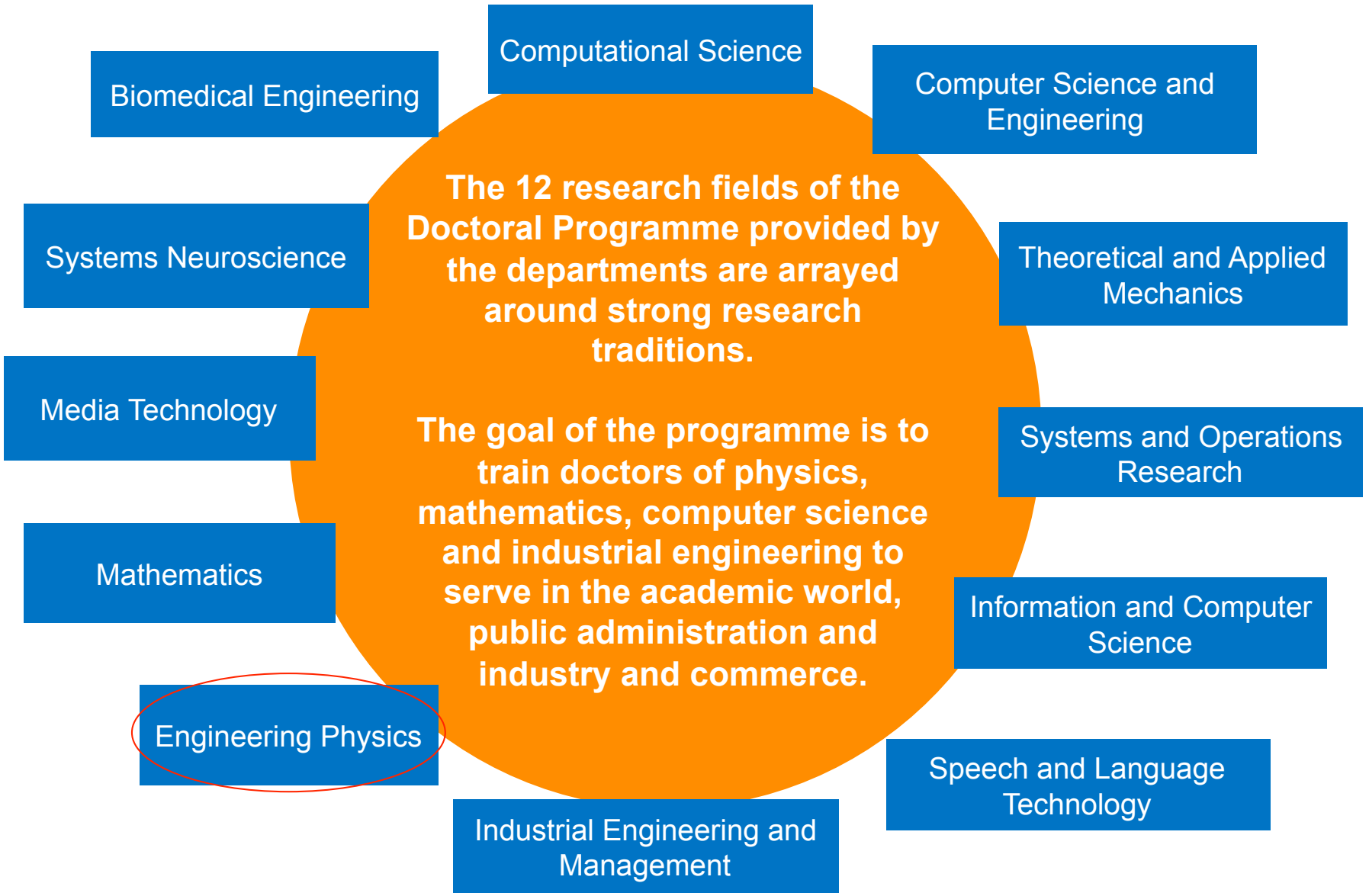
Bachelor of Science (B.Sc.)
180 cr (3 yr)

includes B.Sc. thesis and seminar (10 yr)

