Oslo Metropolitan University, Oslo, Norway

Intelligent Health and Physical Sensors

Olga Korostynska
Prof in Biomedical Engineering

20 Sep 2024

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Olga Korostynska: Education and Career

OSLOMET

B.Eng. in Biomedical Engineering

Kiev, Ukraine

→ **M.Sc**. in Biomedical Electronics

Kiev, Ukraine

→

Ph.D. in Electronic and Computer Engineering (**2003**)

UL, Limerick, Ireland

→ **Postdoctoral Researcher**
LLB Bachelor of Laws

Limerick, Ireland

→ Lecturer in Physics (2011)

Dublin, Ireland

→ Marie Curie Fellow
Senior Lecturer

Liverpool, UK

→ Associate Prof (2018-2023)

NMBU, Ås, Norway

→ **OsloMet**

Prof in BioMedical Engineering (2019+)

OsloMet, Norway

→ (**2023**) Adjunct Professor in the Department of Electronics & Computer Engineering, UL

Coordinator for Masters Degree in BioMedical Engineering

OsloMet history

oslo university college

Oslo University College (HIO) 1994

- 7 500 students
- Scattered premises
- 23 University Colleges

HØGSKOLEN I AKERSHUS
AKERSHUS UNIVERSITY COLLEGE

HiAK 1994

- 3 000 students
- Scattered premises
- 5 University Colleges

2003

Moved to Kjeller

OSLO AND AKERSHUS
UNIVERSITY COLLEGE
OF APPLIED SCIENCES

HiOA 2011

- 17 000 students
  HiO: 14 000
  HiAK: 3 000
- Campus Pilestredet
  Campus Kjeller

autumn 2014
The addition of a new campus in Sandvika

2014
AFI
NOVA

2016
NIBR
SIFO

2018
NAFO

OSLOMET
OSLO METROPOLITAN UNIVERSITY
STORBYUNIVERSITETET

January 12th. 2018
Oslo and Akershus University of Applied Sciences becomes OsloMet - Oslo Metropolitan University

1995 2000 2005 2010 2015 2020

OSLOMET

Facts & figures

3rd largest university in Norway

48 Bachelor's programmes

21,900 Students

33 Masters's programmes

Housing starts at **3,200 NOK**

6 International Master’s programmes

Tuition fees: **0 NOK**

7 PhD programmes

Studies within: Health sciences, Technology, Art and Design, Social Sciences, Education and International Studies

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For more content see: www.oslomet.no/en/about and https://www.oslomet.no/en/study

Science & Research

16 **Horizon 2020 projects**

OsloMet is an active participant in the EU's flagship research and innovation programme.

103 **Research groups**

216 **Research Council of Norway projects**

The Research Council of Norway (NFR) is a leading source of research funding in Norway

