sefas

SENTER FOR ALDERS- OG SYKEHJEMSMEDISIN

2024
Annual Report

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Greeting from Bettina

In recent years, many of us have been confronted with radical changes that we have not seen or experienced before. The future ahead is characterized by numerous opportunities, but also unforeseen surprises. Success and happiness are concepts that have been transformed because of the pandemic and through the introduction of artificial intelligence, climate change and the heartbreaking suffering in war zones such as the ones in Palestine, Ukraine, and Sudan. This time of challenges is putting a strain on each and every one of us. In comparison, it might seem like a luxury problem to strive for better elderly care and a comfortable end of life – after all, we are getting older with even healthier latter years than in the past centuries. That is in itself very good news. Yet, with good reason, many of us fear loneliness, reduced resources in the health care system, and lack of support when we or our loved ones get old.

In these times of transformation, at SEFAS, we have been monitoring the healthcare development and targeted our projects accordingly. Our research topics are supported with funding from a wide range of sources, including the Norwegian Directorate of Health, the University of Bergen (UiB), the Research Council of Norway (RCN), the Western Norway Regional Health Authority (Helse Vest), the GC Rieber Foundations, the European Research Council (ERC) and, most recently, the Trond Mohn Research Foundation (TMF) and Eureka Eurostars.

We experience this recognition from the funding agencies as extremely motivating and boosting. At the beginning of 2024, we were just a small staff completing the RCN-funded LIVE study and developing the ActiveAgeing project with the Helgetun and DIGI.PARK branches (funded by the GC Rieber Foundations, UiB and RCN). Then we started up the DIPH.DEM, 5-D and ORAL.DEM projects (funded by the ERC, Helse Vest and the UiB) and CC.AGE (funded by TMF and the UiB), and by that, we welcomed 13 new staff members and students who jumped right into intense work. The opening of CC.AGE was celebrated in UiB's grand aula in a distinguished way with national and international guests and a great communicative atmosphere.

This annual report presents all our employees and projects in more detail and is a result of everyone's contribution. I am very grateful for the efforts of our staff and students and how they dedicate their time to develop and research socially and medically important issues. They are driven by the need to do something meaningful for our elders, for their relatives and for nursing home staff. We want people to stay healthy longer and we aim for better care and a good end of life. This is the important "glue" that binds us and lets us have a job with meaning, independence, and creativity. It can, however, not be overlooked that 2024 has been demanding. At times, I felt like a captain of a sailboat about to sail around Cape Horn in South America, where the Atlantic meets the Pacific, with rough seas and an unpredictable path ahead. To manage the journey, we had to get rid of unnecessary ballast or tasks, work interdisciplinarily and cross-culturally, and not least have to go "all in" at the "Point of no return".

At the end of 2024, we received the good news that our BetterAge proposal was among the 30 selected applications for an RCN-funded Centre for Research-based Innovation that will have the opportunity to participate in the second competition round. We find the application process to be a motivating driving force – perhaps even more than the result itself. Together with around 35 partners, we aim to develop, implement and test social, affordable and sustainable living environments with multiple generations and neighbourhoods. The way we live together in a community greatly influences how we feel and how old age unfolds. BetterAge will find out more on this, through which we hope to continuously contribute toward a positive societal development that will be relevant for Norway and abroad.

Bettina S. Husebø, leader of SEFAS

Vision and Research Areas

VISION AND GOALS

SEFAS focuses on older adults and people with complex conditions including neurological diseases such as dementia and Parkinson's disease. We aim to contribute to better health and end-of-life care for older adults living at home or in institutions, by promoting research-based knowledge about age-related diseases, care services, and the living situation for all people involved.

This will be achieved by researching the competent assessment and treatment of pain and distressing symptoms, good palliative care at the end of life, and by exploring the necessary follow-up for those who want as much time as possible living at home or who want to die at home. Based on this, we contribute to increasing competence and innovation in the municipal health and care services. This overall umbrella is supported and financed by the Norwegian Government, which enables the SEFAS administrating structure and development.

The overarching paradigm of SEFAS is to discover, validate, and translate novel approaches to improve our understanding of good ageing and to support our society in developing high-quality treatment and care. We strive to facilitate healthy and independent ageing for older adults, and to support their informal (relatives) and formal (healthcare professionals) caregivers. To achieve this, we have established a comprehensive interdisciplinary research centre collaborating with a network of excellent national and international partners.

PARADIGM SHIFT IN ELDERLY CARE

The Norwegian society is ripe for a paradigm shift in elderly care. There has long been a one-sided investment in traditional nursing homes. Research shows that more people want to live at home longer and even die there, if possible. There is also an explicit political goal that more older adults should be able to live safely at home.

In parallel with our research efforts, an important aim for us is **to recruit young researchers and students into this important field and facilitate for their education** in collaboration within the connected units of our university hierarchy. Last, but not least, SEFAS aims to be **a strong knowledge-based voice in the public debate**.

Our work investigates innovative methods of symptom assessment, non-pharmacological interventions, service provision and living environments. Our research activities are project-based, and our ongoing work concentrate on the following integrated and overlapping research topics:

1. Interdependencies of pain, activities, and distressing symptoms, including oral health, at the end of life in people with dementia (Clinical Studies, Biomarker Mapping)
2. Effect of virtual darkness on behavioural symptoms in people with dementia (Clinical Study)
3. Sensor-based symptom assessment in Parkinson's disease (Clinical Study)
4. Innovative living environments promoting social and active living for older adults (Qualitative Study)
5. Digital platform development for safe and independent living at home for people with complex conditions (Clinical Study)
6. Social robot to manage behavioural symptoms in people with dementia and intellectual disabilities (Innovation Study).

RESEARCH PLAN AND STRATEGY

We apply novel technologies to improve treatment, care and service provision to older adults. Sensing technology encompasses active and passive sensors integrated in the person's environment, and data from these sensors are valuable supplements when evaluating the health of older adults. Several of the projects concern digital phenotyping, that is, the determination of a person's characteristics by its digital data, such as data from smartwatches, wall mounted sensors, etc. The aim is to develop digital biomarkers for symptoms and treatment response, which will enhance precision in clinical assessments. Moreover, through the development of the ALIVE platform in the CC.AGE project, we aim to not only assess, but also to intervene on symptoms and change the clinical state based on sensor data (e.g. from Garmin, Somnofy, etc.). A prerequisite for successful use of novel technologies is the application of knowledge-based artificial intelligence, which is safeguarded by our engineers.

Our next strategic step is to extend our investigation into how we can organize social, affordable, and sustainable living environments for the increasing group of older adults in our society. We wish to address these long-term needs at the intersection of construction, urban and rural planning, digitalization, and healthcare, to help shape the emerging sector of smart-tech enabled age-friendly environments.

Organization

SEFAS is part of the Section for Elderly Medicine, Social Pharmacy and Inter-professional Workplace Learning (FEST) at the Department of Global Public Health and Primary Care (IGS) at the University of Bergen (UiB).
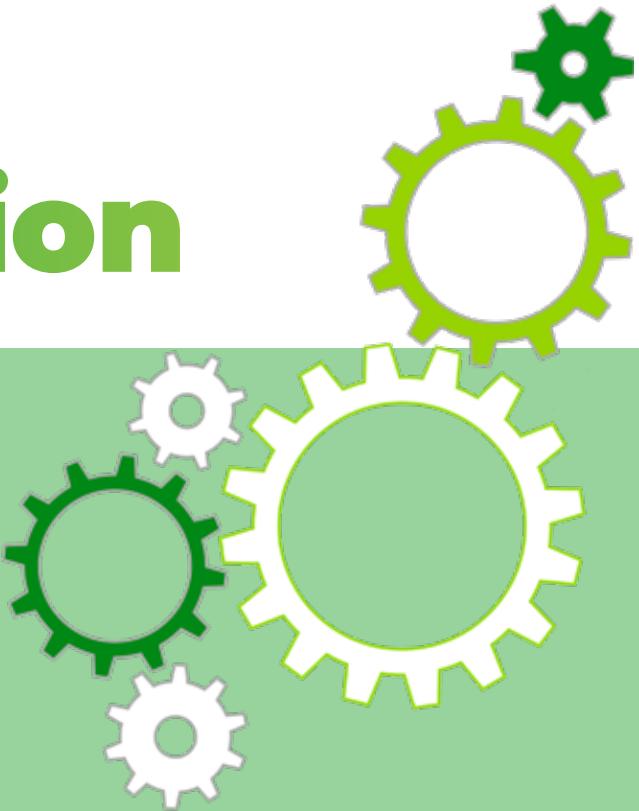
In 2012, UiB, in collaboration with the G.C. Rieber Foundations, established the country's first Centre for Elderly and Nursing Home Medicine (SEFAS). Since the autumn of 2014, SEFAS has received basic funding from the National Budget, and receives project support from several key partners, including the G.C. Rieber Foundations, the Western Norway Regional Health Authority (Helse Vest), the Research Council of Norway (RCN), Eureka Eurostars, the European Research Council (ERC), the Trond Mohn Research Foundation (TMF) and the University of Bergen (UiB). SEFAS has 20 employees in an interdisciplinary environment and nine new staff members are expected to join us in 2025. We are geographically located on the health campus at Årstadvollen, in the Alrek Health Cluster, which constitutes a separate environment for innovative health and care solutions in collaboration with the Eitri Medical Incubator.

Board

SEFAS has a board consisting of Per Bakke (chair), dean of the Faculty of Medicine, UiB, Bjarne Robberstad, head of department at IGS, Nina Broch Mathisen, regional director of Innovation Norway of Western Norway, Kjell A. Wolff, municipal director of Bergen Municipality and Bettina S. Husebø, head of SEFAS. The board adopts strategies for research, innovation, education and other academic activities at the centre. The board is responsible for ensuring that the academic activities are of high quality, and that the centre is run efficiently and in accordance with applicable laws, regulations and rules, as well as with the framework and goals set for the centre. The board also has overall responsibility for the centre's financial resources, property and internal organisation. The board meets twice a year.

User Panel

One of SEFAS' strategic research goals is to cater to the user perspectives with the involvement and participation of patients, relatives, health personnel and volunteers to contribute to personalized treatment and care. In this regard, the centre has established an advisory user panel with the aim of strengthening the connection between the research and those who actually benefit from the results –

patients, other older adults and their relatives. See details on page 8–9.

Partnerships

SEFAS has established strong international partnerships, such as with the Leiden University and Exeter University in Europe, Tohoku University in Japan, and Yale University and Harvard University, McLean, in the United States. Participation in the COST network NET4AGE-FRIENDLY COST Action provides additional contacts in 27 European countries.

In Norway, we collaborate locally with, among others, Bergen Municipality, Haukeland University Hospital, Haraldsplass Deaconess Hospital, NORCE and Western Norway University of Applied Sciences, and nationally with the Norwegian National Centre for Ageing and Health, the Norwegian Women's Public Health Association, the Norwegian Smart Care Cluster, the Centre for Age-related Medicine (SESAM), the University of Oslo, the University of Tromsø, and the Norwegian University of Science and Technology in Trondheim.

SEFAS collaborates with Neuro-SysMed, the first Norwegian centre for clinical treatment research on neurological diseases with a focus on multiple sclerosis (MS), Parkinson's disease, amyotrophic lateral sclerosis (ALS) and dementia. Neuro-SysMed is organized with nine nodes, where SEFAS participates as the Care node under the leadership of Bettina S. Husebø. Through Neuro-SysMed, SEFAS has, among other, access to a research school in translational neuroscience with courses and monthly seminars that are credit-giving for our students, support within relevant funding proposals, and joint project management on relevant projects.

Fixed meeting points

FEST seminar: Once a month, SEFAS' staff and students participate in FEST's interdisciplinary seminars with focus on interprofessional collaboration in the health sector and research related to elderly health care and the field of pharmaceutics. The interdisciplinary seminar group is an arena for learning, dissemination, collaboration and professional development. It addresses relevant and current topics and strengthens collaboration across the academic communities.

The FEST environment also has daily, informal lunch meetings for everyone in the section.

Regular SEFAS meeting points:

- Weekly early Monday meeting for all postdocs and permanently employed researchers (Bettina, Brice, Kamilla, Line, Monica, Valentina, Zoya) to clarify plans for the week ahead.
- Every other week there is a journal club where the PhD candidates give project presentations to their colleagues for practice in presentation techniques and peer review.
- Every other week there are project meetings for updates on ongoing projects, currently concerning the projects ActiveAgeing (the Helgetun and DIGI.PARK branches), 5-D/DIPH.DEM/ORAL.DEM, DARK.DEM and CC.AGE. Project meetings for EI ROBOT take place monthly.
- Every other week we have individual supervision meetings for the PhD candidates where their supervisors follow up on the candidates' progress, data collection and analyses.
- Monthly SEFAS meetings for all staff and students at the centre with updates on status and focus on current issues.
- Yearly lunch-to-lunch meetings with everyone related to FEST, including the user panel, with invited speakers, group work and interdisciplinary discussions.
- SEFAS' user panel members meet with their relevant research project group every 6 weeks, and the members of the user panel meet four times a year.
- Yearly, informal Christmas lunch for everyone.
- Yearly, informal Easter lunch for everyone.
- Informal summer party for everyone once a year.

User panel

A strategic research goal at SEFAS is to meet the user perspectives with involvement and participation of patients, relatives, healthcare personnel and volunteers, to contribute to personalized treatment and care. In this connection, the Centre has established an advisory user panel with the aim of strengthening the link between research and those who actually benefit from the results – patients, other elderly people and their relatives.

The SEFAS user panel consists of members who have personal experience with the healthcare services. The panel's main task is to ensure that users' experiences and views are taken into account in the assessment of research projects, and that the Centre's research areas cover real needs within the sector. In addition, the panel will ensure the quality of the services that are being developed.

The role of the members

The user panel members shall have a proactive role. They shall be active contributors with the opportunity to influence medical research, keeping focus on issues that are important to patients, users and the patients' families. The panel constitutes a resource for SEFAS, where the panel members bring valuable perspectives and contribute to the impact of the research. At the start of new research projects, the role of the users is clarified in relation to the individual stages of the process, mutual expectations, the need for training, common objectives, etc.

Composition of the panel

The members are appointed by the head of SEFAS, and the panel acts as an advisory body for research and development projects. To ensure relevant expertise, members are expected to have long and personal experience related to the specific projects. This may include experience as a patient, family of a patient, as healthcare personnel or as representative from a patient organization. The panel members should complement each other in terms of background. The panel can have up to six members, depending on current needs.

Organization and meetings

The members of the panel are appointed for two years at a time, and they are compensated according to current rates. The user panel meets at least once a quarter. When necessary, the members also participate in meetings related to the individual research projects. The goal is to have at least two members involved in each project.

Project meetings are currently established for the CC.AGE centre, for the 5-D project including DIPH.DEM and ORAL.DEM, and for DARK.DEM and EI ROBOT. See separate project chapters.

When working on these projects, the panel focuses on the following areas:

1. Update on the project process.

2. Clarification of where in the project process the members' contributions are needed.

3. Clarification of expectations of the members.

4. Clarification of expectations of the researchers and collaborators.

5. Assess the need for training.

6. Set up common success criteria and goals.

7. Defining or adjusting milestones for evaluating the collaboration.

The goal is for the SEFAS user panel to be a valuable resource for research in healthcare services. Through close collaboration between researchers and the members, the panel will contribute to ensuring that the research is relevant and practice-oriented, which will strengthen the quality of knowledge and services in the sector.

Also read about Pårørendebanken on the following pages, an exciting initiative from one of the user panel's members.

