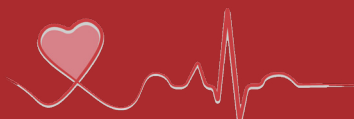


Annual report 2025

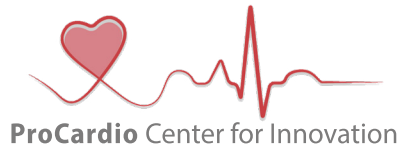
ProCardio – Precision Health Center for Optimized Cardiac Care



Norwegian Centre
for Research-based
Innovation



ProCardio Center for Innovation



Annual report 2025

ProCardio – Precision Health Center for Optimized Cardiac Care



University of Oslo



GE HealthCare



OSLO UNIVERSITETSSYKEHUS



SØRLANDET SYKEHUS

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"I am delighted to see the unwavering commitment from all partners and the great plans we have for the upcoming years"

Summary

One of the most significant milestones of 2025 was the successful mid-term evaluation of ProCardio, culminating in the Research Council of Norway's decision to extend our funding for the remaining four years of the SFI period. The Portfolio Board for Innovation emphasized the quality of our work and confirmed that the centre will continue under the current contract. This achievement is the result of remarkable teamwork—from the thorough preparations in the second half of 2024 to the strong engagement during the panel visit in March.

Based on the responses from the panel, we organized a day away for all ProCardio leaders and senior researcher, where the aim of the day was to stake the course and focus our work moving forward for the remaining SFI period.

In the fall we organized our annual ProCardio meeting with great attendance. We were also well represented at a variety of national- and international conferences, where ProCardio members were active with abstracts, presentations, networking, and learning.

In 2025, ProCardio achieved nearly 50 scientific publications and close to 100 disseminations, alongside 15–20 media appearances. We have welcomed several new members, and we truly look forward to getting to know you better, connect, collaborate, and grow together.

A total of [seven PhD fellows successfully defended their theses in 2025](#)—congratulations to John Nyberg and Artem Chernyshov (NTNU), Lena Myklebust and Julie Uv (Simula), and Jorun Tangen, Tove-Elizabeth Hunt and Christian K. Five(OUH).

ProCardio members received several prestigious awards in 2025. A special congrats to Professor Lasse Løvstakken (NTNU), [winner of the Research Prize](#) at the Norwegian Society of Cardiology (NCS) Fall Meeting; PhD fellow



Foto: Bildmakarna

Bendik Skinningsrud, recipient of [the Best Abstract award](#) at the same meeting; and medical research student Cordelia Hellstrand, honored with the [Best Presentation prize](#) at the “Frampeik 2025” seminar.

Kristina Haugaa chaired the ESC Task Force for the [new European guidelines on heart disease and pregnancy](#), presented at the ESC Congress in Madrid and simultaneously published in the European Heart Journal (EHJ) in August 2025. Nina Eide Hasselberg served as coordinator for the guidelines, and Mette-Elise Estensen was a member of the Task Force. Congratulations to all on this impressive and persistent effort!

Another highlight of the year was GEVU's launch of the new ultrasound system Vivid Pioneer at the ESC Congress in Madrid—an exciting milestone for innovation in cardiovascular imaging.

We have strengthened our innovation focus, working with several DOFIs. All members engaged in sessions at Soria Moria to advance 1–2 projects for dedicated sprints.

We extend our sincere thanks to all partners and contributors. Your efforts have strengthened ProCardio and helped us move closer to our shared goals within the field of Cardiology. We look forward to continuing this exciting journey together.

Director Kristina Haugaa

Objectives and research plans

The center was established to create a clinically driven, validated ICT (information and communications technology) platform for cardiology that will enable a major change in individualized healthcare, providing the best possible treatment and risk prevention by using big data and artificial intelligence. Based on leading edge research, this platform will facilitate fusion and analysis of rich and diverse data, integrating a wealth of available information into the workflow of clinical cardiology, and tailor individual care to prevent over- and under-treatment.

The most substantial impact of the ProCardio on Norwegian and European societies will be its impact on healthcare. In spite of recent advances leading to decreased mortality rates, cardiovascular disease remains the most common cause of death in Norway accounting for more than one in four deaths.

The envisioned uptake of ProCardio tools will have substantial impact for individual patients with metrics such as cost per Quality Adjusted Life Year gained. Even more important, these improvements will benefit patients by

1. Improved selection criteria
2. Individually optimized treatment
3. More accurate follow-ups
4. Reduced hospitalization stays and procedures
5. Personalized advice on health bringing activities e.g. exercise

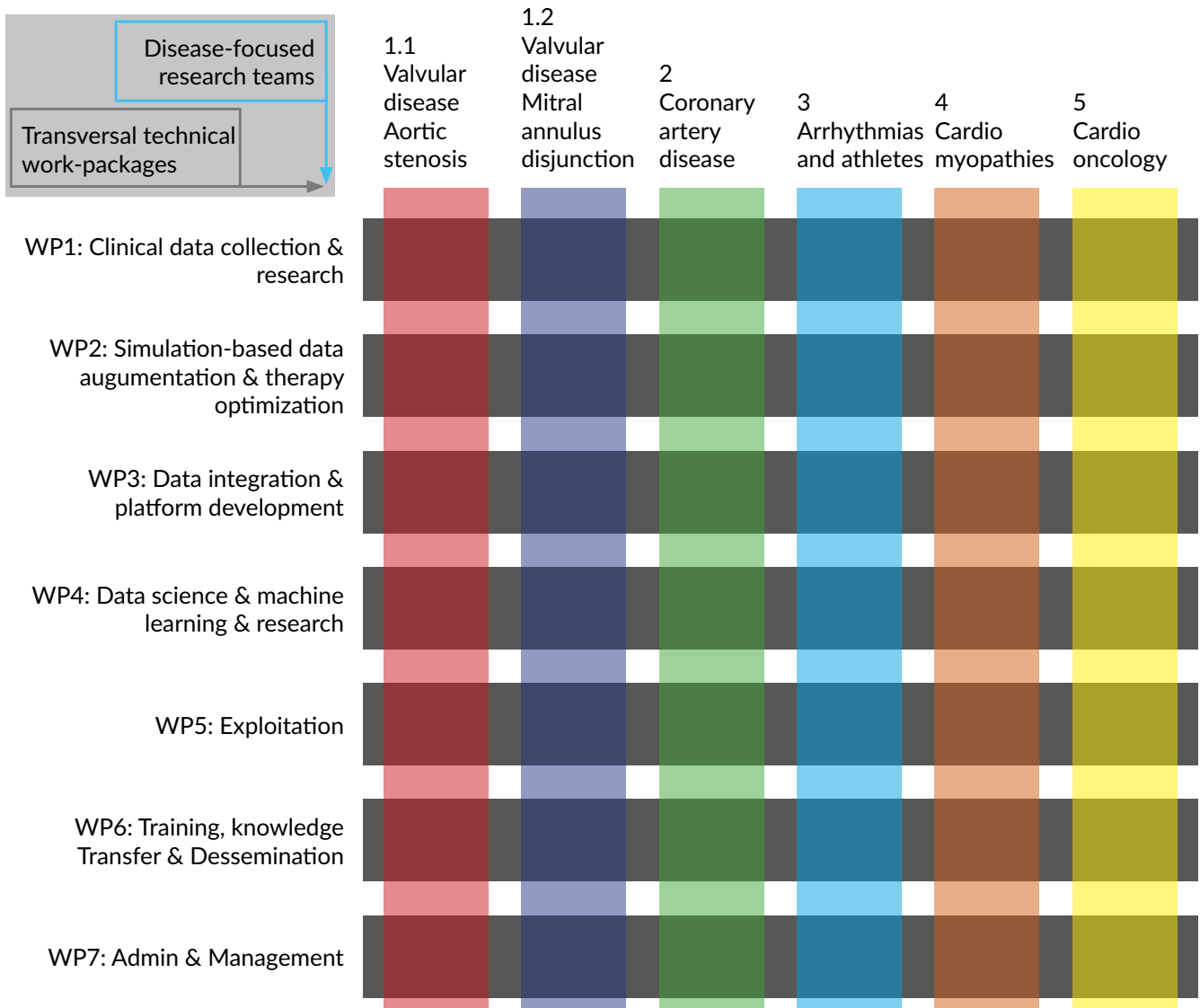
ProCardio will have governing structures and operating mechanism that will guarantee a targeted effort to produce results that can be exploited by the partners and lead to value creation in Norway, through the engaged industrial end-users.

The center is also strongly in line with the strategies of research partners (NTNU, SRL, UiO, OUH) who are all member of the Norway Health Tech cluster. OUH director of Innovation is invited as part of the management team to ensure continuous focus on innovations. Lastly, clinical partners participating in ProCardio will benefit from sizeable value pools from more effective cardiac care.

In order to foster an application-driven mindset and to uncap technical synergies across ongoing projects, ProCardio methodology was designed to focus on a bidimensional approach concept of having “vertical” research teams focusing on a target cardiac disease while the technical work will be coordinated “horizontally” to enable crosspollination of breakthroughs and integration of knowledge in a single platform.

Lastly, common management, coordination and knowledge-transfer mechanisms will work across the entire center.

Organization



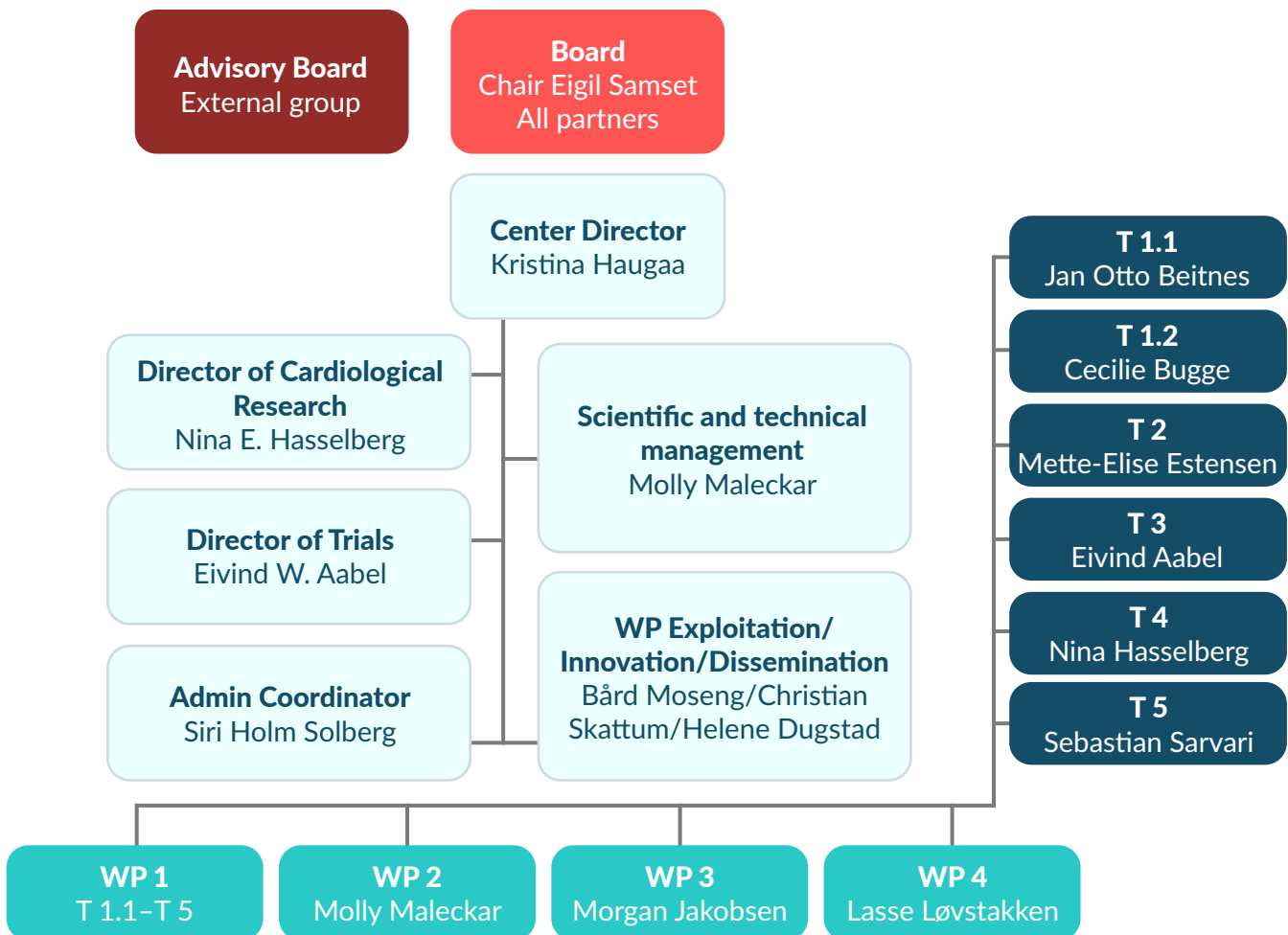
Organization

ProCardio is hosted by Oslo University Hospital. In addition to the host institution, the consortium consists of nine partners from both research and industry. ProCardio is located at the Oslo University Hospital, Rikshospitalet, with the physical hub located at Domus Medica (DM4/The University of Oslo) at Sognsvannveien 9 (entrance from Gaustadalléen 34).

The center director, Kristina Haugaa, is responsible for the center management. She is assisted by the management team. Each clinical task group (T) is led by clinical research and innovation deputies, liaising with WP leaders which ensures transversal synchronization of technical work among the different teams.

By the end of 2025, task group leaders are Jan Otto Beitnes (T1.1), Cecilie Bugge (T1.2), Mette-Elise Estensen (T2), Eivind Westrum Aabel (T3), Nina Hasselberg (T4) and Sebastian Sarvari (T5). In parallel exploitation, dissemination and innovation activities was supervised by designated managers, Bård Moseng (GEVU), Christian Skattum, our representative from OUH Dept. of Innovation and our Key Account Manager Helene B. Dugstad from INVEN2.

Molly Maleckar from SRL acts as Scientific & Technical Manager coordinating the work of the technical teams. Siri Holm Solberg functioned as Administrative Coordinator.



Boards of directors

ProCardio is governed by a Board of Directors, for which representatives have been appointed by each of the partners. The Board comes together twice a year to discuss the Center's development, financial aspects, and administrative issues. Many of the board members participate actively in the Center's research activity and their expertise is of uttermost importance for the development of future technology within ProCardio. The Center's Board of Directors consists of the following members appointed by the consortium participants:

- Eigil Samset, GE Healthcare, Chair
- Bjørn Bendz, OUH
- Liv Bollvåg, DIPS
- Mirco de Melis, Medtronic
- Rune Wiseth, NTNU
- Jan G. Bjålie, UiO
- Samuel Wall, Simula
- Bård Moseng, GE Vingmed
- Daniela Melichova, Sørlandet Sykehus HF
- Tom Marwick, Baker Institute



Partners

The ProCardio Center for Innovation was originally comprised of 11 partners with OUS being the host partner. Each partner represents a unique and required element in the research and development chain leading to the industrial innovations targeted by ProCardio. After Sesam withdrew from the consortium in September 2024, there are now 10 active partners in the center.



Knowledge:

1. Dept of Cardiology at OUS is the largest interventional department in the Nordic countries with more than 4100 PCIs and 1600 ablations every year
2. Front line cardiac research player and world-class clinical expertise;
3. hosted the SFI Center of Cardiological Innovation, which was a highly successful SFI

Resources:

- a. Infrastructures to host the ProCardio center
- b. administrative support towards daily run of the center
- c. image and EMR data (>1000 patients)



Knowledge:

1. Oldest and largest research and educational institution in medicine in Norway
2. K.G. Jebsen Centre for Cardiac Research is a global reference in the field of cardiology, combining outstanding PIs with an extensive international network of research partners

Resources:

- a. PhD training for OUS-hosted researchers



Knowledge:

1. Acknowledged as a SFI center for Innovative Ultrasound Solutions (CIUS);
2. Extensive know-how on medical imaging technology, in particular ultrasound;
3. expertise in artificial intelligence and machine learning algorithms;
4. Centre of excellence for translational medical research at the interface of epidemiology, genetics, statistics, bioinformatics and systems biology

Resources:

- a. Extensive databases with follow up echocardiographic studies and outcome data;
- b. Computational infrastructure to train and run resource-intensive AI algorithms;
- c. Databases on genetic markers to be coupled with cardiac imaging in HUNT database and its digital infrastructure, and also a substantial number of other omics data such as NMR-based metabolomics, CVD related protein arrays, transcriptomics and other targeted protein biomarkers.



