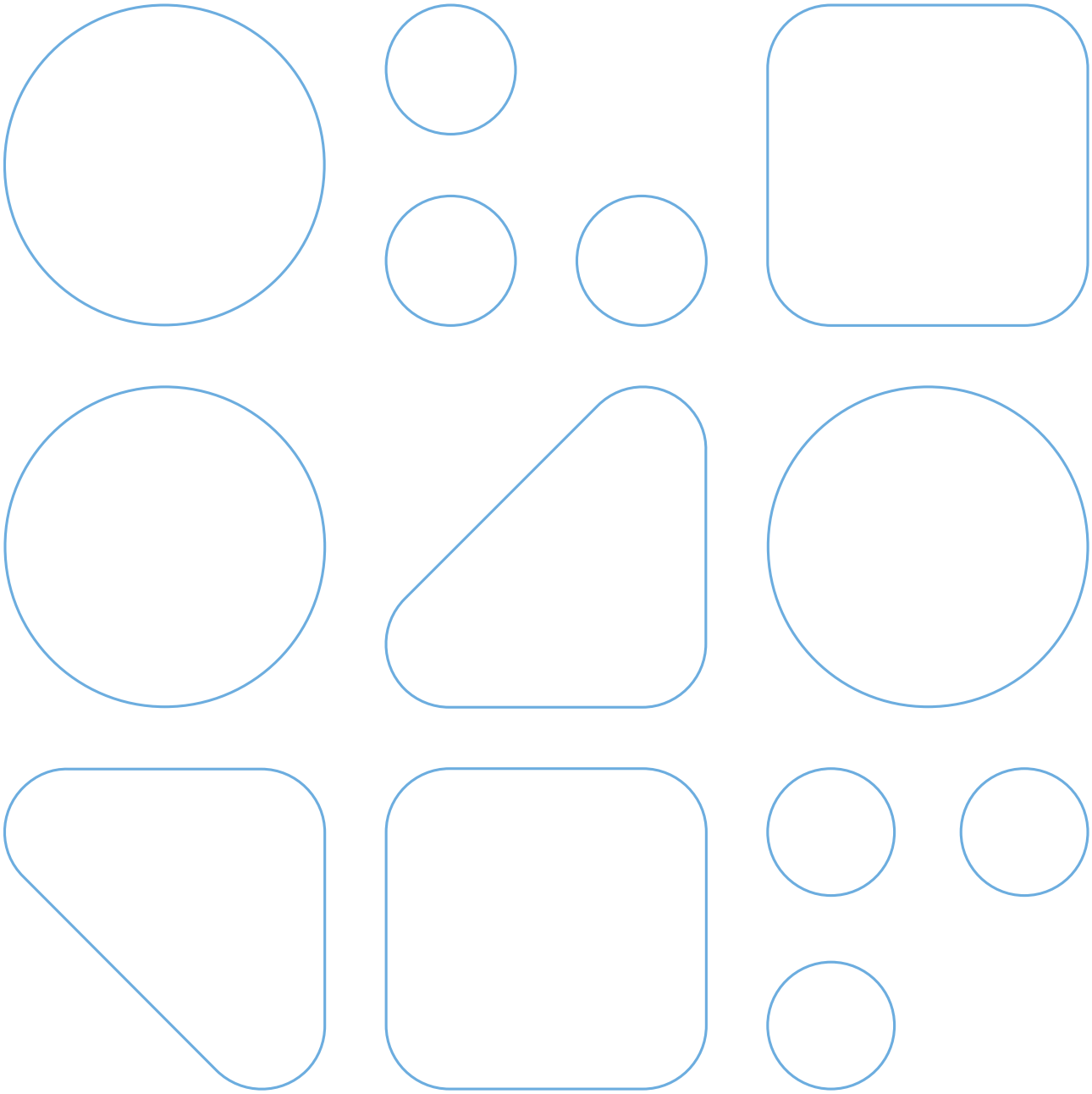
AKERSHUS UNIVERSITETSSYKEHUS

Research and Innovation

Diagnostics and Technology Division
Annual Report 2024



Tittel:
Research and Innovation

Editorial staff: Divisional research council

Innhold

Director's Comments

Foto: Private

As the Director of the Division of Diagnostics and Technology (DDT) at Akershus University Hospital (Ahus), I am immensely proud of the efforts and achievements of our eminent team. Their dedication to advancing laboratories and imaging diagnostics, alongside technological solutions, has been pivotal in enhancing patient care and treatment.

Our six departments- diagnostic imaging, immunology and transfusion medicine, microbiology and infection control, pathology, interdisciplinary laboratory medicine and medical biochemistry, and medical technology and e-health, in conjunction with our research and innovation unit, have all made significant contributions to the field.

The exemplary work of our researchers is evident through their numerous publications and the recognition they have garnered both domestically and internationally. I extend my heartfelt congratulations and commendation to all employees involved in research and innovation in 2024. Your commitment to excellence continuously propels the boundaries of medical science and technology, laying the foundation for a healthier future.

Janne Pedersen
Director

Introduction by the Research and Innovation Leader

It was a complete privilege when I started my new positions at DDT and Ahus in August 2024. Immediately it became apparent to me that DDT with all its activities, provides great opportunities for research and innovation. Even though the different environments within our division differ in size and funding, they all have a lot of ongoing activities. This is the basis for further development, and therefore we can have great ambitions on our own behalf.

Research and innovation constitute one of the four pillars in specialist health service, and as one of the university hospitals in Norway, we are in position to make great advances within our fields. This will be undertaken in collaboration with other environments at Ahus, Campus Ahus, University of Oslo, OsloMet as well as other national and international partners.

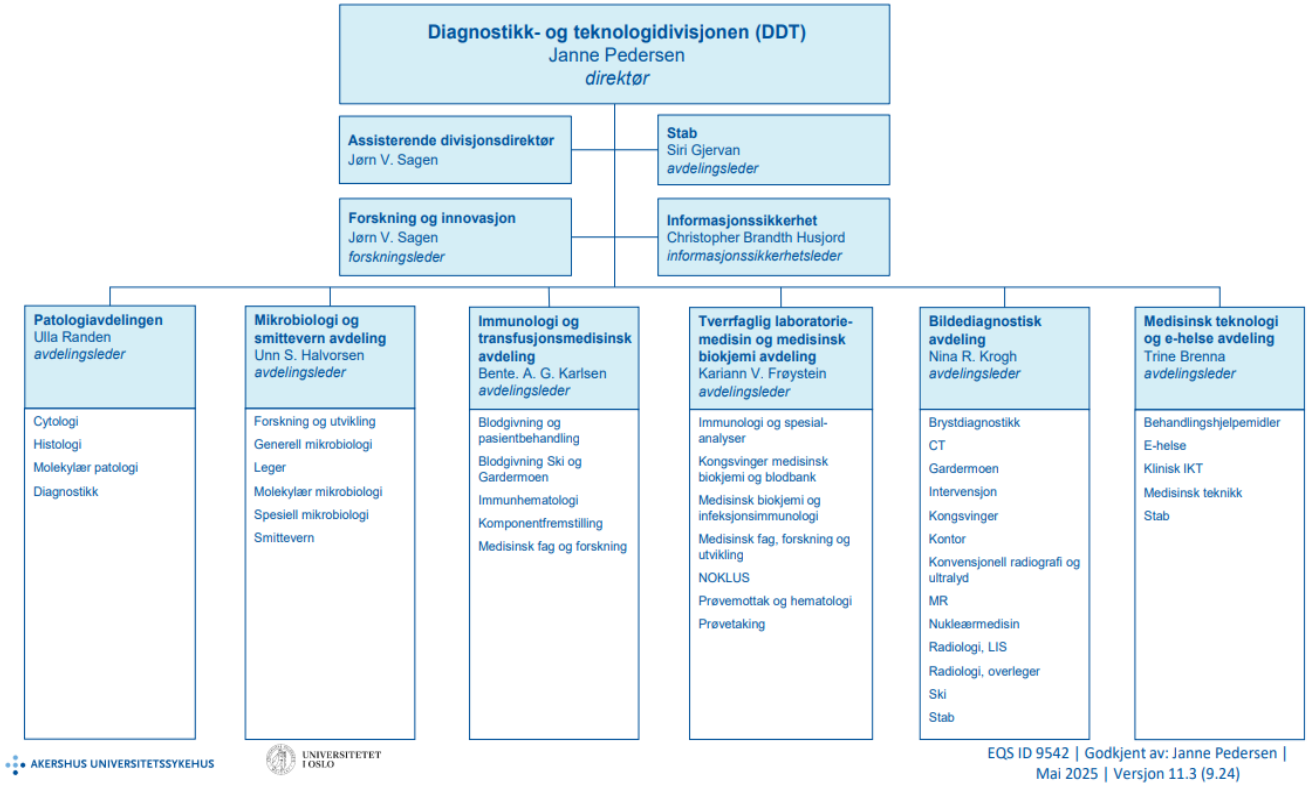
In December 2024 we decided to develop a Research and Innovation Strategy for the period 2026-2029. Moreover, we decided that DDT should provide open funding resources, and a total amount of NOK 500,000 was budgeted for 2025. We also encourage our scientific environments to apply for external funding.

It is vital that leaders and managers at all levels acknowledge research and innovation as important as day-to-day management, and that they have the courage to prioritise research and innovation even in challenging economic times. In continuation of this, investment in resources and equipment also lays the necessary foundation for a successful endeavor in science.

We build our future through new knowledge, innovative solutions, and the ability to change.

Jørn V. Sagen
Head of Research and Innovation, Professor

Organization of research and innovation at the division



The Divisional Research Council (DRC)

Members of DRC	Department
Jørn V. Sagen (leader)	DDT
Semhar Abraham (secretary)	FoI
Petter Hurlen	FoI
aNita Blomfeldt	MIKS
Hege V. Aamot	MIKS
Faiza Mahmood	IMTRA
Per Christian Sæther	IMTRA
Gisle Berge	TLMB
Ragnhild Røysland	TLMB
Jens Borgbjerg	BDA
Siri L. Heck	BDA

Elisabeth Sivy Nginamau	PA
Arian Ranjbar	MTE
Jesper Ravn	MTE

The Divisional Research Council (DRC) (Divisjonens forskningsutvalg) works with topics related to science and innovation, promoting activity throughout the division. There are 14 members, two representatives from each department. In 2024, the council had six meetings.

The annual seminar was organized by the DRC (see below), and all the members contributed to the annual research and innovation report. In December 2024, it was decided DDT would provide an open funding resource of NOK 500.000. The members developed an application form and guidelines for the applicant as well as the review committee.

Research and Innovation highlights for 2024

Annual Research and Innovation event

Foto: DDT

On the 23rd of October 2024, the annual Research and Innovation Seminar was held at Deichman Bjørvika, gathering around 70 attendees. The seminar was a profound celebration of scientific inquiry and advancements, marked by insightful presentations and engaging discussions.

The highlight of the event was a captivating talk by Jo Røyslien, an external speaker known for his ability to make research communication both entertaining and accessible. His presentation not only educated but also delighted the audience, illustrating the importance of effectively conveying complex scientific ideas to the public. Following Jo Røyslien's talk, several PhD candidates, postdoctoral researchers as well as research and innovation leader took the stage to present their ongoing studies. Their presentations showcased a wide array of innovative research across various fields, reflecting the seminar's commitment to fostering a diverse and dynamic scientific community.