60 ECTS/year = 1600 h/year

Partner universities in double degree programmes

Doctoral Programme in Science

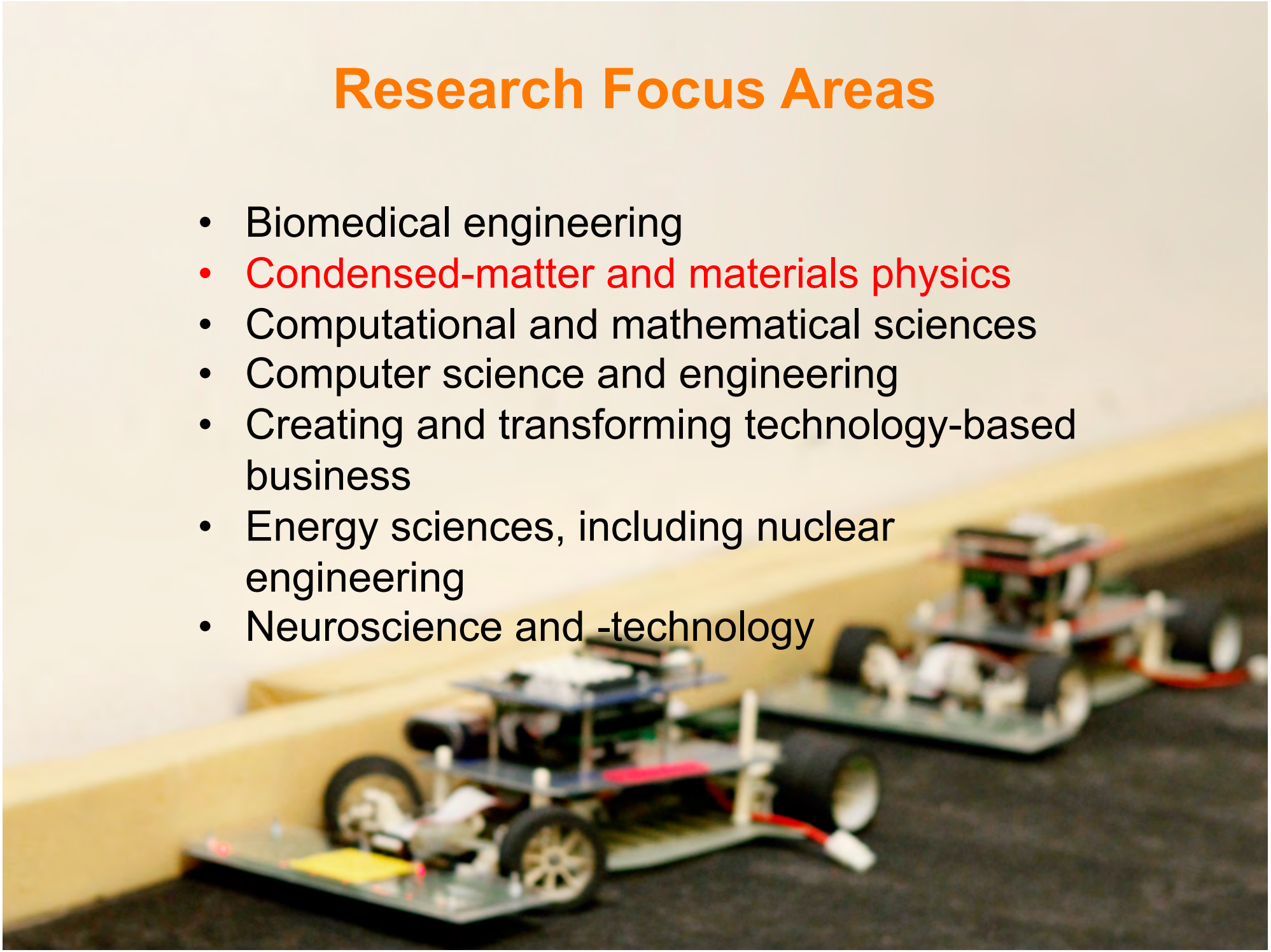


Research

Aalto University
School of Science

Research Focus Areas

- Biomedical engineering
- Condensed-matter and materials physics
- Computational and mathematical sciences
- Computer science and engineering
- Creating and transforming technology-based business
- Energy sciences, including nuclear engineering
- Neuroscience and -technology