Knowledge:

1. Outstanding diabetes & cardiac research center, with global visibility, contributing to ProCardio with strong complementary expertise in the field of cardio-oncology

Resources:

- a. Extensive clinical database of multi-modal data



Knowledge:

1. Leading clinical and experimental research expertise in the area of myocardial function;
2. Extensive hands-on experience on clinical trials to assess new diagnostic technologies and therapies (e.g. we established the IMPROVE study)

Resources:

- a. Image data and EMR data (>2000 patients);
- b. inclusion of cardiac patients with heart failure and myocardial infarction in ongoing and future research projects.

simula

Knowledge:

1. Host of several SFF, SFI, and EU networks focused on excellence in biomedical computing and computing in cardiology,

2. Mathematical growth models for cardiac physiology, growth, and remodeling,
3. data-driven models and analysis for risk prediction;
4. Computational Cardiology Models for biophysical simulation

Resources:

- a. Extensive clinical database of multi-modal data



Knowledge:

1. World's largest medical technology company, offering a large breadth and depth of innovative therapies, including forefront treatments for cardiac and vascular diseases;
2. extensive expertise in clinical trial protocol development and implementation;
3. VBHC approaches for therapy optimization and chronic care programs;
4. Manufacturing of devices (both for delivering therapies as well for diagnostic purposes (sensors))

Resources:

- a. Access to state-of-the-art medical devices;
- b. capable of designing and building custom-made devices addressing the needs of individual or groups of patients according to the specifications provided by a physician/project.



Knowledge:

1. World class design and manufacturing of diagnostic imaging and monitoring systems;
2. Extensive expertise in cardiology diagnostics, artificial intelligence development for imaging and waveforms
3. Deep market understanding
4. GE's center of excellence on ultrasound engineering;
5. World-class know-how in cardiovascular ultrasound acquisition, processing and analysis, speckle-tracking and strain imaging, artificial intelligence in ultrasound, 3D visualization and quantification;
6. Extensive insight on regulatory requirements and ultrasound market intelligence

Resources:

- a. Fast-track integration of innovations into commercial products and application to other imaging modalities beyond ultrasound
- b. provide ultrasound equipment and software to the center to ensure successful execution of clinical projects and data acquisition.



Knowledge:

1. Leading supplier of patient electronic medical records software solutions to Norwegian hospitals;
2. Expertise in eHealth, data integration activities and IT platform development

Resources:

- a. Access to DIPS Arena - a fully integrated patient record system including closed loop medication, charting, booking and planning, electronic document workflow, CPOE, multimedia and reporting.

Cooperation between partners

The partners at ProCardio bring key competences to the joint projects, enabling everyone in ProCardio to effectively pursue the collective goals. To ensure effective dissemination of management goals and coordination of efforts among the partners, an integrated meeting schedule has been established. This includes weekly meetings within individual project teams, biweekly meetings among management and PhD-students, and bimonthly meetings among T-and WP-leaders. The supervisory board normally meets bi-annually, in sync with the planned training and dissemination workshops. ProCardio holds two annual workshops, one in the spring and one in the fall, focusing on innovation, research and collaboration. Due to the underway assessment process and the unknown outcome of the evaluation, the 2025 spring board meeting was cancelled. The annual spring workshop was replaced by a Day away for the ProCardio leaders, in order to discuss feedback from the underway assessment and stake the course for the remaining SFI period.



Collaborative meetings between partners. OUH and DIPS (top), and OUH, NTNU and Simula (bottom).



Day away – June 13th

All leaders and senior researchers were gathered for a workshop to discuss future focus areas.



The Board leader Eigil Samset hosted a brainwriting session.

Fall workshop September 18th – 19th

The annual ProCardio Fall meeting took place at Askeladdens Hus, Soria Moria Hotel in Oslo.

The workshop featured project updates from all T- and WP-leaders, based on the brainwriting session and the priorities identified by leaders and senior researchers during the day away.

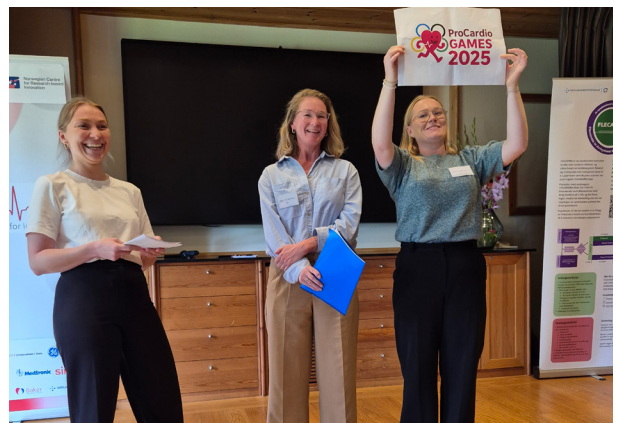


All participants engaged in innovation workshops, each ending with a 30-second elevator pitch. The aim was to identify the two to three key projects to prioritize in the innovation sprints planned for the first half of 2026.

We held the second edition of the ProCardio Games, and after a wonderful meal we ended the evening on a joyful note with karaoke.



Day two was primarily dedicated to thematic group work aimed at planning continued project collaboration in 2026. Camilla Lien Sandnes from the Research Support Office also provided an excellent introduction to funding opportunities, which will be important for sustaining activity after the SFI period concludes.



Scientific Activities and Research

Disease Progression in Exercise-Induced Arrhythmogenic Cardiomyopathy Compared With Arrhythmogenic Right Ventricular Cardiomyopathy

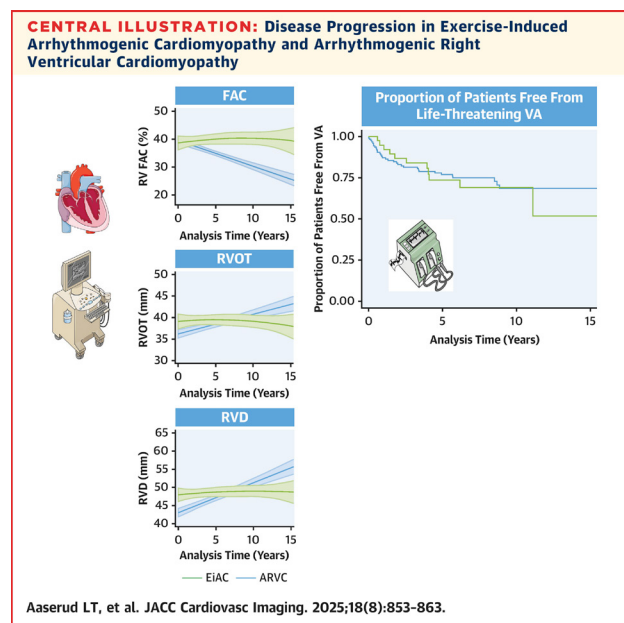
Linda T Aaserud, Christine Rootwelt-Norberg, Paul A S Olsen, Christian K Five, Anna I Castrini, Eivind W Aabel, Kristina H Haugaa, Øyvind H Lie

Several studies have described exercise-induced arrhythmogenic cardiomyopathy (EiAC) as a potential acquired condition in endurance athletes with phenotypic similarities to the inherited disease arrhythmogenic right ventricular cardiomyopathy (ARVC), but differences in disease progression between these entities remain poorly understood.

This longitudinal cohort study included 41 EiAC patients who were competitive endurance athletes (>24 MET-hours/week for >6 consecutive years) referred due to ventricular arrhythmias (VA), without inherited or genetic factors or other evident causes. For comparison, 125 genotype-positive ARVC patients with a definite diagnosis and their genotype-positive family members were included. Disease progression was assessed by serial echocardiographic examinations and incident documented VA during long-term follow-up.

In total, 730 echocardiographic examinations were analyzed. Right ventricular structure and function remained stable in EiAC patients, whereas ARVC patients demonstrated progressive structural and functional deterioration. Despite these differences, the cumulative incidence of VA at 5 and 10 years was similarly high in both groups. These findings suggest that EiAC patients remain at arrhythmic risk even in the absence of measurable structural or functional progression, highlighting the need

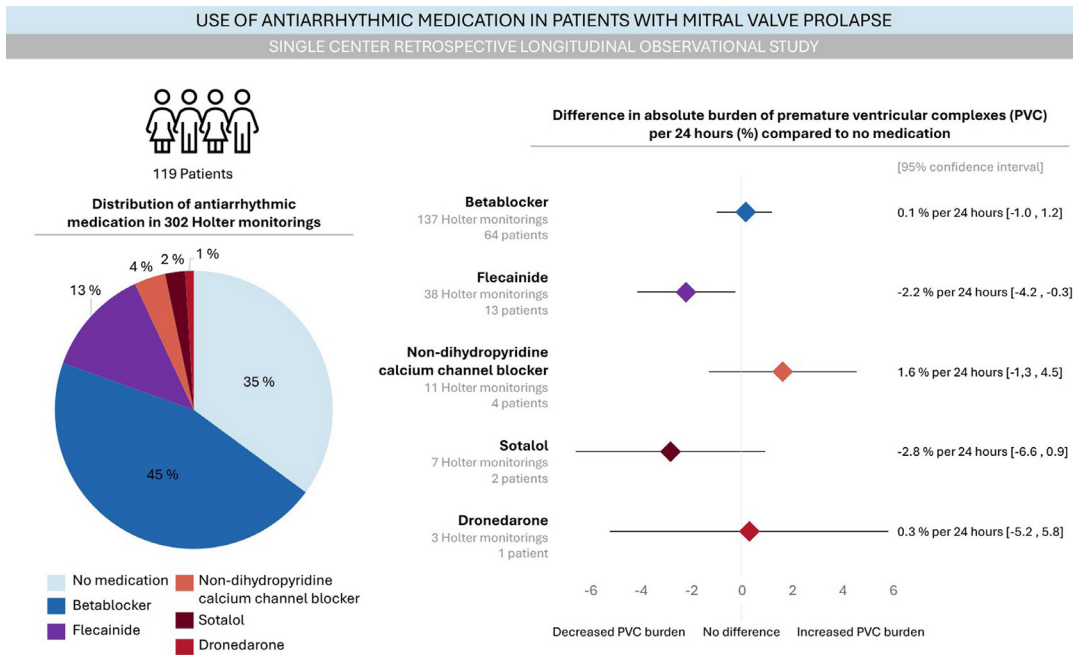
for continued clinical follow-up with particular attention to rhythm monitoring.



This study was published as an original research article in JACC:Journal of Cardiovascular Imaging in August 2025 [10.1016/j.jcmg.2025.03.018](https://doi.org/10.1016/j.jcmg.2025.03.018)

Management of arrhythmias in mitral valve prolapse: Are we making the right choices for our patients?

Cecilie Bugge, Christian K. Five, Julie Bergh, Anna Isotta Castrini, Nina E. Hasselberg, Lars A. Dejgaard, Kristina H. Haugaa, Eivind W. Aabel



For patients with mitral valve prolapse (MVP) there is no established medical therapy to suppress ventricular arrhythmias and relieve arrhythmic symptoms since antiarrhythmic medication for MVP has not been evaluated in randomized controlled trials.

This was a retrospective longitudinal observational study where we aimed to evaluate the antiarrhythmic drug use for ventricular arrhythmias in MVP patients, and to assess the potential efficacy of different antiarrhythmic medications on the reduction of ventricular arrhythmias. Premature ventricular complexes (PVCs) and non-sustained ventricular tachycardia (NSVT) burden were assessed by repeated Holter monitorings. Patients undergoing mitral valve surgery or catheter ablation treatment were censored from follow-up analysis from the time of the procedure.

199 MVP patients (median age 46 years [IQR 35-59], 67% female) with a total of 302 Holter monitorings was included. Betablocker was the most commonly used antiarrhythmic medication (137 Holter monitorings [45%] in

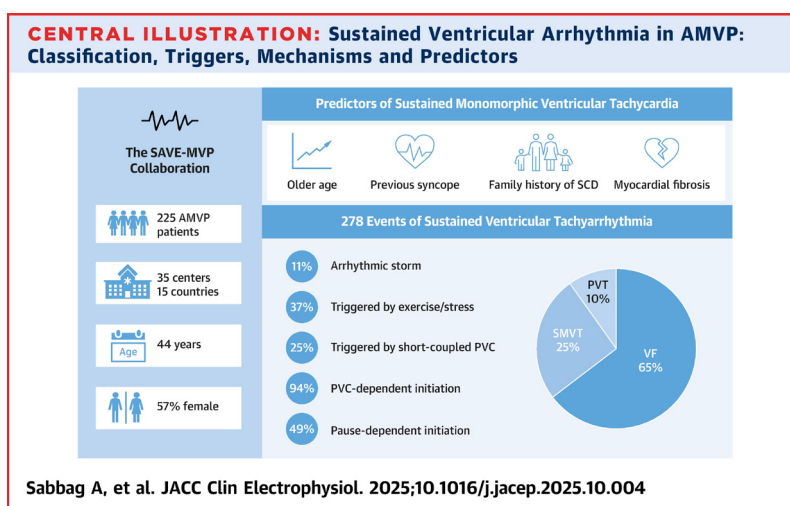
64 [54%] patients), followed by flecainide (38 [13%] in 13 [3%] patients), non-dihydropyridine calcium channel blocker (11 [4%] in 4 [3%] patients), sotalol (7 [2%] in 2 [2%] patients) and dronedarone (3 [1%] in 1 [1%] patient). Compared to no treatment, only flecainide was associated with a lower PVC burden (-2.2% per 24 hours [95% confidence interval, CI, -4.2 to -0.3], $p < 0.03$), with no increased rate of NSVT ($p > 0.05$). Regarding NSVT, only sotalol showed a reduction in NSVT incidence (incidence rate ratio 0.02 [95% CI 0.002-0.29], $p = 0.004$).

This study shows that betablocker was the most commonly used antiarrhythmic medication in MVP patients but showed no reduction in ventricular arrhythmias. Flecainide and sotalol were less frequent used but our study suggested a reduction in ventricular arrhythmias. Randomized control trials are needed to assess the efficacy and safety of different antiarrhythmic medications in MVP.

This abstract was presented at ESC Madrid 2026 (doi: [10.1093/eurheartj/ehaf784.626](https://doi.org/10.1093/eurheartj/ehaf784.626).)

Characterizing Sustained Arrhythmias in Patients With Arrhythmic Mitral Valve Prolapse: Insights From the SAVE-MVP collaboration

Avi Sabbag, Nina Ajmone-Marsan, Fatima Ezzeddine, Guido Ascione, Nicolò Azzola Guicciardi, Pierre Baudinaud, Roy Beinart, Mouna Ben Kilani, Marco Bergonti, Priya Kumar Bhardwaj, Serge Boveda, Csilla Czimbalmos, Luca Cristin, Giulio Conte, Freddy del Carpio, Francesca Delling, Marta de Riva, Jean-Claude Deharo, William Escande, Jonaz Font, Deborah Foltran, Federico Guerra, Charles Guenancia, Kristina H. Haugaa, Christelle Haddad, Alexis Hermida, Olivier Huttin, Peggy Jacon, Alice Krebsová, Mikael Laredo, Han S. Lim, Pilar López-Santi, Philippe Maury, Jacques Mansourati, Anat Milman, Efrat Mazor, Andrea Nagy, Andrzej Przybylski, Magdi Saba, Christian Sohns, Christian Sticherling, Konstantinos C. Siontis, Rachel M.A. ter Bekke, Romain Tixier, Moshe Rav Acha, Robin Richard-Vitton, Bo Gregers Winkel, Pierre Ollitrault, Eivind W. Aabel



Arrhythmic mitral valve prolapse (AMVP) is a cause of sustained ventricular tachyarrhythmias (VAs) and sudden cardiac death (SCD), but the arrhythmias remain only partially understood. In this worldwide collaboration, this study aimed to characterize the VAs occurring in AMVP patients, explore factors associated with various types of sustained VA, and describe common triggering mechanisms.

We included 225 patients from 35 centers (age 44 ± 17 years, 57% female) with AMVP and documented VA. Clinical and imaging data, and detailed data of the arrhythmic events were collected. In addition, electrocardiograms or intracardiac tracings capturing the arrhythmic events were analyzed by a core laboratory. Late gadolinium enhancement (LGE) was found in 61%. We collected 278 arrhythmic events, of which ventricular fibrillation (VF) was the most frequent (65%), followed by sustained monomorphic ventricular tachycardia (SMVT;

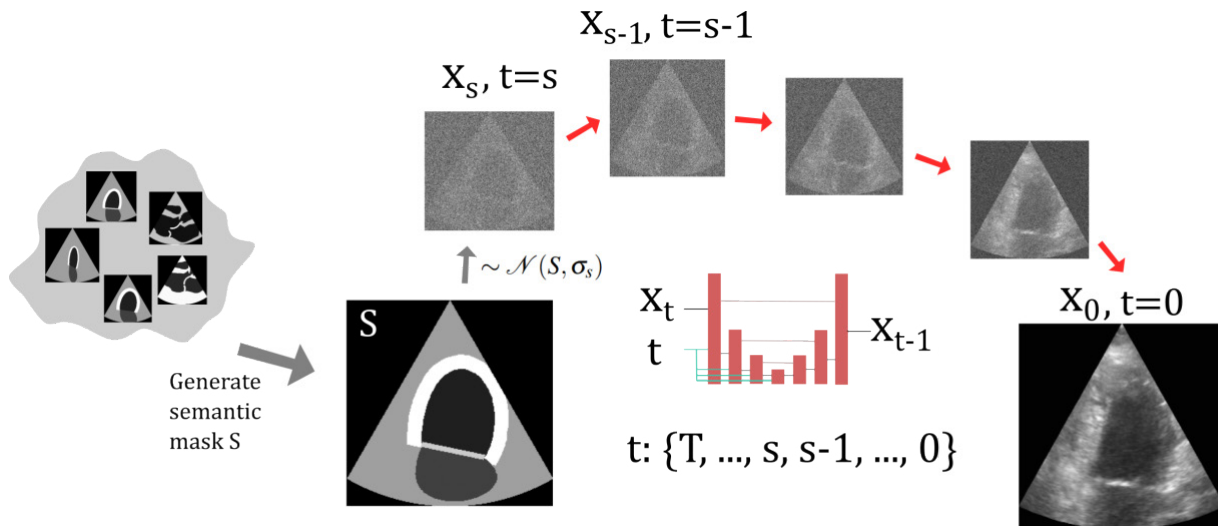
26%). Triggers were most commonly exercise or stress (37%), but 31% had no discernable trigger. SMVT was associated with increasing age ($P = 0.03$), family history of SCD ($P = 0.03$), history of syncope ($P = 0.05$), and myocardial LGE ($P = 0.003$). Of the 278 events, 140 (50%) had available tracings, where 25% of events were triggered by a short-coupled premature ventricular contraction. Pause-dependent initiation was most frequent (49%), and more likely to lead to VF than to SMVT ($P = 0.01$).