346 **PhD candidates**

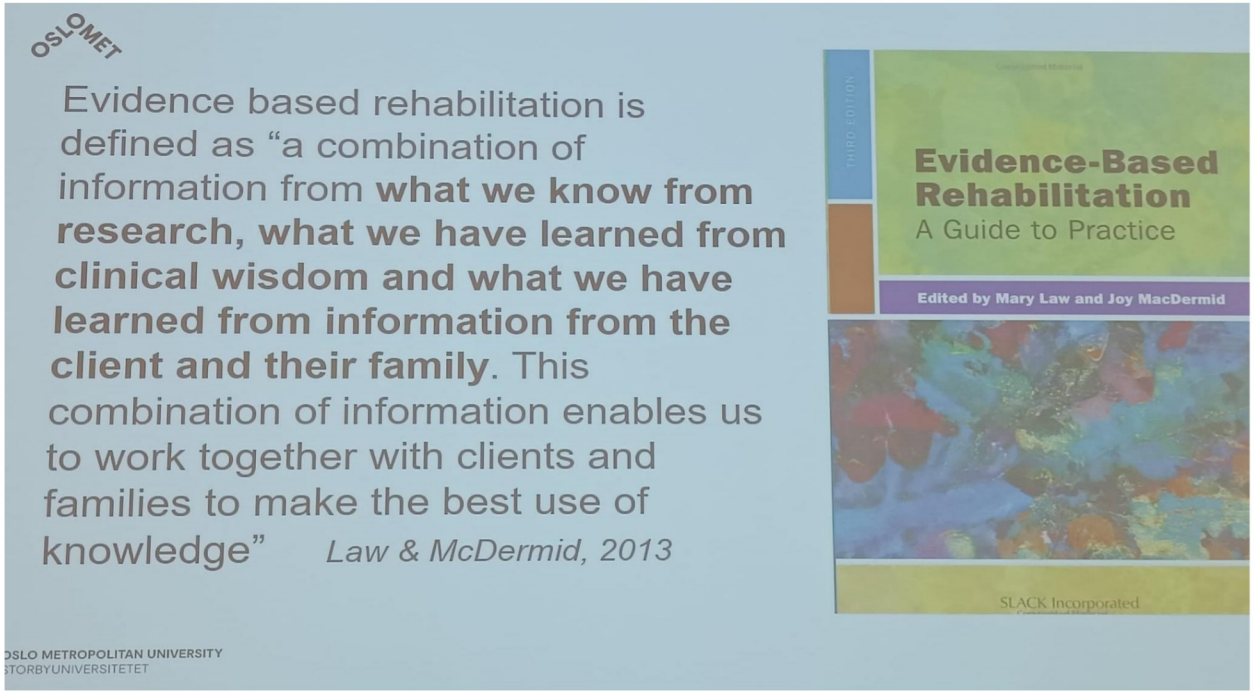
Digital / Intelligent Health

Digital health refers to the use of technology and digital solutions to improve healthcare delivery and outcomes. It encompasses a wide range of applications, including the use of **physical sensors**.

Physical sensors play a crucial role in digital health by capturing and monitoring various physiological data. They can be integrated into wearable devices, smartphones, or medical equipment to track vital signs, activity levels, sleep patterns, and more.

Benefits of Digital Health and Physical Sensors

The combination of digital health and physical sensors offers numerous benefits. It enables remote patient monitoring, allowing healthcare providers to track patients' health in real-time and intervene when necessary. It also empowers individuals to take control of their health and make informed decisions based on the data collected by the sensors.



+ monitoring with physical sensors

The university's role in global health and well-being

Collaboration across OsloMet

Intelligent health is a collaboration between **the Faculty of Health Sciences (HV)** and **the Faculty of Technology, Art and Design (TKD)**.

What is Intelligent Health?

Intelligent Health represents OsloMet's strategic initiative on health and technology.

The initiative will, with the assistance of technology, contribute with knowledge and solutions that foster improved health and counteract diseases.

We will offer an arena that encourages cooperation between the university and the private and public sectors. Through collaborating across disciplines and sectors, we will ensure that research and innovation within health and technology remains user- and problem-oriented.

Stakeholders

Researchers

Private sector

Public sector

OsloMet students

Patients/users / NGOs

Government

The Intelligent Health Conference

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SUNNAAS SYKEHUS

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ACIT Master in Biomedical Engineering

Full-time
SCOPE

120
ECTS

Pilestredet
CAMPUS

2
YEARS

Autumn
SEMESTER START

English
LANGUAGE

Admission Requirements
You choose one specialisation when applying. See information for each specialisation online.

For all the specialisations, you need:
- an average grade of at least C (according to the ECTS grading scale) on your bachelor's degree
- proof of your English proficiency

Application deadline:
You apply via SøknadsWeb. There are different application deadlines based on which country you apply from.