MEMBERS OF THE USER PANEL IN 2024

In 2024, the user panel consisted of the following members:

1. **Rune Samdal,** experiences with a family member with dementia, former employee at SEFAS as a user representative and member of the User Panel for Alrek Health Cluster and Expert Group for Elderly Health

2. **Stine Iversen**, experiences with a family member with dementia, chair of the board of the Bergen Dementia Association, member of the Council of the Elderly

3. **Siren Tyssebotn**, palliative care nurse at Haukeland University Hospital, former home care nurse and has a master's degree in palliative care

4. **Anne Pedersen**, experiences with a family member with primary progressive aphasia, midwife

5. **Trude Antoniazzi**, experiences with a family member with dementia, head of section at the Western Norway Regional Health Authority ICT, member of the quality committee and ethics committee at NKS Olaviken Geriatric Psychiatric Hospital

6. **Finn Patrick Nilsen**, experiences with a family member with dementia
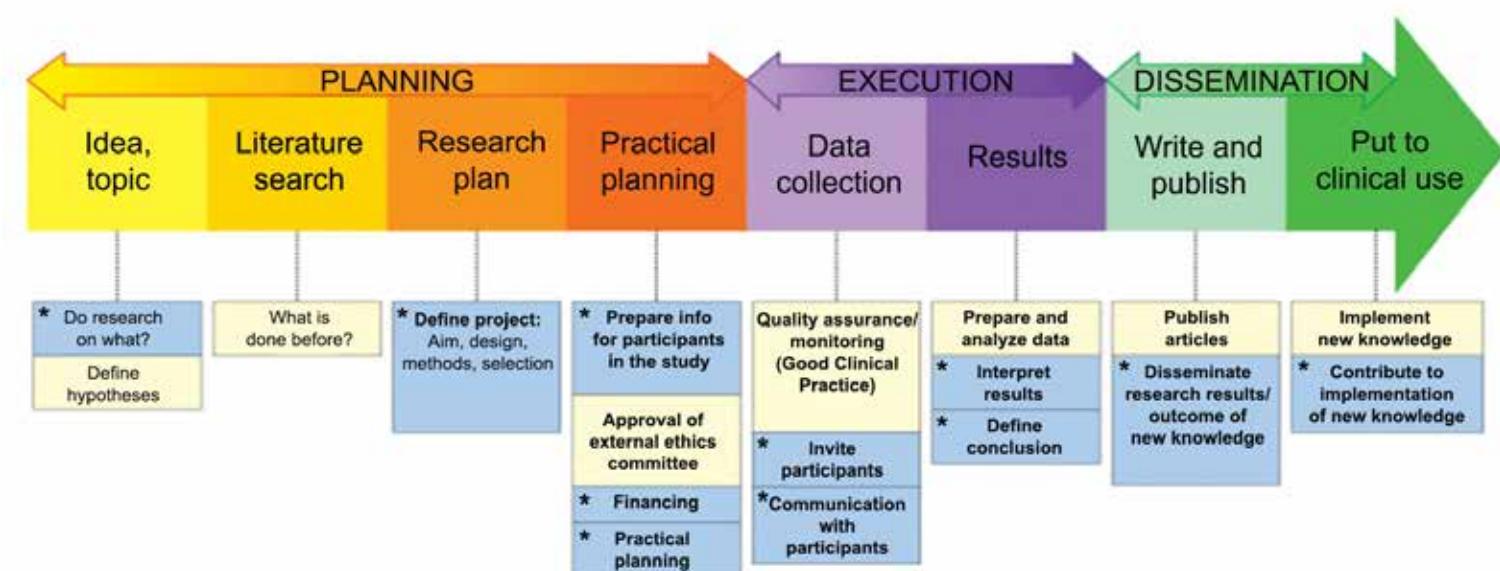
The research process. Fields in blue/with star are possible contribution areas for user representatives. Graphics by EUPATI

Pårørende-banken

Pårørendebanken – the dementia "caregiver bank" – is an initiative by one of the SEFAS user panel's members, Finn Patrick Nilsen. With this initiative, he aims to provide a platform to assist and activate caregivers to better manage their caregiving responsibilities at home and give them a sense of purpose and belonging.

We have asked Finn to explain the background for this initiative, and its aims and plans.

"Caring for a family member with dementia changes your perspective on life. Trivial day-to-day worries are replaced by more meaningful tasks in life, and caring for someone makes you feel needed and valued. Caregiving will also give a unique understanding of symptom development and medication sensitivities over time as well as essential skills to promote quality care and safety at home. Knowledge allows caregivers to develop adaptability and self-confidence. As caregivers, we want to embrace creativity, flexibility, patience, and compassion!

"Pårørendebanken is a voluntary support group and safe space for persons living with dementia and their caregivers to share and enhance knowledge and helping new caregivers to face the challenges. We want this to be a network of individuals who can offer understanding, encouragement, and a sense of belonging. As we know, sharing experiences with others can help alleviate feelings of isolation and stress.

"Here, caregivers can meet and share experiences and practical advice, develop basic skills and learn about the best practices to cope with daily life. We will facilitate information on existing governmental programs that support caregivers and persons with dementia. The group will meet for two hours once a week, always with a fixed agenda. There will be time dedicated to exchanging valuable managing strategies to cope with everyday life. The persons living with dementia can participate in walks and other organized activities. Once every month, there will be an educational presentation by an invited speaker. The meeting will end with a simple, nutritional lunch.

"Pårørendebanken members could be persons living with dementia, their family members, neighbours, or friends. We will also welcome caregivers who have lost their loved ones but want to remain a part of the support group.

"We will also facilitate the opportunity for caregivers to participate in voluntary work and/or be available for assistance to healthcare workers in the Bergen Municipality.

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"Ultimately, we want to have fun and inspire our members to take responsibility for developing this service, and to be the recommended first point of contact after a dementia diagnosis has been received in the family.

"By our collaboration with SEFAS and the Centre for Complex Conditions and Ageing (CC.AGE), we can offer the service a uniqueness and added value through participation in research projects. SEFAS can also help us with scientific qualification of educational materials developed by the support group."

Finn Patrick Nilsen

SEFAS SUPPORTS THIS INITIATIVE

SEFAS sees Pårørendebanken as a highly interesting and very relevant initiative. We believe that the CC.AGE centre in particular could be a good arena for initiating collaborative activities.

As part of CC.AGE and together with Youwell, SEFAS is developing the digital platform "ALIVE" that will act as a facilitator for an independent, active life. Pårørendebanken members can be included in this platform, providing them with a space to work together and initiate collaborative activities. We believe that in the development phase, the ALIVE platform can benefit from their unique experience with informal care. In addition, the members will have the opportunity to proof-of-concept test the ALIVE platform and sign up for the scientific validation study, where the platform's educational part will be made available to them.

Researchers can also learn from the Pårørendebanken members. SEFAS is growing, and we have plans for a future national research school in ageing and innovation. In this connection, it would be natural for SEFAS and Pårørendebanken to jointly create an educational program at SEFAS, where caregivers and doctoral students can learn and share knowledge.

We look forward to a great collaboration!

SEFAS research projects and studies

CC.AGE

The Trond Mohn Research Foundation and the University of Bergen generously provided financial support to SEFAS to establish the Centre for Complex Conditions and Ageing (CC.AGE). Here, we investigate the use of novel technology and high-quality care to improve the lives of older persons with complex conditions living at home.

Providing care and support for the steadily growing population of older adults with chronic complex conditions (CCC) is one of the key challenges of our society. Most older adults do not want to be institutionalized – research has consistently shown that they wish to live independently at home for as long as possible. At the same time, in the coming years, the healthcare system will register a lack of professional health care workers to match future demands, which calls for a paradigm change.

The primary aim of CC.AGE is to improve the living situation for older adults with chronic complex conditions to live safely and independently at home with a good quality of life. At the same time, CC.AGE aims to support their relatives and municipal healthcare professionals.

To achieve this, we aim to:

- design, implement, and test the efficacy of a research-based digital plug-and-play platform with a range of technologies integrated into a mobile tool for use at home.

- identify traditional care areas which can be safely replaced by digital support.

- determine specifications for integrating existing technologies and for developing new products that will be able to sustain 'plug-and-play' integration.

- perform cost-benefit analyses.

- contribute to the design and testing of a social living environment.

Transdisciplinary team

CC.AGE employs major transdisciplinary collaboration between medicine, nutrition, systems science, artificial intelligence, software engineering, economy, and ethics that builds on existing evidence, user-involvement, and methodological expertise. Our industry partner, Youwell, is a developer of e-health platforms, while our public sector partner is the Bergen Municipality. Our local scientific partners are the Center for Nutrition (UiB) and the Bergen Center for Ethics and Priority Setting in health (BCEPS, UiB).

Our collaborators include colleagues from Tohoku University (Japan), Yale University (USA), Harvard McLean Hospital (USA), Massachusetts Institute of Technology (MIT, USA), and Leiden University (The Netherlands). Our national collaborators include the EITRI medical incubator and the Alrek Health Cluster.

Work package organization

The approach of CC.AGE is highly multidisciplinary, encompassing various work packages (WPs). The central activity will be a 12-month randomized controlled trial (RCT) to explore the effect and cost-effectiveness of a multicomponent intervention in home-dwelling people with complex conditions. WPs 1, 3, and 4 inform the development in WPs 5 and 6. WP2 for ethics informs all aspects of our work. The management falls under WP7.

WORK PACKAGES

WP1: e-Delphi: A combined effort informed by all other work packages, with the entire team contributing under the coordination of postdoc Zoya Sabir. This WP is intended to address several questions related to the overarching theme of technology use in elderly care and will be conducted via electronic surveys (the Delphi Method Software), consisting of 2–3 rounds. We will gather experts within technology, innovation, AI and social living environments. The expert panel will be recruited from various environments, including Bergen Municipality and the NET4Age-Friendly, a COST Action (CA19136) aimed at establishing an international and interdisciplinary researcher network to promote the creation and implementation of age-friendly environments. Additionally, experts will be recruited from several of our collaborating universities, including Harvard (USA), Yale (USA), Tohoku (Japan) and Leiden (The Netherlands).

WP2: Ethics: This WP deals with ethical decision-making and consists of practical and theoretical tasks, through which we will ensure ethical assessment throughout all WPs and identify new challenges along the way. Led by Professor Bettina S. Husebø and in collaboration with the Bergen Center for Ethics and Priorities (BCEPS), we employed Justin Haugeland-Pruitt in October 2024 as a PhD candidate for this WP with a PhD project exploring and evaluating ethical and regulatory challenges related to all other work packages as the project evolves in both practical and theoretical proceedings. Ethical considerations work has begun in the form of a contribution to a book on "Neuropsychology in the Age of Digital Health: Explorations, Applications, and Practical Implementations" edited by Sara Weisenbach and Shifali Singh, Harvard McLean Hospital. We are collaborating on "Chapter 12: Ethical Challenges."

WP3: Nutrition: Clinical nutritionist and postdoc Zoya Sabir started in May 2024 and will in collaboration with Professor Jutta Dierkes (Center for Nutrition), investigate food supply for home-dwelling older adults and how this affects nutritional status, activities, quality of life, and general health. This will involve a comprehensive mapping of food and meal services with an emphasis on cost, availability, and user-friendliness for the target group. They will emphasize assessment of hydration status, which is often critically important and not easy to measure. For this, they will test sensor technologies and assess whether these can be useful in preventing dehydration in older adults. In addition, a PhD candidate in nutrition will be hired to work with both quantitative and qualitative dietary data. A pilot study among healthy adults is currently in progress to assess the performance of a newly developed hydration sensor. The findings of the pilot study will be used to guide the choice of methods for hydration assessment in older adults with CCC.
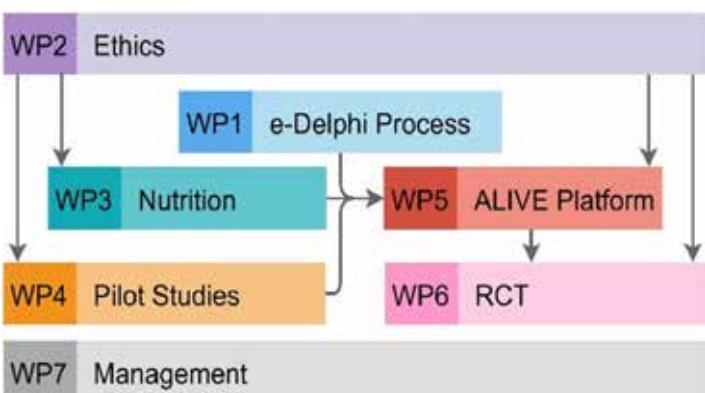
WP4: Proof of concept (pilot studies): This WP is led by Line Iden Berge and will develop digital psychological and social interventions for older adults living at home, and will determine the feasibility of selected devices. The WP covers: general functionality and health status; physical, mental, social activities; mental health/psychological intervention; sleep; and bottom-up development of "Pårørendebanken" (see page 10). PhD candidate Lisa Aaslestad started in September 2024 in this WP, and alongside her main supervisor, Associate Professor Line Iden Berge and her co-supervisors, she will focus on assessing the feasibility of digital psychological and physical interventions to enhance sleep quantity and quality. She will perform a feasibility study of digital sensors to supplement self-reported data for quantifying the activity levels and sleep metrics in older adults.

WP5: ALIVE platform: This WP is being led by postdoc and systems engineer Monica Patrascu. In collaboration with Youwell, we will design a modular, digital plug-and-play mobile platform (ALIVE), with five components: core application, sensing devices, intervention modules, human-machine interface, and user application. CC.AGE will implement knowledge-based AI which utilizes the outcomes of evidence-based healthcare. Restriction mechanisms will be put in place to ensure adherence to ethical, moral, and legal perspectives. The ALIVE platform will interact with the physical world through sensors and actuators. The design, testing, validation, and evaluation of all automation in the project will be performed using established methods from control engineering and systems theory, with special attention to stability, robustness and reliability. Sensors (Garmin Venu 3S, Somnofy) will provide information on the status of the user. Interaction with the user will be through a smartwatch, mobile phone, or tablet. Interventions will be delivered based on individualized assessment of the complex chronic conditions and preferences of the user. A postdoc and a PhD candidate with background in software engineering have been hired and will begin work in early 2025.

WP6: A mixed method randomized controlled trial (RCT): All activities are directed toward the establishment of the RCT, estimated to begin in 2026. Led by Bettina S. Husebø, this will be a 12-month RCT to explore the effect and cost-effectiveness of a multicomponent intervention in home-dwelling people with complex conditions.

WP7: Project management and coordination: This consists of the employment processes and the regular management of the project, and dissemination efforts with scientific presentations, public engagement, and popular science dissemination. The project management and coordination are led by Bettina S. Husebø.

Societal impact

The centre will increase access to research-based mental and physical value-based healthcare with positive impact on safety, quality of life, caregiver burden, ethics, cost-benefit, e-health, and society. This might lead to game-changing support to older adults with complex diseases, enabling them to live safely and independently at home with a good quality of life, at the same time benefitting their relatives and municipal health professionals.

Highlights so far

The centre began its work on February 1st 2024, and **held its opening ceremony in the University Aula on October 1st, 2024.** The project's vast reach and multidisciplinarity were showcased through several insightful contributions from our national and international colleagues and collaborators. The highlights of the programme included an excellent collaborative talk by Dr. Ipsit Vahia and Catharyn Gildesgame from Harvard University titled "Medical Center's Partnership to Support Older Adults' Needs", followed by an energizing and inspiring talk centred around "Successes in Aging" by Professor Heather Allore from Yale School of Medicine. Additionally, our CC.AGE collaborators took the stage to provide insights on the specific work packages encompassed by the project. Overall, it was a successful inauguration that demonstrated the importance of personal engagement and collaboration across disciplines.