The study concluded that the dominant VA in AMVP was VF, although SMVT was also common and associated with older age, family history of SCD, syncope, and myocardial LGE. The most common initiation was pause dependent leading to VF.

This study was presented in JACC: Clinical Electrophysiology November 2025 ([doi:10.1016/j.jacep.2025.10.004](https://doi.org/10.1016/j.jacep.2025.10.004))

Generating echocardiograms from semantic masks using unconditional diffusion models

Sigurd Vangen Wifstad.



Supervised learning for segmentation requires manual annotation, which is resource demanding. We explore how diffusion models can be used to synthesize datasets for segmentation in echocardiography.

This abstract was presented at the Northern Lights Deep Learning Convergence, Tromsø 12.-14. January 2025.

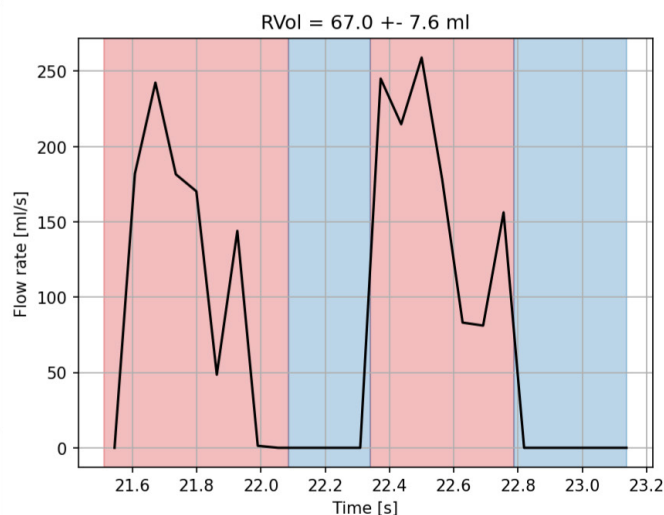
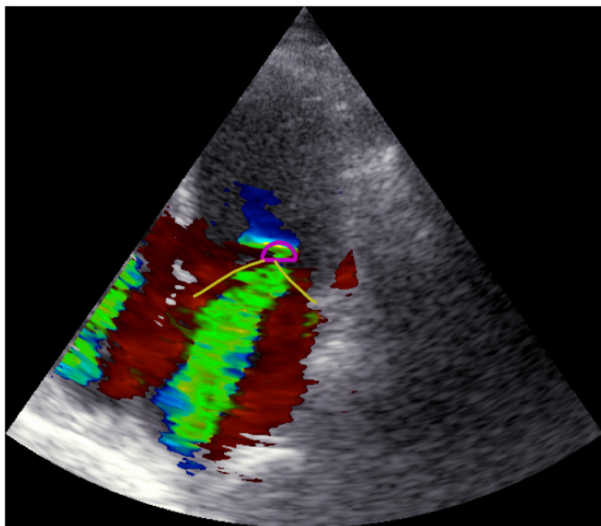
Method: A diffusion model (U-Net, 2M parameters, $T=16$ timesteps) is trained on a large echocardiogram dataset. A semantic mask S is procedurally generated, displaying various anatomical features in the heart. S is embedded in noise with intensity σ_s and taken as the starting point for the reverse diffusion process at timestep $t=s$.

Results: The approach is capable of generating image pairs for various segmentation tasks. By intercepting the reverse diffusion process with a procedurally generated semantic mask, we obtain segmentation-image pairs without needing explicit conditioning during training.

Conclusion: Echocardiograms can be generated from semantic masks using unconditional diffusion models. The approach enables semi-supervised learning for segmentation, requiring less manually annotated images for training. Further work should improve the realism of the semantic mask generators and train the diffusion model on larger and diverse datasets.

EasyPISA: Automated real time assessment of mitral regurgitation from color flow imaging

Sigurd V. Wifstad, Henrik A. Kildahl, Erik Andreas R. Berg, Espen Holte, Bjørnar Grenne, Øyvind Salvesen, Håvard Dalen, Lasse Løvstakken



Mitral regurgitation (MR) is a common condition where blood leaks through the closed mitral valve. Accurately determining the severity of the condition from echocardiography may be challenging and has a high interobserver variability. We argue that automating the surface area measurements can mitigate many of the intrinsic challenges with manual assessment using the conventional Proximal Isovelocity Surface Area (PISA) method on color flow imaging.

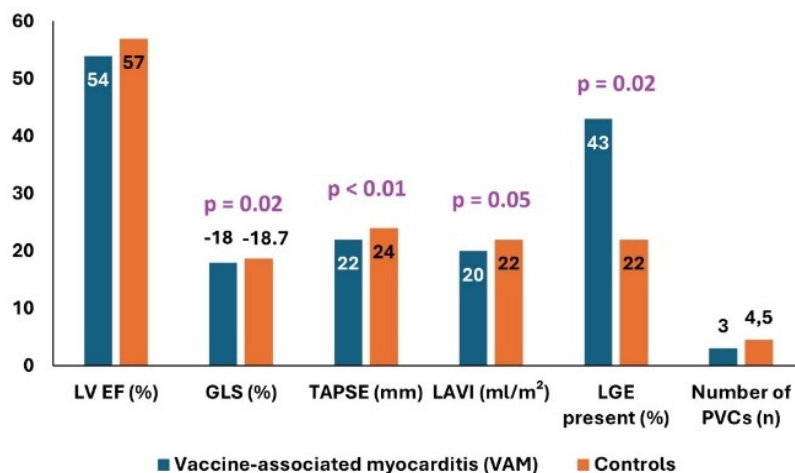
Method: We present EasyPISA: an automated framework for integrative PISA assessment. The framework uses a convolutional neural network trained on 1171 color flow images from 54 patients with MR to segment the isovelocity surface of the MR influx (Figure 1a). The isovelocity surface area is estimated by the surface of revolution, enabling more accurate surface area estimates compared to assuming hemispherical isovelocity shells by PISA. The flow rate is estimated in every frame by multiplying the surface area with the Nyquist velocity. The regurgitant volume (RVol) can be estimated by time integration (Figure 1b), alleviating the need for integration with CW Doppler as for standard PISA. Followingly, mean and variance estimates of the regurgitant volume can be derived automatically from a series of heart cycles.

Results/Discussion: A retrospective analysis of 26 MR patients (Figure 1c) demonstrated a good correlation (Intraclass correlation coefficient: 0.83) with manual PISA assessment. The standard deviation across cycles (errorbars) indicates substantial variation of estimates throughout the recordings, which is not captured by the manual approach. Furthermore, EasyPISA was demonstrated feasible in real time on a patient with MR (Figure 1d). The real time application provided running mean, max, and variance estimates of RVol during acquisition. EasyPISA demonstrates promising results for RVol estimation from color flow, enabling automatic analysis both retrospectively and in real time, which is more detailed and potentially more accurate than standard assessment. Further work will address feasibility on larger retrospective and prospective cohorts.

This abstract was presented at the International Ultrasound Symposium (IUS) in September 2025 in Utrecht, the Netherlands.

Normal cardiac function but discrete late gadolinium enhancement findings after COVID-19 vaccine-associated myocarditis - a nationwide long-term follow-up study

Bendik Skinningsrud Hagen, Katarina Vlasisavljevic, Lars S. Oppedal, Johannes Endresen, Vilde Mohn, Kristina Fladseth, Hanne L. Gulseth, David B. Olsen, Hans Gerhard Suheyli Bosse, Lene Kathrine Ryden Suther, Thomas Möller, Mette Elise Estensen, Kristina H. Haugaa, Kaspar Broch, Nina E. Hasselberg



Background and methods: Long-term cardiac effects of Covid-19 vaccine associated myocarditis (VAM) have not been systematically investigated at a population level. This study investigated cardiovascular long-term adverse effects of COVID-19 mRNA VAM in a nationwide follow-up study.

All confirmed VAM cases identified in Norway between December 2020 and April 2022 were invited to a follow-up study including clinical examination, blood tests, arrhythmia detection by 24hr ECG, echocardiography and cardiac magnetic resonance (CMR) with late gadolinium enhancement (LGE). An age- and sex-matched control group were included for blinded comparison.

Results: 115 (65%) VAM subjects participated (76% men, median age 33 and 54 years for men and women respectively, $p < 0.01$) for follow-up examinations 20 (IQR 16-26) months after VAM. In VAM subjects, ECG showed 99% in sinus rhythm, with a median 3 (IQR 1-33) premature ventricular contractions (PVC), per 24 hrs. Troponin and NT-proBNP levels were normal in 99/115 (86%) ($p = 0.14$ vs. controls

47/50 [94%]) and 108/115 (94%) ($p = 0.08$ vs. controls 50/50 [100%]), respectively. There were no differences in left ventricular (LV) dimensions or function by LV ejection fraction (EF) between VAM subjects and controls (LV end diastolic diameter [EDD] 49 ± 5 mm vs. 51 ± 4 mm, $p = 0.94$, LVEF $54 \pm 6\%$ vs. $57 \pm 4\%$, $p = 0.99$). Although within normal range, absolute GLS was lower in VAM subjects compared to controls: GLS -18.0% [IQR -16.2 - -19.5] vs. -18.7% [IQR -17.8 - -19.4], $p = 0.02$). CMR detected discrete LGE in 28 (43%) VAM subjects, compared to 10 (22%) controls, $p = 0.02$.

In conclusion the study predominantly revealed normal long-term cardiac clinical and imaging findings in subjects with prior COVID-19 mRNA VAM. There were no significant differences between VAM subjects and controls regarding LV dimensions, EF, arrhythmic burden, or biomarkers. However, VAM subjects had a higher prevalence of discrete myocardial LGE, with unknown long-term clinical significance.

Text modified from abstracts presented at ESC 2025 Madrid (Sept 2025) and Norsk Kardiologisk Høstmøte (October 2025)

Sex-Specific Left Ventricular Shape and Mechanics Predict Arrhythmia in Mitral Valve Disease: A Multimodal Statistical Shape Analysis

Giulia Monopoli, Ingvild Askim Adde, Eva Schuijt, Diana Vucevic, Nina Ziegenbein, Eivind Westrum Aabel, Margareth Ribe, Anna Isotta Castrini, Nina Hasselberg), Cecilie Bugge, Christian Five, Kristina Haugaa, Gabriel Balaban, Nickolas Forsch, Mary M. Maleckar.

Background: In Arrhythmic Mitral Valve Syndrome (AMVS) patients with mitral valve disease (MVD) are prone to dangerous arrhythmias. While AMVS is associated with Left Ventricular (LV) remodeling, traditional metrics can fail to capture the complex geometric heterogeneity of patients at risk.

Objective: We developed a statistical shape modeling pipeline to quantify 3D LV geometry and systolic motion from cardiac magnetic resonance (CMR) imaging in MVD patients, investigating association with arrhythmia and the critical yet understudied impact of biological sex.

Methods: We analyzed 91 patients with MVD, including those with documented arrhythmia (aborted cardiac arrest, ventricular tachycardia). We generated 3D point clouds from CMR cine at end-diastole (ED) and end-systole (ES). Principal Component Analysis (PCA) derived variation modes for ED shape and systolic motion (ES - ED).

Results: Five ED shape modes and six motion modes explained >90% and >80% of variance, respectively. In the total cohort, ED modes M1 (basal dilation) and M2 (sphericity), and motion modes M3 (reduced longitudinal shortening) and M6 (posterior-basal "curling") significantly correlated with arrhythmia ($p < 0.05$). Crucially, sex-stratified analysis unveiled distinct risk signatures masked in the pooled cohort. ED mode M5 (mid-wall asymmetry) exhibited opposite trends between sexes, distinguishing arrhythmic status only when stratified. In males, arrhythmia was associated with motion M4 (abnormal twist dynamics) and M6 ($p = 0.04, 0.02$), whereas in females, risk was driven by M1 and M3 (abrupt radial contraction) ($p = 0.01, 0.05$).

Conclusion: 3D SSM reveals that arrhythmic risk in AMVS is linked to specific phenotypes of basal remodeling and abnormal mechanics rather than volume alone. The discovery of distinct geometric risk modes for males and females highlights the necessity of sex-specific risk stratification strategies in valvular heart disease.

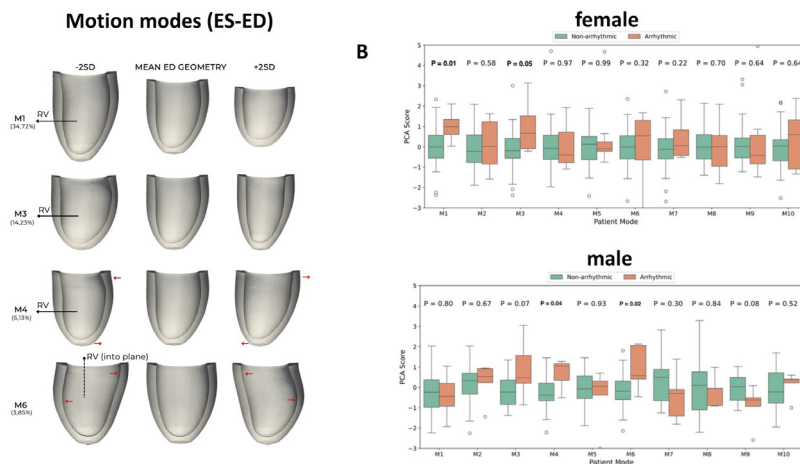


Figure 1. Principal Component Analysis (PCA) modes of systolic motion (ES - ED).

A. The central column represents the mean geometry at ED.
B. Motion modes exhibited opposite trends between sexes, distinguishing arrhythmic status only when stratified.

This abstract was presented at the annual Computing in Cardiology Conference 2025 (Sao Paulo, Brazil) and has been accepted for presentation at the Heart Rhythm Society's Annual Scientific Sessions 2026 (Chicago, USA).

Automated multimodal quantification to characterize systolic curling in mitral valve disease

Giulia Monopoli, Sigurd Vangen Wifstad, Henrik Agerup Kildahl, Cecilie Bugge, Christian K. Five, Julie Bergh, Nina Hasselberg, Eivind Aabel, Jan Otto Beitnes, Kristina Haugaa, Lasse Lovstakken, Nickolas Forsch, Mary M. Maleckar.

Background. Systolic curling is a qualitative clinical hallmark of mitral valve disease (MVD), including mitral valve prolapse (MVP) and mitral annular disjunction (MAD), yet it lacks standardized quantification.

Objective. We present the first fully automated framework to quantify curling dynamics using transthoracic echocardiography (TTE) and cardiac magnetic resonance imaging (CMR) to determine its biomechanical origin and association with MVP/MAD. **Methods.** We studied 149 MVD patients and 106 healthy controls. An automated pipeline tracked annular and ventricular keypoints on TTE and CMR to calculate the annulo-ventricular angle (ζ) and its angular velocity (ζ'). Dense spatio-temporal maps were generated from CMR cine imaging to localize mechanical gradients along the LV lateral wall and around the end-systolic phase.

Results. MVD patients exhibited significantly accentuated zeta compared to controls (zeta: $70.5 \pm 13.1^\circ$ vs $76.8 \pm 13.4^\circ$, $p=0.002$) and more negative angular velocity (zeta': -0.38 vs -0.33 $^\circ/\text{ms}$, $p=0.03$), indicating abrupt deformations.

Metrics correlated inversely with MAD length ($p=0.02$), confirming sensitivity to disjunction severity. Deformation was asymmetric, characterized by increased posterior transverse displacement ($p=0.02$), and amplified by combined MAD and posterior MVP. CMR spatio-temporal mapping revealed that peak curling magnitude does not occur at end-systole (ES), but 10–15% of a beat after ES, during early isovolumic relaxation.