World Class Research

European Research Council (ERC) Grants

Advanced Grants

- Towards two-person neuroscience, *Academy Professor Riitta Hari*
- Biomimetic nanomaterials, *Academy Professor Olli Ikkala*
- Condensation in Designed Systems, *Professor Päivi Törmä*

Consolidator Grant

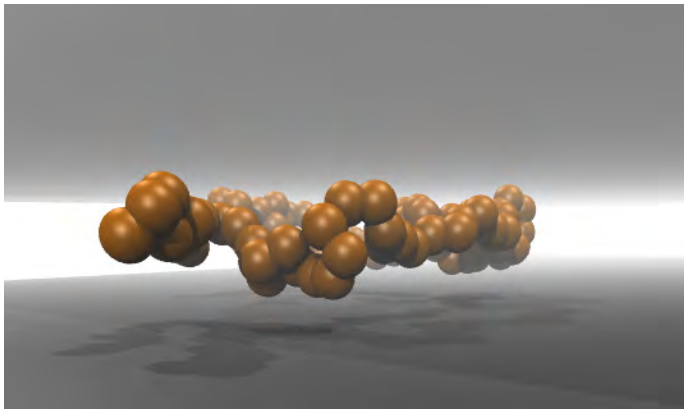
- Cavity quantum phonon dynamics, *Professor Mika Sillanpää*

European Research Council (ERC) Grants

Starting Grants (8, out of which 5 in Physics!)

Research groups at the Department of Applied Physics

- Atomic Scale Physics
- Fission and Radiation Physics
- Fusion and Plasma Physics
- Nanomagnetism and Spintronics
- NanoMaterials
- New Energy Technologies
- Optics and Photonics
- Positron Physics and Defect Spectroscopy
- Quantum Nanomechanics
- Surface Science



Computational Nanoscience (COMP) – Centre of Excellence

COMP members at Applied Physics

- Quantum Dynamics
- Complex Systems and Materials
- Electronic Properties of Materials
- Multiscale Statistical Physics (Tapio)
- Quantum Computing and Devices
- Quantum Many-Body Physics
- Surfaces and Interfaces at the Nanoscale
- Computational Soft and Molecular Matter

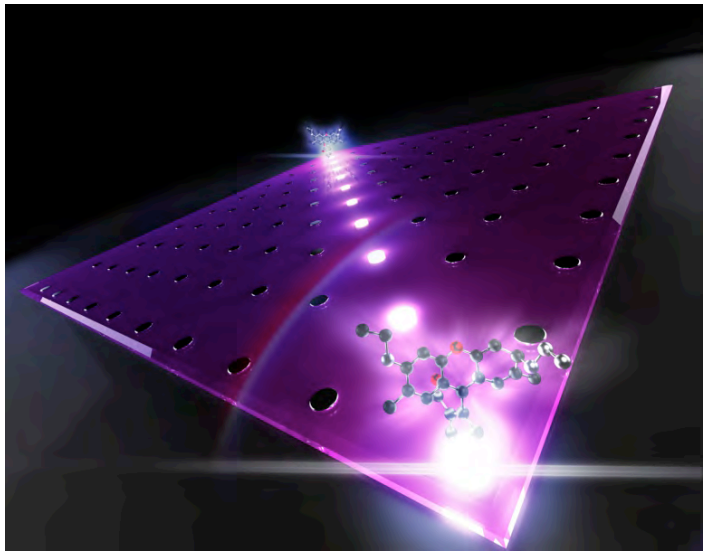
Molecular Engineering of Biosynthetic Hybrid Materials (HYBER) – Centre of Excellence