The seminar also featured a presentation about the Deichman Library, emphasizing its value as a resource for researchers and the broader community.

The event concluded with a delightful dinner, offering attendees the opportunity to network, discuss ideas, and reflect on the day's insights in a relaxed and convivial atmosphere. The annual Research and Innovation Seminar at Deichman Bjørvika not only highlighted the achievements of the past year but also set the stage for future collaborations and discoveries.

DDTs årlige forsknings- og innovasjonsseminar

Onsdag 23. oktober 2024

Deichman Bjørvika

08:30-08:45	Registrering kaffe/Te
08:45-09:00	Velkommen ved direktør **Janne Pedersen**
Ordstyrer:	*Jørn V. Sagen*
09:00-10:00	Jo Røislien
10:00-10:15	Pauseservering- Kaffe/Te .
10:15-11:00	Korte presentasjoner av aktive stipendiat/post doc-prosjekter TLMB: Ingrid Marie Hardang (PhD-stipendiat)- Hepcidin MIKS: Kira Waagner Birkeland (PhD-stipendiat)-Metagenomic sequencing for pathogen detection in CNS infections PA: Thura Omran(PhD-stipendiat). Immunological Signature in Colorectal Neoplasia: Cancer, Polyps, and Fusobacterium nucleatum
11:00-12:00	lunsj
Ordstyrer:	*aNita Blomfeldt*
12:00-13:00	Jørn V. Sagen- Personalized medicine in diabetes and obesity
13:00-13:45	Korte presentasjoner av aktive stipendiat/post doc-prosjekter MTE: Agnar Bjørnstad (PhD-stipendiat)- AI-based risk assessment of recurrence in early HR+/HER2- breast cancer BDA: Jens Borgbjerg (Post.doc)- Agreement Between Routine-Dose and Lower-Dose CT With and Without Deep-Learning Denoising Allows Interchangeability for Active Surveillance of Small Solid Renal Masses: A Multi-Observer Study
13:45-14:10	Pauseservering- Kaffe/Te /Frukt .
Ordstyrer:	*Ulla Randen*
14:10-15:40	Korte presentasjoner av FoI prosjekter som fikk stimuleringsmidler fra DFU i 2024 BDA: Cathrine Helgestad Kristiansen - Reduced iodine contrast medium in spectral CT for patients with cardiovascular disease IMTRA: Faiza Mahmood-Assessing IgE Sensitization Profiles to Birch and Timothy Grass Pollen Allergens in Birch Pollen Allergic Blood Donors Using an Oligoplex Specific IgE Assay[4] MIKS: Milan Stosic- TaME-seq2: tagmentation-assisted multiplex PCR enrichment sequencing for viral genomic profiling PA: Thulasika Senthakumaran- Microbial dynamics with colorectal cancer progression MTE: Tonje Holm Hjertaas - Designing an Efficient Implementation Process for Large Scale Adoption of Telehealth
15:40-15:55	Presentasjon av Deichman
15:55-16:05	Avslutning ved forskningsleder
16:00-17:00	Utforsk Deichmans seks etasjer på egenhånd. Hver etasje har ulike atmosfære, funksjoner og muligheter for en hver smak.

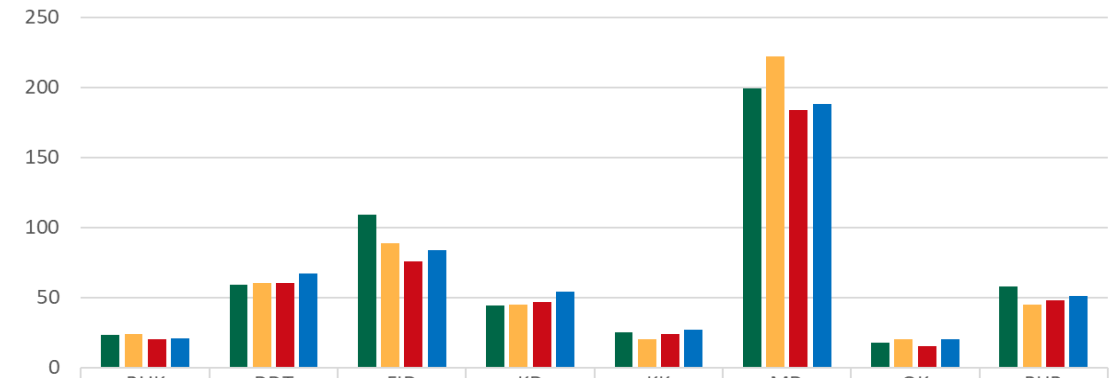
CENTROPA - Middag.

17:00-19:30	Chefs Choice -3 retter

Results for 2024

The following data is proved by the Division of Research and Innovation (Forsknings- og innovasjonsdivisjonen-FID).

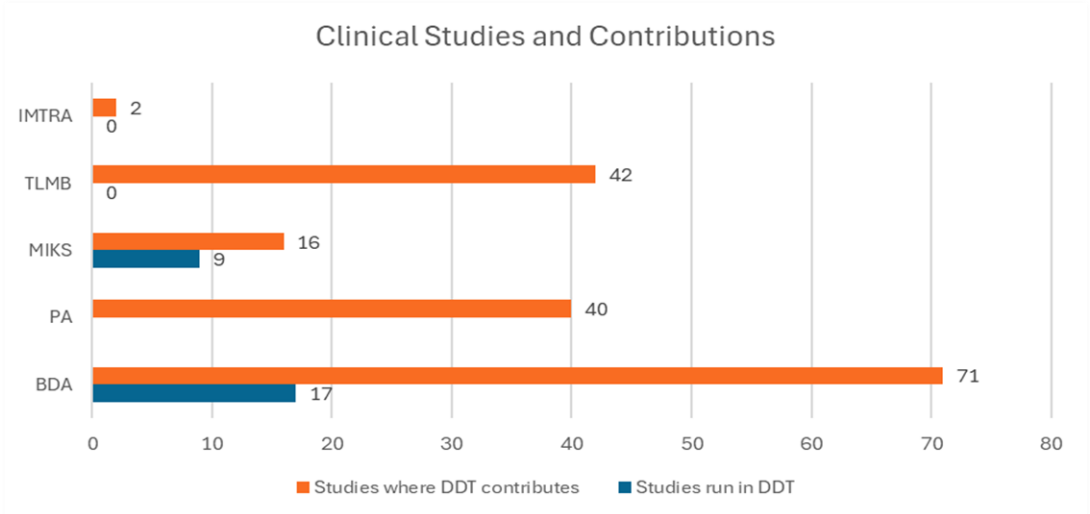
Scientific publications

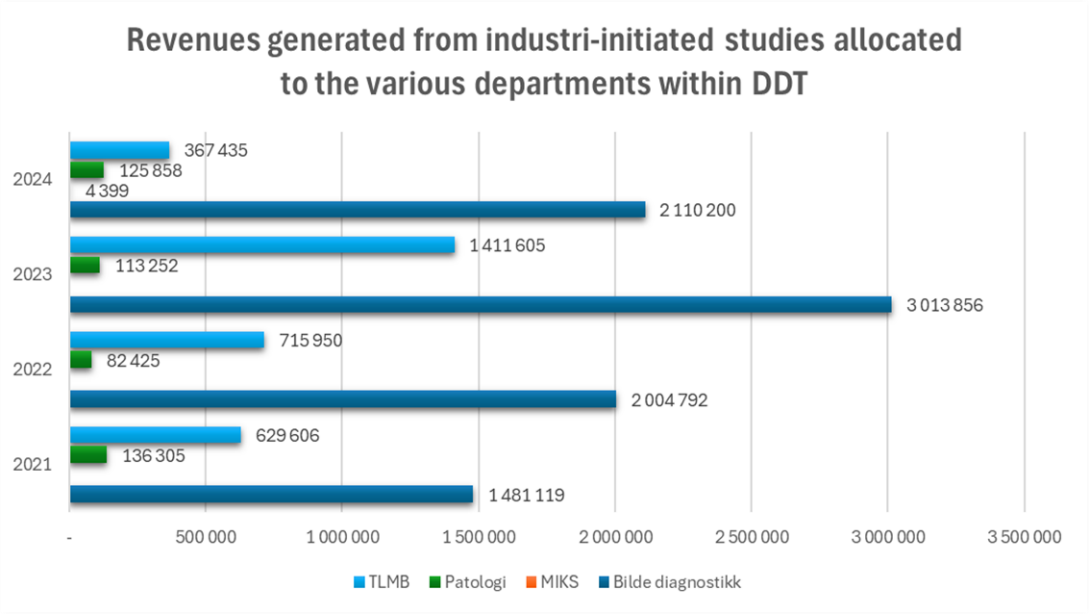


	BUK	DDT	FID	KD	KK	MD	OK	PHR
2021	23	59	109	44	25	199	18	58
2022	24	60	89	45	20	222	20	45
2023	20	60	76	47	24	184	15	48
2024	21	67	84	54	27	188	20	51

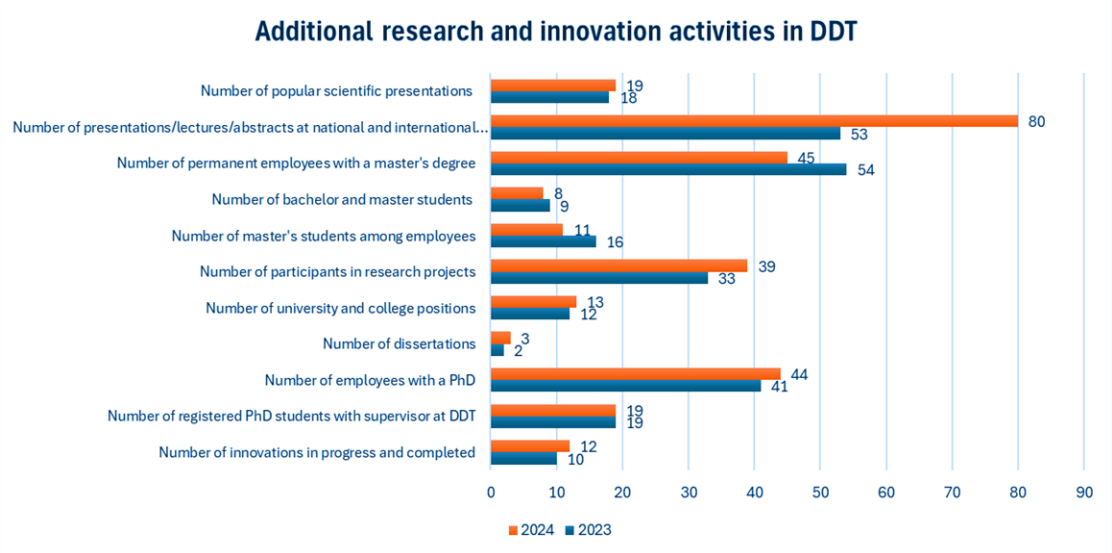
Publications per Ahus divisions in CRISTIN from 2021-2024