Conclusion. Automated multimodal quantification reveals that curling is a dynamic, asymmetric, post-systolic recoil phenomenon that may be driven by MAD. This rapid mechanical snap-back may represent the release of elastic energy stored during systole, occurring during a vulnerable window of repolarization.

This work is currently under revision for publication as an article.

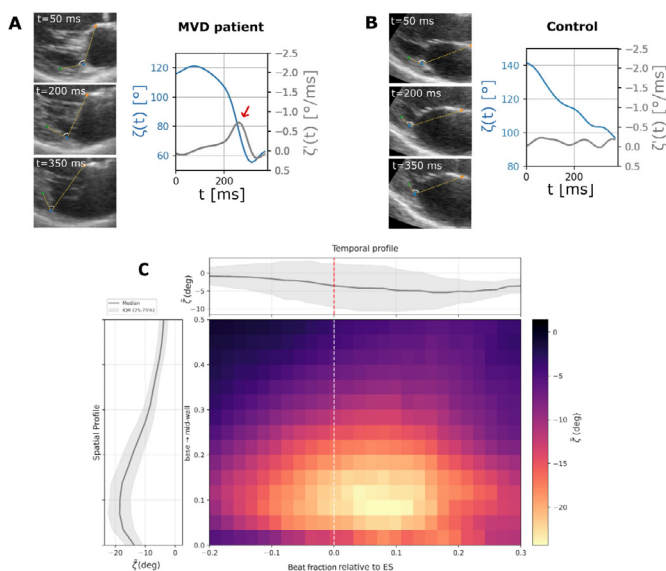
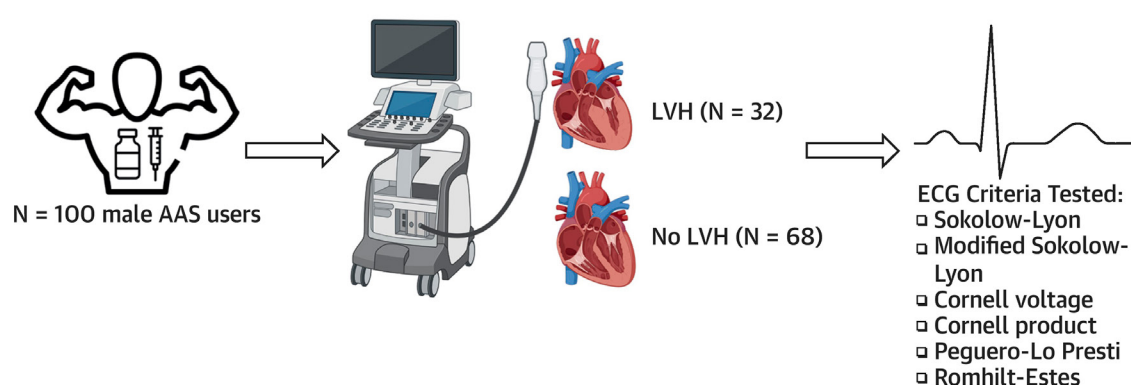


Figure 1. A, B: MVD vs. control patient. Point tracking is shown in three systolic frames alongside the corresponding plot of the annulo-ventricular angle ζ and its time derivative ζ' . A. An MVD patient displaying a high degree of curling. B: A healthy control with no curling. C. Spatio-temporal map of cohort-median curling dynamics derived from CMR. Top and left panels show median temporal and spatial profiles (solid line) with the interquartile range (shaded area), respectively. Note the "hotspot" (maximum ζ) is localized to the basal myocardium, occurring after end-systole (dashed line), characterizing curling as a post-systolic recoil event.

Evaluating ECG Criteria for Diagnosing Left Ventricular Hypertrophy in Anabolic-Androgenic Steroid Users

Rang Abdullah, Astrid Bjørnebekk, Lisa E. Hauger, Ingunn R. Hullstein, Thor Edvardsen, Kristina Haugaa, Vibeke M. Almaas

CENTRAL ILLUSTRATION: Can Electrocardiogram Accurately Detect Echocardiographic Left Ventricular Hypertrophy in Anabolic-Androgenic Steroid Users?



None of the tested ECG criteria were able to yield an adequate combination of sensitivity or specificity. Long-term AAS users represent a high-risk cardiovascular population. Routine specialist evaluation with echocardiography should be considered.

Abdullah R, et al. *JACC Adv.* 2026;5(2):102499.

The use of anabolic androgenic steroids (AAS) can lead myocardial hypertrophy, i.e thickening of the heart muscle, as well as reduced cardiac function. Among other studies, this was shown in a previous study by OUH and ProCardio, concluding that AAS use was associated with not only hypertension, but also increased left ventricular hypertrophy and reduced cardiac function detected by echocardiography in a proportion of users.

ECG is normally the first clinical tool to screen for and diagnose myocardial hypertrophy. In this present study the researchers aimed to investigate to what extent conventional ECG could identify established myocardial hypertrophy in AAS users by comparing various ECG criteria with echocardiography as the reference standard.

The main finding was that in general ECG failed to detect myocardial hypertrophy and

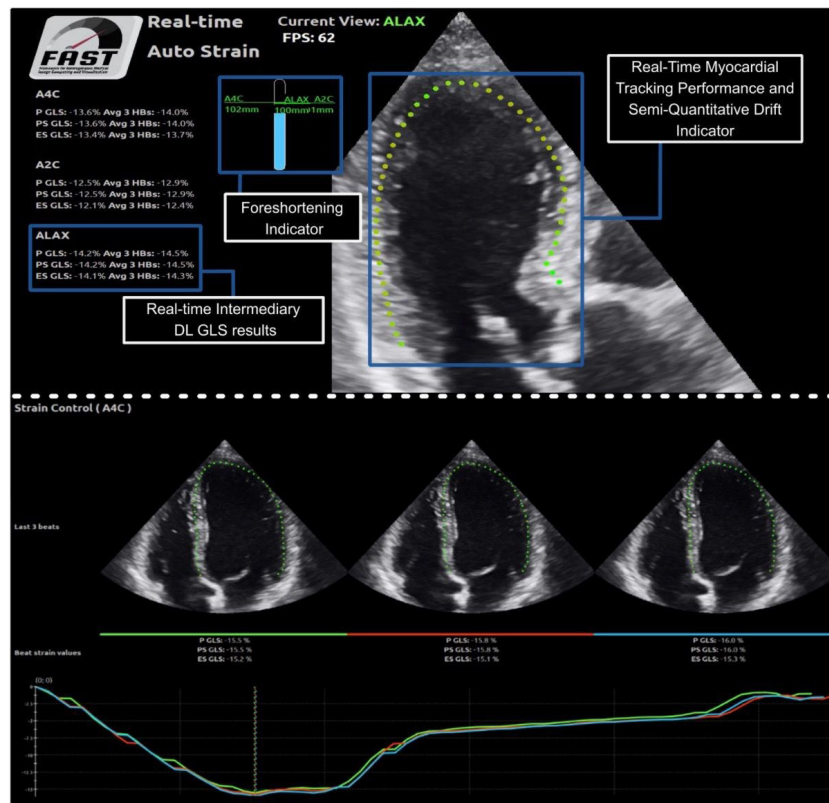
dysfunction verified by echocardiography.

The authors therefore conclude that AAS users should be investigated with an echocardiography even when ECG appears normal. Furthermore, ECG should not be considered a suitable screening tool for myocardial disease in AAS users. AAS use is common in young males and the study therefore has important implications for general clinical practice. AAS users who seek medical care and cardiac evaluation should be investigated with echocardiography, even in the absence of clear ECG abnormalities.

This study was published as an original research article in JACC: Advances in January 2026 (online 2025) <https://doi.org/10.1016/j.jacadv.2025.102499>

Real-Time Global Longitudinal Strain During Echocardiography: A Deep Learning Platform for Improved Workflow

Vegard Holmstrøm, Erik Smistad, Stian Stølen, Espen Holte, Lasse Løvsbakken, Håvard Dalen, Andreas Østvik, Bjørnar Grenne



The study introduces a deep learning platform capable of performing fully automated, real time GLS analysis during echocardiographic scanning, representing a significant step toward a more efficient and standardized workflow. The platform provides live visual feedback that helps operators optimize image acquisition, reduce foreshortening and baseline drift, and obtain robust multicycle strain measurements at the bedside. In a prospective study of 50 patients, the method demonstrated high feasibility, excellent correlation with manual reference measurements, and a 57% reduction in the time required to obtain GLS compared with conventional workflow. These findings show that real time AI based GLS can streamline echocardiographic practice, improve image quality, and support faster and more reliable clinical decision making.

This study was published as an original research article in JASE in November 2025. DOI: [10.1016/j.echo.2025.08.015](https://doi.org/10.1016/j.echo.2025.08.015)

Brugada Syndrome - Drugs in Pregnancy (BrS-DIP)

BrS-DIP is an international multicentre retrospective study with purpose to assess the arrhythmic risk during pregnancy and delivery in women with BrS, and to characterise obstetric, anaesthetic and analgesia management. The study has included 522 deliveries in 253 women with BrS and/or pathogenic or likely pathogenic (P/LP) SCN5A variants and represents until now the largest cohort on pregnant women with BrS and/or SCN5A. We systematically reviewed obstetric management, use of anaesthesia/analgesia and exposure to drugs classified as potentially pro-arrhythmic. Results

are reassuringly as zero severe ventricular arrhythmias occurred during pregnancy, delivery or within first 6 months post partum despite exposure to conventional obstetric management and routine anaesthetic agents.

Study start was February 2025, and data collection was completed by November 2025 in collaboration with Switzerland (Lugano), Sweden (Lund and Stockholm) and The Netherlands (Amsterdam). Analysis and manuscript is in progress and will be submitted During 2026.

Norwegian Spontaneous Coronary Artery dissection study – NOR-SCAD

NOR-SCAD is a national, multicentre observational study investigating spontaneous coronary artery dissection (SCAD) in Norway – an important and still underrecognized cause of myocardial infarction in younger women. The main purpose of NOR-SCAD is to identify risk factors, characterize clinical presentation and complications (including recurrent SCAD and adverse cardiac events), and to improve diagnostics, management and follow-up of SCAD patients. This is the first coordinated national SCAD study in Norway, addressing the lack of standardized care and follow-up in Norway. The project consists of a retrospective cohort of 106 women and a prospective cohort with ongoing enrolment of acute SCAD patients from all major PCI centres in Norway. Data

collection for both cohorts started in spring/summer 2025; analysis of the retrospective cohort will be completed in 2026, while the prospective cohort will continue until 2035. All included patients undergo comprehensive clinical evaluation, including a cardiopulmonary exercise test, which represents an important methodological novelty in the ongoing international research concerning SCAD. The NOR-SCAD observational studies will form the foundation for a planned randomized controlled trial of exercise-based intervention, potentially in Nordic collaboration, which will be crucial for addressing current knowledge gap regarding cardiac physical and mental rehabilitation after SCAD.

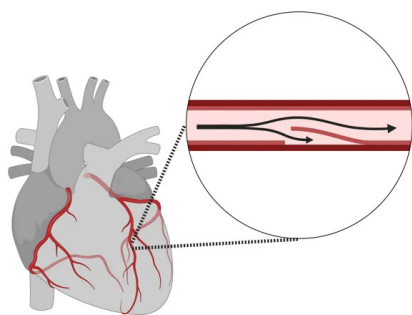
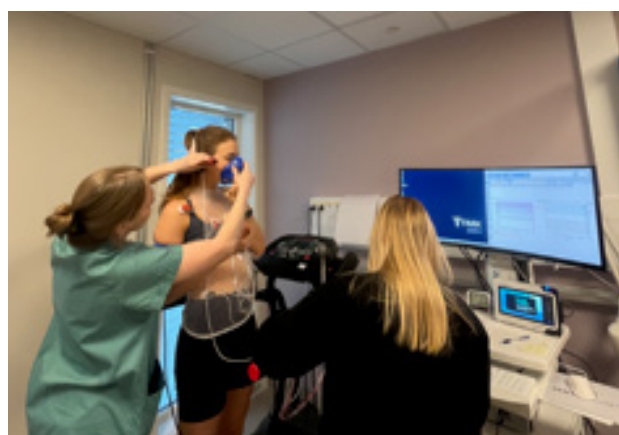


Illustration showing spontaneous coronary artery dissection (SCAD) in a coronary artery.

Illustration: BioRender



Realistic synthetic data speeds up innovation

DIPS have in close collaboration with Simula Research Laboratory developed a method for generating coherent, realistic synthetic patient histories. Meaningful fictional medical records are a game-changer for innovation in e-health. Synthetic medical records give us insight into details before the solutions end up in the hands of users. What does that mean in practice for innovation in ProCardio?

- Development and innovation without legal restrictions related to personal data
- Realistic demos and proof of concept, without access to production data
- Robust testing of integrations in the entire ecosystem around DIPS
- Faster iteration, lower risk, higher quality

The project group (from left Nickolas Forch and Even Moa Myklebust from Simula, and Eivind Holt from DIPS) presenting the ideas and asking for clinical feedback at Soria Moria



International cooperation

ProCardio works with an international perspective where the research methods are of international interest and the innovation projects target the global market. The ProCardio partnership includes two partners outside Norway (Medtronic, the Netherlands and the Baker Heart and Diabetes Institute, Australia in addition to GE HealthCare, which is a global institution. In 2025 ProCardio both continued its ongoing international business as well as established new international collaborations and partnerships.

- ProCardio, through OUH and UiO, has an ongoing collaborative project with the University of Minnesota, USA, on translational research in Lamin cardiomyopathy, involving basic research in the USA based on clinical data from Norway. Funding: Norwegian Centennial Chair (NOCC) grant, Minnesota, USA. In May 2025, project leader Nina Hasselberg was invited to a collaboration meeting and as invited international speaker at Grand Rounds at the University of Minnesota in Minneapolis.
- Kristina Haugaa led the task force for the new European guidelines for cardiovascular disease and pregnancy (“2025 ESC Guidelines for the management of cardiovascular disease and pregnancy”), which were presented at the ESC Congress in Madrid and simultaneously published in the European Heart Journal (EHJ) in August 2025. Nina Eide Hasselberg served as the coordinator for the guidelines, and Mette-Elise Estensen was a member of the task force
- In 2025, ProCardio initiated and established the international collaborative study Drugs-In-Pregnancy (BrS-DIP), which investigates anesthesia treatment during pregnancy and childbirth in Brugada syndrome. The project is led by PhD candidate Anna Sørлие (OUH) in collaboration with centers in the Netherlands (Amsterdam), Italy (Lugano), and Sweden (Lund and Stockholm).
- ProCardio participated in the international multicenter drug study Odyssey. ProCardio at OUH, with Kristina Haugaa as Norway’s PI, randomized and followed three patients in the study. In the spring of 2025, the study was terminated early because no improvement was found in the two primary endpoints: maximal oxygen uptake and health status. The study was presented at ESC 2025 in Madrid.
- ProCardio at OUH is a central part of the Nordic ARVC registry. In 2025, Kristina Haugaa participated in the annual collaboration meeting in Copenhagen, and we also took part in several web-based meetings throughout the year.
- In 2025, ProCardio continued its international research collaboration on AMVP, led by Dr. Sabbag at Chaim Sheba Medical Center, Israel.
- ProCardio participates in an international cardiomyopathy registry led by Johns Hopkins University, Baltimore, MD, USA.
- ProCardio has taken part in an international RCT on atrial fibrillation ablation, led by Uppsala University Hospital, Sweden.
- ProCardio OUH collaborate with the

University Hospital in Brussels, Belgium, on cardiac arrhythmias and sudden death.

- The collaboration between Medtronic Bakken Research Center (BRC) in Maastricht, Netherlands on the ProCardio project NeuECG has evolved further during 2025.
- Through its extensive global network, Medtronic is an active participant in international research collaboration. Several projects are directly linked to ProCardio research, particularly in arrhythmia and sudden cardiac death.
- ProCardio, with NTNU and OUH, is thoroughly involved in high frame rate projects at University of Leuven, Belgium.
- NTNU has an ongoing collaboration with Prof. Olivier Bernard at INSA Lyon in France, on developing AI-based strain imaging trained using advanced ultrasound imaging simulations
- GEVU has an extensive global network and actively engages in international research collaboration. Several of these projects are directly linked to ProCardio research in areas such as functional ultrasound imaging for assessing heart failure and risk of sudden cardiac death.
- GEVU collaborates with some of the world's leading institutions; UCSF, Brigham and Women's Hospital, Massachusetts General Hospital, Baker Heart and Diabetes Institute in Melbourne, and several European institutions have been engaged.
- NTNU has an ongoing collaboration with KU Leuven and GE Vingmed Ultrasound on high frame rate imaging, and what is called shear wave imaging (SWI) or more broadly mechanical wave imaging (MWI). The aim of the collaboration is to: 1) Research the potential of measuring the velocity of short-lived mechanical waves in the myocardium produced by natural cardiac events such as valve closure and the atrial kick. 2) Innovate by developing measurement analysis tool for clinical use, as an App working in the GE HealthCare system.
- Simula collaborates closely with research groups in the USA and Europe, including University of California campuses (San Diego, San Francisco, Berkeley), Tulane University, King's College London, Imperial College London, University of Utah, INRIA Sophia Antipolis, Karlsruhe Institute of Technology, Germany, and the University of Copenhagen, Denmark.
- Simula has a particularly extensive collaboration with UCSD (called SUURPh), focusing on researcher training and PhD exchange in scientific computing and biomedical applications, primarily related to cardiac and neurophysiology. Additionally, Simula collaborates closely with UC Berkeley through the SIMBER project (The Simula Berkeley Education and Research Collaboration), funded through the INTPART program.
- SEARCH project. EU Innovative Health Initiative. Simula and SimulaMet are partners. 2024–2028. Co-PI: Molly Maleckar. The Synthetic Healthcare Data Governance Hub (SEARCH) promotes development in digital health and AI-driven diagnostics. Horizon Europe. Initiated outside ProCardio but with strong potential for collaboration and knowledge transfer.