Additional and prospective funding: To expand our list of living environments and to have a good testing ground for the ALIVE platform, we have collaborated with about 35 industry and public sector partners, including the CG Rieber Eiendom and the Municipalities of Bergen, Sauda and Tysvær, which resulted in **an application for a Center for Research Driven Innovation funded by the Research Council of Norway**, currently selected to submit a proposal for round 2.

Our CC.AGE collaboration with Vitalthings (NO), Mentech (NL), and Sara Robotics (NL) resulted in **funding for the project Emotion-Intelligent Robot System for people with impaired cognition (EI ROBOT)** from the EU program Eureka Eurostars (see page 24).

PROGRAM OF THE CC.AGE OPENING

09:30-09:55   REGISTRATION AND COFFEE

09:55-10:00   Musical opening

10:00-10:10   Welcome by Marion Solheim, leader of the Communications Dept., Faculty of Medicine, UiB

10:10-10:20   Nicholas Nunn, CEO of Trond Mohn Research Foundation

10:20-10:30   Margareth Hagen, Rector, UiB

10:30-10:40   Marte Monstad from the Bergen City Council

10:40-10:45   Official cutting of the ribbon

10:45-10:55   Bettina S. Husebø, leader of CC.AGE and SEFAS: Paradigm change in elderly care

10:55-11:10   COFFEE AND SNACKS

Part 2, international partners. Chair: Line Iden Berge, SEFAS, UiB

11:10-11:40   Ipsit V. Vahia, Harvard University McLean Hospital, USA, and Catharyn Gildesgame, MBA, Mass General Brigham Behavioral and Mental Health, USA: Medical Center's Partnership to Support Older Adults' Needs

11:40-11:55   Heather Allore, Yale University, School of Medicine, USA: Successes in Aging

11:55-12:10   Erwin Meinders, Ceo of Mentech, Eindhoven, the Netherlands: Human-Centric Social Robots with Emotional Intelligence in Elderly Care

12:10-12:30   COFFEE

Part 3, the CC.AGE team. Chair: Marion Solheim

12:30-12:40   Per S. Bakke, Dean at the Faculty of Medicine, UiB

12:40-12:50   Monica Patrascu, SEFAS: CC.AGE Project Structure

12:50-13:00   Øyvind Grimsgaard, CEO of Youwell: Digital tools for the healthcare services of the future

13:00-13:10   Jutta Dierkes, Centre for Nutrition, UiB: Dietary assessment in light of technology – where do we stand?

13:10-13:20   Bård Benum, CEO of Vitalthings, Trondheim: Somnofy and other radar technology at home

13:20-13:30   Bjarne Robberstad, Head of the Department of Global Public Health and Primary Care (IGS), Alrek Health Cluster, UiB

13:30-14:30   LUNCH AND CLOSING

CC.AGE webpage QR link

The 5-D Project

Decoding Death and Dying in people with Dementia by Digital thanotyping (5-D) is a unique project supported by the European Research Council (ERC), investigating how sensing technology can be used to recognize symptoms among people with dementia at the end of life. By collecting data from nursing home residents, the project will develop methods and tools that can provide a more precise understanding of pain and symptoms at the end of life.

People with dementia at the end of life are one of the most vulnerable and difficult groups to study, as they have difficulties in expressing themselves. The incidence of dementia is expected to triple by 2050 in Europe. Studies show that people with dementia in nursing homes often experience behavioral and psychological symptoms (agitation, depression, anxiety, apathy, psychosis, and sleep and appetite disturbances), as well as pain. Under-treatment and over-treatment may aggravate these symptoms, reducing quality of life. Moreover, in the process of dying, our physical, mental and social capacities gradually decrease, making proper treatment challenging. A greater understanding of the end of life for people with dementia is of the utmost importance to improve their care. Additionally, almost 40% of people with dementia die unexpectedly. If we can recognize when the person is in the final phase, we can alert the family and make the end as comfortable and soothing as possible for both the individuals and their loved ones.

5-D combines clinical assessment tools with wearable sensing technology to monitor a) pain and distressing symptoms, b) behavioral and psychological symptoms in dementia, c) oral changes, and to decode "the point of no return" as the beginning of perceived dying.

Using new technology

In this project, we will use wearable and environmental sensor technology to monitor the person's pain, behavioral and psychological symptoms, and changes in oral status. The sensors are designed to avoid noticeable discomfort or distress. Garmin Venu

detects pulse and movement, and Somnofy detects sleep patterns, movement, and air quality.

Interdisciplinary team

With Bettina S. Husebø as the principal investigator on the project, Monica Patrascu coordinating the model development, postdoctoral researchers Brice Marty and Kamilla Haugland-Pruitt, PhD student Anne Therese Hatle, and research nurse Tanja Lukkari, the 5-D team is a strong interdisciplinary team with multifaceted skillsets, primed to investigate the process of dying with dementia. More PhDs, postdocs, and researchers in engineering and dentistry are in the process of being recruited.

The 5-D project involves many people with different backgrounds, such as clinicians, nurses, dental technicians, occupational therapists, data scientists, and neuroscientists.

Complementary studies

We are running complementary sub-studies that look at specific parts of the 5-D project.

The DIPH.DEM study is coordinated by PhD candidate Lydia Boyle and financed by Helse Vest and is performed in collaboration with the Bergen Red Cross Nursing Home. Here, we are mapping the changes in activity of people with dementia at the end of life. DIPH.DEM functions as a pilot for the 5-D project.

The ORAL.DEM study is also financed by Helse Vest. Manal Mustafa is leading this part of the project, and Farzana Haque is a research assistant in odontology, investigating oral health in people with dementia at the end of life. People with dementia are classified as a high-risk group for the development of oral diseases, further complicating their situation. This study aims to evaluate the oral health status of people with dementia at the end of life and identify the best measures to enhance oral care.

Education

At the participating nursing home, we conduct regular educational sessions for the staff, to build a common frame of reference and learn to use the questionnaires and the technology.

Impact

The results of the 5-D project can provide crucial information, with the goal of optimizing individualized treatment for people with dementia. A better understanding of how, why and when people with dementia have reached the last phase of life will provide knowledge that can also be transferred to other scientific fields or diseases. This might improve the quality of life, including the end of life, and provide better and personalized palliative care to those who cannot express their symptoms or pain. In the long run, we hope we can support older adults throughout their end of life at home.

Current status

Ethical approvals are obtained from the National (NEM) and Regional Committee for Research Ethics (REK). Ten nursing homes in the municipalities of Bergen, Alver and Voss have joined the project. Currently, the recruitment process and educational meetings have started in six nursing homes: Bergen Red Cross Nursing Home, Stiftelsen Metodisthjemmet, Stiftelsen Domkirkehjemmet i Bergen, Stiftelsen Betanien Bergen, Stiftelsen Adventistkirkens Sykehjem Nordås, and Vetleflaten Omsorgssenter.

Data collection has already started in the first three nursing homes, and we have 60 participants with completed basement measurements in 2024.

[5-D webpage](#) QR link

Part of the 5-D team: Brice Marty, Tanja Lukkari, Kamilla-Haugland-Puitt, Anne Therese Hatle, Farzana Haque, Monica Patrascu and Bettina S. Husebø. Photo by Silje Robinson.

The DIPH.DEM Study

Digital phenotyping for changes in activity at the end of life in people with dementia: an observational trial based on sensing technology (DIPH.DEM) is a study investigating activities and symptom changes in persons with dementia, with the goal of describing the activity trajectory toward the end of life. DIPH.DEM is funded by the Regional Health Authorities of Western Norway (Helse Vest) and functions as a pilot to the larger 5-D study.

Almost 90% of people with dementia develop behavioral and psychological symptoms (BPSD). Recent research shows that data acquired from mapping the physical, mental, and social activities of a person can serve as a marker for some clinical conditions, including BPSD. The use of digital phenotyping (analysis of characteristics and behaviors through sensor technology data) in people with dementia is still mostly unexplored, therefore there is value in investigating whether these measures can enhance the objectivity of tracking activity changes during the last period of life in nursing home residents with dementia.

Objectives

The primary objective of DIPH.DEM is to evaluate the physical activities of people with dementia living in the nursing home, as many experience restlessness, pain and poor sleep during their stay. For this, the study will combine digital measures with validated assessment tools to describe the activity trajectory. The secondary objective is to discover which sensor types and data resolution are required to successfully monitor activity in people with dementia. The study functions as a pilot to the larger 5-D study.

Sensors and devices

Sensing technology used in the study includes the Garmin Vivoactive5 smartwatch (movement, heart rate) and the contactless wall-mounted radar-based sensor Somnofy (respiration, light, sound, air quality, movement, sleep). Data is collected over 7-day periods every 6 months up to 1 year, with continuous measurement between 8–12 weeks after a significant

event causing a change in health status. All data will be stored using the secure server infrastructure at the University of Bergen.

Team

Coordinating investigator is PhD candidate Lydia D. Boyle, who is working with an international multi-disciplinary team including Bettina S. Husebø (professor and palliative care physician, main supervisor of the candidate), Monica Patrascu (systems scientist, project manager and co-supervisor), and Brice Marty (neuroscientist).

The collaborators of DIPH.DEM are Kristoffer Haugarvoll (neurologist, co-supervisor), Ole Martin Steihaug (geriatrician, co-supervisor), Rune Samdal (user representative), Ipsit V. Vahia (psychiatrist, USA), Rui Nouchi (psychologist, Japan), and Wilco P. Achterberg (elderly care physician, The Netherlands).

Current status

The study was initiated in May 2023, and received ethical approval in October 2023 (REK). The DIPH. DEM team met with partner institutions in the U.S. in the fall of 2023, allowing for enhanced collaboration about the project between the University of Bergen, Yale University, Harvard University, and MIT. Active recruiting efforts at the Bergen Red Cross Nursing Home began in January 2024. The primary contacts and participants have been provided with education, training, and support for the project. DIPH.DEM has so far included 11 total participants, with baseline measurements completed and data analysis underway.

The DIPH.DEM team is very thankful to the families, participants, and healthcare team at the Bergen Red Cross Nursing Home for making this study possible.

DIPH.DEM webpage
QR link

Mona Storheim, Ingrid Utbjoe and Berit Wiedner together with coordinating researcher Lydia Boyle, with the project rollup at the Bergen Red Cross nursing home showing that the nursing home's staff and residents are doing research in collaboration with SEFAS/the University of Bergen.

The ORAL.DEM Study

"ORAL care at the end of life in people with DEMentia" (ORAL.DEM) is a pioneer study to assess oral health in people with dementia during the last period of life. It is funded by the Regional Health Authorities of Western Norway (Helse Vest) and is part of the European Research Council (ERC) funded larger project "Decoding Death and Dying in people with Dementia by Digital thanotyping" (5-D).

Caring for people with advanced dementia presents unique challenges, particularly in recognizing when they are approaching the end of life. The Lancet Commission for "The value of death" has highlighted the importance of this phase, stressing the need for timely identification to enable effective end-of-life planning and care. Despite the significance of this stage, oral health is often overlooked in dementia health care.

People with dementia frequently struggle with basic oral hygiene due to memory loss and impaired motor skills. This leads to various dental issues, such as poor oral hygiene and unhealthy dietary behavior, resulting in many oral problems including caries and periodontal lesions. These challenges contribute to malnutrition, discomfort, and a decline in overall health. Incorporating oral health into palliative care helps researchers identify effective ways to improve patient outcomes and better understand the overall needs of people with dementia.

Aims

With the ORAL.DEM study, we aim to develop a state-of-the-art method to assess oral health symptoms in people with dementia during the last period of life. We will create an advanced method for evaluating the oral health status, detect possible microbial profile changes and assess any imbalance in molecules involved in the inflammatory and resolution molecules that might occur.

Impact

In the near future, we expect that this comprehensive approach not only enhances the quality of life for

vulnerable individuals but also reduces healthcare burdens caused by untreated oral health issues, ultimately benefiting society at large.

Bringing in dentistry expertise

SEFAS is collaborating with Haraldsplass Deaconess Hospital and the Department of Clinical Dentistry at UiB in this project. Researcher and dentist Manal Mustafa is leading ORAL.DEM. Professor Kamal Babikeir Elnour Mustafa, Leader of the Center for Translational Oral Research, is also contributing, and Farzana Haque is on board as a research assistant working on the calibration process and data collection in nursing home patients with dementia. Associate Professor Ragnhild Eide Skogseth is consulted as geriatrician and will lead the development of the knowledge package. From the 5-D team, Monica Patrascu (systems scientist) will oversee the data analyses and a PhD student in odontology will also be recruited. Rune Samdal is the user representative.

Prevention strategy

We will be adopting the following procedures:

1. **Primary prevention:** Preventing the oral diseases from occurrence (e.g., caries lesions and periodontal diseases) by communication with health personnel at the nursing homes regarding the challenges in providing oral care to people with dementia.
2. **Secondary prevention**: Early detection and intervention to arrest the early lesions by examining and providing follow-up of the oral

health status among the residents.
3. **Tertiary prevention:** Referring to treatment when needed to reduce the impact of impairment, disability, and handicap due to pain.

This study will recruit 150 older adults aged 65 and above with dementia living in nursing homes, focusing on those receiving long-term care until the end of life. Every 6 months, clinical assessments will be conducted to evaluate oral mucosa, gingival tissue, saliva levels, and record any lesions such as caries and gingivitis. Caries assessment will follow WHO guidelines. Unstimulated saliva samples will be collected at baseline and every six months to measure salivary pH and buffer capacity, while plaque samples will be analysed using the Human Oral Microbial Identification Microarray (HOMIM). Gingival crevicular fluid (GCF) will also be collected for future analysis, ensuring a comprehensive assessment of oral health in this vulnerable population.

Current status

Data collection started in November 2024, with 10 nursing homes lined up for participation and the potential to include more if needed. ORAL.DEM, as part of the larger 5-D project, has been approved by the National Ethics Committee (NEM nr 2023/166). Written informed consent is obtained for every participant, ensuring anonymity and confidentiality. Participation is voluntary and all requested information is confidential.

ORAL.DEM webpage
QR link

The DARK.DEM Study

DARK.DEM is a randomized controlled trial to test whether virtual darkness can alleviate agitation in people with dementia. It is funded by the Research Council of Norway (RCN) and the University of Bergen (UiB) and aims to enhance diagnostics and treatment of behavioural and psychological symptoms of dementia in specialized and municipal dementia care.

Behavioural and psychological symptoms of dementia (BPSD) describe changes in behaviour and mental state caused by the dementia syndrome, and encompasses amongst others anxiety, depression, psychosis and agitation. These symptoms are prevalent in persons with dementia, often treatment-resistant, resource-demanding and contribute to worsening of cognition, independency, reduced quality of life and increased mortality.

The "gold standard" for assessment is retrospective proxy rating with psychometric scales, yet the low test-retest reliability challenges evaluations over time. This barrier can be overcome by "digital phenotyping", that is, the characterisation of human behaviour by moment-by-moment monitoring with personal digital devices. Moreover, in dementia, circadian rhythms become less robust, which potentiates BPSD. As

such, chronotherapy, i.e., interventions targeting the circadian rhythm, is promising. Intrinsically photosensitive retinal ganglion cells (ipRGC) monitor the perception of day and night and are maximally sensitive to light with short wavelengths. This discovery paved the way for virtual darkness therapy, that is, solely exposure to light deprived of blue wavelengths in the evening and night. Lastly, when the new procedures and interventions are applied in health institutions for people with dementia, successful implementation is dependent on knowing the complexity of contextual factors affecting it.