Clinical studies and contributions





Additional activities



Funding and Grants

Source of funding	Project title	Project leader (department)	Awarded amount for 2024 (NOK)
Ahus internal research funds	Detection of renal fibrosis burden and prediction pf kidney function deterioration: The role of the kidney MRI and markers of accelerated renal aging	Anne Negård (BDA)	250 000
Sophies Minde Ortopedi AS	Medial and Superior Tibiotalar Distance in Lateral Ankle Fractures-Standing vs. Supine Imaging	Haseem Ashraf (BDA)	750 000
OUS	Defining the extent of hepatobiliary complications to IBD at 5 years using MRI (IBSEN III)	Aida Kapic Lunder (BDA)	262 160
Helse Sør-Øst	Improving antibiotic stewardship in hospitals using electronic records, individual feedback to prescribers, and assessing environmental risk of antibiotics in wastewater	Kirsten Midttun Gravningen (MIKS)	3 882 000
NORM	Next-generation antibiotic stewardship. Measuring broad-spectrum antibiotic use in a Norwegian university hospital based on pharmacy dispensary data versus	Kirsten Midttun Gravningen (MIKS)	50 000

	electronic administration data		
Ahus internal research funds	Understanding Fusobacterium-induced inflammation in colorectal cancer – laying the groundwork for non-invasive biomarkers	Vahid Bemanian (PA)	500 000
Astra Zenica	Use of liquid biopsy in cancer diagnostic: Evaluation of next-generation sequencing for following up the lung cancer patients at Akershus University Hospital	Vahid Bemanian (PA)	630 118
Novartis Norge AS	AI-based risk assessment of recurrence in early HR+/HER2-breast cancer	Jesper Ravn (MTE)	4 250 000

PhD dissertation in 2024

Foto: Private

Hasan Banitalebi MD PhD (UiO)

MRI findings in lumbar spinal stenosis: reliability and association to clinical features
Supervisor: Anne Negård- Professor II
Department of Diagnostic Imaging

Foto: Private

Ivar Mjåland Salte MD PhD (UiO)

Artificial intelligence to improve measurement reproducibility of left ventricular function in echocardiography
Supervisors: Thor Edvardsen MD PhD, Professor II (UiO), Harald Brunvand MD PhD (SSH), Bjørnar Grenne MD PhD (NTNU)
Department of Diagnostic Imaging

Foto: Private

Thulasika Senthakumaran PhD (OsloMet)

Exploring gut microbiota as biomarkers for colorectal neoplasia: Insights gained from Norwegian cohorts using colonic biopsies and fecal samples
Supervisors: Vahid Bemanian-PhD, Hege Smith Tunsjø-Associate professor, Trine Rounge -Professor
Department of Microbiology and infection control

Ahus Innovation Center AI^2

Just before Christmas 2024, the Ahus Innovation Center AI (AI^2) was established (organized to MTE/DDT). The center's vision is to build the hospital of the future, driven by data and automation. In 2025 the focus will be on the following three areas:

- Development of research infrastructure and services: This involves enabling access to data and clinical systems for model development, technical testing, and clinical studies.
- In-house development of process automation: Through a development team established within the center, software (robots/RPA) will be developed to automate (initially) administrative processes.
- GRC guidance within AI: Advising and guiding on AI governance, risk, and regulatory compliance. Assist the hospital in the faster implementation of already CE-marked AI tools, as well as clarifying needs and opportunities.

2024 annual research and innovation reports from the seven departments

Department of Diagnostic Imaging (BDA)

2024 has been an eventful year for research at BDA. Our department continues to integrate clinical expertise with research at both postdoctoral and Ph.D. levels. In 2024, BDA published 36 research articles, including 14 first and/or last authorships. Two PhD students employed at the department completed their thesis defense. Hasan Banitalebi defended the thesis “MRI findings in lumbar spinal stenosis: reliability and association to clinical features” at Ahus and Ivar Mjåland Salte’s defense of “Artificial intelligence to improve measurement reproducibility of left ventricular function in echocardiography” was held at Rikshospitalet.

Ivar Salte (the second from the right). *Foto: BDA*

Ivar Salte’s PhD was awarded the title of best national thesis degree in cardiac imaging at the Nordic Cardiac Imaging Conference.

Research Committee

The BDA research committee is composed of members representing research, management, and various professional groups, ensuring a broad and multidisciplinary perspective in its work. The committee meets every other month and is responsible for evaluating applications for participation in and contributions to new research projects. Additionally, the committee monitors ongoing research within the department and facilitates research activities among the department's staff.

Research group, Resources and Infrastructure

Four of our staff members hold part-time positions at the University of Oslo: Professor Jonn Terje Geitung, Professor Anne Negård, Associate Professor Haseem Ashraf, and Associate Professor Siri Lagethon Heck. They are responsible for teaching medical students, supervising PhD candidates and conducting a wide range of quality, innovation, and research projects. PhD candidate and radiographer Cathrine H Kristiansen holds a part-time position as a university lecturer at Oslo Met. Postdoctoral candidates Vigdis Hillestad, Jens Borgbjerg and Aida Kapic Lunder participate in research and supervision

One new PhD candidate has been admitted to the University of Oslo, and currently there are nine candidates at the department at different stages in their PhD education.
The 9 PhD students in our department are MScs of radiography Cathrine Helgestad Kristiansen and Heidi Hamill Gorman and MDs Maiken N. Selseth, Thakshani Wimalanathan, Joanna Sulkowska, Nadia Goncalves Ferreira, Albin Mahovkic, Mateusz Kubak and Trine Lied-Herland. Their research projects include both technical aspects of CT and MR imaging and topics related to disease diagnostics. Artificial intelligence is making its way into radiology, opening a wide range of exciting opportunities, and several ongoing projects also include artificial intelligence.

Research activities

The department hosts a diverse group of researchers engaged in a wide range of research areas, collaborating actively with other departments as well as national and international partners. The lung cancer screening trial, led by associate professor Haseem Ashraf, has completed the second yearly follow-up, and the third and final follow-up is ongoing. Associate professor Siri Lagethon Heck supervises candidates in cardiac MRI research projects. Vigdis Hillestad conducts research on imaging of the placenta and cerebral stroke and thrombolytic therapy together with PhD candidates. Jens Borgbjerg and Aida Kapic Lunder are engaged in research validating lower-dose imaging protocols and utilizing spectral CT for abdominal applications. In addition, the cryoablation team at Ahus conducts research aimed at optimizing procedural CT imaging during tumor cryoablation.
Professor Jonn Terje Geitung submitted a report about the activities in the Clinical Radiology Research Group to be evaluated by the Research Council.

Public Outreach

The screening project continues to receive coverage in national media, and Haseem Ashraf has participated in an expert group appointed by the Norwegian Directorate of Health to evaluate whether to start national lung cancer screening.

In 2024, following a successful project period, we transitioned to establishing Norway's first permanent program for CT-guided cryoablation of renal tumors at Ahus. The program is led by Jens Borgbjerg, marking a significant institutional milestone in interventional oncology. The results and clinical experience from this initiative were presented at the Radiology Autumn Meeting and the annual meeting of the Norwegian Surgical Society.

Our research has been presented at both national and international congresses such as the World Conference of Lung Cancer, the conferences of the Society for Cardiovascular Magnetic Resonance, the Society of Cardiovascular Computed Tomography, The European Society of Gastrointestinal and Abdominal Radiology and the European Society of Coloproctology, the European Congress of Radiology (ECR), the autumn meeting of the Norwegian Association of Radiology, the national meeting for spinal surgeons, the Nordic Congress of Radiology and Radiography as well as the Radiology Congress of North America (RSNA).

BDA continues to contribute to numerous national and international societies dedicated to advancing educational and research objectives in radiology. Associate Professor Haseem Ashraf is the on the board of the National Society for Thorax Radiology and the Norwegian Lung Cancer Group. PhD Aida Kapic Lunder is the National Society of Abdominal Radiology leader. Prof Anne Negård is a national ambassador of the European Society of Gastrointestinal Radiology (ESGAR). Hasan Banitalebi serves as a member of the Spine subcommittee of the European Society of Musculoskeletal Radiology (ESSR)
Member of the Editorial board of the European Radiology Experimental.

Department of Pathology (PA)

Research Committee

In 2024 the research committee consisted of:

- Ulla Randen - Head of department and Associate Professor
- Vahid Bemanian - Research scientist
- John Christopher Noone - leader for Section of Molecular Pathology and research
- Silje Mathiassen - medical laboratory scientist/ research coordinator
- Claudia Zaharia - Medical consultant
- Ann-Christin Røberg Beitnes - Medical consultant
- Anastasia Renzi - Medical consultant
- Elisabeth Sivy Nginamau - Medical consultant,
- Jose Louis Subirats Camacho - Medical consultant
- Benoit Follin-Arbelet -Molecular biologist
- Øystein Stakkestad - Molecular biologist.

The committee hosted 2 meetings in 2024.

Research group

Vahid Bemanian leads the research group CRC-microbiome that consists of Ulla Randen, Hege Tunsjø (OsloMet), Per Christian Sæther (IMTRA), Jose L.S. Camacho, Silje Mathiassen, Anette Knapskog, Gro Gundersen, Sofie Flovik Ranestad, Stephan Brackmann (Gastro medicine), and Thura Omran (doctoral fellow).

Research activities

In 2024 the research efforts of the Pathology department resulted in 14 scientific publications. Furthermore, by providing pathology services, laboratory services and through sectioning of FFPE samples for further analysis, the department contributed to several research projects in collaboration with clinicians at Ahus.

The research group led by Vahid Bemanian proceeded with its work on the project “Colorectal cancer: Early detection using non-invasive biomarkers and monitoring of intestinal bacterial flora” during 2024. This project is a collaboration between Ahus and OsloMet. As well as leading the project, Bemanian is responsible for the project biobank, which consists of tissue biopsies, fecal samples, blood samples, and oral swabs.

These samples are collected to investigate the genetic changes in cancer patients and to examine the role of gut microbiota in the development of colorectal cancer.

Vahid Bemanian applied for funding for a new project from AstraZeneca titled “Use of liquid biopsy in cancer diagnostic: Evaluation of next-generation sequencing for following up the lung cancer patients at Akershus University Hospital”, which is a collaboration between our department and the Department of Respiratory Medicine, here at Ahus. During the winter of 2024, the project received approval from Data Protection Office (PVO), and the project starts in the spring of 2025.

In September of 2024, Thulasika Senthakumaran defended her PhD thesis and got her degree. Her thesis was titled “Exploring gut microbiota as biomarkers for colorectal neoplasia: Insights gained from Norwegian cohorts using colonic biopsies and fecal samples”. The department also had two ongoing PhD-projects by the following candidates: Thura Omran (MSc, PhD candidate) and Jose Louis Subirats Camacho (MD). Thura Omran published two papers in 2024. Additionally, in May 2024 Sofie Flovik Ranestad submitted her MSc thesis titled “Detection of somatic mutations in tumor biopsies and circulating tumor DNA during neoadjuvant endocrine therapy in breast cancer patients” and got her degree. Her supervisors were Vahid Bemanian, Hege Smith Tunsjø and Jürgen Geisler.