International visiting researchers

- Dr. Alexandra Apostu has been a visiting researcher at ProCardio from September 2025. Dr. Apostu normally works as a cardiologist and PhD fellow at the Emergency Institute for Cardiovascular Diseases 'Prof. Dr. C.C. Iliescu' in Bucharest, Romania. Her research project focuses on arrhythmogenic cardiomyopathy, particularly desmoplakin (DSP) cardiomyopathy. The aim of the work is to identify arrhythmia risk markers in carriers of DSP mutations using multimodal imaging, in order to improve decision-making regarding ICD implantation. She contributes actively with expertise in cardiac MRI.

During her research at ProCardio, she conducted a prospective, multicenter study including patients with DSP cardiomyopathy from two European referral centers in Oslo and Bucharest. The study involved a comprehensive analysis of ECG findings and advanced echocardiographic parameters, including left ventricular global longitudinal strain, mechanical dispersion, and right ventricular free wall strain. On cardiac magnetic resonance (CMR), late gadolinium enhancement (LGE) extent, mass, and distribution were systematically assessed. This work provided an integrated electro-mechanical characterization of

DSP cardiomyopathy and contributed to the identification of novel predictors of ventricular arrhythmias. These findings may improve arrhythmic risk stratification and optimize primary preventive ICD decision-making in patients with DSP cardiomyopathy.

- Dr. Teodora Gardovic from Sweden has been a visiting researcher at ProCardio from September to December 2025. During this period, Dr. Gardovic has been involved in a project on improved risk stratification and the development of a risk calculator for patients with arrhythmogenic mitral valve prolapse (AMVP), the establishment of a patient cohort for Fabry disease, and participation in follow-up project on long QT syndrome.

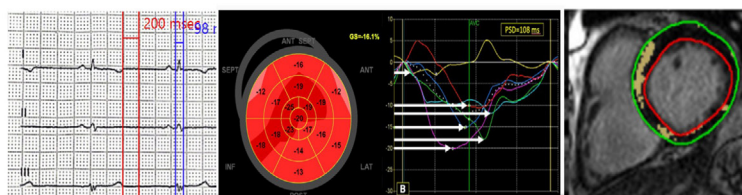
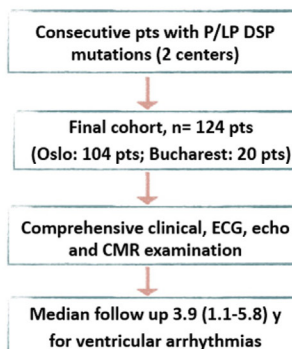


Oslo University Hospital, Rikshospitalet



Emergency Institute for Cardiovascular Diseases, Bucharest

Prospective, multicentric study



New Members



Robert Bigseth, OUH
MD, PhD fellow

Focus: Cardiogenetics, inherited ion channel diseases, athletes and sudden cardiac death



Eirunn Røtnes, OUH
MD, PhD fellow

Focus: Spontaneous coronary artery dissection



Joshua Hammer-Rav, OUH
MD, PhD fellow

Focus: Mitralprolps and arrhythmias



Ragnhild Rønningen, OUH
Research nurse



Cordelia Hellestrand, UiO
Medical research track student

Focus: Exercise in Titin



Alexandra Apostu, UiO
MD, Guest researcher, Romania

Focus: Cardiomyopathies and mulitmodality imaging



Teodora Gardovic, UiO
MD, Guest researcher, Sweden

Focus: Arrhythmogenic mitral valve, Fabry and long QT syndrome



Even Moa Myklebust, Simula
Data Scientist

Focus: Machine learning, time series modeling, latent variable analysis, sampling



Alf Grini, GEVU
Engineer

Focus: High frame rate imaging



Aslak W. Kristoffersen, OUH
MD, PhD-fellow

Focus: Cardiomyopathies in children



Harald M. Dobloug, DIPS
MD, Head of Clinical AI

Focus: Artificial intelligence in EPJ



Communication and dissemination activities

Deformation Imaging Meeting 2025

A large delegation from Norway was present at the annual Deformation Imaging Meeting in Leuven, February 2025., including several from ProCardio (NTNU and OUH). The meeting is an interactive state-of-the-art symposium focusing on clinical and pre-clinical research in myocardial function imaging.



Several members of ProCardio (OUH, NTNU, GEVU) attended the annual Deformation Imaging Meeting in Leuven

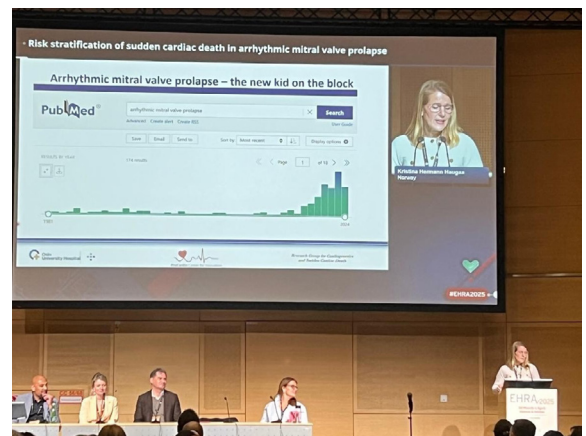


PhD-fellow Henrik Kildahl and Postdoc Sigurd V. Wifstad presented their work on AI-based mitral valve disease quantification.

EHRA European Heart Rhythm Association 2025

The annual meeting of the European Heart Rhythm Association (EHRA) convenes scientists, healthcare professionals and other stakeholders involved in arrhythmia management from all around the world.

EHRA 2025 brought together experts across a wide range of disciplines including sudden cardiac death, ventricular arrhythmias, device therapy, syncope and bradycardia. Research presented at EHRA also explored how AI can be used in arrhythmia prevention and management. Professor Kristina Haugaa was invited to present Risk stratification of sudden cardiac death in arrhythmic mitral valve prolapse.



SCAD dagen June 8th

T-leader Mette Estensen and PhD-fellow Anna Sørliie was invited to SCAD dagen at Lovisenberg rehabilitering, Gardermoen to talk about the ongoing NOR-SCAD projects in ProCardio.



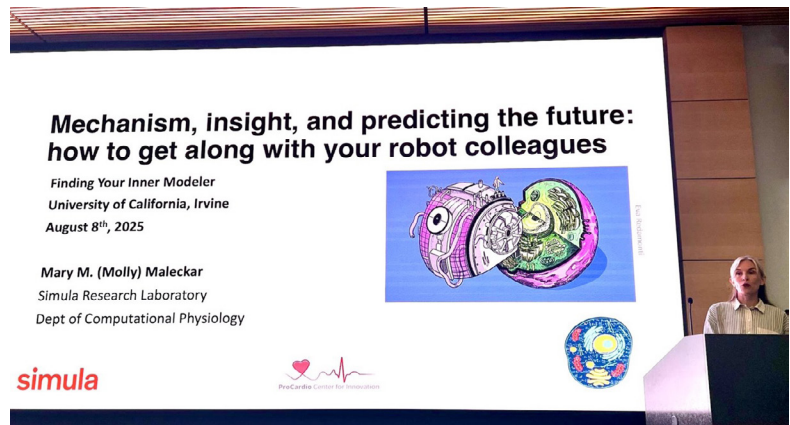
Simula Research Days June 12th

The ProCardio team gave an introduction and practical demonstration of echocardiography. ProCardio represented by Phd-fellow Anna Sørliie (OUH), PhD-fellow Giulia Monopoli (Simula) and Adjunct Research Professor Molly Maleckar (Simula).



Finding Your Inner Modeler NSF workshop

Molly Maleckar was invited to give the presentation “Mechanism, insight, and predicting the future: how to get along with your robot colleagues”.



European Society of Cardiology (ESC) Congress 2025

The ESC Congress took place in Madrid from August 29th to September 1st, gathering more than 30.000 participants. One of the highlights of the conference, in particular for ProCardio, was the presentation of the New European Guidelines for cardiovascular disease and pregnancy.

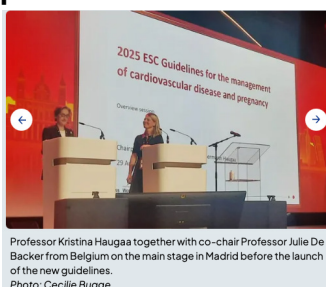


ProCardio was well represented at ESC in Madrid

OUH leads on new European Guidelines



Kristina Haugaa during the press conference after the guideline release.
Photo: Siri Holm Solberg

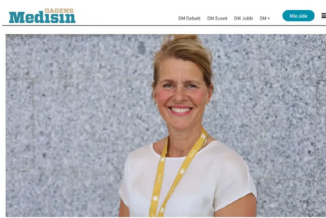


Professor Kristina Haugaa together with co-chair Professor Julie De Backer from Belgium on the main stage in Madrid before the launch of the new guidelines.
Photo: Cecilie Bugge

Kristina Haugaa chaired the Task Force for the 2025 European Society of Cardiology guidelines on cardiovascular disease and pregnancy, presented at the ESC Conference in Madrid and simultaneously published in the European Heart Journal in August 2025.

Also, the ProCardio team leaders Nina Eide Hasselberg and Mette-Elise Estensen were part of these guidelines and served as coordinator and Task Force member, respectively. Congratulations to all on this impressive and persistent effort!

There was great interest in the new European guidelines on heart disease and pregnancy.



Flere nye ESC-retningslinjer: OUS-lege ledet arbeid med ESC-retningslinje

Professor Kristina Haugaa fikk mye skyte for å lede arbeidsgruppen gjennom revideringen av retningslinjene.
Foto: Michael Chr. A. Simonson, Dagens medisin

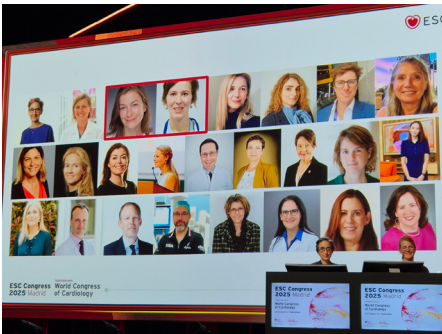


Presenterte om nye ESC-retningslinjer og erfaringer fra Rikshospitalet



Ekspertene Isotta Castrini og Kristina Haugaa gjennomgår de viktigste oppdateringene i ESCs nye retningslinjer
Foto: ESC

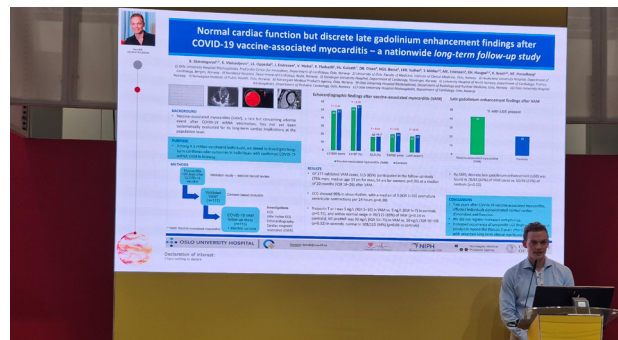
On behalf of the Council for Cardiovascular Genomics, Dr. Anna Isotta Castrini interviewed Professor Kristina Haugaa. During the interview, published on the ESC website, they highlighted key updates and explored how these recommendations will shape clinical practice moving forward.



ProCardio PhD-fellows also presenting their work at ESC:



PhD-fellow Cecilie Bugge presented her work on mitral valve prolapse. King Felipe VI of Spain visited the research area this day



PhD-fellow Bendik Skinningsrud Hagen presented his work on COVID-19 vaccine-associated myocarditis in Norway

During one of the Hot-line sessions the norwegian BETAMI-DANBLOCK trial was presented. ProCardio researchers have have been part of this important trial.

GE HealthCare Vivid Pioneer



At ESC 2025 in Madrid, ProCardio industrial partner GE HealthCare introduced its latest ultrasound platform, the Vivid™ Pioneer, further advancing innovation in cardiovascular imaging.

ProCardio Board Member Bård Moseng in front of the new released Vivid™ Pioneer



Medtronic

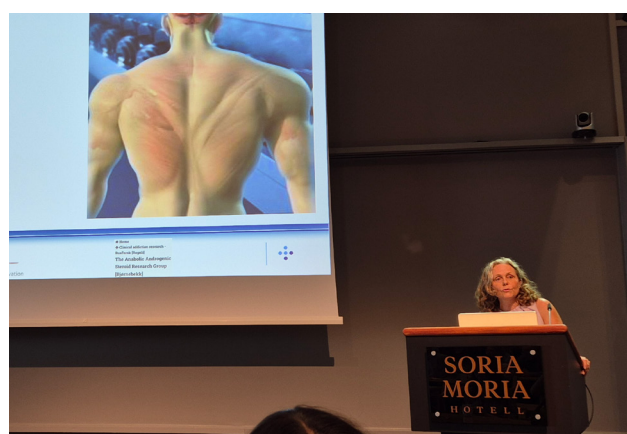
ESC is an important arena for collaboration and knowledge sharing for Medtronic, here represented by Board Member Mirko deMelis and Anders Milch

23rd Annual Norwegian Symposium on Heart Research

The 23rd Annual Norwegian Symposium on Heart Research, organized by Department of Cardiology, Oslo University Hospital in collaboration with ProCardio and Norheart, took place on September 11th and 12th. A consistent group of young and senior cardiologists, researchers, and PhD students gathered for the symposium held at Soria Moria Hotel.



Bendik Skinningsrud Hagen



Vibeke M. Almaas

ProCardio PhD-fellow Bendik Skinningsrud Hagen displayed his work with an abstract on the topic Covid 19 vaccine-associated myocarditis in Norway. Dr. Vibeke M. Almaas presented results from the study on effects of anabolic-androgenic steroids on cardiac function. In addition, several ProCardio affiliated senior doctors and researchers had important roles as chairs, moderators and in the panels.



Key note speaker, Connie Bezzina, from Amsterdam was invited to give a speak on Polygenic risk scores and risk assessment. ProCardio had also arranged for a fruitful workshop with Connie Bezzina besides the symposium program.

NCS Fall meeting 2025

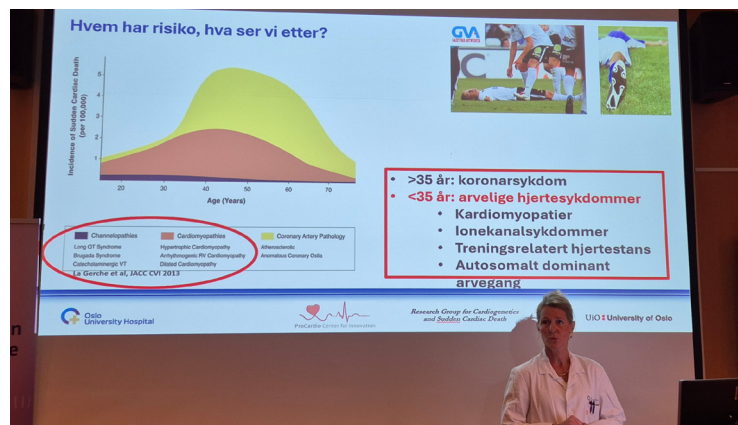
The fall meeting of the Norwegian Society of Cardiology was held at Scandic Hotel, Holmenkollen Park. The meeting is well attended by cardiologists from all over Norway and includes sessions on relevant clinical topics as well as research presentations and clinical cases. ProCardio PhD fellows Bendik Skinningsrud Hagen and Lisa Marie Selmer presented abstracts. Several of ProCardio's senior researchers served as session chairs. Bendik Skinningsrud Hagen won the prize for the best abstract presentation and Lasse Løvstakken won the prestigious NCS Research Award 2025.

Verdens hjertedag 2025 – 29.september

ProCardio, together with LHL, NCS, Novartis and Amgen, hosted a breakfast seminar on World Heart Day with the theme 'From prevention and elite sports to cardiac arrest and rehabilitation'. The seminar, which gathered around 80 participants in the auditorium at Rikshospitalet and more than 200 digital attendees, highlighted the heart's role across different life stages and situations – from peak athletic performance to sudden cardiac arrest and the road back through rehabilitation.