Aim

The aim of DARK.DEM is to develop and evaluate digital phenotyping and virtual darkness therapy to enhance BPSD management in specialized dementia care and facilitate implementation in municipal dementia care.

Methods

In the first part of the project, we will use artificial intelligence to examine whether data from smart watches can provide accurate measures of agitation, depression and sleep disturbances in persons with dementia admitted to NKS Olaviken Geronto-psychiatric Hospital. Here, we use the Empatica embrace wristband measuring movement, heart rate variability, skin temperature and oxygen saturation.

In the second part of the project, we will conduct a randomized controlled trial to determine whether treatment with virtual darkness, that is, light without blue wavelengths, can alleviate agitation and other BPSD among inpatients at the hospital. This treatment had striking effect in reducing manic symptoms in persons with bipolar disorders in a recent trial, and in addition, it reduced the need for psychotropic drugs and shortened the hospital stay. A circadian light system is delivered by Chromaviso for this purpose.

In the final part of the project, we will conduct focus group interviews with staff at the hospital and in nursing homes in Bergen to explore barriers and enablers for implementation of the new methods in municipal dementia care.

Team

PI of the study is Line Iden Berge, specialist in psychiatry, senior doctor at NKS Olaviken Gerontopsychiatric Hospital, and associate professor at SEFAS. On her team are also systems engineer and postdoc Monica Patrascu, psychologist and PhD candidate Sunniva Vibe Skagen, psychologist and PhD candidate Kjersti Nedreskår, research nurse Anne Marie Espeland, engineer and postdoc Valentina Casadei, nurse and associate professor at VID Stein Erik Fæø, psychologist and professor Elisabeth Flo-Groeneboom, UiB, and Tone Elise Gjøtterud Henriksen, chief physician and postdoc at HelseFonna.

An Nordic steering group is connected to the study, consisting of Geir Selbæk, psychiatrist, professor, and head of The Norwegian National Centre for Ageing and Health (Ageing and Health), Norway, Klaus Martiny, professor at the University of Copenhagen, Denmark, and Carlo Volf, light architect from the University Hospital of Copenhagen, Denmark.

Societal impact

This project will enhance diagnostics and treatment of behavioural and psychological symptoms of dementia in both specialized and municipal dementia care.

Status

The study was initiated in august 2023, and we have recruited two PhD candidates, one postdoc and a research nurse. We have applied for REK approval, developed a Data Protection Impact Assessment (DPIA), registered the trial in the proper channels (clinicaltrial.gov, helsenorge.no, RETTE and christin.no) and developed information materials for staff, patients and caregivers. The 9th of September 2024 we had a kick-off with the staff at the hospital. We are currently recruiting participants, the procedures including the virtual darkness therapy is perceived well by both the staff and the patients. We aim to include 72 patients by the end of 2026.

DARK.DEM webpage
QR link

Part of the DARK.DEM team: Kjersti Nedreskår, Valentina Casadei, Line Iden Berge, Sunniva Vibe Skagen and Monica Patrascu.
Photo by Silje Robinson.

The EI ROBOT Project

In collaboration with Vitalthings (NO), Mentech (NL), and SARA B.V. (NL) we have established the project Emotion-Intelligent Robot System for People with Impaired Cognition (EI ROBOT), with funding from the European Union program Eureka Eurostars, the Norwegian Research Council and the Netherlands Enterprise Agency.

The European (and global) population is ageing, which leads to an increase in age-related afflictions (e.g. dementia) and corresponding challenges regarding their well-being. Declining cognitive functions combined with a shortage of healthcare workers further complicate the matter. Consequently, loneliness, depression and anxiety for people in long-term care institutions are at risk to increase. Robotic solutions are proposed to support residents in daily routines and alleviate the workload of healthcare workers. With emotion-intelligent robotics, non-pharmacological interventions can be fast and easily fitted for personal preferences and the cognitive abilities of residents.

Emotion-intelligent robot system

The objective of EI ROBOT is to develop an emotion-intelligent robot system to enhance the well-being of persons with dementia or other intellectual disabilities residing in long-term care institutions through personalized interactions while supporting care professionals. The intelligent robotic solution integrates advanced sensing technology, artificial intelligence, and personalized interventions. The system will monitor the residents' physiological states in real-time using non-intrusive sensors, and then accurately interpret this data to estimate the emotional states of agitation and drowsiness. The robot will deliver tailored interventions to address individual needs, thereby enhancing the residents' emotional well-being and reducing the workload on caregivers.

Our sub-objectives are:

1. **Advanced Sensing Technology**: Implement non-intrusive sensors to monitor residents' physiological and emotional states in real-time, measuring heart rate, respiration, and stress levels.

2. **AI-Driven Emotion Recognition:** Develop AI algorithms to accurately detect and interpret residents' emotional states, combining data from multiple sensors for comprehensive analysis.

3. **Personalized Interventions:** Design personalized non-pharmacological intervention protocols based on residents' emotional and physiological states, providing real-time responses to improve well-being.

4. **Ethics, Validation, and Acceptance:** Maintain ethical considerations through expert validation and trustworthy AI principles and analyze the acceptance of the robot.

Team

The project team at SEFAS is interdisciplinary and is led by Monica Patrascu. Bettina S. Husebø and Line I. Berge provide expertise in elderly care, specifically for people with dementia. Finn Patrick Nilsen is the user representative for this project. The team will be joined by a researcher with clinical background in 2025.

Impact

The results of EI ROBOT will provide valuable knowledge on emotion recognition via sensing technology, the delivery of individualized non-pharmacological interventions, and the effect on both users and the care staff. By utilizing a modular and multi-modal approach, the emotion-intelligent robot system has sustainable potential for different use cases and settings in both future extramural and intramural care.

Current status

The project began in August 2024 and is currently developing the user requirements and the technical specifications.

EI ROBOT webpage
QR link

Photo by SARA B.V.

ActiveAgeing – DIGI.PARK

The Digital Phenotyping in people with Parkinson's Disease (DIGI.PARK) branch of the ActiveAgeing study explores the use of wearable sensor devices for symptom tracking in home-dwelling people with Parkinson's disease. The study is financed by the University of Bergen, the GC Rieber Foundations, and the Research Council of Norway.

PD is characterized by disturbances in motor behavior, including tremors, slowness, stiffness, and several other problems due to a degeneration of neural pathways for which there are no biomarkers, making diagnosis and research challenging. The symptoms are challenging to measure over time due to subjective and low-resolution assessment methods. Current tools for assessing clinical phenotypes and severity of Parkinson's disease (PD) are based on observation while the patient performs a series of tasks. The Unified Parkinson's Disease Rating Scale (UPDRS) is considered the gold standard for assessing the efficacy of clinical trials testing symptomatic and neuroprotective agents. These tools are however limited by lack of objectiveness, low sensitivity and reproducibility, and vast variations depending on the time of the examination, time of last received dose of dopaminergic treatment, etc. One approach

to circumvent these limitations and establish more objective measures of severity is that of digital phenotyping via the use of wearable sensor devices.

The aim of the DIGI.PARK study is to explore the use of wearable sensors for symptom tracking in home-dwelling people with Parkinson's disease.

This branch of ActiveAgeing is an observational study comprised of two phases. In the first phase, we investigated the use of wearable sensor technology for research and clinical work in Parkinson's disease. A 2-week data collection was conducted in the participants' homes on 15 participants with Parkinson's and 15 participants without Parkinson's from the innovative living environment Helgetun. We employed clinical assessment tools (cognitive assessment, parkinsonian symptomology, sleep disturbances), two smartwatches (Fitbit Sense and

Empatica E4), and a smart ring (Oura).

The second phase of the study is based on the results of the first phase, as the data collection procedure is refined according to the first-phase data analysis. The second phase involves data collection from persons with Parkinson's disease and their spouses, to compare the crossover effects of the disease. Both phases include the design of specific Parkison's disease digital biomarkers for symptom tracking.

Part of a two-sided study

The ActiveAgeing study consists of two branches – the DIGI.PARK branch and the Helgetun branch. The Helgetun branch is exploring how living in an innovative, community-based environment can affect the lives of older adults, using a qualitative approach. See separate description on the next page.

Team

DIGI.PARK is a collaborative initiative between the Centre of Excellence Neuro-SysMed and SEFAS. Our team comprises Haakon Reithe, PhD student and main investigator of the project, Dr. Monica Patrascu, systems engineer, Dr. Juan Carlos Torrado Vidal, computer engineer, Dr. Brice Marty, electrical engineer and neuroscientist, Elise Førsund, PhD student in the Helgetun branch, Professor Bettina S. Husebø, palliative care physician and leader of SEFAS, and Professor Charalampos Tzoulis, neurologist and co-leader of Neuro-SysMed.

Current status

The first phase study was initiated in the spring of 2021 and all data was collected in 2021/2022. The comparative cross-correlation analysis of the three wearable devices is finalized, and a digital biomarker for tremor quantification and a digital biomarker for physical activity response are designed.

PhD student Haakon Reithe submitted the first paper in the fall of 2024, where we **cross-evaluated devices for Parkinson's research and clinical use.** Our findings indicate that commercial-grade and research-grade devices alone are not optimal. Research-grade devices provide excellent data resolution and access, whereas commercial-grade devices are user-friendly both for researchers and participants. We conclude that for symptom tracking, gaining access to raw data from user-friendly sensors is essential for scaling efforts in decentralized PD research.

Reithe is currently finishing the second paper, with **work testing an algorithm that quantifies the intensity of tremors** in ranges of 3 to 12 Hz. The algorithm was developed together with Monica Patrascu and Brice Marty, and in the paper, we validate the algorithm on participants who exhibit unilateral tremors by examining the differences between the most tremor-affected hand with the least affected hand. The algorithm output gives us a tremor index (TI). Preliminary results indicate that the TI of the most tremor-affected hand is higher than the least affected hand.

For the third paper, we are **making use of the TI to evaluate the response to medication**, by comparing computed TI pre- and post-medication. In this paper, we will also include control participants, allowing us to test both between and within participants.

Impact

This project investigates how technology can assist society in addressing the challenges posed by an increasingly aging population with Parkinson's disease (PD). This provides important knowledge for planning of future health care, which is transferrable to other disease that share symptomology with PD, such as essential tremor and other motor dysfunction.

DIGI.PARK webpage
QR link

Part of the ActiveAgeing team: Brice Marty, Haakon Reithe, Bettina S. Husebø, Monica Patrascu and Elise Førsund. Photo by Silje Robinson.

ActiveAgeing – Helgetun

The Helgetun branch of the ActiveAgeing study explores how living in an innovative, community-based environment can affect the lives of older adults, using a qualitative approach. The study is financed by the GC Rieber Foundations, the University of Bergen and the Research Council of Norway.

Chronic complex conditions including age-related neurological diseases pose one of the greatest challenges facing science and society. Many will end their lives in institutions where they do not wish to be, and which society is finding increasingly difficult to finance. Demographic studies show that patient numbers will continue to grow, and older adults with complex conditions are increasingly constituting major challenges to healthcare provision in the 21st century. SEFAS is researching solutions, and one of our focus areas is smart living and care. Care today is very costly, and loneliness is a threat. Self-management and independence should exist alongside social activities and healthcare services. We wish to explore and use novel technology and smart buildings to innovate care and treatment for the elderly through

sustainable business models and look at how we can implement new scientific knowledge into action more effectively and efficiently. One such pilot project is Helgetun, built and financed by the GC Rieber Foundations.

Helgetun is a community-based living environment for seniors located in a rural area of Bergen. The first residents moved in in 2019, and Helgetun promotes active ageing by facilitating mental, social, and physical participation. It consists of 31 rental apartments and several shared facilities. At Helgetun, the residents can participate in several group activities such as singing in a choir, joining in on social walks, playing bridge, dancing, volunteering in a kindergarten, working at a farm, gardening, and supporting their neighbours in the nearby Helgeseter senior centre.

Among the facilities, there is a common room for social activities and a greenhouse for occasional cultural arrangements.

The aim of this study is to evaluate how this way of living can reduce loneliness and potentially delay the development of chronic complex conditions, allowing people to live longer independently at home. Based on observations, interviews, and sensor data from wearable devices, we are investigating how living at Helgetun affects the lives of the residents.

Team

Professor Bettina S. Husebø is leading the project, and molecular biologist Elise Førsund is employed as a doctoral fellow on this project, doing qualitative research to obtain rich and detailed data about the living environment, based on the residents' experiences. Monica Patrascu as systems engineer with long experience with artificial intelligence and control systems is onboard to apply knowledge on discovery and digital signal processing, to detect patterns in the data that show us information about the lifestyle and activity levels of older adults. Rune Samdal joins the project as user representative, while Juan Carlos Torrado Vidal and Stein Erik Fæø provide experience with qualitative analyses as co-supervisors for the doctoral fellow. Haakon Reithe is a doctoral fellow in the DIGI.PARK branch.

Part of a two-sided study

The ActiveAgeing study consists of two branches – the Helgetun branch and the DIGI.PARK branch. DIGI.PARK is an observational study based on quantitative research, exploring the use of wearable sensor devices for symptom tracking in home-dwelling people with Parkinson's disease. See separate description.

Current status

Three scientific publications are emerging from ActiveAgeing's Helgetun branch. The first article was published in Frontiers in Public Health in April 2024 titled "Active ageing in community-based living environments: an ethnographic study". In this study, we **identified three main factors that were important in facilitating active ageing in this living environment.** These were "Maintaining self-identity", "Experiencing growth and development" and "Feeling a sense of belonging".

The next article is **exploring a deeper understanding of how this community came about and how older adults experience this process**, and we continued by looking at the participants' relocation stories. For this purpose, we used a narrative approach based on unstructured interviews, with the main question, "Can you tell me about when you moved to Helgetun?" This knowledge is important to understanding how these communities form and evolve over time. The article from this work is currently (Dec. 2024) under review.

The last paper focuses on **the living environment's impact on technology adoption for older adults**. In 2021/2022, we collected sensor data from 15 residents at Helgetun at two different timepoints: one in spring and one in autumn. We used two commercial-grade devices (Fitbit Sense smartwatch and Oura ring) and a research-grade wristband (Empatica E4). Interviews were performed after both data collections, to investigate the participant's experience with the use of digital devices. We are currently working on the analysis for this manuscript.

Societal impact

Knowledge from this project might inform policy makers on how we as society should plan the use of novel technology, social living constellations and person-centred solutions to support independent, safe living for older adults, and maintain or improve their quality of life as well as for their families.

ActiveAgeing Helgetun webpage QR link

Maintaining self-identity	Experiencing growth and development	Feeling a sense of belonging
New role in life and sense of self	Exposure to new activities and knowledge	Role in a new social network
Access to meaningful activities	Accessibility and social motivation	Social support and safety

Community-based living environments

The NADage Study

NADage is a phase II randomized controlled trial of nicotinamide riboside (NR) in aging-related frailty. Here, the aim is to determine whether treatment with NR can increase intrinsic capacity in a community-dwelling older population living with frailty, including assessment of cognitive function and overall quality of life. This is a study headed by Neuro-SysMed, and financed by the G.C. Rieber Foundation, the University of Bergen, the Research Council of Norway (Neuro-SysMed), Haukeland University Hospital, NutriBrain, and the DAM Foundation.

There are currently no treatments that can prevent pathological brain aging and cognitive decline in the elderly. Achieving this requires neuroprotective interventions during prodromal stages of the disease, i.e., while it is still possible to avert irreversible neurodegeneration and prevent clinical progression to dementia. We propose that this can be achieved by augmenting brain nicotinamide adenine dinucleotide (NAD)-metabolism in the non-demented, elderly, frail population.