Through Vahid Bemanian, the department collaborates with the research group CRCbiome (Kreftregisteret and UiO) led by Prof. Trine Rounge. This has led to two research projects initiated by the group:

1. Understanding the longitudinal changes in and interplays between lifestyle, gut microbiome, lesion genome and epigenome during colorectal cancer development
2. Evaluating microbial biomarkers for improved stool-based colorectal cancer screening,

This collaboration resulted in the publication of one paper (Istvan et al, Nature Commun., Feb 2024).

Vahid Bemanian also participates in the NEOLETEXE trial “A neoadjuvant cross-over study exploring the lack of cross resistance between aromatase inhibitors”, led by Jürgen Geisler (MD, PhD, Professor UiO).

There is also an ongoing collaboration with Prof. Dr. Med. Anne Hansen Ree regarding oncological studies (e.g. the METIMMOX-study) where the pathologyand molecular pathology analyses are both central elements.

Public Outreach

In the past year, members of the department have contributed to three poster presentations throughout 2024 at conferences.

In June, Vahid Bemanian contributed to a poster presentation with the title "Immuno-microbial signatures in colorectal cancer" at the 10th International Human Microbiome Consortium Congress in Rome along with Thura A. Omran, Thulasika Senthakumaran, Per Christian Sæther, and Hege Smith Tunsjø.

Bente Ekeberg and Mette K Pedersen also contributed to a poster presentation in June, about "Human cystic echinococcosis detected in mesentery" at the European Congress of Cytology in Leipzig.

In September, John Christopher Noone contributed to a poster presentation with the title "Comprehensive genomic profiling of circulating tumor DNA for treatment recommendation: a sub-project of the IMPRESS-Norway trial" at the 2024 European Society for Medical Oncology in Barcelona.

Department of Microbiology and Infection Control (MIKS)

Research Committee

The Research Committee for Microbiology and Infection Control (FUMS) was established in 2012 and in 2024 consisted of:

- Hege Vangstein Aamot - Representative for researchers
- Truls Leegaard - Representative for Scientific staff/Associate Professor
- Anita Blomfeldt (Chair) - Section Leader R&D
- Kirsten Gravningen - Representative for doctors
- Kristiane Søreng - until 14/2-24 Irene Kraus Christiansen - Representative human papillomavirus:
- Adina Repesa - Representative for lab scientists and Stine Martinsen substitute for the entire autumn

FUMS held 6 meetings in 2024.

Research group – Microbiology and Infectious diseases

The research group consisted of 22 employees from MIKS and the Department of Infectious Diseases. Kristiane Søreng at the reference laboratory for HPV has led this group since February 2023. The group aims to conduct infection-related research, and the focus spans several topics such as molecular microbiology, diagnostics and technology, infection control, and outbreak investigation. The group had two meetings in 2024.

In 2024, the Research Council of Norway (RCN) conducted an evaluation of the research group through EVALMEDHELSE 2023-2024, where the quality and relevance of the research group's work were assessed: The group’s focus on clinical research within infectious diseases fits well with the hospital’s ambition of being a university hospital. The group’s research is leading the way in medical microbiology and infectious diseases in Norway. However, the evaluation suggested that the group should increase its international impact and create a clearer vision with related aims and objectives to improve focus and depth.

Resources and Infrastructure

Twelve different employees contributed to publications, and 11 staff members have PhDs. Three of the department's employees hold academic positions; two as Associate Professors at the Institute of Clinical Medicine, University of Oslo, and one as Associate Professor at the Institute of Nursing, Health, and Biomedical Sciences, Østfold University College. The department funds one permanent full-time researcher position and one PhD candidate position at 50% employment. Other employees, who spend part of their time on research and development, have primary roles such as infection control physician, section leader,

HPV reference laboratory, and diagnostics. The department covers minor parts of certain research projects by incurring increased costs for equipment and reagents for analyses conducted solely due to ongoing projects, while routine analyses are used in research projects.
In total, the department's staff participated in 7 research grant applications, either as applicants or project collaborators. Two applications involving the department's staff were granted a total of 3,932,000.

Research activities

The department's staff are engaged in a wide range of ongoing projects, including molecular epidemiology of infectious diseases, next-generation sequencing for use in surveillance and rapid diagnostics, infection control, antibiotic resistance and stewardship, human papillomavirus and cancer, and diverse clinical translation projects in collaboration with various clinical departments

The department published 17 articles in peer-reviewed journals in 2024 and contributed data to an additional three articles. A total of 12 different employees participated in one or more articles.

The department currently has 3 PhD candidates: Patricia Campbell: “The gonorrhoea epidemic in Norway – the importance of the throat niche in transmission and antimicrobial resistance development”, Heidi Espvik: “Improving AntiBiotic stewardship in hospitals using electronic records, indiVIdual feedback to presCribers, and assessing Environmental risk in wastewater (ABVICE)”, and Milan Stosic: “Profiling Intrahost HPV Variability – Relevance for Risk Stratification of Cervical Cancer development”. In addition, the department's staff supervise three external PhD candidates and one master student.

Public Outreach

In the past year, the department's staff have given 16 invited oral presentations, one oral presentation with peer review, and 8 posters with peer review at conferences/meetings. Additionally, MIKS staff have given 5 other presentations (chair, national online teaching lecture, and national course lecture) and published one book chapter in an international textbook on infections related to travel and migration, as well as two chapters in a newly released online HPV laboratory manual.

ESCMID postgraduate course

The ESCMID postgraduate hybrid course “The Future of Infection Diagnostics: A Comprehensive Guide to Next-Generation Sequencing” was held at Akershus University Hospital from 2 to 4 September 2024. Coordinated by John WA Rossen, University Medical Center Groningen, Netherlands, and Hege Vangstein Aamot, MIKS, the event featured 16 national and international speakers, 46 onsite participants (Figure 1),

and 80 online participants from various countries including Australia, Canada, China, India, Korea, Taiwan, and South Africa.

Speakers and onsite participants at the main auditorium at Akershus University Hospital. *Foto: Ahus communications and editorial dep.*

The first day covered the basics of next-generation sequencing (NGS), quality control, lab implementation, and optimal application selection, culminating in a hands-on bioinformatics session. Participants engaged in quality control, trimming, and assembly of Illumina sequenced data, with online participants working in breakout rooms.

Days 2 and 3 focused on clinical applications of NGS, including targeted NGS, whole genome sequencing, metagenomics, human transcriptomics, and microbiome analyses. Participants worked in groups during a second hands-on bioinformatics session to determine the presence of an outbreak, presenting their findings. The course also featured young researchers sharing practical tips on setting up NGS, discussions on the future role of artificial intelligence and machine learning in NGS, and a pro/con debate on the impact of NGS developments on clinical work. The event concluded with a quiz covering the course topics, fostering an engaging and collaborative learning environment.

NSCMID 2025

The annual conference of the Nordic Society for Clinical Microbiology and Infectious Diseases (NSCMID) was arranged in Oslo from 29th August to 1st September 2024 by Truls Leegaard (meeting president), Heidi Espvik and Kirsten Gravningen from MIKS with the help from the Department of Infectious Diseases at Ahus (Jan Erik Berdal and Olav Dalgard). The event featured 41 speakers, mainly from the Nordic countries with some international speakers, and about 220 participants. The meeting covered a wide array of topics of interest to Clinical Microbiology, Infectious Diseases and Infection Control and was a great success.

NSCMID Scientific committee. *Foto: NSCMID*

Department of Interdisciplinary Laboratory Medicine and Medical Biochemistry (TLMB)

Research Committee

In 2024 the research committee in TLMB (FORUT) consisted of:

- Gisle Berge - PhD, researcher, leader of FORUT
- Lamya Garabet - MD, PhD/postdoc
- Ingrid Marie Hardang - MD, PhD student
- Ragnhild Røysland - MD, PhD, associated professor
- Naila Shaheen - research biomedical laboratory scientist
- Kristine Helena Undal Pettersen - MD, LIS
- Trude Haga Flatås - leader of Section MFFU
- Kariann Vangen Frøystein - Head of department

FORUT held six meetings in 2024.

Employees at TLMB with research positions

Research biomedical laboratory scientists

- Naila Shaheen (100% research biomedical laboratory scientist)
- Inger Line Madsø (100% research biomedical laboratory scientist), until 22/3-24
- Carlos Pastor Nadal (100% research nurse), until 1/8-24
- Tina Bogetvedt Spernes (100% research nurse), from 4/6-24

Scientists (research and development)

- Gisle Berge (PhD)
- Alexey Zatula (PhD)
- Morten Kaare Moe (PhD)

Medical doctors in medical biochemistry with research position

- Ingrid Marie Hardang (50% PhD student)
- Lamya Samir Noori Garabet (PhD, 50% post doc)
- Ragnhild Røysland (PhD, associate professor UiO 20%)

Research activities

Members of the department have published 4 research papers in peer-reviewed journals and participated with 3 presentations/abstracts/posters in 2024. The research active employees at TLMB were involved in different research projects during 2024, including iron metabolism (Ingrid M. Hardang), coagulation/thrombosis (Lamya Garabet), complement activation (Lamya Garabet) and cardiovascular biomarkers (Ragnhild Røysland).

PhD projects

The department had one PhD student in 2024:

Ingrid M Hardang, 50%, University in Oslo, financed by TLMB. Project title: Biomarkers of iron deficiency in COPD.

Other projects

Lamya Garabet, consultant at TLMB and postdoc at Østfold Kalnes Hospital, is involved in projects at Østfold Kalnes Hospital both in the field of thrombosis and ITP. Her postdoc project involves investigation of the role of microRNAs in the diagnosis of Immune thrombocytopenia (ITP). In collaboration with Carola Henriksson and Andreas Hillarp at Oslo University Hospital she has investigated the role of von Willebrand factor and its multimers in the hypercoagulant state in ITP. She has also performed a validation study of some candidate microRNAs as diagnostic biomarkers in ITP. She presented one poster at the International Society of Thrombosis and Haemostasis (ISTH) congress in 2024. She received Grifols Research Award in Immune Thrombocytopenia for her new project investigating coagulation profiles in ITP patients receiving fostamatinib vs. thrombopoietin receptor agonists. Ragnhild Røysland, resident medical doctor of medical biochemistry at TLMB and associate professor at campus Ahus, UiO, is collaborating with Professor Torbjørn Omland and the Cardiovascular research group, at campus Ahus, UiO.

Our research biomedical laboratory scientists were involved in 42 clinical studies/research projects in 2024 in collaboration with different clinical departments.

Research group

In 2024 there was no research group at TLMB, but research active employees at TLMB collaborate with research groups at Ahus and Østfold Kalnes Hospital.

Funding and grants

No funding grants were obtained in 2024

Public outreach

Publications in non-index journals:

Frøystein KV, Flatås TH, Bergskaug EMS. *Pilotprosjekt om opplæring av portører i blodprøvetaking på Akershus universitetssykehus.* Bioingeniøren 14.06.2024.

Abstracts/posters, international congresses:

Lamya Garabet L, Ghanima W, Hillarp A, Mathisen ÅB, Lae S, Le MS, Bussel J, Henriksson C.
Effect of thrombopoietin receptor agonists on coagulation factors, von Willebrand factor and ADAMTS13 in patients with immune thrombocytopenia.
2024 International Society on Thrombosis and Haemostasis (ISTH).