HYBER members at Applied Physics

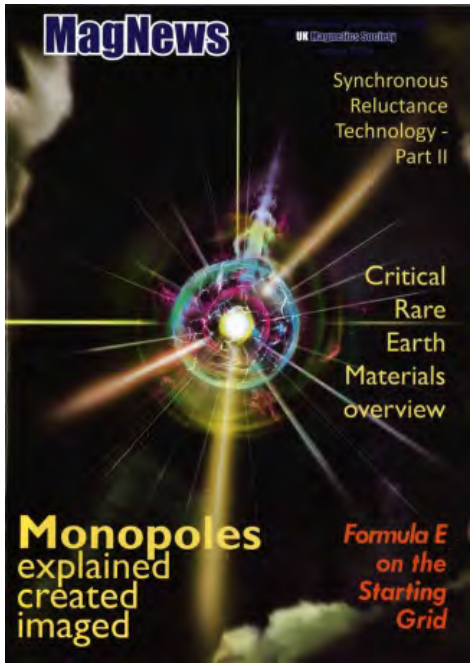
- Molecular Materials
- Soft Matter and Wetting

COMP strives for excellence in advanced methodologies and condensed-matter sciences at the nanoscale

World-renowned expertise



Cutting-edge research

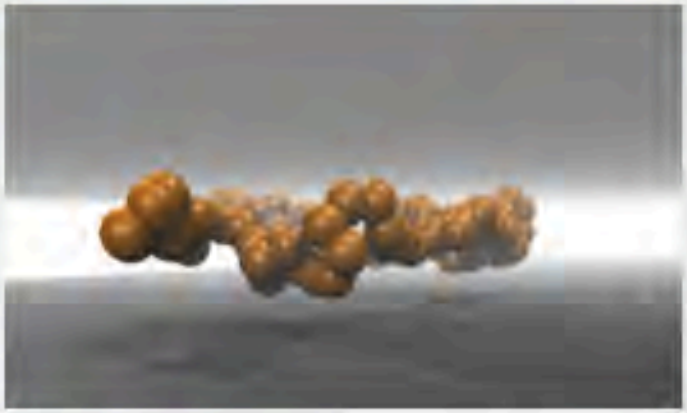


Successful outreach

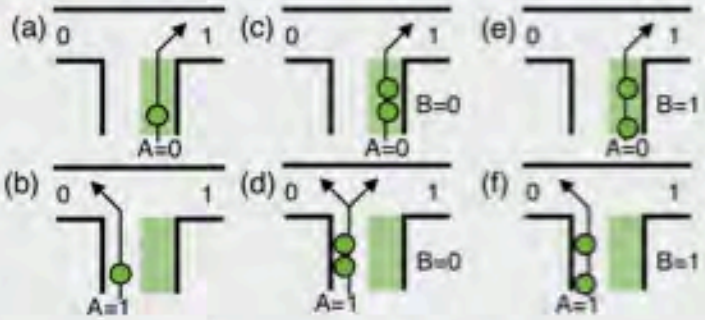
Aalto University
School of Science

Multiscale Statistical Physics group of Tapio Ala-Nissilä: Between Quantum and Classical, and Nano and Macro

MSP Group

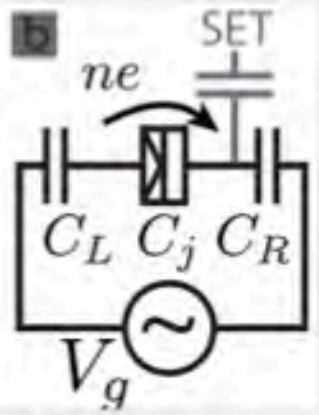


Micro and Nanofluidic systems



"Colloidal Computer"

Polymer translocation through nanopores



$$\langle e^{-\beta(W-\Delta F)} \rangle = 1\,?$$

Fluctuations in small systems

MSP group summary

Thank you for your attention!

Creating Tomorrow's Science

sci.aalto.fi/en