Frailty is defined as a geriatric syndrome of multi-system physiological deterioration, which is closely associated with pathological brain aging and a significantly increased risk of dementia, including mild cognitive impairment (MCI), Alzheimer's disease (AD) and vascular dementia. Frailty may therefore be considered a precursor state to cognitive disorders, offering a therapeutic window for disease prevention. The ideal preventive strategy during this window would involve agents that not only enhance general neuronal resilience but also bolster resistance to disease-specific stressors, while being safe and suitable for long-term use in individuals at risk of cognitive disorders. We propose that this can be achieved through NAD-replenishment therapy, employing oral precursors such as nicotinamide riboside (NR). To test this hypothesis, we are conducting NADage study.

The primary objective of the NADage study is to determine whether treatment with NR, 2000 mg daily, can increase intrinsic capacity in a community-dwelling older population living with frailty, as measured by the change from baseline to week 52 in the 6-minute walk test (6MWT). Secondary objectives include assessment of cognitive function and overall quality of life.

NADage will recruit a total of 100 participants from all over Norway. The study duration will be one year. 2000 mg NR will be administered orally per day, versus placebo, in older individuals with mild to moderate frailty.

Team

NADage involves a comprehensive team across Neuro-SysMed, Centre for Elderly and Nursing Home Medicine (SEFAS) and Haraldsplass Deaconess Hospital. Co-Director at Neuro-SysMed, Professor Charalampos Tzoulis, is the study director, with PhD candidate Katarina Lundervold as coordinator. Professor Bettina S. Husebø is scientific advisor for the project, as is Senior Researcher Christian Dölle. PhD Candidate Haakon Berven is onboard as investigator, as is Associate Professor and Geriatrician Ragnhild Skogseth Eide and Consultant Neurologist Kristoffer Haugarvoll. Study nurses are Mona Søgnen and Erika Veslemøy Sheard. Bård Erik Bogen, Astri J. Lundervold, and Jörg Assmus have contributed as scientific advisors in the project planning.

Societal impact

The NADage study has the potential to significantly impact society by offering a promising intervention for age-related frailty, a condition closely linked to cognitive decline and dementia. If successful, the research could lead to an accessible, preventive treatment for older adults, enhancing their quality of life, cognitive function, and overall well-being, while also potentially reducing the societal burden of dementia and long-term care.

Current status

The study protocol is completed, and necessary approvals are obtained. Recruitment of participants has started. We expect to reach inclusion of half of the participants during 2025.
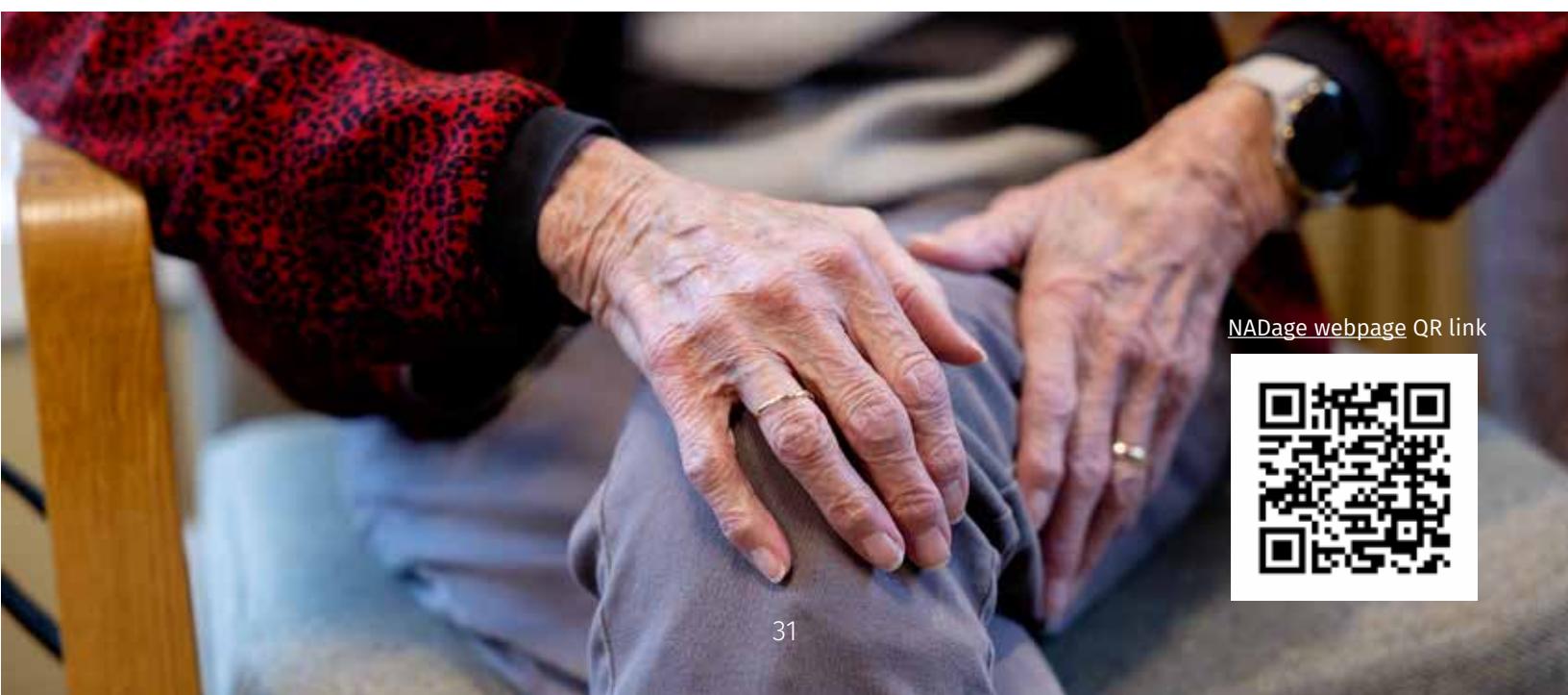
NADage webpage QR link

LIVE@Home.Path

The LIVE@Home.Path trial is completed, and has in 2024 been finishing the last publications. The study focused on how to improve the caring situation for caregivers to people with dementia living at home. The project was financed by the Research Council of Norway (NFR), The Dignity Centre, Nasjonal kompetansetjeneste for kvinnehelse, Oslo University Hospital, GC Rieber Foundations, and Extrastiftelsen.

The LIVE@Home.Path trial is a grand SEFAS investment in municipal dementia services and home-dwelling persons with dementia and their caregivers. The project was led by Professor Bettina S. Husebø and was a collaboration with NORCE, the Western Norway University of Applied Sciences, Haraldsplass Deaconess Hospital, the Dignity Centre and the municipalities of Bergen, Bærum and Kristiansand. International scientific partners included Yale (US), Harvard/McLean (US), Leiden University (the Netherlands), Tohoku University (Japan), Kings College (UK) and Exeter University (UK).

LIVE@Home.Path applied both qualitative and quantitative methods to explore how different components (ie a multicomponent intervention) facilitated by a municipal coordinator can improve resource utilization and caregiver burden in dementia care. LIVE is an acronym for the components of the intervention, consisting of L for learning, I for innovation and ICT, V for volunteering and E for empowerment, that is, planning of treatment and care in the last period of life. In the quantitative part of the project, we explored how this multicomponent intervention can reduce number of informal care hours and caregiver burden, applying a stepped wedge randomized controlled design, which implies that all participants eventually will receive the intervention, while the timing of the intervention

is determined by randomization. In total, we have followed 280 dyads of persons with dementia and their informal caregivers from 2019 in Bergen, Bærum and Kristiansand, and implemented the coordinator facilitated LIVE intervention over 6 months. We have also performed qualitative interviews with selected dyads and volunteer coordinators along the trial. We found that the LIVE intervention did not improve resource utilization nor caregiver burden for caregivers to home dwelling persons with dementia. However, the caregivers reported a positive change over the intervention period, this was most pronounced for the allocation of a personal coordinator.

Impact

Our findings highlight that the personalization of dementia care is highly valued by the caregivers. This finding may support clinicians and stakeholders in designing future health care services for people with dementia and their caregivers since the prevalence will more than double over the next 30 years, thereby also increasing the need to support their caregivers.

Educational outcomes from the trial

- PhD student Stein Erik Fæø defended his thesis in 2021: "Being Home with Dementia: Exploration of the Meaning of Home and Approaches to Care and Support".

- PhD student Marie Hidle Gedde defended her thesis in 2023: "Behavioral and Psychological Symptoms of Dementia. The impact of medication reviews in multicomponent interventions and the consequences of Covid-19 restrictions." Gedde received the award for best PhD work at the Faculty of Medicine in 2023.

- PhD student Maarja Vislapuu defended her thesis in 2024 with the thesis "Informal and formal resource utilization in people with dementia."

- Masterstudent Guro Kårøy Almås defended her master's degree in Health Sciences in 2024 with the thesis "Betydelig pårørendebelastning hos hjemmeboende personer med demens."

- PhD student Eirin Hillestad at the Dignity Centre studies volunteerism in dementia care by conducting interviews with volunteer coordinators.

Publications from the project

13 scientific publications has emerged from the trial, 3 scientific presentations, and 9 newspaper articles. See complete list on the LIVE@Home.Path webpage.

LIVE@Home.Path webpage QR link

The BetterAge Proposal

SEFAS is answering the call from the Research Council of Norway of a Centre for Research-based Innovation (SFI), by proposing a new model of living with lifestyle dynamics that empower independent living for older adults throughout the rest of their lives. Our proposal was well received for round 1 and was subsequently selected to submit a proposal for round 2.

How can we organize social, affordable, and sustainable living environments for the increasing group of older adults? As we are getting older, our physical, mental, and social abilities are gradually declining: multimorbidity and the need for costly and resource-demanding long-term care are the reality for many. No systematic Norwegian non-institutional living model for healthy ageing exists, although the infrastructure and technology are available.

New thinking for a growing challenge

A project such as BetterAge is of key importance for the development in our society as the necessity is well documented by recent policy papers on smart living, digital inclusion, living safely at home, and future perspectives in the Norwegian healthcare system. Demographic studies show that patient numbers will continue to grow, and older adults with complex conditions are increasingly constituting major challenges to health care provision in the 21st century.

Collaboration across municipalities, industry and academia

BetterAge addresses these long-term needs at the intersection of construction, urban and rural planning, digitalization, and healthcare, to help shape the emerging sector of smart-tech enabled age-friendly environments. Thus, BetterAge will collaborate with the municipalities, the industry and academia to design a new living model of lifestyle dynamics that empowers independent living for older adults throughout their lives and combine this with multi-generational living and neighborhood.

BetterAge will provide an evidence base for new products and services, disease preventive measures, reduced public care costs, increased international commercialization, and competence training for the public and industry sectors.

What is an SFI?

The Research Council of Norway runs the *Centres for Research-based Innovation* scheme (SFI) to develop expertise that is important for innovation and value creation in Norway. The view is that long-term research in close cooperation between R&D-active companies and prominent research groups will strengthen technology transfer, internationalisation and researcher training. The centres are established for a maximum period of eight years.

The centres are co-financed by enterprises, host institutions and the Research Council. Enterprises participate actively in a centre's governance, funding and research. The main criterion for selecting centres is their potential for innovation and value creation. The scientific quality of the research must be of a high international standard. When the centres are established, they are given a contract for five years. Based on a successful midway evaluation, the contract may be extended for another three years.

The first SFI-scheme funding call was issued in 2005 and 14 centres were active in the period 2007–2015 (SFI-I). The second funding call was in 2010, and seven centres began their activities during 2011 (SFI-II). In 2014, a third funding call was launched, and 17 centres were selected for activities beginning in 2015 (SFI-III). The most recent call was announced in 2024, where funding was announced for at least eight centres through a two-stage application process. The decision to award the new SFI centres will be made in October/November 2025, and November 1st is the earliest permitted project start.

Harsh competition

We are proud to have been invited to submit a proposal in round 2 of the selection process. However, we are still facing a harsh competition, as 30 potential centres out of 96 initial applications were selected for round 2. Two other are from the University of Bergen:

- Centre for Deep-Sea Innovation
- ICoN: Innovation Center for Neuroresilience

Professor Bettina S. Husebø is leading the BetterAge initiative. In a realization of the project, the entire SEFAS team will be part of the project as well as collaborative partners, supported by a Scientific Advisory Board, the Department of Global Public Health and Primary Care (IGS), and the UiB Faculty of Medicine.

SEFAS — on a quest to change the landscape of ageing, starting in Bergen, Norway

[BetterAge webpage](#)
QR link

The SEFAS Staff and Students

We have the privilege of working with research fields that are more important than ever and that are answering current societal needs. Last year, SEFAS expanded considerably as we added more projects and expertise to our community. We are proud to present our great staff and students! First, our visionary leader, followed by the rest of the SEFAS staff in alphabetical order.

BETTINA S. HUSEBØ — Professor and Head of SEFAS

Bettina S. Husebø, MD, PhD is a specialist in anesthesiology, intensive care, palliative care, and nursing home medicine, and a postgraduate of the Harvard Medical School's Safety, Quality, Informatics, and Leadership program (SQIL). As a professor at the University of Bergen, Norway, Department of Global Public Health and Primary Care, she is the leader of the Centre for Elderly and Nursing Home Medicine, SEFAS. In 2023, Dr. Husebø received an ERC Consolidator Grant for the 5-D project, and established the Center for Complex Conditions and Ageing (CC.AGE), with support from the Trond Mohn Research Foundation and the UiB.

Her clinical research has been focused on method development and randomized controlled intervention trials, including nursing home patients and home-dwelling people with dementia, highlighting the assessment and treatment of pain, neuropsychiatric and behavioral disturbances, medication reviews, and end-of-life care. One of her latest publications is the Lancet Commission on The Value of Death, which sheds light on the considerable care gaps at the end of life. Her recent work involves a transdisciplinary approach on technology, smart living, and artificial intelligence in healthy older adults and people with complex conditions, such as dementia and Parkinson's disease. She is also leader of the Neuro-SysMed Care Node and key partner of the Neuro-SysMed Dementia Node.

LISA AASLESTAD — PhD Candidate

Lisa completed her Master in 2024 at the UiB/SEFAS with the thesis "Bridging Gaps: Wearable sensing-driven assessment of REM sleep behavior disorder in Parkinson's Disease. Results from the DIGI.PARK study." She is currently a PhD candidate at SEFAS, working with the Centre for Complex Conditions and Ageing (CC.AGE). In this project, she will concentrate on developing a digital solution aimed at enhancing sleep health, with the goal of improving activity levels and the overall quality of life among older adults.

LINE IDEN BERGE — Professor

MD, PhD, specialist in old age psychiatry, senior doctor NKS Olaviken Gerontopsychiatric Hospital and professor at SEFAS. Line completed her PhD at the UiB in epidemiology exploring somatic comorbidity in people with depression. She conducted the LIVE@Home.Path trial as a postdoc at SEFAS. From 2023 she has been the PI of the DARK.DEM study, exploring how virtual darkness theraphy and digital phenotyping can improve diagnostics and treatment of behavioral and psychological symptoms of dementa. She is also co-PI of CC.AGE, and board member of the American Journal of Geriatric Psychiatry.

LYDIA DAWN BOYLE — PhD Candidate

M.Phil in global health studies from the University of Bergen and Doctor of Physical Therapy (DPT) from the University of Texas Medical Branch. Lydia is currently a PhD candidate at SEFAS. Her project, funded by Helse Vest and in partnership with Neuro-SysMed, will investigate phenotyping using sensing technology for persons with dementia at the end of life (DIPH.DEM).