Sithiravel C, Pettersen KHU, Kravdal G. *Does screening with serum immunofixation provide diagnostic value in identifying patients with monoclonal gammopathy-associated peripheral neuropathy?*
2024 Norsk selskap for medisinsk biokjemi; Nordisk Kongress, Stockholm sept.

Sithiravel C, **Røysland R**, Fauskrud IT, **Hermansen HKT**, **Granberg IK**, Strand TA, Bakken KS.
Converting waste into value. The sample stability of leftover EDTA whole blood. A Comparative study of analyte concentrations in plasma separated from EDTA whole blood at various time intervals and serum for nine clinical chemistry analyses.
Poster IFCC (26th International Congress of Clinical Chemistry and Laboratory Medicine), Dubai 2024. **C. Sithiravel** obtained a young scientist travel scholarship from IFCC for the meeting.

Department of Immunology and Transfusion Medicine (IMTRA)

Research Committee

The committee is led by researcher Per Christian Sæther (PhD) and has nine members that are elected or nominated for a continuous period of four years. The members in 2024 included Abid Hussain Llohn (Executive Chief Medical Consultant, MD), Bente Anita Grande Karlsen (Head of Department, Master of Management), Astrid Aandahl (Chief Transfusion Medicine physician, MD), Faiza Mahmood (Chief Medical Consultant, MD, PhD student), Ayesha Fakhruddin Muhammed (Acting Chief Medical Consultant, MD), Brita Hermundstad (Senior Consultant, Master of Health Administration), Hege Ingebretsen (Postgraduate Trainee), and Betlehem Biratu Oljiya (Biomedical Laboratory Scientist with MBD), representative from Section of Blood Group Serology).

The IMTRA research committee held seven meetings in total in 2024.

Research group

IMTRA has currently no research group but is striving to establish a research group in the future.

Resources and Infrastructure

In total, three IMTRA employees contributed to peer-reviewed publications of original research papers in 2024. Additionally, several staff members—including medical doctors, biomedical laboratory scientists, and managers—were involved in ongoing research and development projects at IMTRA. Researcher Per Christian Saether is currently the only employee holding a PhD, while MD Faiza Mahmood is pursuing her doctorate in a 50% position.

Research activities

The research efforts of the Department of Immunology and Transfusion Medicine (IMTRA) primarily focus on blood banking and transfusion services. These include research and quality improvement projects aimed at enhancing current transfusion practices, ultimately improving clinical outcomes for patients receiving blood transfusions. Several of these projects are long-term initiatives, such as the department's participation in the World Apheresis Registry. Other projects are conducted in collaboration with clinical departments at Ahus or with Oslo University Hospital. Additionally, some research efforts are self-initiated and focus on local transfusion practices and the genetic typing of HLA and blood group antigens.

The department is also involved in two PhD projects. Faiza Mahmood, MD, is pursuing her PhD with a primary focus on allergies. In one of her studies, she examined the effects of Andosan as a supplementary treatment

for patients with asthma and allergies. In another project, she investigated IgE antibody profiles in a cohort of blood donors at Ahus. Researcher Per Christian Sæther serves as a co-supervisor for the second PhD project, which is in collaboration with Vahid Bemanian from the Department of Pathology and Hege Tunsjø from Oslo Metropolitan University. This project investigates inflammation in colorectal cancer, with an emphasis on identifying non-invasive diagnostic biomarkers.

The research efforts at IMTRA resulted in three peer-reviewed publications in 2024. Astrid Aandahl and Andreas Ulvær participated in a Phase I/II Clinical Study initiated by Kristian Espeland at the Department of Gastroenterology, Ahus. The remaining two publications were in collaboration with the Department of Pathology and Oslo Metropolitan University. Per Christian Sæther served as last author together with Vahid Bemanian in one of the publications. A list of publications is provided in this report.

Public Outreach

As a member of the National Patient Blood Management Group, Astrid Aandahl contributed to a poster presentation at the 2024 NATA conference (Network for the advancement of Patient Blood Management, Haemostasis, and Thrombosis). Brita Hermundstad delivered two oral presentations: one at the Hemovigilance Seminar organized by DMP, and another at the Regional Blood Bank Forum in HSØ, where she addressed the status of plasma availability in Norway and Europe.

Department of Medical Technology and E-health (MTE)

Research Committee

The 2024 research committee of MTE:

- Jesper Ravn – Senior consultant, committee leader
- Arian Ranjbar, PhD – Head of Research
- Trine Brenna – Head of MTE
- Tonje Holm Hjertaas – Senior consultant E-health
- Eilin Wermundsen Mork – Consultant Information Security

Research group

Artificial Intelligence and Medical Informatics (AIM)

Research at MTE has undergone an exponential growth during the last few years, starting by the end of 2022. During 2024, a formal research group was started within the UiO organization, called “Artificial Intelligence and Medical Informatics (AIM)”, led by Arian Ranjbar.

Resources and Infrastructure

During 2024, MTE employed two additional PhD students (Elias Stenhede and Agnar M. Bjornstad), both working on multi-modal AI with applications in cardiology and oncology, respectively. Additionally, Arian Ranjbar was appointed as Head of Research for MTE. As a result, the total number of research positions increased from 1.5 FTE in 2023 to 3.5 FTE in 2024.

Furthermore, AIM welcomed an affiliated PhD student (Bangin Turan, Senior consultant – invasive cardiology), who is working in our project on AI-based myocardial infarction diagnostics. By the end of the year, AIM had three PhD students and two affiliated PhD students. In addition to these five PhD students in AIM, MTE had one employee enrolled in a PhD program at OsloMet (50%). One researcher at MTE held a PhD degree in 2024.

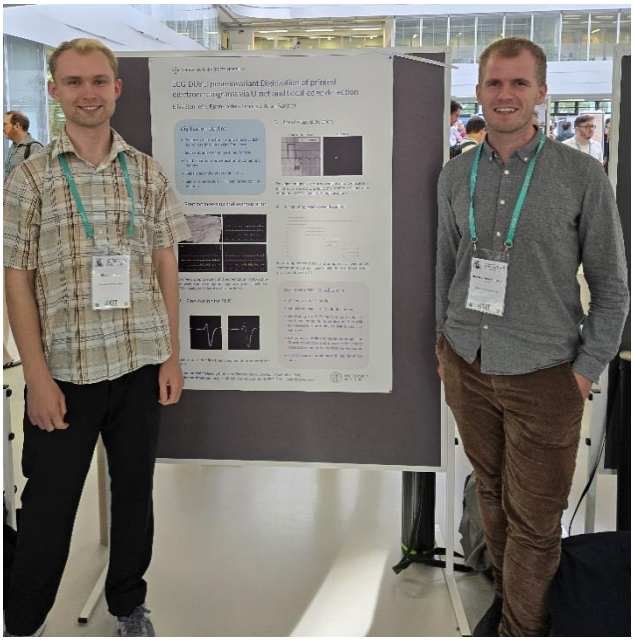
Research activities

The primary research focus of MTE and AIM continues to be artificial intelligence (AI). In 2024, a major initiative was launched for AI-driven breast cancer (BC) diagnostics in collaboration with Novartis. This project has been facilitated by continuous improvements in our in-house research infrastructure, which now supports advanced multimodal AI development by integrating data from diverse sources. These advancements represent a considerable step forward in the capabilities of our research. The BC project is

designed as a five-year initiative, structured in two phases: Phase 1 focuses on developing a deep learning-based risk estimator for BC recurrence, which will undergo clinical validation in Phase 2.

In parallel, our previous cardiology-related research has also been expanded to incorporate additional data modalities beyond electrocardiograms (ECGs), and to explore more advanced regression models, transitioning from traditional classification approaches to survival and hierarchical modelling techniques.

A notable achievement in 2024 was securing a top 3 placement in the annual Computing in Cardiology machine learning competition, ranking as the highest-placed academic institution. ML-challenges have played a significant role in advancing the field of AI during the last decade, and we look forward to continuing our participation in such competitions as part of strengthening Ahus' in-house expertise in AI.



Poster presentation. *Foto: MTE*

While the number of publications decreased from 6 (2023) to 3 in 2024, the number of submitted funding applications increased from 3 (2023) to 4 (2024). Notably, the total amount of funding awarded saw a significant increase from 2.5M NOK (2023) to 7.25M NOK (2024). In particular, we received 4.25M NOK funding from Novartis in the collaboration on breast cancer diagnostics, with Jesper Ravn as PI. We also received 3M in funding for a medical PhD student working on clinical trials in the AI-based MI diagnostics project, from

HSO, with Prof. Henrik Schirmer, affiliated with AIM, as main supervisor and Arian Ranjbar as PI of the main project.

Public Outreach

MTE had several poster presentations and public speaks during 2024. Arian Ranjbar presented the AI-based heart failure diagnostics model at ESC Heart Failure, and an AI monitoring system at Medical Informatics

Foto: Private

Europe. He was also invited speaker at the 2024 Intelligent Health conference in Oslo and the 2024 Big Data conference in Växjö. In addition, Arian Ranjbar and Eilin W. Mork held a course in AI management for healthcare organizations.

Research and Innovation unit (FoI)

The new leader of Research and Innovation, Jørn V. Sagen, started at Ahus the 26th of August 2024. He is also the leader of the Divisional Research Council (DRC), and Semhar Abraham is the secretary. Sagen applied for a professorship at Campus Ahus, University of Oslo (professor II) with the aim to lead a clinic at Campus Ahus

Research group

It is a goal to build up a new research group within FoI, with a scientific focus on obesity, diabetes mellitus, and heart disease. We will take advantage of already available resources (e.g. ACE 1950, Obesity registry) but also to develop an infrastructure for deep clinical and biochemical phenotyping. In the latter case we will also lay the foundation for developing biobanks.

Resources and Infrastructure

We plan to employ a researcher position in 2025, and to apply for funding for a PhD student as well for the research group. We decided to develop a research and innovation strategy for DDT for the period 2026-2029 in collaboration with all the six departments. We also received NOK 500.000 for internal funding that researchers in the six different departments can apply for.

Public Outreach

FoI organised the annual Research and Innovation event the 23rd of October 2024.

Publication list

Department of Interdisciplinary Laboratory Medicine and Medical Biochemistry (TLMB)

Hardang IM, Søyseth V, Kononova N, **Hagve TA,** Einvik G. COPD: Iron Deficiency and Clinical Characteristics in Patients With and Without Chronic Respiratory Failure. Chronic Obstructive Pulmonary Diseases. 2024;11(3):261-269. doi: 10.15326/jcopdf.2023.0477.

Bechensteen BT, **Sithiravel C**, Strøm-Roum EM, Ruud HK, **Kravdal G**, Winther JA, Valderhaug TG. Post-bariatric pregnancy is associated with vitamin K1 deficiency, a case control study. BMC Pregnancy Childbirth. 2024;24(1):229. doi: 10.1186/s12884-024-06407-0.

Kjersti Aaseth K, Dhami SKG, **Kravdal G**, Zarnovicky S, Faiz KW, Vetvik KG, Kristoffersen ES. Diagnostic workup of acute headache and subarachnoid hemorrhage in a Norwegian population: An observational study. Euro J of Neurology. 2024. DOI: 10.1111/ene.16385.