Want to know more?
Contact us by phone or e-mail or see:
www.oslomet.no/en
See information for each specialisation online:

Academic Coordinators
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Phone: +47 67 23 67 12

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Phone: +47 67 23 68 87

Administrative Coordinator
Karltjn Hillekens
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Phone: +47 67 23 76 92

FOR MER INFORMASJON
www.oslomet.no/en/study/tkd/applied-computer-information-technology

Master's programme

Applied Computer and Information Technology (ACIT)

Biomedical Engineering and **Robotics and Control**

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OsloMet is Norway's third largest university, with great diversity among its nearly 22,000 students and 2,200 employees. OsloMet is close to the city and working life, and conducts education and research within a wide range of disciplines that contribute to solving society's challenges. OsloMet has long historical lines with major professional educations that have existed for over 100 years. The university is also an active promoter of innovation and new technology for the development of the welfare state.

ACIT is offered as collaboration between the Deptartment of Computer Science and The Department of Mechanical, Electrical and Chemical Engineering.

The programme offers specialisations in *Applied Artificial Intelligence*, *Biomedical Engineering*, *Cloud-based Services and Operations*, *Data Science*, *Mathematical Modelling and Scientific Computing*, *Robotics and Control* and *Universal Design of ICT*.

Here you will find information about the spesialisations offered at the Department of Mechanical, Electronic and Chemical Engineering: *Biomedical Engineering* and *Robotics and Control*.

Biomedical Engineering

The need for innovation in the field of biomedical engineering has never been as important as right now. Neither has it ever been given so much attention from governments, organisations providing health care and the media.

With advancements in technology, it has become increasingly evident that integrating innovative solutions into healthcare systems is necessary to deliver world-class services. From electronic health records and telemedicine to wearable medical devices and artificial intelligence, technology has the potential to revolutionize healthcare delivery.

This specialisation will prepare you for a professional career in companies and research organisations related to new and existing healthcare devices. You will gain an interdisciplinary background and hands-on experience in biomedical engineering and technology by completing the following courses:

- ACIT4710 Digital Signal and Image Processing
- ACIT4720 Medical Sensors and Actuators
- ACIT4730 Special Biomedical Engineering subject
- ACIT4740 Rehabilitation and Assistive Devices

Robotics and Control

Norwegian industry has demand for electrical and mechanical engineerings with multidisciplinary skills in automation, robotics, AI and ICT. ACIT robotics and control specialisation has a unique combination subjects targeted to meet these demands and enable your dream career!

As ACIT robotics and control student you will start the first semester with social-scientific activities at Ocean lab. You will get to know your peer-students, teachers and our research facilities.

Our robotics and control courses are focused on solving real industrial problems. You will participate three robotics and control subjects (10 ECTS each), and as an elective course you can choose the robotics and control project course (10 ECTS) or one of the many ACIT elective courses.

Through the semester you will work on inspiring assigments in groups of 2-5 students. In the middle of the semester you will choose an application area for your individual project-based exam. During the two years you will become fluent in presenting and documenting your work with high academic standard. For your master thesis, you can join our industrial research projects or plan your own project with a company.

https://www.oslomet.no/en/study/tkd/applied-computer-information-technology

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What, when and where are we measuring?

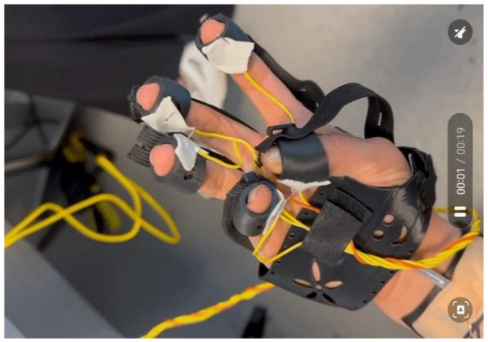
Have to consider:

- Measurand
- Range
- Measurement time
- Response and recovery times
- Measurement frequency
- Repeatability
- Resolution
- Sensitivity
- Accuracy
- Selectivity
- Hysteresis
- Any special requirements for material compatibility
- Cost