VALENTINA CASEDEI — Postdoc

Engineer and PhD who received her Master's degree in biomedical engineering from the Università Politecnica delle Marche (Italy), and her doctorate from the University of Liverpool, specializing in biomedical signal processing and measurement uncertainty quantification. She is currently a postdoc at SEFAS, working on identification and extraction of biomarkers for behaviors and psychological symptoms of dementia (BPSD) in the DARK.DEM study.

ELISE FØRSUND — PhD Candidate

Molecular biologist and MS on the correlation between aging cells and Parkinson's disease. Elise is currently working on her PhD on the "ActiveAgeing" project, Helgetun branch. Her PhD is qualitative and focuses on new living environments for older adults and the implementation of smart technology for this age group. She has a background as a civil engineer and molecular biologist, where she in her master's looked at the correlation between the lipid composition of aging neurons and the development of Parkinsons disease.

ANNE THERESE HATLE — PhD Candidate

Occupational therapist with a master's degree in evidence-based practice in health sciences. Since 2022, Anne Therese has been a lecturer in the occupational therapy bachelor's program at Western Norway University of Applied Sciences. In April 2024, she started as a doctoral candidate at SEFAS. Her research is focusing on Decoding Death and Dying in people with Dementia by Digital thanotyping (5-D), a groundbreaking study financed by the European Research Council (ERC Consolidator Grant) to precisely investigate the end of life in nursing home patients with dementia utilizing digital technology.

KAMILLA HAUGLAND-PRUITT — Postdoc

Kamilla has a PhD in neuroscience from the Arctic University of Norway (UiT), in which she focused on growth hormone modulation of hippocampal activity concerning aging and dementia. At SEFAS, she works as a postdoctoral researcher on the 5-D project, investigating decoding death and dying in people with dementia. Kamilla takes part in data collection, analyses, and supervision of PhD students. As a neuroscientist, Kamilla is particularly interested in the link between brain activity and digital phenotypes, and how to improve the quality of life for elderly with cognitive deficits.

JUSTIN HAUGLAND-PRUITT — PhD Candidate

M.Phil in Global Health from the UiB. During his masters, he explored the experiences and perceptions of medical overuse among migrant health professionals in Norway. Justin is currently a PhD candidate at SEFAS on the CC.AGE project and working closely with BCEPS. He will be studying the ethical and regulatory challenges surrounding assistive technologies, algorithms, and AI in research involving older adults with dementia.

FARZANA HAQUE — Research Assistant

Farzana is a dental professional with a Bachelor of Dental Surgery (BDS) from the University of Dhaka, Bangladesh, and a Master's in Dentistry from University Sains Malaysia (USM). She is currently a research assistant for the ORAL.DEM project, where her focus is to assess the oral health status and treatment needs of individuals with dementia during the end-of-life phase. Her key responsibilities include assessing oral health status, and collecting microbial (dental plaque), gingival crevicular fluid and saliva samples. She will also monitor the development of caries and periodontal diseases throughout the study to ensure accurate data collection and reporting.

EIRIN HILLESTAD — PhD Candidate

Eirin holds an MPhil in Media Studies from the University of Bergen and has completed continuing education in counseling at VID Specialized University. She is currently a PhD candidate at SEFAS, researching volunteer support for older home-dwelling people living with dementia. Her project involves interviewing volunteers, volunteer coordinators, individuals with dementia, and their relatives, as well as conducting participant observations. Eirin works at the Dignity Centre as a Specialist and Research Developer.

TANJA LUKKARI — Research Nurse

MSc in nursing from the University of Bergen. During her master's, she investigated the phenomenon of indigenous dement patient with linguistic problems and health care by conducting interviews with the health care professionals in northern Norway. She has ten years of experience as a registered nurse. Currently she is working as a research nurse at SEFAS in a project that aims to phenotype for changes in activity at the end-of-life in persons with chronic cognitive impairment using sensor technology (5-D).

BRICE MARTY — Postdoc

MS in electrical engineering, modelling and systems from Université Toulouse III, France, and PhD in neuroscience from the Université Libre de Bruxelles, Belgium. After a postdoctoral and a lecturer position at the school of Psychology at Bond University, Gold Coast, Australia, he is currently a postdoctoral fellow at SEFAS. He is working on the development of digital biomarkers for symptom tracking in real-world everyday life for persons with dementia and Parkinson's disease. He is involved as a researcher and supervisor in most of the current SEFAS projects. He is also part of Neuro-SysMed, where he is working on the use of functional near infrared spectroscopy as diagnostic tool for Parkinson's disease, and he designed a course in algorithm and coding for health researchers without computer sciences background.

PER TINIUS MOWINCKEL — Administrative Coordinator

Per holds a Bachelor's degree in organizational psychology, human resources, and leadership. He has a background in recruitment at the Faculty of Medicine, UiB. Currently, he serves as acting Administrative Coordinator at SEFAS.

KJERSTI NEDRESKÅR — PhD Candidate

Kjersti holds a bachelor's degree in cell and molecular biology from the NTNU and a Cand. Psychol. from the University of Oslo. She has seven years of experience as a clinical psychologist and is currently doing her PhD at SEFAS on the DARK.DEM project. Her doctoral work is qualitative and focuses on the implementation of new methods for diagnosis and treatment of behavioral and psychological symptoms of dementia in specialized and municipal dementia care.

MONICA PATRASCU — Postdoc

PhD in Systems Engineering and an MSc in Intelligent Systems from the University Politehnica of Bucharest, Romania, with a general research focus on complex psycho-social and biosystems, artificial intelligence, mobile robotics, and symptom tracking for neurological diseases. At SEFAS, Monica has been the main technology designer, focusing on developing digital biomarkers for symptom tracking in real-world everyday life for older adults, persons with dementia including the end of life, and Parkinson's disease. They are also part of Neuro-SysMed, the chair of the IEEE Engineering in Medicine and Biology Society Norway Chapter, the coordinator of the Complex Systems Laboratory (xLab) and an associate professor member of the Doctoral School of Automatic Control and Computers at the University Politehnica of Bucharest.

HAAKON REITHE — PhD Candidate

Haakon has a background in psychology and neuroscience where he developed a keen interest in the measurement of human physiology and cognition. He is currently a PhD candidate in the ActiveAgeing study, working on the DIGI. PARK branch. There, he is mainly focusing on cross-evaluating devices for Parkinson's research and clinical use, and testing a SEFAS-developed algorithm which quantifies the energy of tremors in ranges 3 to 12 Hz, including testing and validating the algorithm by comparing TI pre and post medication.

ZOYA SABIR — Postdoc

MS and PhD in Clinical Nutrition from the University of Bergen. In her PhD project, she investigated associations of dietary patterns and protein intake with muscle mass and strength in community-dwelling older adults. She is currently a postdoctoral fellow at the Centre for Elderly and Nursing Home Medicine (SEFAS), working on the CC.AGE project. Her work within CC.AGE will mainly focus on food environments, hydration, and nutritional status in older adults with chronic complex conditions. This will include an evaluation of digital methods for assessment of dietary intake and hydration status, with the goal of protecting older adults from nutritional deficiencies and dehydration.

SUNNIVA VIBE SKAGEN — PhD Candidate

MS in psychology from 2023 with a specialization in behavioral neuroscience. Her thesis, titled "An Exploration of the Effects of tDCS on the Supplementary Motor Complex and its Impact on Inhibitory Control: Implications for Tourette's Syndrome," investigated the effects of transcranial direct current stimulation (tDCS) on inhibitory control. Currently, Sunniva is working as a PhD candidate at SEFAS, specifically with the DARK.DEM study, which investigates the potential therapeutic benefits of darkness therapy for reducing agitation in individuals with dementia.

MANAL MUSTAFA — Dentist

Dentist with a PhD in Dentistry and a Master's in clinical oral sciences. She participates in the ORAL.DEM study by evaluating the oral health status at baseline and during follow-up sessions, assessing the microbial profile and molecules in oral biological samples linked to oral lesions among people with dementia. This aims to improve early detection of oral diseases and enhance the quality of end-of-life oral health care for individuals with dementia.

ELI SYNNØVE VIDHAMMER — Senior Executive Officer

Communications officer working with SEFAS' website, flyers, brochures, annual reports, rollups and other communication tasks in a 20% position. She is also engaged at other research centres at the UiB (Neuro-SysMed and CCBIO, in all 70% at the UiB), and has 19 years of experience at the University of Bergen with administration work (communication, HR, education). Her background is a Bachelor in English, German, and literature science, and has previously worked many years in marketing in the private sector. She works from remote, but visits SEFAS in-person from time to time. Besides UiB, Eli works as a freelance translator.

A happy SEFAS staff plus some of the CC.AGE collaborators, dressed up for the grand CC.AGE opening October 1.

MAARJA VISLAPUU — PhD Candidate

MS in clinical diabetes nursing from the Western Norway University of Applied Sciences (2017), and PhD from the UiB in 2024. From 2019 to 2024, she has been a research fellow at SEFAS, working on the three studies LIVE@Home.Path, PAN.DEM, and COSMOS. Currently, she is working on teaching at the VID Specialized University in Bergen. Her doctoral work was based at SEFAS with Professor Bettina S. Husebø as main supervisor and Line Iden Berge as co-supervisor. She successfully defended her PhD work "Informal and formal resource utilization in the care for people with dementia" on April 19, 2024.

SPECIAL AWARDS IN 2024

Congratulations to the below with these special achievements in 2024!

Brice Marty got the Best Poster award at the Department Day (IGS) 2024, for the poster titled Functional Near Infrared Spectroscopy (fNIRS) in Parkinson's disease as a future diagnostic tool.

Monica Patrascu was appointed as a lifetime member of the Doctoral School of Automatic Control and Computers, University Politehnica, Bucharest, Romania, which organizes scientific doctoral studies in the fields of systems engineering, computer science, and information technology.

Monica Patrascu and Valentina Casdei landed the establishment of the first IEEE EMBS Chapter in Norway, to be based at SEFAS. See more on the next page.

Line Iden Berge was awarded competence area of old age psychiatry from the Comitte of Old Age Psychiatry, Norwegian Psychiatric Association.

Line Iden Berge was also promoted to full professor of elderly medicine!

IEEE EMBS Chapter in Norway

IEEE is the world's largest technical professional organization dedicated to advancing technology for the benefit for humanity. Now, the first IEEE EMBS Chapter is being established in Norway, based at SEFAS, representing a significant milestone. It provides a unique opportunity to become a hub for the growing biomedical engineering community in this country, aligning with the main drive of the department.

IEEE is a major network that counts a wide number of sections and societies, including **Engineering in Medicine and Biology Society (EMBS)**, which gathers professionals with backgrounds from engineering to clinical disciplines.

In an era where technology is expanding at a rapid rate and the needs for medical application of these technologies has never been greater, the intersection between engineering, medicine and biology is a critical place to be.

We received the official letter confirming the establishment of the Chapter in Norway on the 24th of December 2024, where Monica Patrascu will lead as Chair and Valentina Casadei will support as Vice-Chair.

Our vision is simple yet ambitious: to connect researchers, professionals, and students in the field of biomedical engineering and related disciplines to foster collaboration, share knowledge, and support each other in our endeavours. This chapter will serve as a platform for networking, education, and the advancement of our shared interests in biomedical engineering.

QR link to inter-view with Monica and Valentina.

Project Technologies

SEFAS explores a wide range of technologies in its research projects. Here, you can see an overview of our current devices and systems in 2024. This list will be constantly increasing as we are collaborating on developing new technology as well as implementing novel commercial grade and research grade medical sensor devices.

Somnofy is a small, contactless radar installation (approx. 10 x 10 cm) developed and tested by Vitalthings in Trondheim, Norway. Somnofy is installed on the wall next to the bed and captures: breathing rate, sleep patterns, movement, air quality, light in the room.

Garmin Venu 3S and Garmin Vivoactive 5 are two wrist-mounted fitness smartwatches. They capture heart rate, inter-beat interval, movement (acceleration for both, rotation for the Venu 3S), and estimate breathing rate.

Oura ring (versions V2 and V3) is commercial smart ring, which provides several aggregated scores: sleep (hypnogram), heart rate variability, heart rate, and metabolic equivalent task.

Fitbit Sense is a wrist-mounted fitness smartwatch that captures heart rate, inter-beat interval, estimate energy expenditure (calories), number of steps, and metabolic equivalent task scores.

Empatica E4 is a research-grade wrist-worn multi-sensor device, validated for measuring physiological variables: heart rate, inter-beat interval, movement (acceleration), electrodermal activity, body temperature.

Empatica Embrace Plus is a smart watch equipped with multiple medical-grade sensors designed for continuous measuring of physiological variables, including heart rate (HR), electrodermal activity (EDA), peripheral body temperature and accelerometer.

GENEactiv is a medical wrist-worn device designed to record raw and unfiltered accelerometer data, environmental light and peripheral body temperature.

ocuWEAR 1.0 is a wearable light-logger provided by Chromaviso. This device is designed to track visual and not visual of light, based on the CIE Standard S:26S2018.

Polar H10 is a high-resolution heart rate monitoring sensor worn on the chest with a strap. It is widely implemented in both medical and research applications.

HUME is a sensor system from Mentech measuring stress and its build-up, that can be mounted as a chest strap, a patch or as sock with sensors (SentiSock). The strap and patch measure heart rate and movement, while the sock measures skin conductance and movement.

A circadian light system at Olaviken is provided by Chromaviso and offers non-exposure to blue wavelengths from 19 PM to 8 AM. The light system is not considered as medical technical equipment, and is CE approved.

We explore this to determine whether treatment with virtual darkness, that is, light without blue wavelengths, can alleviate agitation and other BPSD among inpatients at the hospital.
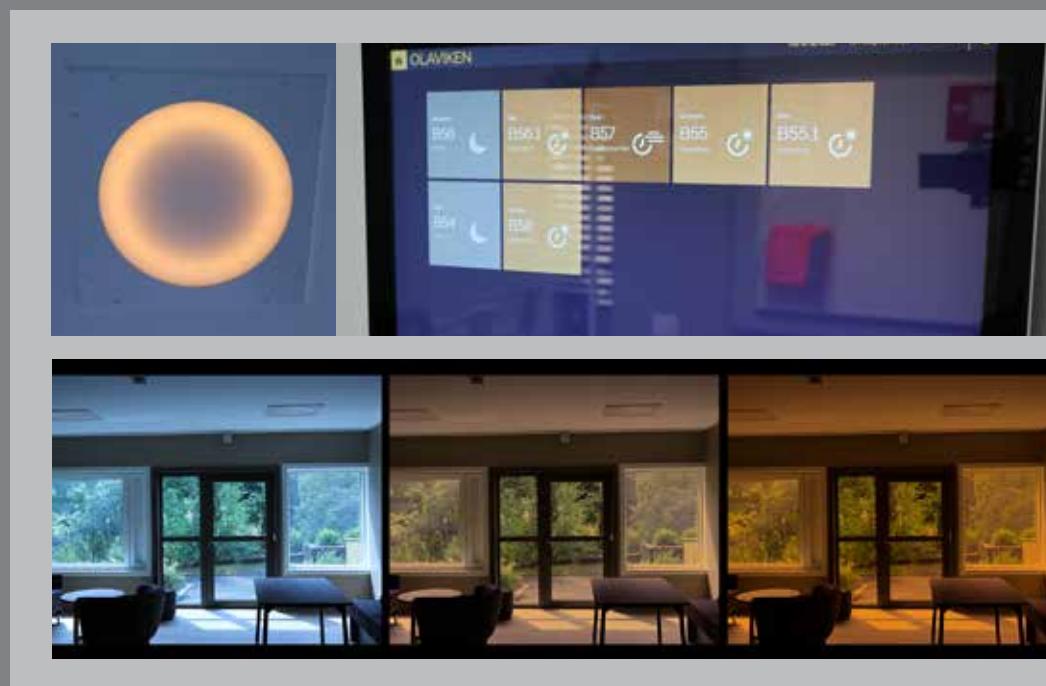
Completed PhDs and Masters

Completion of a PhD or Master degree is a highlight in the year for the supervisors and the whole Centre as well as for the candidate, and in 2024, we celebrated three completed Masters and three PhDs.