Værøy H, Skar-Frøding R, **Hareton E**, Fetissov SO. Possible roles of neuropeptide/transmitter and autoantibody modulation in emotional problems and aggression. Review. Frontiers in Psychiatry. 2024. DOI: 10.3389/fpsyt.2024.1419574.

Department of Immunology and Transfusion Medicine (IMTRA)

T. A. Omran, H. S. Tunsjø, D. Jahanlu, S. A. Brackmann, **V. Bemanian** and **P. C. Sæther**. Decoding immune-related gene-signatures in colorectal neoplasia. Front. Immunol. 2024 Jun 24:15:1407995. doi: 10.3389/fimmu.2024.1407995

K. Espeland, E. Christensen, A. Aandahl, A. Ulvær, T. Warloe, A. Kleinauskas, S. Darvekar, P. Juzenas, V. Vasovic, Q. Peng, J. Jahnsen. Extracorporeal Photopheresis with 5-Aminolevulinic Acid in Crohn's Disease-A First-in-Human Phase I/II Study. J. Clin. Med. 2024 Oct. 17;13(20):6198. doi: 10.3390/jcm13206198

T. A. Omran, I. L. Madsø, **P. C. Sæther**, **V. Bemanian** and H. S. Tunsjø. Selection of optimal extraction and RT-PCR protocols for stool RNA detection of colorectal cancer associated immune genes. Sci. Rep. 2024 Nov 10;14(1):27468. doi: 10.1038/s41598-024-78680-0

Department of Microbiology and Infection Control (MIKS)

Bøås, H., Havdal, L.B., Bekkevold, T., Flem, E., Inchley, S., Døllner, H., Nordbø, S.A., Rojahn, A.E., Størdal, K., Debes, S.M., Barstad, B., Haarr, E., **Leegaard, T.M.**, Bakken Kran, A.M. (2024). No association between disease severity and Respiratory syncytial virus subtypes RSV-A and RSV-B in hospitalized young children in Norway. *PlosOne*, 19: e0298104.

Kommedal, Ø., Kildahl-Andersen, A., Siljan, W.W., Bø, B., Grøvan, F., Eagan, T.M.L., Fløtten, Ø., Tilseth, R.H., Fardal, H., **Leegaard, T.M**., Larssen, K.W., Hjetland, R., Karolewska, K., Dyrhovden, R., Løes, S.S., Lindemark, F. (2024). Microbiological diagnosis of pleural infections: a comparative evaluation of a novel syndromic real-time PCR panel. *Microbiol Spectr*, e0351023.

Prétet, J.L., Mühr, L.S.A., Cuschieri, K., Fellner, M.D., Correa, R.M., Picconi, M.A., Garland, S.M., Murray, G.L., Molano, M., Peeters, M., van Gucht, S., Lambrecht, C., van den Broeck, D., Padalko, E., Arbyn, M., Lepiller, Q., Brunier, A., Silling, S., **Søreng**, **K., Christiansen, I.K.,** Poljak, M., Lagheden, C., Yilmaz, E., Eklund, C., Thapa, H.R., Querec, T.D., Unger, E.R., Dillner, J. (2024). Human papillomavirus negative high grade cervical lesions and cancers: Suggested guidance for HPV testing quality assurance. *Journal of Clinical Virology*, 171: 105657.

Werner, G., **Aamot, H.V**., Couto, N. (2024). Antimicrobial susceptibility prediction from genomes: a dream come true? *Trends Microbiol*, 2: S0966-842X(24)00052-0.

Linde-Ozola, Z., Classen, A.Y., Giske, C.G., Göpel, S., Eliakim-Raz, N., Semret, M., Simonsen, G.S., Vehreschild, J.J., **Jørgensen, S.B**., Kessel, J., Kleppe, L.K.S., Oma, D.H., Vehreschild, M.J.G.T., Vilde, A., Dumpis, U. (2024). Quality, availability and suitability of antimicrobial stewardship guidance: a multinational qualitative study. *JAC Antimicrob Resist*, 6: dlae039.

Costanzi, J.M., Stosic, **M.S., Løvestad, A.H.**, Ambur, O.H., Rounge, T.B., **Christiansen, I.K.** (2024). Changes in intrahost genetic diversity according to lesion severity in longitudinal HPV16 samples. *Journal of Medical Virology*, 96: e29641. doi: 10.1002/jmv.29641.

Mutschler, E., Roloff, T., Neves, A., **Aamot, H.V**., Rodriguez-Sanchez, B., Ramirez, M., Rossen, J., Couto, N., Novais, Â., Howden, B.P., Brisse, S., Reuter, S., Nolte, O., Egli, A., Seth-Smith, H.M.B.; ESCMID Study Group for Epidemiological Markers (ESGEM), and ESCMID Study Group for Genomic and Molecular Diagnostics

(ESGMD). (2024). Towards unified reporting of genome sequencing results in clinical microbiology. *PeerJ*, 12: e17673.

Germuskova, Z., Sosa, E., Lagos, A.C., **Aamot, H.V.**, Beale, M.A., Bertelli, C., Björkmann, J., Couto, N., Feige, L., Greub, G., Hallbäck, E.T., Hodcroft, E.B., Harmsen, D., Jacob, L., Jolley, K.A., Kahles, A., Mather, A.E., Neher, R.A., Neves, A., Niemann, S., Nolte, O., Peacock, S.J., Razavi, M., Roloff, T., Schrenzel, J., Sikora, P., Sundqvist, M., Mölling, P., Egli, A. (2024). Conference report: the first bacterial genome sequencing pan-European network conference. *Microbes Infect*, 105410.

Rao, A., **Stosic, M.S.**, Mohanty, C., Suresh, D., Wang, A.R., Lee, D.L., Nickel, K.P., Chandrashekar, D.S., Kimple, R.J., Lambert, P.F., Kendziorski, C., Rounge, T.B., Iyer, G. (2024). Targeted inhibition of BET proteins in HPV16-positive head and neck squamous cell carcinoma reveals heterogeneous transcriptional responses. *Front Oncol*, 14: 1440836.

Schandiz, H., Nasser, S.N., Ekeberg, B., Pedersen, M.K., **Leegaard, T.M**., Sauer, T. (2024). Human cystic echinococcosis detected in mesentery: A case report. *SAGE Open Medical Case Reports*, 12.

Kaspersen, H.P., Brouwer, M.S., Nunez-Garcia, J., Cárdenas-Rey, I., AbuOun, M., Duggett, N., Ellaby, N., Delgado-Blas, J., Hammerl, J.A., Getino, M., Serna, C., Naas, T., Veldman, K.T., Bossers, A., Sunde, M., Mo, S.S., **Jørgensen, S.B**., Ellington, M., Gonzalez-Zorn, B., La Ragione, R., Glaser, P., Anjum, M.F. (2024). Escherichia coli from six European countries reveals differences in profile and distribution of critical antimicrobial resistance determinants within One Health compartments, 2013 to 2020. *Eurosurveillance*, 29: 2400295.

Flygel, T.T., Hameiri-Bowen, D., Simms, V., Rowland-Jones, S., Ferrand, R.A., Bandason, T., Yindom, L.M., Odland, J.Ø., Cavanagh, J.P., Flaegstad, T., **Sovershaeva, E.** (2024). Exhaled nitric oxide is associated with inflammatory biomarkers and risk of acute respiratory exacerbations in children with HIV-associated chronic lung disease. *HIV Med*, 25: 223-32.

Gopalakrishnan, R.P., Østrøm, M.S., Skjeldal, F.M., Bakke, O., Bogen, B., **Huszthy, P.C.** (2024). B Cells With Complementary B Cell Receptors Can Kill Each Other. *Eur J Immunol*, e202350890. doi: 10.1002/eji.202350890.

Haghmorad, D., Oksenych, V., **Huszthy, P.C.** (2024). Editorial: Exploring the role of T helper cells in autoimmune disease. *Front Immunol*, 15: 1434684. doi: 10.3389/fimmu.2024.1434684.

Fostervold, A., Raffelsberger, N., Hetland, M.A.K., Bakksjø, R., Bernhoff, E., Samuelsen, Ø., Sundsfjord, A., Afset, J.E., Berntsen, C.F., Bævre-Jensen, R., Ebbesen, M.H., Gammelsrud, K.W., Guleng, A.D., **Handal, N**., Jakovljev, A., Johal, S.K., Marvik, Å., Natvik, A., Sandnes, R.A., Tofteland, S., Bjørnholt, J.V., Löhr, I.H.; Assoc. on behalf of The Norwegian Study Group on Klebsiella pneumoniae. (2024). Risk of death in Klebsiella pneumoniae bloodstream infections is associated with specific phylogenetic lineages. *J Infect*, 88: 106155. doi: 10.1016/j.jinf.2024.106155.

Handal, N., Whitworth, J., Lyngbakken, M.N., Berdal, J.E., Dalgard, O., **Bakken Jørgensen, S.** (2024). Mortality and length of hospital stay after bloodstream infections caused by ESBL-producing compared to non-ESBL-producing E. coli. *Infect Dis (Lond)*, 56: 19-31. doi: 10.1080/23744235.2023.2261538.

Ovestad, I.T., Dalen, I., **Søreng, K.**, Akbari, S., Lapin, M., Janssen, E.A., Austdal, M., Munk, A.C., Gudlaugsson, E. (2024). Gene expression levels associated with impaired immune response and increased proliferation could serve as biomarkers for women following cervical cancer screening programmes. *Front Immunol*, 15: 1507193. doi: 10.3389/fimmu.2024.1507193.

Department of Pathology (PA)

Fjermeros K, Ghannoum S, Geisler SB, Bhargava S, Tahiri A, Klajic J, Lüders T, Fongård M, Nawaz MS, Bosnjak-Olsen T, Buvarp UE, Rosenskiold AKJ, Nguyen NT, Sletbak TT, Seyedzadeh M, Selsås K, Porojnicu AC, Skjerven HK, Hovda T, Sahlberg KK, Torland LA, **Lyngra M, Hammarström CL, Hönigsperger EB, Noone JC, Mathiassen S**, Hurtado A, Goel S, Koff A, Tekpli X, Kristensen VN, Geisler J. The NEOLETRIB trial: neoadjuvant treatment with Letrozole and Ribociclib in ER-positive, HER2-negative breast cancer. Future Oncol. 2024;20(32):2457-2466. doi: 10.1080/14796694.2024.2377531. Epub 2024 Jul 29. PMID: 39073142; PMCID: PMC11520546.

Puco K, Fagereng GL, Brabrand S, Niehusmann P, Støre Blix E, Samdal Steinskog ES, Haug Å, Fredvik Torkildsen C, Oppedal IA, Meltzer S, Flobak Å, Johansson KAM, Bjørge L, Hjortland GO, Dalhaug A, Lund JÅ, Gilje B, Grønlie Cameron M, Hovland R, Falk RS, Smeland S, Giercksky Russnes HE, Taskén K, Helland Å; **InPreD Consortium**; IMPRESS-Norway Consortium. IMPRESS-Norway: improving public cancer care by implementing precision medicine in Norway; inclusion rates and preliminary results. Acta Oncol. 2024 May 23;63:379-384. doi: 10.2340/1651-226X.2024.28322. PMID: 38779911; PMCID: PMC11332498.