The Secretary-General of the Norwegian Heart and Lung patient organization (LHL).



Professor Kristina Haugaa addressed how the heart of elite athletes can develop adaptations that resemble disease.



Yngvild Larsen (LHL) led the panel debate on heart screening in athletes. Participants (from left), Dr. Erik Ekker Solberg, Dr. Hilde Moseby Berge and former professional soccer player participated in the debate.

Computing in Cardiology Annual Conference

Simula was well attended at the conference in Brazil this year. PhD-fellow Giulia Monopoli presented her work on “MRI derived mitral valve and ventricle shape biomarkers for arrhythmic mitral valve syndrome” and senior researcher Joakim Sundnes presented “Polynomial Chaos Expansion, AI and data assimilation for uncertainty quantification of cardiac mechanics”. In addition, Molly Maleckar co-chaired the session on modelling atrial electrophysiology and fibrillation.



Simula Summer School in Computational Physiology

The University of California, San Diego (UCSD) has promoted long-standing research collaborations with the University of Oslo (UiO) and Simula Research Laboratory (Simula), focused on multiple aspects of computational physiology. This joint summer school, now in its 12th year, has emerged based on the complementary expertise and shared educational goals of these three institutions.

The core goal of the summer school is to promote successful research collaboration between the host institutions, with particular emphasis on the training of excellent Ph.D. candidates.

The annual Summer School in Computational Physiology is organised as part of the SUURPh program. Usually between 24-30 students join this international course every year.

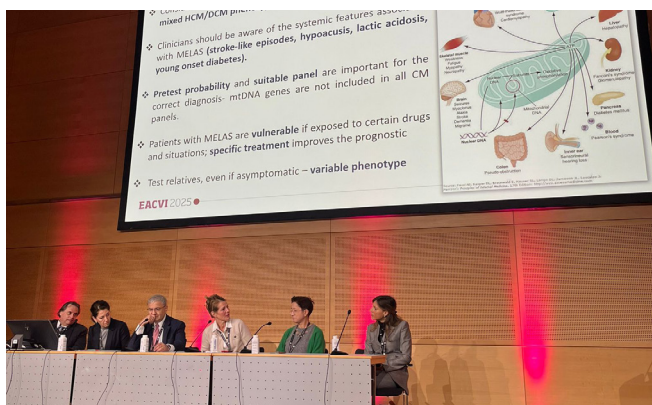
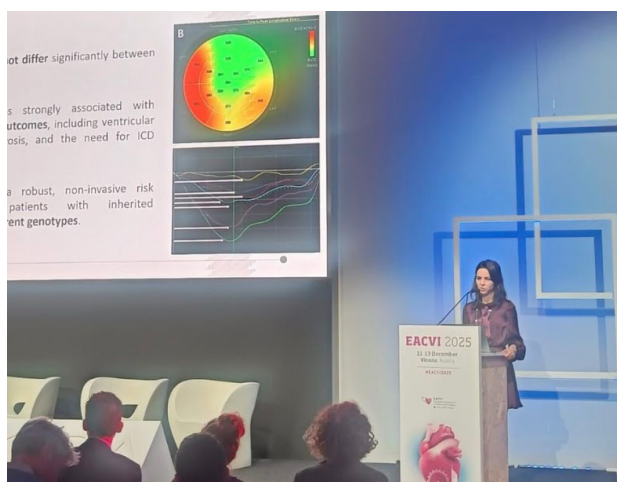
This school includes both targeted research lectures and a practical project component. The lectures are conducted over 2 weeks in Oslo in June. Students complete a group research project in their area of interest and write up the project methods and results during the second half of the school, held in San Diego in August.

The material covered by this summer school focuses on fundamental principles of mathematical modeling in electrophysiology and biomechanics. Specifically, the lectures will address cellular and subcellular biophysical processes responsible for electrical activation in cardiac muscle cells, frameworks for tissue scale electrical signal propagation, and cellular- and tissue-level contractile mechanics in the heart.



EuroEcho 2025

At the EACVI Congress 2025 in Vienna, our guest researcher, Alexandra Apostu, presented her study on left ventricular mechanical dispersion across different genotypes in dilated cardiomyopathy.



Faces and Places: Snapshots from 2025

Arendalsuka 2025



Bridging the gap in sex differences



Meeting at the ministry of education
earch



NRC expert panel evaluation



LaMinOs: University of Minnesota



Inven2 Innovasjonspris



Sinergy 2025 Belgrade



Nobel prize winner Prof. Brunkow



St. Olavs konferansen



News, Podcasts, and Public Engagement

Can this AI model transform heart disease diagnosis?



Can this AI model transform heart disease diagnosis?

[Read the article here](#)



Åpent hjerte med VMH

15 min • Åpent hjerte med VMH

Åpent

Åpent hjerte med VHM

[Listen to the podcast here](#)

OUS INNSIKT

Når hjertet svikter uten forvarsel – jakten på de skjulte genene

En ung kvinne i 20-årene kolliderer med hjertestans – tilsynelatende frisk. Det viser seg at hun har en arvelig hjertesykdom. Professor Kristina Haugaa ved Oslo universitetssykehus har viet karrieren til å forstå hvorfor dette skjer – og hvordan det kan forhindres.

Siri Holm Solberg, ProCardio, Kardiologisk avdeling, Oslo universitetssykehus, (OUS) Rikshospitalet
Publisert 16.12.2025
Sist oppdatert 16.01.2026



Marit Haugdahl fra Voksne med medfødt hjertefeil (VMH) inviterte Kristina Haugaa fra OUS til å snakke om genetiske hjertefeil i podkasten Åpent Hjerte. Bildet er fra Verdens hjertedag, hvor også Carl-Erik Torp delte sin historie.
Foto: Kristina Haugaa

Når hjertet svikter uten forvarsel - jakten på de skjulte genene

[Read the article here](#)



DELER AV FORSKNINGSTEAMET: (F.v) Håvard Dalen, overlege ved St. Olavs hospital og professor ved NTNU, Bjørnar Grenne, overlege ved St. Olavs og førsteamanuensis ved NTNU, Espen Holto, overlege ved St. Olavs og førsteamanuensis ved NTNU, Andreas Østvik, sivilingeniør og forsker ved NTNU og SINTEF Digital, og professor Lasse Levstakken ved NTNU. Foto: NTNU

Norsk KI-forskning trekkes frem som verdensledende

Norsk KI-forskning trekkes frem som verdensledende

[Read the article here](#)



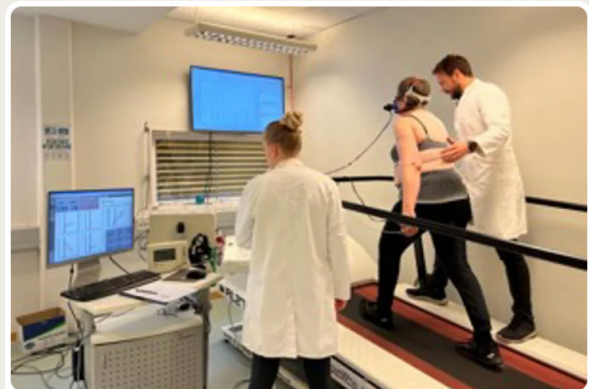
St.Olav and NTNU researchers present their AI-driven cardiac ultrasound technology to the Minister of Health, Jan Christian Vestre during his visit to St.Olavs hospital.

St.Olav hospital and NTNU develop AI that can make cardiac ultrasound faster, simpler and more precise. With more than 200,000 examinations performed annually in Norway, improved workflow and high quality have a major impact on patient care. This work is the result of close collaboration between clinicians, engineers and researchers, and the international recognition as “world leading” reflects the dedication of many colleagues committed to improving treatment for heart patients

The Impact of Exercise after Breast Cancer Treatment

The CAUSE Study (Cardiovascular Survivors Exercise) is a randomized controlled trial that investigates the effects of endurance training in long-term breast cancer survivors. The study clearly shows that aerobic exercise can have a significant positive impact on quality of life, physical fitness, and mental health in long-term survivors, emphasizing the importance of physical activity in rehabilitation.

| Published 5/26/2025



All patients were tested on a treadmill at the beginning and the end of the study.
Photo: Mall Sæter

The impact of exercise after Breast Cancer Treatment

[Read the article here](#)

[Read the related article on TV2 here](#)

Awards

NCS Research Award 2025 to Lasse Løvstakken

Professor Lasse Løvstakken, NTNU, was awarded the 2025 Norwegian Society of Cardiology (NCS) Research Award. The award recognizes his 15 years of dedication in the development of echocardiography and ultrasound technology for cardiac diagnostics.

Sitat: We congratulate Lasse on the well-deserved research award and thank him for his significant contributions to cardiology research in general – and for all his valuable contributions to ProCardio in particular.

Professor Kristina Haugaa, ProCardio Center Director

[Read more on our website.](#)



Lasse Løvstakken receives the Research Award at NCS.

NCS Best Abstract 2025

During the Research Session at the NCS Fall Meeting 2025, Bendik Skinningsrud Hagen, a PhD-fellow from ProCardio, was awarded Best Abstract. Bendik presented his work on COVID-19 vaccine-associated myocarditis in Norway

[Read more on our website.](#)



Bendik Skinningsrud Hagen receives the award "Best Abstract" of the NCS Fall Meeting 2025. Photo: Private

Frampeik 2025 Best Presentation

The Frampeik conference bring together research track students from across the country. Cordelia Hellstrand was awarded Best presentation for her work on the effect of physical exercise in the development of TTN-related dilated cardiomyopathy.

[Read more on our website](#)



Cordelia Hellstrand receives the award "Best Presentation" at Frampeik 2025.

Photo: Private

Publication of the Year 2024 at St. Olavs, awarded in 2025

The PUBLICATION OF THE YEAR award was presented to a research group from the Department of Cardiology and Cardiothoracic Surgery, which, in collaboration with NTNU, has developed an entirely new method that uses artificial intelligence to make cardiac ultrasound significantly more efficient.



From left: Clinic director Ole Christian Mjølstad, researchers Andreas Østvik og Erik Smistad, senior consultants Torvald Espeland, Espen Holte and Bjørnar Grenne, principal investigator/last author Håvard Dalen and Hospital Chief executive Tom Christian Martinsen. Photo: Geir Otto Johansen/St. Olavs hospital

Publication: ["Automatic measurements of left ventricular volumes and ejection fraction by artificial intelligence: clinical validation in real time and large databases"](#). Sindre Olaisen, Erik Smistad, Torvald Espeland, Jieyu Hu, David Padeloup, Andreas Østvik, Svend Aakhus, Assami Rösner, Siri Malm, Michael Stylidis, Espen Holte, Bjørnar Grenne, Lasse Løvstakken, and Håvard Dalen. Eur Heart J Cardiovasc Imaging. 2024; 25:383–95

Dissertation

Lena Myklebust

Modeling the Electrophysiology and Mechanics of Ventricular Arrhythmia

May 21, 2025

Adjudication committee

- First opponent: Dr., PhD Caroline Roney, University of London, UK
- Second opponent: Associate Professor Luca Dede, Politecnico di Milano, Italy
- Third member and chair of the evaluation committee: Professor Torbjørn Rognes, University of Oslo, Norway

Chair of the Defence

Associate Professor Ellen Munthe-Kaas, Department of Informatics, University of Oslo

Principal Supervisor

Senior Research Scientist Hermenegild Arevalo, Simula Research Laboratory

Co-supervisors

Professor Aslak Tveito, Simula Research Laboratory

Summary

Irregular heart beats can lead to a sudden stop in heart function and is an important cause of death worldwide. However, the disease mechanisms which lead to dangerous heart rhythms are often unclear. Therefore, improved methods for understanding and diagnosing heart rhythm disorders are needed.

One approach is to use computational methods to model the physics of the heart. Computer models can be used to calculate the electrical activity and movement of the heart, which determines the heart beat. By building these models from medical images, the risk of



dangerous rhythms in individual patients may be predicted.

Through computational modeling, this thesis investigates how irregular heart rhythms may arise in patients with heart disease. Specifically, we look into irregular rhythms caused by tissue damage and abnormal movement. We also study and compare different computational approaches for predicting patient risk. Finally, we contribute to the development and validation of software which models the interaction between electrical activity and movement of the heart.

Artem Chernyshov

Automated analysis of the right ventricle with efficient deep learning methods in 2D echocardiography

May 28, 2025

Adjudication committee

- First opponent: Dr. Alberto Gomez, Ultromics Ltd, Oxford, United Kingdom
- Second opponent: Professor Michael Kampffmeyer, Department of Physics and Technology, The Arctic University of Norway (UiT), Tromsø, Norway
- Third member and chair of the evaluation committee: Associate Professor Garbiel Kiss, Department of Computer Science, Norwegian University of Science and Technology, Trondheim, Norway

Chair of the Defence

Associate Professor Garbiel Kiss, NTNU

Principal Supervisor

Professor Lasse Løvstakken, NTNU

Co-supervisors

Dr. Andreas Østvik, NTNU

Associate Professor Bjørnar Grenne, NTNU

Dr. Svein Arne Aase, GE Vingmed Ultrasound AS

Summary

Echocardiography is the main tool for assessing heart health, but image interpretation remains difficult and prone to variability, even for experts. Deep learning-based AI tools have been proposed to aid analysis and enable real-time measurements, but current solutions are still limited. They mainly focus on the left ventricle (LV), require high computational power, and often neglect the right ventricle (RV), which is



important for diagnosing many heart and lung conditions. These limitations hinder their use in low-resource settings.

The work aimed to broaden AI's role in echocardiography by developing efficient deep learning methods for analyzing the RV in 2D echo. The goal was to include RV assessment without adding to clinician workload and to support wider adoption in diverse healthcare settings.

Three contributions supported this goal: simplifying LV segmentation models, applying the obtained insights to RV segmentation, and streamlining an advanced tracking method for RV myocardium. Results showed that RV analysis can be accurate and efficient with lightweight models, with especially strong gains in tracking performance. These improvements may also benefit LV analysis.

Julie Uv

Computational Study of the Fetal ECG

June 3, 2025

Adjudication committee

- First opponent: Senior scientist Matthijs Cluitmans, Maastricht University Medical Center, The Netherlands
- Second opponent: Assistant Professor Karli Gillette, University of Utah, USA
- Third member and chair of the evaluation committee: Associate Professor Håkon Kvale Stensland, University of Oslo

Chair of the Defence

Head of Department, Professor Ole Christian Lingjærde, University of Oslo

Principal Supervisor

Senior Research Scientist Hermenegild Arevalo, Simula Research Laboratory

Co-supervisors

Research Scientist Johannes Langguth, Simula Research Laboratory
Professor Aslak Tveito, Simula Research Laboratory

Summary

Monitoring a baby's heart during pregnancy and labor is vital for detecting issues like fetal hypoxia, growth restriction, or congenital heart disease. While cardiotocography (CTG) is widely used, it has limitations in accuracy. A promising alternative is non-invasive fetal ECG (NI-fECG), which offers more detailed information of the fetal cardiac activity. However, a key challenge is separating fetal signals from maternal ones, prompting the need for better computational methods.



This thesis presents a new computational framework using mono- and bidomain equations to model fetal ECG and study how factors like vernix caseosa (a waxy skin coating), cardiac ischemia, and fetal position affect signal quality and diagnostic markers. Findings show vernix caseosa, fetal ischemia and fetal position can alter markers such as the T/QRS ratio, while time-based features such as QT and QRS intervals stay relatively consistent across different positions.

Overall, the approach provides a foundation for bidomain-based computational models of fetal ECG, as well as a method for evaluating and improving signal processing algorithms, potentially leading to better prenatal care.

John Nyberg

Strain echocardiography in healthy and diseased populations using speckle tracking and deep learning

June 18, 2025

Adjudication committee

- First opponent: Professor Frank A. Flachskampf, Uppsala universitet, Sweden
- Second opponent: Associate Professor Dana Cramariuc, Universitetet i Bergen
- Third member and chair of the evaluation committee: Professor Arne Seternes, NTNU

Chair of the Defence

Guri Greiff, St.Olavs Hospital

Principal Supervisor

Associate Professor Bjørnar Grenne, NTNU

Co-supervisors

Professor Lasse Løvstakken, NTNU

Professor Håvard Dalen, NTNU

Dr. Andreas Østvik, NTNU

Summary

Echocardiographic measurement of cardiac deformation is an accessible and relatively inexpensive clinical tool that provides important diagnostic and prognostic information. The drawbacks of conventional methods are high time consumption and significant operator-related measurement variability.

This thesis comprises three papers. In the first study, we measured global deformation (strain) in all four cardiac chambers using a conventional semiautomatic method in echocardiograms from participants in the fourth wave of the Trøndelag Health Study (HUNT). We evaluated which clinical characteristics varied the most with the deformation measurements in the healthy study participants without cardiac disease,



to construct reference ranges of deformation measurements adjusted for age, sex, and other clinical characteristics.