LISA AASLESTAD – MASTER

Date: June 10, 2024
Project: *Bridging Gaps: Wearable sensing-driven assessment of REM sleep behavior disorder in Parkinson's Disease. Results from the DIGI.PARK study*
Supervisors: Line Iden Berge, Brice Marty, Monica Patrascu, and Haakon Reithe.

Abstract: Lisa's Master thesis investigates sleep disturbances in Parkinson's disease (PD) and how wearable sensor technology can improve the assessment of probable REM sleep behavior disorder (pRBD) in PD patients. The study involved 14 participants with PD who completed the RBD screening questionnaire (RBDSQ) and used a wearable activity sensor for 14 nights. The sensor data, including nocturnal movements and heart rate variability (HRV), were analyzed to identify sleep disturbances. The study found significant differences between self-reported RBD symptoms and objective sensor data, suggesting that integrating wearable sensor data with questionnaires can provide a more objective method for assessing pRBD in PD patients, potentially improving diagnostic accuracy by reducing subjective biases.

GURO KÅRØY ALMÅS – MASTER

Date: June 12, 2024
Project: *Betydelig pårørendebelastning hos pårørende til hjemmeboende personer med demens. Resultater fra LIVE@Home.Path studien*
Supervisor: Line Iden Berge

Abstract: The study aimed to investigate which characteristics among home-dwelling individuals with dementia and their relatives that were associated with significant caregiver burden. Data for this cross-sectional study were obtained from the baseline of the LIVE@Home.Path study. The study showed that aregivers who were not spouses or children of the person with dementia, who had higher education levels, and had previously participated in caregiver courses were more likely to experience significant caregiver burden. Caregiver burden decreased with dementia patients increasing age and was positively associated with more neuropsychiatric symptoms and impaired daily activities. The conclusion is that recognizing and supporting caregivers, offering tailored services to alleviate burden and enhance quality of life for both individuals with dementia and their caregivers, is essential. Caregivers play a vital role both for the individual and within society.

CORNELIA BLYTT – MASTER

Date: June 17, 2024
Project: *Free school lunch or packed lunch: The relationship between the school meal and diet quality in pupils with different socioeconomic status.*
Supervisors: Line Iden Berge and Bodil Bjørndal.

Abstract: This quasi-experimental study with cross-sectional design carried out data collection at 5 primary schools, two provided free school lunch; (n=134) and three had packed lunch; (n=113). Data included meal photographs and a questionnaire about the Family Affluence Scale. The aim of the study was to investigate the variation in dietary quality between groups (free school lunch vs. packed lunch), and how socioeconomic status is associated with dietary quality. Results showed that dietary quality varied between groups, but the variation only appeared in specific foodgroups and not in the form of mealscores. The results also imply that free school lunch can reduce social inequality in health related to dietary quality.

MAARJA VISLAPUU – PHD

Date: April 19, 2024
Dissertation: *Informal and formal resource utilization in the care for people with dementia.*
Supervisors: Bettina S. Husebø, Egil Kjerstad, and Line Iden Berge.

Abstract: Proper symptom management, informal caregiver support, and service innovation are required to reduce the dementia care burden. Vislapuu used data from three clinical trials to investigate: 1) the effect of the multicomponent LIVE (Learning, Innovation, Volunteering, Empowerment) intervention on caregiver experience of the self-perceived care situation, coordinator performance, and informal care time; 2) what effect COVID-19 restrictions had on informal and formal resources spent on elderly people with dementia living at home; and 3) factors associated with formal and informal resource utilization in nursing home patients with and without dementia (analyses from the COSMOS trial). In the first study, LIVE@Home.Path, caregivers reported improved caregiver situation, even though informal care time for activities of daily living was not reduced. The PAN.DEM study showed that the lockdown of Norway (March-April 2020) led to a significant increase in informal care time. The COSMOS study showed that increased family involvement in Norwegian nursing homes can potentially be improved with more user-friendly environments. There is also a need to facilitate a greater variety of activities to meet the different interests and needs of nursing home patients.

CRISTIAN BERCEANU – PHD

Date: October 17, 2024
Dissertation: *Contributions to complex systems: modeling emergent psycho-social processes based on decentralized control principles.*
Supervisors: Monica Pătrașcu and Cristian Oară.

Abstract: The overall objective of the thesis is to establish a microscopic agent-based modeling approach that utilizes decentralized control principles applied to emergent psycho-social processes: crowds and infodemics (rapid and far-reaching spread of true and false information regarding certain issues. The findings of this research enable a better understanding of emergent crowd dynamics and behavior: the emergency evacuation scenario shows a crowd reaction phenomenon comparable to the psychological reaction process of human beings, quantified as the reaction time. The decentralized control structure of the psycho-social infodemic model shows potential in identifying mechanisms for mitigating future infodemics. Through the methodology proposed for the ABM-EBM inter-model equivalence analysis and the validation of these models against real-world data, the thesis contributes to the foundation and strengthening of infodemic and psycho-social modeling research as fields of science.

ANDREEA CRISTINE ION - PHD

Date: September 28, 2023
Dissertation: *Contributions to Large-Scale Complex Systems: from Evolutionary Learning to Scale-Free Networks*
Supervisors: Cristian Oară and Monica Patrascu.

Abstract: This thesis focuses on the study of real-world networks with complex systems properties, investigating organizational patterns and control within and between these systems, along with the supporting and necessary methodologies. To understand the creation and formation of these emergent, complex behaviors in decentralized control systems applied to socio-technical (urban) networks, this research begins at low-level components and follows a hierarchical structure up to the whole system level. Increasing complexity, the thesis proposes a framework to address some key challenges in the organizational principles of systems. Equipped with the necessary algorithms and methodologies, the eSCAPE framework supports the design and simulation of large-scale systems. The framework enables the modeling of real-world networks, and, to illustrate this concept, the thesis includes the design of a robust complex network model with scale-free properties.

Education & Dissemination

During 2024, SEFAS members have been very engaged in the delivery of scientific results, implementation and popular-science dissemination to the academic audience, students, and society members in general. There is a lot of knowledge available, and our aim is to bring it out to the whole population, including municipal healthcare professionals. The very same arenas provide valuable training and education to our own students.

Education in nursing homes

An important aim for SEFAS is to improve palliative end-of-life care in Norwegian nursing homes for people with dementia. To achieve this, nursing home staff is trained and educated in the assessment and treatment of pain and distressing symptoms, installation and usage of digital tools, training in the use of traditional assessment instruments (e.g., behavioural disturbances related to dementia, pain and distressing symptoms at the end of life, dementia stage, activity level, etc.). These training sessions are performed continuously through the year as seminars at our collaborating nursing homes, as needed. In 2024, 28 such seminars took place at various nursing homes in the Bergen area, Alver, Voss and Farsund.

These sessions are also vital for providing presentation training to our younger researchers, and to facilitate their communication and collaboration with health professionals and the municipality services.

Reaching out to decision-makers

2024 has been active also with other measures to reach out to patients, relatives and decision-makers. We participated with talks on four Norwegian conferences for municipality healthcare services, had meetings with two different ministers, with the City Council of Bergen, with the Directorate of Health, with NAV, had two presentations at the Senior University and was facilitator at an open webinar. Our opening conference on October 1 for CC.AGE was a great occasion to reach out to the public, partners and decision-makers, with 232 participants. Several of SEFAS' researchers and collaborators had presentations with dissemination of our research.

We specifically reached out to chief municipal medical officers, in addition to the doctors already involved in our projects, with talks in two plenary meetings. Throughout 2024, we also had 29 different meetings with the private sector and other already existing and potential partners about possible innovation collaboration on ageing, health and sustainable housing communities.

FEST Seminar

SEFAS is part of the Section for Elderly Medicine, Social Pharmacy and Inter-professional Workplace Learning (FEST) at the IGS department, who is hosting a seminar series providing a resource and arena for PhD students to gain experience in scientific presentation. Most SEFAS PhD students have presented their projects, or posters, articles or topics relevant to their PhD projects. In 2024, we have presented the 5-D project (Anne Therese Hatle and Jane Johannessen), the implementation challenges in research (Kjersti Nedreskår), using LaTeX for writing articles (Valentina Casadei) and technology in geriatric research (Lydia Boyle). We are also hosting meetings where our PhD candidates receive feedback and suggestions from their peers on any challenges in their projects, research articles or posters.

Interdisciplinary training at TVEPS

Our neighbour in FEST, the Centre for Interprofessional Workplace Learning (TVEPS), offers interdisciplinary training of around 900 students from the Bergen health and social welfare professions. Students from various health professions gather in groups to examine patients in workplaces in the municipality. The task is to assemble an interdisciplinary treatment plan for the selected patients. Afterwards, a dialog meeting is arranged between the students and health care staff at the selected workplace. One person connected to TVEPS facilitates the meetings, often represented by one of SEFAS' staff or students. Four of our PhD candidates participated regularly through 2024 as facilitators.

Algo Class

Initiated by postdoc Brice Marty, SEFAS runs a course introducing algorithms for health researchers without an engineering background. The main goal of this class is to provide students without previous engineering or computer sciences knowledge, with the basics of algorithmics, scripting and programming, with application to MATLAB (a widely used scientific computing framework). Our course is designed to empower health researchers to perform tasks related to data analysis in their studies, and to

autonomize them in the deep understanding of the technical process of their research. The ambition of this course is to have real relevance, adapted to the interdisciplinary perspective of a doctorate in health sciences, offering the ability of multiple interpretations and outcomes. This class is practice-oriented with a large part dedicated of practical programming applications and exercises in a research context. Once they have completed the course, the participants should be able to have an informed opinion about the data processing aspect of their work, and to discuss efficiently with the engineer or the technical support staff of their project. In 2023, the inaugural session of the class was tested and improved with 8 participants from SEFAS. In 2024, the course was attended by 20 participants from SEFAS, Neuro-SysMed, and the Centre for Nutrition, over both semesters. By 2025, it is planned to be an annual event, every semester.

Master program in Health and Ageing

SEFAS contributes with lectures in the Master program in Health and Society, on the societal challenges of an ageing population (basic and advanced level), quantitative methods, and a full course on the academic process from idea to publication. Supervision of three master students in this program was also one of our commitments in 2024. In 2024, we also had a lecture for the master students in Pharmacy in Bergen.

Professional studies in medicine

In the professional studies in medicine, we contribute with lectures on dementia and behavioral symptoms and on collaboration between the primary and specialist health care services. We also provide lectures in old age psychiatry including team-based learning and case studies, and supervision of a 7th year medical student. Additionally, we contributed to the organizing committee of the Alrek Student Conference.

The Neuro-SysMed Research School

Through our collaboration with Neuro-SysMed, we have access to ECTS-providing courses in their Research School in Translational Neuroscience. Here, we contribute with lectures where applicable in their seminar series, Junior Scientist Symposia, Annual Symposium and their courses. In 2024, we contributed with talks in three Neuro-SysMed seminars, a lecture in their Junior Scientist Symposia, and a lecture in their course NEUROSYSM930 Applied bioinformatics and data analysis in medical research.

Our PhD and Master level students participate in relevant Neuro-SysMed courses and seminars for their own education.

Apart from Neuro-SysMed and UiB programs, SEFAS participates in other external educational activities. In 2024, we participated with two lectures at the Western Norway University of Applied Sciences, one at the National Research School in Nutrition, NutriNOR, University of Oslo, one at Harvard University, one at the European Conference on pharmacy education, Bergen, and one at the National Research Conference in Medical and Health Education, Bergen.

Forskningsdagene

One obvious opportunity for science dissemination is the annual public research event by the scientific and research community in Bergen, the Research Fair (*Forskningstorget*). In 2024, this took place September 20 and 21. SEFAS took with great enthusiasm the opportunity to showcase our research and results to the public. During this two-day event, the first day was for schoolchildren, and the second for the general public.

We named our stand *Teknologibua: Fremtidens besteforeldre* ("The Technology Shack: Grandparents of the Future"), focusing our attention on a young audience by organizing our stand with a playful approach. We entertained the younger audience with fun games and intriguing questions about how they view ageing today and in the future. On the general public day, we had stimulating and interesting discussions with people of all ages about the topics of ageing and technology. In addition, we had a TV screen running with slides representing our research. The Research Fair was deemed a success, with high energy, an eager and interested audience, and great training in public research communication for our researchers.

As put by our Research Fair coordinator, Brice Marty:

"From these two days we certainly will remember the many smiles, the children's drawings and the conversations that were particularly enriching both personally and scientifically."

The Research Fair administration estimated they had 5000 visitors during the 2 days.
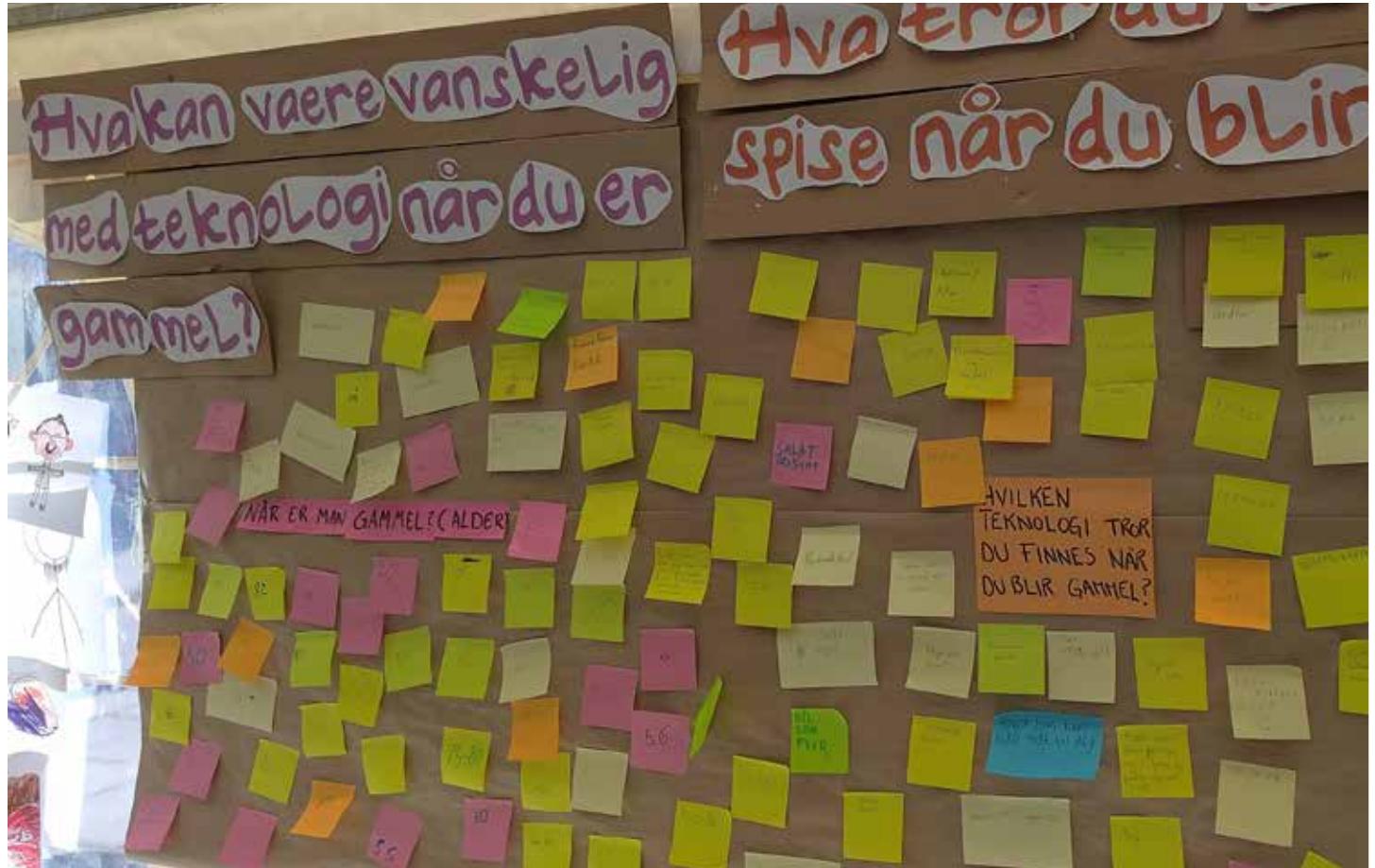
Scientific Publications

The SEFAS researchers publish their findings in international, acknowledged journals, disseminating our research findings to our peers and the general public. In 2024, we completed 14 publications, most of which were through interdisciplinary or international collaborations. In addition, we contributed with talks, abstracts and posters at other scientific arenas.