Omran TA, Madsø IL, Sæther PC, **Bemanian V**, Tunsjø HS. Selection of optimal extraction and RT-PCR protocols for stool RNA detection of colorectal cancer associated immune genes. Sci Rep. 2024 Nov 10;14(1):27468. doi: 10.1038/s41598-024-78680-0. PMID: 39523395; PMCID: PMC11551167.
Bucher-Johannessen C, Senthakumaran T, Avershina E, Birkeland E, Hoff G, **Bemanian V**, Tunsjø H, Rounge TB. Species-level verification of Phascolarctobacterium association with colorectal cancer. mSystems. 2024 Oct 22;9(10):e0073424. doi: 10.1128/msystems.00734-24. Epub 2024 Sep 17. PMID: 39287376; PMCID: PMC11494908.

Omran TA, Tunsjø HS, Jahanlu D, Brackmann SA, **Bemanian V**, Sæther PC. Decoding immune-related gene-signatures in colorectal neoplasia. Front Immunol. 2024 Jun 24;15:1407995. doi: 10.3389/fimmu.2024.1407995. PMID: 38979413; PMCID: PMC11229009.
Senthakumaran T, Tannæs TM, Moen AEF, Brackmann SA, Jahanlu D, Rounge TB, **Bemanian V**, Tunsjø HS. Detection of colorectal-cancer-associated bacterial taxa in fecal samples using next-generation sequencing and 19 newly established qPCR assays. Mol Oncol. 2024 Jul 6. doi: 10.1002/1878-0261.13700. Epub ahead of print. PMID: 38970464.

Istvan P, Birkeland E, Avershina E, Kværner AS, **Bemanian V**, Pardini B, Tarallo S, de Vos WM, Rognes T, Berstad P, Rounge TB. Exploring the gut DNA virome in fecal immunochemical test stool samples reveals

associations with lifestyle in a large population-based study. Nat Commun. 2024 Feb 29;15(1):1791. doi: 10.1038/s41467-024-46033-0. PMID: 38424056; PMCID: PMC10904388.

Ree AH, Høye E, Esbensen Y, **Beitnes AR**, Negård A, Bernklev L, Tetlie LK, Fretland ÅA, Hamre HM, Kersten C, Hofsli E, Guren MG, Sorbye H, Nilsen HL, Flatmark K, Meltzer S. Complete response of metastatic microsatellite-stable BRAF V600E colorectal cancer to first-line oxaliplatin-based chemotherapy and immune checkpoint blockade. Oncoimmunology. 2024 Jun 28;13(1):2372886. doi: 10.1080/2162402X.2024.2372886. PMID: 38952672; PMCID: PMC11216098.

Zhong J, **Doughty R**, Thymann T, Sangild PT, Nguyen DN, Muk T. Insulin-like growth factor-1 effects on kidney development in preterm piglets. Pediatr Res. 2024 May 18. doi: 10.1038/s41390-024-03222-3. Epub ahead of print. PMID: 38762663.

Omran TA, Tunsjø HS, Jahanlu D, Brackmann SA, **Bemanian V**, Sæther PC. Decoding immune-related gene-signatures in colorectal neoplasia. Front Immunol. 2024 Jun 24;15:1407995. doi: 10.3389/fimmu.2024.1407995. PMID: 38979413; PMCID: PMC11229009.
Bucher-Johannessen C, Senthakumaran T, Avershina E, Birkeland E, Hoff G, **Bemanian V**, Tunsjø H, Rounge TB. Species-level verification of Phascolarctobacterium association with colorectal cancer. mSystems. 2024 Oct 22;9(10):e0073424. doi: 10.1128/msystems.00734-24. Epub 2024 Sep 17. PMID: 39287376; PMCID: PMC11494908.

Bucher-Johannessen C, Birkeland EE, Vinberg E, **Bemanian V**, Hoff G, Berstad P, Rounge TB. Long-term follow-up of colorectal cancer screening attendees identifies differences in Phascolarctobacterium spp. using 16S rRNA and metagenome sequencing. Front Oncol. 2023 Apr 27;13:1183039. doi: 10.3389/fonc.2023.1183039. PMID: 37182146; PMCID: PMC10172651.

Senthakumaran T, Moen AEF, Tannæs TM, Endres A, Brackmann SA, Rounge TB, **Bemanian V**, Tunsjø HS. Microbial dynamics with CRC progression: a study of the mucosal microbiota at multiple sites in cancers, adenomatous polyps, and healthy controls. Eur J Clin Microbiol Infect Dis. 2023 Mar;42(3):305-322. doi: 10.1007/s10096-023-04551-7. Epub 2023 Jan 27. PMID: 36703031; PMCID: PMC9899194.

Zhong, J., Bæk, O., **Doughty, R**., Jørgensen, B. M., Jensen, H. E., Thymann, T., Sangild, P. T., Brunse, A., & Nguyen, D. N. (2025). Reduced parenteral glucose supply during neonatal infection attenuates neurological and renal pathology associated with modulation of innate and Th1 immunity. Biochimica et Biophysica Acta - Molecular Basis of Disease, 1871(4), Article 167723. https://doi.org/10.1016/j.bbadis.2025.167723

Poster, ESMO 2024: Comprehensive genomic profiling of circulating tumor DNA for treatment recommendation: a sub-project of the IMPRESS-Norway trial I. Dyvik, L. Fagereng, T. Lien, V. Nygaard, L. Silwal-Pandit, **J.C. Noone**, A.B. Wennerström, A.J. Skjulsvik, K. Ersland, T.K. Guren, K. Puco, S. Brabrand, E. Blix, A. Haug, A. Flobak, K. Johansson, S. Smeland, K. Tasken, A. Helland, H. Russnes

Poster, Årsmøte i Cytologi Foreningen, Leipzig, 2024: Human cystic echinococcosis detected in mesentery: A case report. Hossein Schandiz, Salah NM Nasser, **Bente Ekeberg**, **Mette K Pedersen**, Truls M Leegaard, and Torill Sauer. https://doi.org/10.1177/2050313X241287645

Poster, 10th International Human Microbiome Consortium Congress, 22-25 Juni 2024: Immuno-microbial signatures in colorectal cancer. **Thura A Omran**, Thulasika Senthakumaran, Per Christian Sæther, Hege Tunsjø and **Vahid Bemanian.**

Department of Diagnostic Imaging (BDA)

Kristiansen CH, Tetteroo PM, Dobrolinska MM, Lauritzen PM, Velthuis BK, Greuter MJW, Suchá D, de Jong PA, van der Werf NR. Halved contrast medium dose coronary dual-layer CT-angiography – phantom study of tube current and patient characteristics. The International Journal of Cardiovascular Imaging. 2024;40:931-940. doi: 10.1007/s10554-024-03062-6

Austad G, **Geitung** JT, Tonstad S. Validation and Reproducibility of Total Plaque Thickness in Carotid and Femoral Arteries Using Ultrasound. Ultrasound Med Biol. 2024;50:207-215. doi: 10.1016/j.ultrasmedbio.2023.09.020

Banitalebi H, Hermansen E, Hellum C, Espeland A, Storheim K, Myklebust TA, Indrekvam K, Brisby H, Weber C, Anvar M, Aaen J, **Negard** A. Preoperative fatty infiltration of paraspinal muscles assessed by MRI is associated with less improvement of leg pain 2 years after surgery for lumbar spinal stenosis. Eur Spine J. 2024;33:1967-1978. doi: 10.1007/s00586-024-08210-z

Tronstad S, Haug KJ, Myklebust TÅ, Weber C, Brisby H, Austevoll IM, Hellum C, Storheim K, Aaen J, **Banitalebi** H, Brox JI, Grundnes O, Franssen E, Indrekvam K, Solberg T, Hermansen E. Do patients with lumbar spinal stenosis benefit from decompression of levels with adjacent moderate stenosis? A prospective cohort study from the NORDSTEN study. *Spine J*.2024, Jan 16; S1529-9430(24)00017-2. DOI:doi.org/10.1016/j.spinee.2024.01.010.

Johan Wänman, Josefin Åkerstedt, Hasan **Banitalebi**, Tor Åge Myklebust, Clemens Weber, Kjersti Storheim, Ivar Magne Austevoll, Christian Hellum, Kari Indrekvam, Helena Brisby & Erland Hermansen.The association between lumbar lordosis preoperatively and changes in PROMs for lumbar spinal stenosis patients 2 years after spinal surgery: radiological and clinical results from the NORDSTEN-spinal stenosis trial. *Spine.* 2024 Feb. 22. https://doi.org/10.1007/s00586-024-08137-5

Hagerup S, Jens Ivar Brox, Hasan **Banitalebi**, Kari Indrekvam, Tor Åge Myklebust and Erland Hermansen.The Influence of Spinous Process Union on Clinical Outcomes After Spinous Process Osteotomy for Lumbar Spinal Stenosis After 2 Years: A Secondary Analysis From the NORDSTEN-Study. *Int. J. Spine Surg*. Feb. 2024, 8576; DOI: https://doi.org/10.14444/8576

Banitalebi H, E Hermansen, C Hellum, A Espeland, K Storheim, T Å Myklebust, K Indrekvam, H Brisby, C Weber, M Anvar, J Aaen, **A Negård**. Preoperative fatty infiltration of paraspinal muscles assessed by MRI is

associated with less improvement of leg pain 2 years after surgery for lumbar spinal stenosis. E *Spine J* 2024, March 25. https://doi.org/10.1007/s00586-024-08210-z.

E Hermansen, T Å Myklebust, I M Austevoll, C Hellum, K Storheim, H **Banitalebi**, K Indrekvam, H Brisby.Dural Sac Cross-sectional area change from preoperatively and up to 2 years after decompressive surgery for central lumbar spinal stenosis: investigation of operated levels, data from the NORDSTEN study. E *Spine J* 2024, April 8. https://doi.org/10.1007/s00586-024-08251-4.