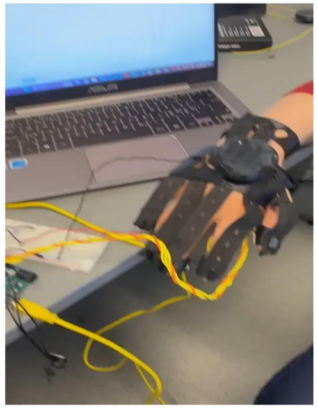
Beurer BC 28 blood pressure monitor (Clas Ohlson)

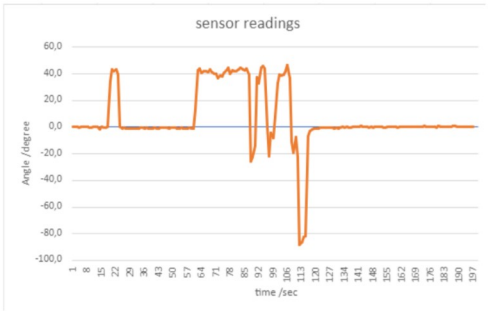
Galaxy watch active measuring blood pressure

EXAMPLES OF MASTERS PROJECTS WITH SENSORS

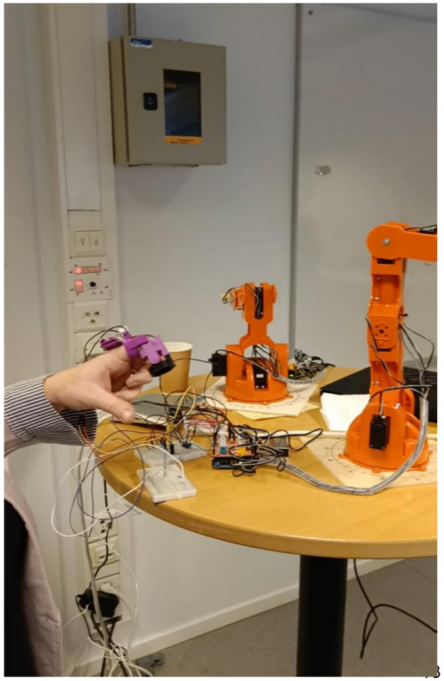


Sensor Decade





The sensory readings: the y-axis shows the angle of bending while the x-axis shows the time in seconds (negative angles refer to the down bending)



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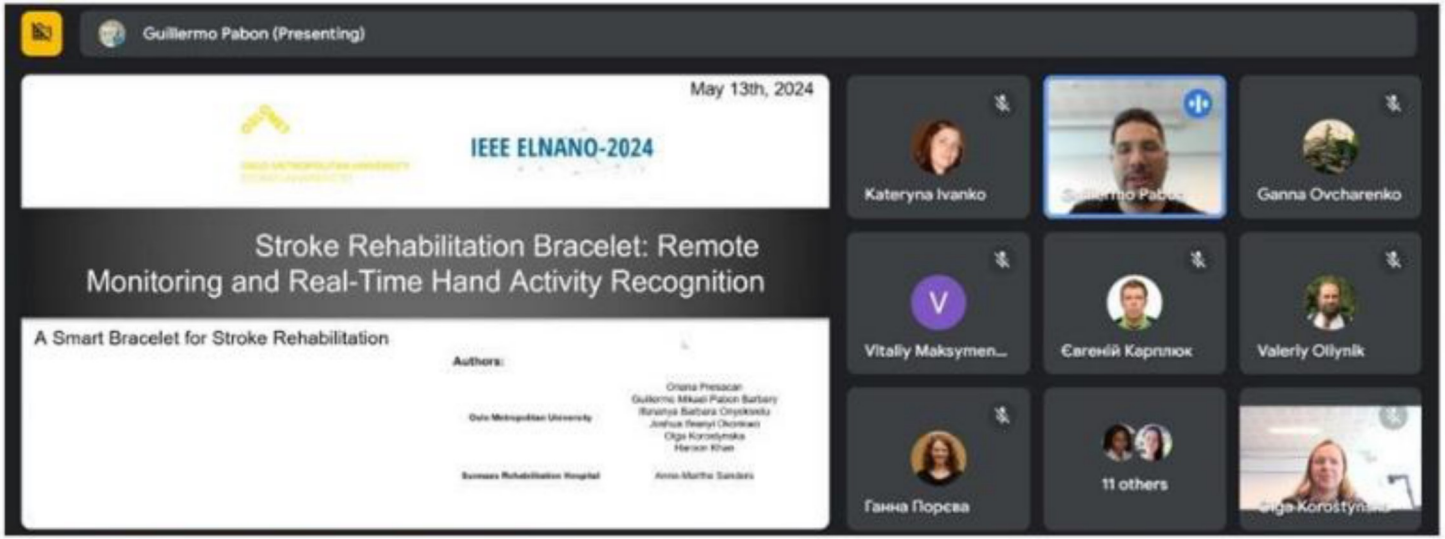