In the second study, we compared the reproducibility of deformation measurements in smaller regions of the left ventricle between two consecutive echocardiograms. A novel method based on artificial intelligence (AI) measured all images fully automatically, and it was compared against a conventional semi-automatic method. The AI-based method had better reproducibility for regional deformation measurements compared to the conventional method, equivalent to the reproducibility of the most used method to measure global left ventricular deformation.

In the third study, we analyzed the degree of deformation and the variation in the time to peak deformation in the left ventricle (mechanical dispersion) in patients with heart failure and reduced ejection fraction. The measurements were performed using a novel AI-based method, which fully automatically measured all images. The measurements were compared with conventional semiautomatic measurements. The combination of strain and mechanical dispersion showed an important prognostic value in identifying patients at high risk of developing life-threatening arrhythmia.

Jorun Tangen

Disease manifestations and prognostication by imaging and echocardiography in covid-19 patients and in patients with myocardial infarction

June 24, 2025

Adjudication committee

- First opponent: Assistant Professor Luna Gargani, University of Pisa, Italy
- Second opponent: Professor Mai Tone Lønnebakken, University of Bergen, Norway
- Third member and chair of the evaluation committee: Professor Dan Atar, University of Oslo

Chair of the Defence

Associate Professor Lars Fjellbirkeland, University of Oslo

Principal Supervisor

Professor II Thor Edvardsen, University of Oslo

Co-supervisors

Professor Kristina Haugaa, University of Oslo
Professor Helge Skulstad, University of Oslo

Summary

Research has highlighted a concerning prevalence of cardiac abnormalities in hospitalized COVID-19 patients.

Acute myocardial infarction remains a significant global health challenge. An enlarged left atrium in patients with myocardial infarction has shown increased mortality risk in patients with myocardial infarction for two decades ago.

The aims of the thesis were to emphasize the crucial role of echocardiography in identifying conditions that can reveal cardiac damage after COVID-19 infection and myocardial infarction which can elevate the risk of adverse outcome



by doing echocardiography of patients 3 months recovery of COVID-19 and before discharge of patients with acute myocardial infarction.

Improved echocardiographic method using speckle tracking, which is a method that visualizes how the heart muscle moves and deforms, the atrial function can be measured in different phases.

The heart function of hospitalized COVID-19 patients three months recovery was minimally affected.

Despite advancements in treatment for patients with myocardial infarction over the past two decades an enlarged left atrium remains as a significant prognostic factor.

The residual phase where the atrium fills with blood was together with the size of the atrium significant predictors of adverse outcome in patients with myocardial infarction.

Overall, these studies show the importance of echocardiography as a tool for early detection of heart disease. This can provide physicians with the opportunity to initiate treatment and other measures that may reduce the risk of adverse events.

Tove Elizabeth Hunt

Patients with atrial fibrillation and obstructive sleep apnea: Impact of continuous airway pressure treatment

Oct 17, 2025

Adjudication committee

- First opponent: Professor Carina Blomström-Lundqvist, Uppsala University, Sweden
- Second opponent: Associate Professor Sverre Lehmann, University of Bergen, Norway
- Third member and chair of the evaluation committee: Professor Jørgen Gravning, University of Oslo

Chair of the Defence

Associate Professor Lars Fjellbirkeland, University of Oslo

Principal Supervisor

Senior Consultant Ole-Gunnar Anfinson, Oslo University Hospital

Co-supervisors

Professor Kristina Haugaa, University of Oslo
Professor Lars Gullestad, University of Oslo

Summary

Atrial fibrillation (AF) is the most common sustained arrhythmia, while obstructive sleep apnea (OSA) is a frequent and often underdiagnosed comorbidity. Both conditions are associated with increased risk of stroke, heart failure, and death, yet their interplay remains insufficiently understood.

Continuous positive airway pressure (CPAP) is the established treatment for OSA, but its role in AF has been unclear.



This doctoral thesis presents the first randomised controlled trial to systematically investigate CPAP therapy in patients with AF and OSA, both before and after catheter ablation with pulmonary vein isolation (PVI) for AF.

Continuous rhythm monitoring with implantable loop recorders and carefully measured CPAP adherence enabled detailed assessment of AF burden, recurrence after ablation, cardiac remodelling, and inflammatory mechanisms.

The work provides novel insights into the relationship between OSA and AF and represents a significant scientific advance in the field.

Christian K. Five

Mitral Valve Prolapse: Clinical Risk Stratification and Systemic Associations

Dec 15, 2025

Adjudication committee

- First opponent: Senior Consultant Cardiologist Marta De Riva Silva, Leiden University Medical Center, Netherlands
- Second opponent: Senior Consultant Cardiologist Thomas Gero von Lueder, Oslo Kardiologi, Norway
- Third member and chair of the evaluation committee: Professor Erik Øie, University of Oslo

Chair of the Defence

Associate Professor Lars Fjellbirkeland, University of Oslo

Principal Supervisor

Professor Kristina Haugaa, University of Oslo

Co-supervisors

Nina Eide Hasselberg, Oslo University Hospital

Summary

Mitral valve prolapse (MVP) is usually a benign condition, yet a minority of patients developed severe ventricular arrhythmias that may lead to syncope or, rarely, sudden cardiac death. This thesis examined clinical markers, electrophysiological features, lifestyle factors, and systemic associations that may influence arrhythmic risk in MVP.

The overall aim was to assess factors related to ventricular arrhythmias by reviewing clinical records, performing structured assessments, and analysing imaging, Holter data, and exercise testing.



Lifetime exercise dose was not associated with severe ventricular arrhythmic events, and exercise exposure did not correlate with established risk factors for severe ventricular arrhythmias. In contrast, non-sustained ventricular tachycardia during exercise stress testing was associated with later severe arrhythmias during follow-up.

Most MVP patients exhibited an increased burden of premature ventricular complexes at higher heart rates, suggesting an adrenergic component. However, PVC profile was not independently associated with severe arrhythmic outcomes. A separate analysis of patients with keratoconus found no increased prevalence of MVP, contradicting earlier reports of a shared mechanism.

Despite methodological limitations, the findings suggested that while cumulative exercise was safe, elevated heart rate may act as an acute arrhythmic trigger in susceptible individuals. Exercise stress testing may therefore be a useful adjunct tool for risk stratification.

Overall, the thesis contributed to improved understanding of arrhythmic mechanisms in MVP and highlighted the need for larger prospective studies.

Appendix

Funding	Amount*
The Research Council	16 035
The Host Institution (Oslo University Hospital)	4 168
Research Partners	
University of Oslo	597
Simula Research Laboratory	679
Norwegian University of Science and Technology	734
Sørlandet Hospital	191
Baker Heart and Diabetes Institute	-
Enterprise partners	
GE Healthcare	604
GE Vingmed Ultrasound	4 890
Medtronic	588
DIPS AS	390
Other Public Funding	3 448
Total	32 324

Cost	Amount*
The Host Institution (Oslo University Hospital)	16 307
Research Partners	
University of Oslo	2 009
Simula Research Laboratory	2 947
Norwegian University of Science and Technology	3 765
Sørlandet Hospital	824
Baker Heart and Diabetes Institute	-
Enterprise partners	
GE Healthcare	604
GE Vingmed Ultrasound	4 890
Medtronic	588
DIPS AS	390
Total	32 324

Personnel

Key Researchers		
Name	Institution	Main research area
Kristina Hermann Haugaa	OUH	Cardiomyopathies, arrhythmias, cardiogenetics
Thor Edvardsen	UiO	Cardiac imaging
Jan Otto Beitnes	OUH	Cardiac imaging, valvular heart disease
Eivind Aabel	OUH	Arrhythmias, cardiomyopathies and clinical trials
Sebastian Sarvari	OUH	Cardiac imaging, Cardiooncology
Øyvind Haugen Lie	OUH	Coronary artery disease, Athletes and arrhythmias/ Invasive cardiology and intensive coronary care
Mette-Elise Estensen	OUH	Pregnancy in heart disease
Eigil Samset	GEHC	Data integration & platform development
Morgan Jakobsen	GEHC	Data integration & platform development
Attila Vojtek	GEHC	Data integration & platform development
Olivier Gerard	GE Vingmed	Data integration & platform development
Jurica Sprem	GE Vingmed	Data integration & platform development
Sten Roar Snare	GE Vingmed	Data integration & platform development
Benjamin Fermann	GE Vingmed	Data integration & platform development
Bård Moseng	GE Vingmed	Data integration & platform development
Cristiano Tiago	GE Vingmed	Data integration & platform development
Tormod Selbekk	GE Vingmed	Data integration & platform development
Molly Maleckar	Simula	Simulation-based data augmentation and therapy optimization
Joakim Sundnes	Simula	Simulation-based data augmentation and therapy optimization
Samuel Wall	Simula	Simulation-based data augmentation and therapy optimization
Gabriel Balaban	Simula/ Kristiania University College	Simulation-based data augmentation and therapy optimization
Hermenegild Arevalo	Simula	Simulation-based data augmentation and therapy optimization
Nickolas Forsch	Simula	Simulation-based data augmentation and therapy optimization
Liv Bollvåg	DIPS	Data integration & platform development
Pål Haugar Brekke	OUH/DIPS	Data integration & platform development
Eivind Holt	DIPS	Data integration & platform development
Lasse Løvestakken	NTNU	Data science and machine learning
Håvard Dalen	NTNU	Data science and machine learning
Bjørnar Grenne	NTNU	Data science and machine learning
Kristian Hveem	NTNU	HUNT genetics
Andreas Østvik	NTNU	Data science and machine learning
Espen Holte	NTNU	Data science and machine learning
Eivind Coward	NTNU	HUNT genetics
Nikhil Arora	NTNU	HUNT genetics
Artem Chernyshov	NTNU	Data science and machine learning

Key Researchers		
Name	Institution	Main research area
Daniela Melichova	SS	Cardiomyopathies
Richard Cornelussen	Medtronic	Biomedical engineering
Per Christiansen	Medtronic	Biomedical engineering
Mirco de Melis	Medtronic	Biomedical engineering
Anders Milch	Medtronic	Biomedical engineering
Gunnar Morne	Medtronic	Biomedical engineering
Kaspar Broch	OUH	Echocardiography and heart failure
Richard Massey	OUH	Echocardiography and heart failure
Lars Aaberge	OUH	Invasive cardiology, Acute cardiovascular care
Thomas Helle Valle	OUH	Myocardial function and Cardiac imaging
Klaus Muhræch	OUH	Echocardiography and heart failure
Christian Eek	OUH	Invasive cardiology and acute cardiovascular care
Njord Nordstrand	OUH	Myocardial function and cardiac imaging
Lars Dejgaard	OUH	Echocardiography and heart failure
Stian Ross	OUH	Electrophysiology and cardiovascular function
Erik Kongsgård	OUH	Electrophysiology and cardiovascular function
John Aalen	OUH	Myocardial function and cardiac imaging
Torbjørn Holm	OUH	Electrophysiology and cardiovascular function
Kristin Nordvoll	OUH	Cardiomyopathies
Elin Bjurstrøm	OUH	Cardiomyopathies
Margareth Ribe	OUH	Myocardial function and cardiac imaging
Roger Håland	OUH	Myocardial function and cardiac imaging
Thea Dalén	OUH	Across all research areas
Eline Schjelderup Myrene	OUH	Across all research areas
Nicole Due-Tønnessen	OUH	Across all research areas
Helen Storaker	OUH	Myocardial function and cardiac imaging
Eystein Skjølvik	OUH	Cardiomyopathies
Sairam Ghanta	OUH	Scientific programmer
Hans Gerhard Suheyl Boss	OUH	Cardiac imaging
Isotta Castrini	OUH	Cardiomyopathies
Erik Lyseggen	OUH	Electrophysiology and cardiovascular function
Ida Skrinde Leren	OUH	Cardiomyopathies
John-Peder Kvitting	OUH	Ventricular arrhythmias in patients with arrhythmic valve syndrome
Vibeke Marie Almaas	OUH	Cardiomyopathies
Tom Marwick	Baker Institute	Cardiooncology
Christian Five	OUH	Cardiomyopathies, arrhythmias

Visiting Researchers					
Name	Affiliation	Nationality	Sex M/F	Duration	Topic
Teodora Gardovic	Karolinske Institutet	Sweden	F	3 months	Arrhythmogenic mitral valve, Fabry and long QT syndrome
Alexandra Apostu	Emergency Institute for Cardiovascular Diseases, Bucharest	Romania	F	3 months	Cardiomyopathies and mulitmodality imaging

Postdoctoral researchers with financial support from the Centre budget				
Name	Nationality	Period	Sex M/F	Topic
Nina Hasselberg	Norwegian	01.05.2021-30.04.2025	F	Disease progression and risk assessment in familial cardiomyopathies and arrhythmogenic mitral valve prolapse
Sigurd V. Wifstad	Norwegian	01.06.2024 – 29.11.2026	M	Echo-cardiography, mitral valve disease, blood flow imaging, deep learning
Davis Padeloup	French	01.06.2024 – 29.11.2026	M	Echocardiography, deep learning, improved patient follow-up

Postdoctoral researchers working on projects in the centre with financial support from other sources					
Name	Funding	Nationality	Period	Sex M/F	Topic
Marit Kristine Smedsrud	OUS	Norwegian	01.04.21-28.03.25	F	Early detection of genetic heart diseases – Prevention of sudden cardiac death in children
Javad Sadeghinia	Simula/NFR Dynacomp	Norwegian	14.08.23 – 13.08.26	M	The Dynamic Heart - Computational Tools for Studying Cardiac Growth and Remodeling.

PhD students with financial support from the Centre budget				
Name	Nationality	Period	Sex M/F	Topic
Linda Tangen Aaserud	Norwegian	01.11.2021-21.07.2025	F	Athletes and arrhythmias
Henrik Agerup Kihdahl	Norwegian	01.01.2022-31.12.2027	M	Valvular disease, automated measurements, 50% PhD
Sverre Høie	Norwegian	21.11.2022-20.11.2028	M	Valvular disease 50%
Giulia Monopoli	Italian	16.11.2022-15.11.2025	F	MAD, image-based diagnostics, and mechanistic simulation 1
Cecilie Bugge	Norwegian	30.04.23-30.04.26	F	Ventricular arrhythmias in patients with arrhythmic valve syndrome
Paul A.S. Olsen	Norwegian	01.04.24 – 31.03.27	M	Desmoplakin (DSP) mutations in arrhythmogenic right ventricular cardiomyopathy (ARVC), and especially on echocardiographic findings, exercise and pregnancy.
Anna Sørli	Norwegian	01.10.24 – 30.09.27	F	High-risk cardiovascular diseases in women
Julie Bergh	Norwegian	01.12.24 – 30.11.27	F	Risk stratification of mitral valve prolapse and surgery of the mitral valve
Robert Bigseth	Norwegian	06.10.2025-05.10.2028	M	Cardiogenetics, inherited ion channel diseases, athletes and sudden cardiac death
Eirunn L. Rotnes	Norwegian	27.10.2025-26.10.2028	F	Spontaneous coronary artery dissection

PhD students working on projects in the Centre with financial support from other sources

Name	Funding	Nationality	Period	Sex M/F	Topic
Kristoffer Andresen	OUS/HSØ	Norwegian	01.06.2020-31.05.2026	M	Triplane speckle-tracking echocardiography of the right ventricle
Marianne Inngjerdingen Forså	OUS/HSØ	Norwegian	05.02.2018-30.08.2025	F	Cardiac remodelling in children and adolescents
Jorun Tangen	OUS/UiO	Norwegian	15.04.20-30.01.2025	F	Improved prediction of clinical outcome in patients with myocardial infarction and heart failure
Tove-Elizabeth Hunt	OUS/HSØ	Norwegian	01.09.2016-30.06.2025	F	Atrial fibrillation and sleep apnea
Sigrun Skarstad Ådnegard	OUS/NFR	Norwegian	06.09.23-05.09.26	F	Manganese as intracellular contrast medium in cardiac MRI
Bendik Skinningsrud	OUS/FHI/SLV	Norwegian	19.09.23-01.10.26	M	Covid-19 vaccine associated myocarditis in Norway
Lisa Marie Selmer	OUS/HSØ	Norwegian	03.01.24 - 02.01.27	F	Developing and refining non-invasive diagnostic techniques for myocardial tissue characterization using high frame rate echocardiography
Ingrid Tveten	SINTEF (NTNU)	Norwegian	01.09.23 - 31.08.27	F	Holistic AI in echocardiography for improved measurements of cardiac function
Ingvild Adde	Kristinia (SRL)	Norwegian	05.03.24 -05.03.27	F	Physics-informed neural networks for electrophysiology simulation for ischemic and structural heart disease, driving towards speed ups for clinically-relevant timescales.
Håvard Dahlbom	NTNU	Norwegian	01.09.23 - 31.08.27	M	Progresjon av aortastenose
Rang Abdullah	UiO	Norwegian	Xxx	M	Cardiovascular risk associated with long-term use of anabolic-androgenic steroids (AAS).
Joshua Hammer-Rav	UiO	Norwegian	15.12.2025-14.12.2028	M	Mitralpropls and arrhythmias