Borgbjerg J, Kongsrud T, **Negard** A, Krogh NMR, Gunther T, Muller S. CT-guided cryoablation of renal masses. Tidsskr Nor Laegeforen. 2024;144. doi: 10.4045/tidsskr.24.0542

Borgbjerg J, Leland-Try M, Graumann O, Nielsen TK, Müller S. Accuracy and reproducibility are essential in imaging-based size assessment of renal masses: comment on-"Renal mass imaging modalities: does body mass index (BMI) matter?". International Urology and Nephrology. 2024;57:1351-1352. doi: 10.1007/s11255-024-04237-9

Borgbjerg J, Rafdal H, Rasmussen GE, Johansen TJ, Svendsen ED, Graumann O. Improved Ice Ball Visualization during CT-Guided Cryoablation of Renal Tumors Using Dual-Energy CT Virtual Monoenergetic and Electron Density Images. J Vasc Interv Radiol. 2024:S1051-0443 (1024) 00756-00755. doi: 10.1016/j.jvir.2024.12.002

Knuth F, Tohidinezhad F, Winter RM, Bakke KM, **Negard** A, **Holmedal** SH, Ree AH, Meltzer S, Traverso A, Redalen KR. Quantitative MRI-based radiomics analysis identifies blood flow feature associated to overall survival for rectal cancer patients. Sci Rep. 2024;14:258. doi: 10.1038/s41598-023-50966-9

Kulseng CPS, Sommerfelt S, Flo K, Gjesdal KI, Peterson HF, **Hillestad** V, Eskild A. Placental size at gestational week 27 and 37: The associations with pulsatility index in the uterine and the fetal-placental arteries. Placenta. 2024;145:45-50. doi: 10.1016/j.placenta.2023.11.014

Mecinaj A, Gulati G, Omland T, **Heck** SL. Reply: Probing the Anthracycline-Induced Myocardial Injury: A Glimpse Through the Lens of the PRADA Trial. JACC CardioOncol. 2024;6:630. doi: 10.1016/j.jaccao.2024.05.010

Mecinaj A, Gulati G, Ree AH, Gravdehaug B, Rosjo H, Steine K, Wisloff T, Geisler J, Omland T, **Heck SL**. Impact of the ESC Cardio-Oncology Guidelines Biomarker Criteria on Incidence of Cancer Therapy-Related Cardiac Dysfunction. JACC CardioOncol. 2024;6:83-95. doi: 10.1016/j.jaccao.2023.10.008

Naimi S, Tetteh MA, **Ashraf** H, Johansen S. Evaluation of an in-use chest CT protocol in lung cancer screening - A single institutional study. Acta Radiol Open. 2024;13:20584601241256005. doi: 10.1177/20584601241256005

Peterson HF, Eskild A, Sommerfelt S, **Hillestad** V. Placental size at gestational week 36: Comparisons between ongoing pregnancies and deliveries. Acta Obstet Gynecol Scand. 2024;103:85-92. doi: 10.1111/aogs.14700

Peterson HF, Flo K, Sommerfelt S, **Hillestad** V. Placental volume at gestational week 27 and subsequent fetal growth: An observational study. Placenta. 2024;158:200-205. doi: 10.1016/j.placenta.2024.10.022

Ree AH, Hoye E, Esbensen Y, **Beitnes** AR, **Negard** A, Bernklev L, Tetlie LK, Fretland AA, Hamre HM, Kersten C, Hofsli E, Guren MG, Sorbye H, Nilsen HL, Flatmark K, Meltzer S. Complete response of metastatic microsatellite-stable BRAF V600E colorectal cancer to first-line oxaliplatin-based chemotherapy and immune checkpoint blockade. Oncoimmunology. 2024;13:2372886. doi: 10.1080/2162402X.2024.2372886

Ree AH, Saltyte Benth J, Hamre HM, Kersten C, Hofsli E, Guren MG, Sorbye H, Johansen C, **Negard** A, Bjornetro T, Nilsen HL, Berg JP, Flatmark K, Meltzer S. First-line oxaliplatin-based chemotherapy and nivolumab for metastatic microsatellite-stable colorectal cancer-the randomised METIMMOX trial. Br J Cancer. 2024;130:1921-1928. doi: 10.1038/s41416-024-02696-6

Sagberg K, Eskild A, Sommerfelt S, Halle TK, **Hillestad** V, Haavaldsen C. Two-dimensional (2D) placental ultrasound measurements - The correlation with placental volume measured by magnetic resonance imaging (MRI). Placenta. 2024;149:7-12. doi: 10.1016/j.placenta.2024.02.010

Sulkowska J, Melles AW, Skranes JB, Berge T, Tveit A, Rosjo H, Lyngbakken MN, Omland T, **Heck** SL. Cardiac troponin T associates with left ventricular function and synchrony assessed by CMR in the general population: results from the Akershus Cardiac Examination 1950 Study. Eur Heart J Imaging Methods Pract. 2024;2:qyae078. doi: 10.1093/ehjimp/qyae078

Tonkopi E, Tetteh MA, Gunn C, **Ashraf H**, Rusten SL, Safi P, Tinsoe NS, Colford K, Ouellet O, Naimi S, Johansen S. A multi-institutional assessment of low-dose protocols in chest computed tomography: Dose and image quality. Acta Radiol Open. 2024;13:20584601241228220. doi: 10.1177/20584601241228220

Viktil E, Hanekamp BA, Nesbakken A, Loberg EM, Sjo OH, **Negard** A, Dormagen JB, Schulz A. Early rectal cancer: The diagnostic performance of MRI supplemented with a rectal micro-enema and a modified staging system to identify tumors eligible for local excision. Acta Radiol Open. 2024;13:20584601241241523. doi: 10.1177/20584601241241523

Wimalanathan T, Paus MF, Skranes JB, Berge T, Tveit A, Rosjo H, Omland T, Lyngbakken MN, **Heck SL**. Associations between Growth Differentiation Factor 15, Cardiac Troponin T, and N-terminal pro-B-type Natriuretic Peptide, and Future Myocardial Fibrosis Assessed by Cardiac Magnetic Resonance Imaging: Data from the Akershus Cardiac Examination 1950 Study. Journal of Applied Laboratory Medicine. 2024;10:392-405. doi: 10.1093/jalm/jfae145

Aalokken TM, **Ashraf H**, Einvik G, Lerum TV, Meltzer C, Rodriguez JR, Skjonsberg OH, Stavem K. CT abnormalities 3 and 12 months after hospitalization for COVID-19 and association with disease severity: A prospective cohort study. PLoS One. 2024;19:e0302896. doi: 10.1371/journal.pone.0302896

Aaseth K, Dhami SKG, Kravdal G, **Zarnovicky** S, Faiz KW, Vetvik KG, Kristoffersen ES. Diagnostic workup of acute headache and subarachnoid hemorrhage in a Norwegian population: An observational study. Eur J Neurol. 2024;31:e16385. doi: 10.1111/ene.16385

Syversen IF, Reznik D, Witter MP, Kobro-Flatmoen A, Navarro Schröder T, Doeller CF. A combined DTI-fMRI approach for optimizing the delineation of posteromedial versus anterolateral entorhinal cortex. Hippocampus. 2024;34:659-672. doi: https://doi.org/10.1002/hipo.23639

Randsborg P H, H **Banitalebi**, A Årøen, T Straume-Næsheim.The Tibial Tuberosity–Trochlear Groove Distance Can either Increase or Decrease during Adolescent Growth. *Children* 2024, 11(5), 504; https://doi.org/10.3390/children11050504.

Åkerstedt J, J Wänman, H **Banitalebi**, T Å Myklebust, C Weber, K Storheim, C Hellum, K Indrekvam, E Hermansen, H Brisby.Change in Lumbar Lordosis after Decompressive Surgery in Lumbar Spinal Stenosis Patients and Associations with Patient Related Outcomes 2 Years after Surgery. Radiological and Clinical

Results from the NORDSTEN Spinal Stenosis Trial. *Spine*, May 13, 2024. | DOI: 10.1097/BRS.0000000000005037.

Weber C, Hermansen E, Myklebust TÅ, **Banitalebi** H, Brisby H, Brox JI, Franssen E, Hellum C, Indrekvam K, Harboe K, Rekeland F, Solberg T, Storheim K, Austevoll IM Comparison of Patients Operated for Lumbar Spinal Stenosis with and without Spondylolisthesis - A Secondary Analysis of the NORDSTEN Trials.. *Spine*. 2024 Jun 11. DOI: 10.1097/BRS.0000000000005038.

E L Kgomotso, C Hellum, M W Fagerland, T Solberg, Jens I Brox, K Storheim, E Hermansen, E Franssen, C Weber, H Brisby, K R H Algaard, H Furunes, H **Banitalebi**, I Ljøstad, K Indrekvam, I M Austevol. Decompression alone or with fusion for degenerative lumbar spondylolisthesis (Nordsten-DS): five year follow-up of a randomised, multicentre, non-inferiority trial. *BMJ* 2024, August 07. DOI: https://doi.org/10.1136/bmj-2024-079771.

K Indrekvam, T Å Myklebust, I M Austevoll, E Hermansen, H **Banitalebi**, I F Bånerud, C Weber, H Brisby, J I Brox, C Hellum & K Storheim. Responsiveness of the Oswestry Disability Index and Zurich Claudication Questionnaire in patients with lumbar spinal stenosis: evaluation of surgically treated patients from the NORDSTEN study. E Spine (Phila Pa 1976) 2024, August 13. DOI: https://doi.org/10.1007/s00586-024-08440-1.

A O Seip, T K Solberg, J I Brox, M W Fagerland, C Weber, K Storheim, **H Banitalebi**, H Brisby, H Furunes, K Indrekvam, C Hellum, I Ljøstad, I M Austevoll. Surgeons' selection of the right patient for fusion surgery for degenerative spondylolisthesis. The Spine J, Vol. 24, September 2024. DOI: https://doi.org/10.1016/j.spinee.2024.06.416.

E Franssen, C Weber, T Å Myklebust, I M Austevoll, H Brisby, C Hellum, K Storheim, J Aaen, H **Banitalebi**, J I Brox, K Indrekvam, E Hermansen Clinical Importance of Redundant Nerve Roots in Patients with Symptomatic Lumbar Spinal Stenosis: A Secondary Analysis of NORDSTEN Spinal Stenosis Trial Data.. Spine (Phila Pa 1976). 2024 Sep 26. DOI: 10.1097/BRS.0000000000005160.

E Hermansen, K Indrekvam, E Franssen, T Å Myklebust I M Austevoll, C Hellum, K S, I Fjeldheim Bånerud, E K Ebbs, J Aaen, **H Banitalebi**, J I Brox, C Weber, T Solberg, A Hjulstad, H Brisby.ISSLS Prize in Clinical Science 2025: A randomized trial on three different minimally invasive decompression techniques for lumbar spinal stenosis. Five years follow-up from the NORDSTEN-SST. Eur Spine J. 2024 Oct 24. doi: 10.1007/s00586-024-08514-0.

Department of Medical Technology and E-health (MTE)

Ranjbar A, Mork EW, Ravn J, Brøgger H, Myrseth P, Østrem HP, Hallock H. Managing risk and quality of ai in healthcare: are hospitals ready for implementation? Risk management and healthcare policy. 2024 Dec 31:877-82.
Ranjbar A, Ravn J. Monitoring of Artificial Intelligence in Hospitals. Studies in health technology and informatics. 2024 Aug 22;316:683-4.
Stenhede E, Singstad BJ, Ranjbar A. ECG-DUaL: Pose-Invariant Digitization of Printed Electrocardiograms via U-Net and Local Edge Detection. In 2024 Computing in Cardiology. IEEE.

Research and Innovation Unit (FoI)

Løvås K, Skrede S, **Sagen JV**. Riktig bruk av laboratorieprøver. Tidsskr Nor Lægeforen. 2024 Nov 25; 144: doi: 10.4045/tidsskr.24.0493.

Contact Information

Ahus intranett Forskning og innovasjon DDT

E-post: kliniske.studier.DDT@ahus.no

Akershus universitetssykehus HF

Besøksadresse: Sykehusveien 25, Lørenskog
Postadresse: Postboks 1000, 1478 Lørenskog
Telefon: 67 96 00 00
Epost: postmottak@ahus.no