Guillermo Pabon (Presenting)
May 13th, 2024
IEEE ELNANO-2024
Stroke Rehabilitation Bracelet: Remote Monitoring and Real-Time Hand Activity Recognition
A Smart Bracelet for Stroke Rehabilitation
Authors:
Kateryna Ivanko
Ganna Ovcharenko
Vitaliy Maksymen...
Євгеній Карплюк
Valeriy Oliynik
Ганна Порєва
11 others

Cooperation with Sunnaas

- ACIT course in Rehabilitation and Assistive Devices
- 3D printing consultancy and projects
- Master and Bachelor Projects
- Hackathons

SV: Students working with robotic arm project

LM

Lene Mosberg <lenmos@sunnaas.no>
To Syeda Ghousia Fatima
Cc Olga Korostynska

This sender lenmos@sunnaas.no is from outside your organization.

Hei Syeda,
Takk for i går.
Kan du sende meg tittelen på bachelor utdanningen du tar nå, og litt hva du er på utkikk etter mht. tema for oppgave, så skal jeg ta kontakt med firmaet og høre om det er greit for dem at dere deltar.

Cooperation with Sunnaas: 3D scanning and 3D printing

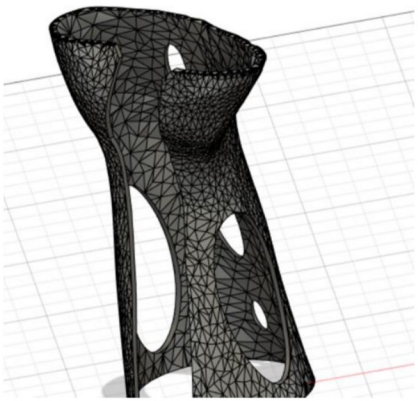
Use of 3D-scanners and 3D printers in smart orthoses

OSLOMET

Institute RHT(HV)

SUNNAAS SYKEHUS

BEITOSTØLEN HELSESPORTSENTER



Smart 3D printed orthoses include:

- Temperature sensors
- Pressure sensors
- Wireless data transfer
- Patient - specific

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Carl Christian Thodesen • 1st
Dean at The Faculty of Technology, Art, and Design at OsloMet
1mo •