Patrascu A, Ion A, Vislapuu M, Husebo BS, Tache IA, Reithe H, Patrascu M. Digital phenotyping from heart rate dynamics: Identification of zero-poles models with data-driven evolutionary learning. *Comput Biol Med.* 2024 Dec 27;186:109596. doi: 10.1016/j.compbiomed.2024.109596. PMID: 39731924.

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Vislapuu M, Patrascu M, Allore H, Husebo BS, Kjerstad E, Gedde MH, Berge LI. Feedback System Analysis of a Multicomponent Intervention on Dyads of Home-Dwelling Persons With Dementia and Their Caregivers: Results From the LIVE@Home.Path Trial. *Innov Aging.* 2024 Feb 23;8(3):igae020. doi: 10.1093/geroni/igae020. eCollection 2024. PMID: 38550899 Free PMC article.

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van de Beek SH, Erdal A, Husebø BS, Vislapuu M, Achterberg WP, Caljouw MAA. Impact of Pain and Neuropsychiatric Symptoms on Activities in Nursing Home Residents (COSMOS Trial). *J Am Med Dir Assoc.* 2024 May;25(5):847-852. e3. doi: 10.1016/j.jamda.2024.01.012. Epub 2024 Feb 22. PMID: 38403273 Clinical Trial.

Collins JT, Walsh DA, Gladman JRF, Patrascu M, Husebo BS, Adam E, Cowley A, Gordon AL, Ogliari G, Smaling H, Achterberg W. The Difficulties of Managing Pain in People Living with Frailty: The Potential for Digital Phenotyping. *Drugs Aging.* 2024 Mar;41(3):199-208. doi: 10.1007/s40266-024-01101-4. Epub 2024 Feb 24. PMID: 38401025.

Sandvik RKNM, Husebo BS, Selbaek G, Strand G, Patrascu M, Mustafa M, Bergh S. Oral symptoms in dying nursing home patients. Results from the prospective REDIC study. *BMC Oral Health.* 2024 Jan 25;24(1):129. doi: 10.1186/s12903-024-03901-x. PMID: 38273300 Free PMC article.

Sabir Z, Hjartåker A, Dierkes J, Rosendahl-Riise H. The Association of Isocaloric Substitution of Dietary Protein in Middle Age with Muscle Mass and Strength in Old Age: The Hordaland Health Study. Curr Dev Nutr. 2023 Nov 30;8(1):102052. doi: 10.1016/j.cdnut.2023.102052. eCollection 2024 Jan. PMID: 38187989 Free PMC article.

Ion A., Patrascu A., Patrascu M. Comparative evaluation of evolutionary learning fitness functions in model fitting for human heart rate during treadmill exercise. *UPB Scientific Bulletin, Series C: Electrical Engineering*, vol. 86, is. 1, pp. 69-80

Berceanu C., Patrascu M. Comparative Analysis of Agent-Based Modeling Frameworks for Signal Propagation in Complex Networks: NetLogo and Python Mesa. *UPB Scientific Bulletin, Series C: Electrical Engineering*, vol. 86, is. 2, pp. 27-40

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van Staalduinen, W. and Dantas, C. (SEFAS contributor: **M Patrascu.**) White Paper: Designing the perfect New European Bauhaus neighbourhood. *Zenodo.* doi: 10.5281/zenodo.11212838.

Abstracts, Posters & Presentations

Berge, Line Iden: Invited guest to podcast "Søvnens Makt, med dr. Flo og dr. Blytt" (16.01.2024). Title of session: "Søvn gjennom livsløpet: Kan søvnproblemer øke risikoen for demens? Med overlege og førsteamanuensis Line Iden Berge."

Berge LI, Henriksen TEG, Fæø SE, Hynninen KMJ, Skagen S, Patrascu M, Flo-Groeneboom E. Oral presentation/poster, "Kronoterapi ved adferdsmessige og psykiatriske symptomer ved demens: Fra innovasjonsprosjektet BrighterAge til forskningsprosjektet DARK.DEM," at the National Conference in Geriatric Psychiatry, Trondheim.

Boyle LD, Husebo BS, Marty B, Haugarvoll K, Steihaug OM, Patrascu M: Oral presentation and abstract, "Digital Phenotyping in Persons with Dementia using Sensing Technology, Dementia and Technology Track." International Society for Gerontechnology (ISG) conference 2024, Frankfurt, Germany.

Marty B, Boyle L, Førsund E, Reithe H, Berge LI, Pătrașcu M, Husebø BS: Poster, "Functional Near Infrared Spectroscopy (fNIRS) in Parkinson's disease as a future diagnostic tool," at the IGS Department Day 2024.

Marty, Brice: Presentation, "Corticokinematic Coherence from Magnetoencephalography to functional InfraRed Spectroscopy: a switch to a better understanding of the coupling between brain and movement kinematic," at the 2nd Annual Meeting of sfNIRS, Norway.

Patrascu M (Kelly A): Oral presentation and abstract, "Digital Necromancy: Ethical Implications of Virtual Life after Death." Digital Afterlives Session, Academic Track, Worldcon 2024, Glasgow, Scotland, UK.

Patrascu M, Berge LI, Vislapuu M, Husebo B: Oral presentation and full article, "Circadian Rhythm Stability Analysis from Actigraphy Data in Persons with Dementia." Conference paper for the 2024 European Control Conference, Stockholm, Sweden.

Patrascu M (Kelly A): Invited talk, panel on "Older Heroes and Protagonists," at the 2024 SFWA Nebula Conference, Anaheim, Canada.

Patrascu M (Kelly A): Invited talk, panel on "Ageism in SFF: Broadening the Ages of Protagonists," at the Gen Con Writers' Symposium 2024, Indianapolis, Indiana, USA.

Patrascu M (Kelly A): Invited popular science talk, panel on "Ask an AI Scientist," at the Gen Con Writers' Symposium 2024, Indianapolis, Indiana, USA.

Patrascu M (Kelly A): Invited talk, panel on "Exciting Possibilities of Trustworthy AI," at the Gen Con Writers' Symposium 2024, Indianapolis, Indiana, USA.

Patrascu M (Kelly A): Invited talk, panel on "Learning from COVID - an International Perspective," at the Glasgow 2024: A Worldcon for Our Futures, Glasgow, Scotland, UK.

Patrascu M (Kelly A): Invited talk, panel on "Can We Turn the Machines Off?" at the Glasgow 2024: A Worldcon for Our Futures, Glasgow, Scotland, UK.

Patrascu M: Presentation, "Ethical Implications of AI-driven Digital Necromancy," at the Bergen Meeting on AI Ethics.

Patrascu M: Presentation, "Human-in-the-loop research at the Centre for Elderly and Nursing Home Medicine," at the Lunette Care Organization, Eindhoven, The **Netherlands.**

Patrascu M: Presentation, "Technology development with applications to elderly care," at the University Politehnica of Bucharest, Romania.

Skagen, S, Berge, LI, Casadei, V, Pallesen, S, Hjetland, GJ, Mannseth, J, Patrascu, M, Henriksen, T, Thun, E, Kolberg, E, Nordhus, IH, Flo-Groeneboom, E. (2024): Abstract and presentation, "Effectiveness of Bright Light Therapy on stabilizing the Circadian Rhythm and reducing Agitation in People with Dementia." Frontiers in Neuroscience.

Skagen, S, Henriksen, TEG., Fæø, S, Nedreskår, K, Flo-Groeneboom, E, Berge, LI: Abstract and poster, "Virtual darkness for agitation in dementia: The DARK.DEM randomized controlled trial". Society for Light and Behavioral Treatment (SLTBR) Prague, The Czech Republic.

SEFAS in the Media

Being available to the media is of great importance to SEFAS. We believe it is our obligation to relate new and coming knowledge to society, to enable the general public and health professionals to make informed decisions. See the 2024 media coverage on the following pages, starting with the most recent.

Dec. 12, 2024, Studvest: *Studenter og eldre skal bo side om side. - Som en italiensk landsby*.

Interview with Bettina S. Husebø in connection with the construction of 52 senior apartments and 17 studio apartments for students at Marineholmen. The GC Rieber Foundations are initiator of the housing projects, including the already established Helgetun, where SEFAS has an ongoing research project. Our research will continue at Marineholmen.

Nov. 30, 2024, Bergensavisen: *En beskjeden hedersmann med hjerte for Bergen*.

A portrait article by Christian Rieber at the age of 99. Interview with Bettina S. Husebø as one of three key people who were asked to comment. Bettina highlights Rieber's commitment to community medicine and his support for research projects.

Nov 28, 2024, Dagbladet: *Dette øker demensrisikoen med 90 prosent*.

Article on an updated report from the Lancet Commission on dementia, presenting new, promising findings that might change the way we look at dementia prevention. Bettina S. Husebø was asked to bring her view as an expert on the dementia and ageing field.

Nov. 25, 2024, NRK: *Denne pulsklokka skal avsløra kva tid døden begynner: – Når er «point of no return»?*

Bettina S. Husebø and Kamilla Haugland-Pruitt interviewed on national TV about the new research project Decoding Death and Dying in people with Dementia by Digital thanotyping (5-D). Both as webnews article and news video at Dagsrevyen.

Nov. 16, 2024, UiB News, IGS: *IGS deltok på Forskningsdagene 2024*.

About the Research Fair 2024, which was held in

Bergen under the direction of the Research Council of Norway at the end of September. Interview with Brice Marty, SEFAS' coordinator for our stand.

Nov. 13, 2024, På Høyden: *Fem UiB-miljøer søker SFI-status*.

An overview of the research communities answering the Research Council's fifth call for proposals for the Centre for Research-based Innovation (SFI), including SEFAS with our BetterAge initiative.

Oct. 28, 2024, Aftenposten: *Dødshjelpdebatt på faglige premisser*.

Opinion piece signed by 52 doctors and other health professionals, including Bettina S. Husebø. They state that if politicians want to debate the legalization of euthanasia in Norway, the discussion must be based on sound professional reasoning. This continues with the group's view on the subject. Comment on an opinion piece by Henrik Thune in Aftenposten (13 October), and the fact that some political parties show an interest in taking the matter further.

Sept. 30, 2024, NTB Info: *Åpner nytt senter for sammensatte sykdommer og aldring*.

NTB forwarding of a press release from UiB centrally on the official opening of CC.AGE (Centre for Complex Conditions and Ageing).

Sept. 15, 2024, Bergensavisen: *Lokal seniorlandsby vekker oppsikt.*

Article about the Minister of Health and Care Services' visit to Helgetun. Reference to SEFAS/Bettina S. Husebø and the research we do in connection with Helgetun.

Sept. 13, 2024, Fanaposten: *- Her er det mye å hente inspirasjon fra. Den lokale seniorlandsbyen vekker oppsikt.*

Covers the same story as above.

July 19, 2024, TV2: *Slik kan alderen påvirke Joe Biden (81)*.

Bettina S. Husebø interviewed as an expert in elderly medicine about the ability of an 81-year-old to perform the complicated tasks entailed in a presidential job.

June 17, 2024, Bergens Tidende: *Her kommer eldreboliger med plass til studenter. – Vi vil avlaste det offentlige*.

Article on the construction of 52 senior apartments and 17 studio apartments for students at Marineholmen, and the already established Helgetun community.

Scientific dissemination

Reference to SEFAS' ongoing research project in this connection.

June 6, 2024, Bergens Tidende: *Syv triks for å få et (nesten) evig liv.* Opinion piece from Bettina S. Husebø with a "crash course in biohacking" for anyone who wants to grow old sustaining a good health.

May 10, 2024, Se og Hør Extra: *Hun har jo så mye energi.* About 87-year-old Queen Sonja and her good health. Bettina S. Husebø is referred to as a prominent researcher on ageing and says that the Queen follows current research recommendations to the letter, by being creative, active, social, curious and interested.

April 17, 2024, UiB News, Med.Fak.: *Stor interesse for Fakultetets dag 2024.* Article on the recognitions awarded on the Medical Faculty Day, including the Doctoral Work of the Year award that was presented to a graduated SEFAS PhD student, Marie Hidle Gedde. She highlighted the support from her supervisors Bettina S. Husebø and Line Iden Berge.

January 31, 2024, Khrono: *De skal dele ut milliarder til forskning. Her møtes de for første gang.* Article about the Research Council's 11 portfolio boards, which are responsible for monitoring trends and status within their portfolio areas, developing their portfolios, providing professional advice to the Research Council's board and administration, and contributing to the implementation of research and innovation policies within their areas of responsibility. Bettina S. Husebø was listed as a member of the Portfolio Board for Health, and included in the photo of the first meeting of the portfolio boards.

UiB/Sefas, Silje Kathrine Robinson

Contact

We are very happy to answer any questions you might have, or talk about a collaboration! Call us, e-mail us or make an appointment to see us.

We recommend you to check out our web pages as well, at uib.no/sefas.

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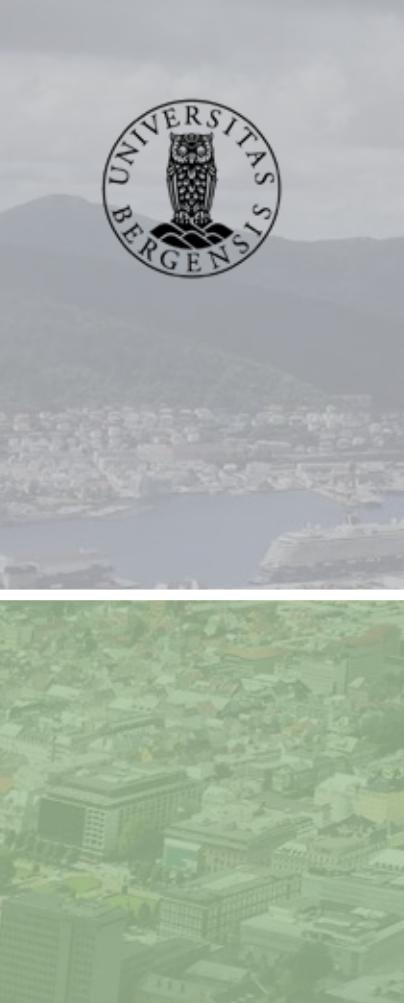
Thank you for your support!