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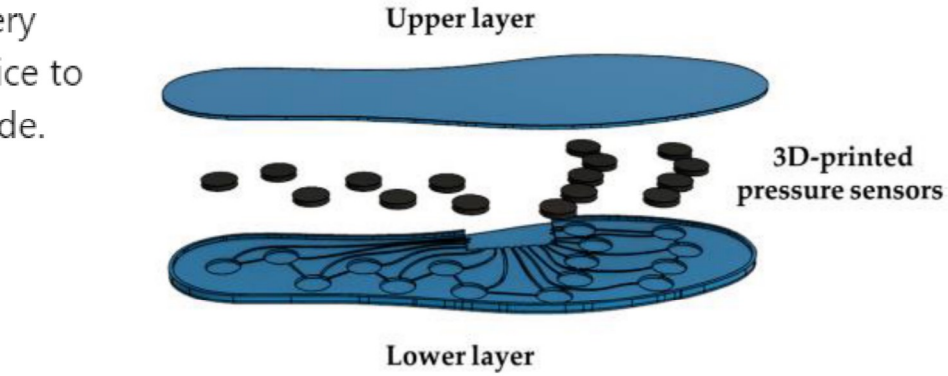
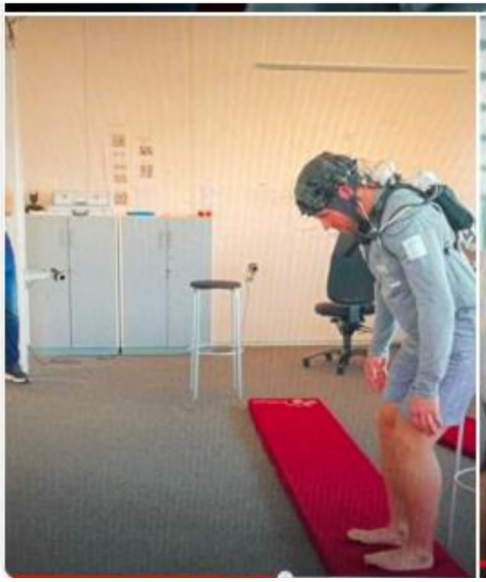
Gaitline

For everyone who has Viaplay here is your chance to check out OsloMet's very own **Peyman Mirtaheri** and **Haroon Khan** in action providing input and advice to world champion and multiple Olympic medal winner Aleksander Aamodt Kilde. You will have to watch the show to hear what they said to him.

Now that I have seen you on TV I will be looking for your advice on my own running style, I have a feeling it can be improved :)

Great work guys!! https://viaplay.no/serier/aamodt-kilde/sesong-1/episode-3





Cooperation with industry: Gaitline

Rehabilitation of mind and body

https://youtu.be/IT_tW3EVDK8

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Rehabilitation of mind and body

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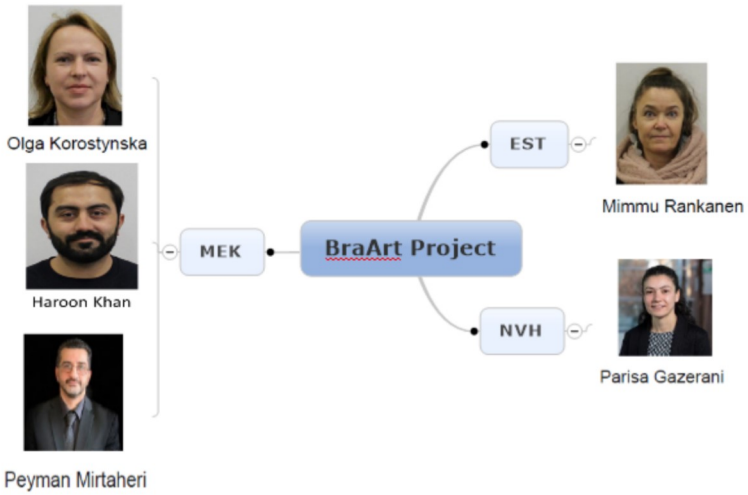
BraArt

Measuring the Therapeutic Mechanisms and Effects of Art

PhD Proposal description

Integrating Technology, Art and Health for Sustainable Future



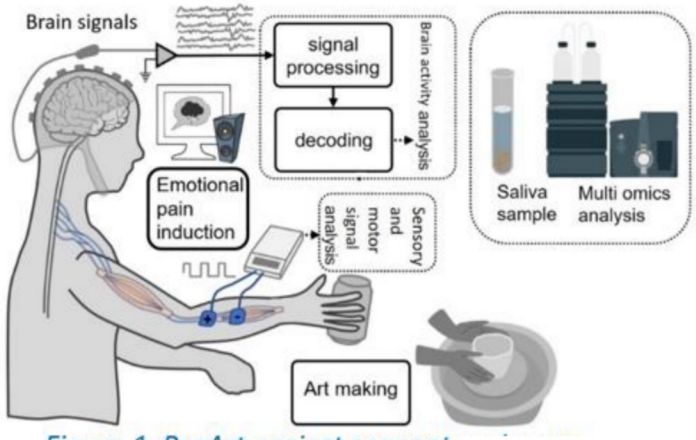
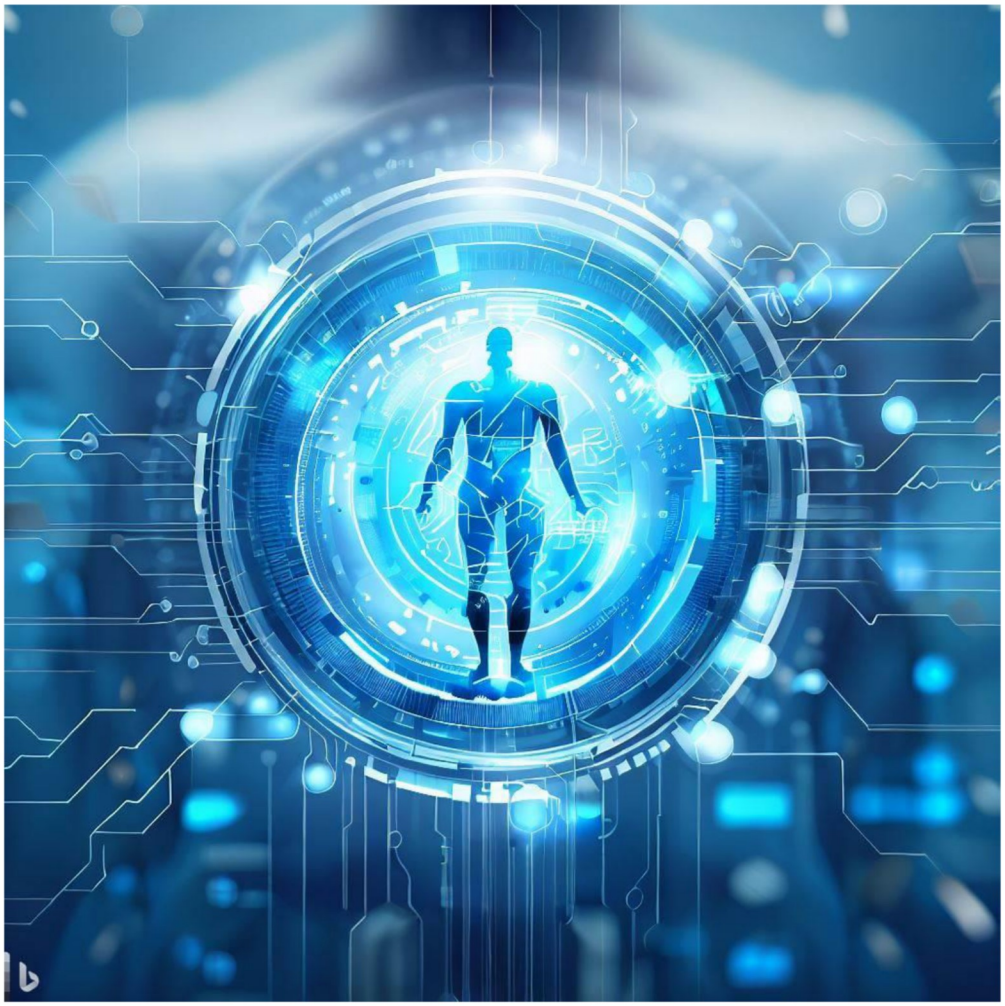


Figure 1. BraArt project concept

Future of Digital / Intelligent Health and Physical Sensors

- The future of digital/intelligent health and physical sensors holds great promise.
- Advancements in technology, such as miniaturization, improved connectivity, and artificial intelligence, will further enhance the capabilities of physical sensors.
- This will lead to more personalized and precise healthcare, early detection of diseases, and improved overall wellness.



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Thank you

Rector Mihnea Costoiu
Prof. Harald Kainz


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Norwegian winter
Nordmarka forest
Oslo, Norway