Master degrees

Name	Sex M/F	Period	Topic
Cordelia Hellestrand	F	08.2025 - 08.2026	Exercise in Titin Cardiomyopathy
Jireg Tang	M	01.08.2023 - 24.09.2027	Use of myocardial strain in patients with MI and HF

Publications

- 1 Ahn JS, Dineen EH, Haugaa KH, Yagmour B, Xu J. Running the risk: extreme right ventricular remodelling in an endurance athlete-a case report. *Eur Heart J Case Rep*. 2025;9:ytaf598. doi: [10.1093/ehjcr/ytaf598](https://doi.org/10.1093/ehjcr/ytaf598)
- 2 Behr ER, Winkel BG, Ensam B, Alfie A, Arbelo E, et al. The diagnostic role of pharmacological provocation testing in cardiac electrophysiology: a clinical consensus statement of the European Heart Rhythm Association and the European Association of Percutaneous Cardiovascular Interventions (EAPCI) of the ESC, the ESC Working Group on Cardiovascular Pharmacotherapy, the Association of European Paediatric and Congenital Cardiology (AEPC), the Paediatric & Congenital Electrophysiology Society (PACES), the Heart Rhythm Society (HRS), the Asia Pacific Heart Rhythm Society (APHRS), and the Latin American Heart Rhythm Society (LAHRS). *Europace*. 2025;27. doi: [10.1093/europace/eaaf067](https://doi.org/10.1093/europace/eaaf067)
- 3 Bjaalie J, Løberg M, Haugaa K, Nebb H, Harbo HF. Innovation - the final leg in the research relay race. *Tidsskr Nor Laegeforen*. 2025;145. doi: [10.4045/tidsskr.25.0553](https://doi.org/10.4045/tidsskr.25.0553)
- 4 Bugge C, Five CK, Castrini AI, Hasselberg NE, Dejgaard L, Haugaa KH, Aabel EW. Linking ventricular ectopy to heart rate: Unveiling the hidden rhythm in mitral valve prolapse. *Hjerteforum* 2025.
- 5 Cameron JN, Sutherland N, Chow CL, Han HC, Yudi M, et al. Arrhythmogenic mitral valve prolapse-a systematic review of ventricular arrhythmia and sudden cardiac death outcomes before and after mitral valve surgery. *J Arrhythm*. 2025;41:e70108. doi: [10.1002/joa3.70108](https://doi.org/10.1002/joa3.70108)
- 6 Cardim N, Haugaa K, Mohiddin SA, Hinojar R, Hirsch A, et al. Role of multimodality cardiac imaging in the management of patients with hypertrophic cardiomyopathy in 2025. A Clinical Consensus Statement of the European Association of Cardiovascular Imaging (EACVI) of the ESC. *Eur Heart J Cardiovasc Imaging*. 2025. doi: [10.1093/ehjci/jeaf282](https://doi.org/10.1093/ehjci/jeaf282)
- 7 Chakrabarti A, Giudicessi JR, Ezzeddine FM, Delling FN, Dixit S, et al. Characteristics of Patients With the Arrhythmogenic Mitral Valve Prolapse Syndrome and Sudden Cardiac Arrest and Sustained Ventricular Arrhythmias. *Circ Arrhythm Electrophysiol*. 2025;18:e013099. doi: [10.1161/CIRCEP.124.013099](https://doi.org/10.1161/CIRCEP.124.013099)
- 8 Chernyshov A, Nyberg J, Holmstrøm V, Azad MA, Grenne B, et al. Low Complexity Point Tracking of the Myocardium in 2D Echocardiography. *IEEE Access*. 2025;13:186992-187004. doi: [10.48550/arXiv.2503.10431](https://doi.org/10.48550/arXiv.2503.10431)
- 9 De Backer J, Haugaa KH. The 'Ten Commandments' for the 2025 ESC Guidelines on Cardiovascular Disease and Pregnancy. *Eur Heart J*. 2025. doi: [10.1093/eurheartj/ehaf862](https://doi.org/10.1093/eurheartj/ehaf862)
- 10 De Backer J, Haugaa KH, Hasselberg NE, de Hosson M, Brida M, et al. 2025 ESC Guidelines for the management of cardiovascular disease and pregnancy. *Eur Heart J*. 2025;46:4462-4568. doi: [10.1093/eurheartj/ehaf193](https://doi.org/10.1093/eurheartj/ehaf193)
- 11 Desai MY, Maurizi N, Biagini E, Charron P, Fernandes F, et al. Pathophysiology and Therapeutic Needs in Nonobstructive Hypertrophic Cardiomyopathy. *JACC Heart Fail*. 2025;13:102658. doi: [10.1016/j.jchf.2025.102658](https://doi.org/10.1016/j.jchf.2025.102658)
- 12 Desai MY, Okushi Y, Jadam S, Olivotto I, Owens A, et al. Echocardiographic Changes With Mavacamten in Nonobstructive Hypertrophic Cardiomyopathy: Exploratory Insights From the ODYSSEY-HCM Trial. *J Am Coll Cardiol*. 2025;86:2434-2449. doi: [10.1016/j.jacc.2025.08.019](https://doi.org/10.1016/j.jacc.2025.08.019)
- 13 Desai MY, Owens AT, Abraham T, Olivotto I, Garcia-Pavia P, et al. Mavacamten in Symptomatic Nonobstructive Hypertrophic Cardiomyopathy. *N Engl J Med*. 2025;393:961-972. doi: [10.1056/NEJMoa2505927](https://doi.org/10.1056/NEJMoa2505927)
- 14 Donati TG, Ortelli F, Hebeisen M, Protonotarios A, Olsen PAS, et al. Right Ventricular Outflow Tract Diameter for Event Prediction in Arrhythmogenic Right Ventricular Cardiomyopathy: Incremental Value Over Echocardiographic Free-Wall Strain. *JACC Cardiovasc Imaging*. 2025. doi: [10.1016/j.jcmg.2025.10.019](https://doi.org/10.1016/j.jcmg.2025.10.019)
- 15 Edvardsen T, Klæboe LG. Assessment of diastolic function - is it time to relax? Rethinking Echocardiographic Approaches. *J Am Soc Echocardiogr*. 2025. doi: [10.1016/j.echo.2025.02.004](https://doi.org/10.1016/j.echo.2025.02.004)
- 16 Edvardsen T, Selmer LM. Shear wave elastography in cardiac imaging: promise and questions ahead. *Eur Heart J Cardiovasc Imaging*. 2025;26:1546-1548. doi: [10.1093/ehjci/jeaf208](https://doi.org/10.1093/ehjci/jeaf208)
- 17 Five CK, Hasselberg NE, Bjerkreim H, Aaserud LT, Castrini AI, et al. Revisiting the Link Between Keratoconus and Mitral Valve Prolapse. *Cardiogenetics*. 2025;15:4. [10.3390/cardiogenetics15010004](https://doi.org/10.3390/cardiogenetics15010004)

- 18 Garcia MI, Dame K, Charwat V, Siemons BA, Finsberg H, et al. Human induced pluripotent stem cell-derived cardiomyocytes and their use in a cardiac organ-on-a-chip to assay electrophysiology, calcium and contractility. *Nature Protocols*. 2025;20:3096-3142. doi: [10.1038/s41596-025-01166-4](https://doi.org/10.1038/s41596-025-01166-4)
- 19 Grendstad H, Skarstad S, Edvardsen T, Hallén J. A Prospective Study on Maximal Oxygen Uptake and Cardiovascular Functions in 12-Year-Old Endurance Athletes and Their Non-Endurance-Trained Peers. *Scand J Med Sci Sports*. 2025;35:e70016. doi: [10.1111/sms.70016](https://doi.org/10.1111/sms.70016)
- 20 Grenne B, Østvik A, Dalen H, Løvstakken L. One strain to rule them all? Inter-vendor variability in global longitudinal strain-progress made, challenges remain. *Eur Heart J Cardiovasc Imaging*. 2025;26:1374-1375. doi: [10.1093/ehjci/jeaf171](https://doi.org/10.1093/ehjci/jeaf171)
- 21 Halvorsrød MI, Mohajery M, Espeland T, Salles S, Støylen A, et al. Mechanical wave velocities in acute myocardial infarction: an exploratory study using three-dimensional high frame rate echocardiography. *European Heart Journal - Imaging Methods and Practice*. 2025;3. doi: [10.1093/ehjimp/qqaf060](https://doi.org/10.1093/ehjimp/qqaf060)
- 22 Hammersley DJ, Zaidi HA, Jones RE, Hatipoglu S, Androulakis E, et al. Fibrosis Entropy Is Associated With Life-Threatening Arrhythmia in Nonischemic Cardiomyopathy. *Journal of the American Heart Association*. 2025;14:e040517. doi: [10.1161/JAHA.124.040517](https://doi.org/10.1161/JAHA.124.040517)
- 23 Haugaa KH, Haby I. KCNB1: a new player among the suspects of cardiogenetic arrhythmias. *Eur Heart J*. 2025;46:3498-3500. doi: [10.1093/eurheartj/ehaf328](https://doi.org/10.1093/eurheartj/ehaf328)
- 24 Haugaa KH, Hasselberg NE. The cardiac myosin inhibitor era - more than treating left ventricular outflow tract obstruction in hypertrophic cardiomyopathy? *Eur Heart J Cardiovasc Imaging*. 2025. doi: [10.1093/ehjci/jeaf364](https://doi.org/10.1093/ehjci/jeaf364)
- 25 Holmström V, Smistad E, Grue JF, Lovstakken L, Stolen S, et al. Deep learning in echocardiography: Fully automated B-mode MAPSE measurements in real-time. *European Heart Journal - Cardiovascular Imaging*. 2025;26. doi: [10.1093/ehjci/jeae333.071](https://doi.org/10.1093/ehjci/jeae333.071)
- 26 Holmström V, Smistad E, Stølen S, Holte E, Løvstakken L, et al. Real-Time Global Longitudinal Strain During Echocardiography: A Deep Learning Platform for Improved Workflow. *J Am Soc Echocardiogr*. 2025;38:1041-1051. doi: [10.1016/j.echo.2025.08.015](https://doi.org/10.1016/j.echo.2025.08.015)
- 27 Hove IH, Kleiven Ø, Bjørkavoll-Bergseth MF, Svane J, Erevik CB, Hansen MW, Bugge C, Skadberg Ø, Solberg EE, Melberg T, et al. The potential diagnostic benefit of repeated troponin I measurements following high-intensity exercise. *Journal of Science and Medicine in Sport*. 2026;29:3-10. doi: [10.1016/j.jsams.2025.07.005](https://doi.org/10.1016/j.jsams.2025.07.005)
- 28 Hørgmo Jæ Ger K, Tveito A. Electrodiffusion dynamics in the cardiomyocyte dyad at nano-scale resolution using the Poisson-Nernst-Planck (PNP) equations. *PLoS Comput Biol*. 2025;21:e1013149. doi: [10.1371/journal.pcbi.1013149](https://doi.org/10.1371/journal.pcbi.1013149)
- 29 Hu J, Olaisen SH, Padeloup D, Van De Vyver G, Østvik A, et al. A deep learning-based pipeline for large-scale echocardiography data curation and measurements. *European Heart Journal - Digital Health*. 2025;6:1194-1203. doi: [10.1093/ehjdh/ztaf108](https://doi.org/10.1093/ehjdh/ztaf108)
- 30 Hunt TE, Traaen GM, Aakerøy L, Øverland B, Bendz C, et al. Systemic markers of inflammation and immune activation in patients with obstructive sleep apnea and paroxysmal atrial fibrillation. *Eur J Intern Med*. 2025;139:106363. doi: [10.1016/j.ejim.2025.05.028](https://doi.org/10.1016/j.ejim.2025.05.028)
- 31 Johansen SH, Sæter M, Sarvari SI, Reinertsen KV, Edvardsen E, et al. Effects of Aerobic Exercise on Cardiorespiratory Fitness and Cardiovascular Risk Factors in Long-Term Breast Cancer Survivors: A Randomized Controlled Trial. *JACC CardioOncol*. 2025;7:414-426. doi: [10.1016/j.jaccao.2025.04.006](https://doi.org/10.1016/j.jaccao.2025.04.006)
- 32 Jæger KH, Charwat V, Healy KE, Wall S, Tveito A. Determining properties of human-induced pluripotent stem cell-derived cardiomyocytes using spatially resolved electromechanical metrics. *J Physiol*. 2025. doi: [10.1111/JP287275](https://doi.org/10.1111/JP287275)
- 33 Jæger KH, Louch WE, Tveito A. Reduced gap junction coupling amplifies the effects of cardiomyocyte variability and destabilizes the heartbeat. *Physiol Rep*. 2025;13:e70461. doi: [10.14814/phy2.70461](https://doi.org/10.14814/phy2.70461)
- 34 Kjeldsberg HA, Schnabel RB, Sundnes J, Valen-Sendstad K. Estimation of inlet flow rate in simulations of left atrial flows: A proposed optimized and reference-based algorithm with application to sinus rhythm and atrial fibrillation. *J Biomech*. 2025;183:112594. doi: [10.1016/j.jbiomech.2025.112594](https://doi.org/10.1016/j.jbiomech.2025.112594)
- 35 Lashkarinia SS, Lee AWC, Baptiste TMG, Barrows RK, Sillett CP, et al. Representation of women in cardiovascular disease management: a systematic analysis of ESC guidelines. *Open Heart*. 2025;12. doi: [10.1136/openhrt-2025-003320](https://doi.org/10.1136/openhrt-2025-003320)

- 36 Lieve KV, van der Werf C, Kallas D, Denjoy I, Bos JM, et al. Catecholaminergic polymorphic ventricular tachycardia mediated by ryanodine receptor 2: a validated risk stratification. *Eur Heart J*. 2025. doi: [10.1093/eurheartj/ehaf965](https://doi.org/10.1093/eurheartj/ehaf965)
- 37 Liga R, Gimelli A, Podlesnikar T, Cvijić M, Pontone G, et al. Treatment and outcomes of chronic coronary syndromes: the EORP EURECA imaging registry. *Eur Heart J*. 2025;46:3922-3927. doi: [10.1093/eurheartj/ehaf594](https://doi.org/10.1093/eurheartj/ehaf594)
- 38 Lodin K, Da Silva CO, Wang Gottlieb A, Bulatovic I, Rück A, et al. Mitral annular disjunction and mitral valve prolapse: long-term risk of ventricular arrhythmias after surgery. *Eur Heart J*. 2025;46:2795-2805. doi: [10.1093/eurheartj/ehaf195](https://doi.org/10.1093/eurheartj/ehaf195)
- 39 Melichova D, Nyberg J, Nguyen TM, Salte IM, Brunvand H, et al. Clinical validation of a novel fully automated measurement method for echocardiographic mechanical dispersion using deep learning. *European Heart Journal - Cardiovascular Imaging*. 2025;26. doi: [10.1093/ehjci/jeae333.024](https://doi.org/10.1093/ehjci/jeae333.024)
- 40 Monopoli G, Haas D, Singh A, Aabel EW, Ribe M, et al. DeepValve: The first automatic detection pipeline for the mitral valve in Cardiac Magnetic Resonance imaging. *Comput Biol Med*. 2025;192:110211. doi: [10.1016/j.combiomed.2025.110211](https://doi.org/10.1016/j.combiomed.2025.110211)
- 41 Mora MT, van Herck I, Daversin-Catty C, Finsberg H, Llopis-Lorente J, et al. Insights from electromechanical simulations to assess omecamtiv mecarbil efficacy in heart failure. *J Physiol*. 2025. doi: [10.1113/JP288233](https://doi.org/10.1113/JP288233)
- 42 Myklebust L, Arevalo H, Daversin-Catty C, Wall ST, Finsberg HNT. Impact of segregation scheme on performance of a strongly coupled cardiac electromechanical solver. *Computer Methods in Applied Mechanics and Engineering*. 2025;446:118270. doi: [10.1016/j.cma.2025.118270](https://doi.org/10.1016/j.cma.2025.118270)
- 43 Noor L, Bjerkreim H, Five CK, Haugaa K, Drolsum L, et al. Prevalence of keratoconus in persons with mitral valve prolapse in a nationwide register study. *Acta Ophthalmol*. 2025;103:e202-e203. doi: [10.1111/aos.16786](https://doi.org/10.1111/aos.16786)
- 44 Ohnemus S, Fullerton K, Riebel LL, Maleckar MM, McCulloch AD, et al. Low Complexity Elasticity Models for Cardiac Digital Twins. *arXiv preprint arXiv:250809772*. 2025. arxiv.org/abs/2508.09772
- 45 Padeloup D, Østvik A, Olaisen S, Skogvoll E, Dalen H, et al. Challenges and Strategies for Deep Learning in Cardiovascular Imaging. *JACC: Cardiovascular Imaging*. 2025;18:751-764. doi: [10.1016/j.jcmg.2025.02.011](https://doi.org/10.1016/j.jcmg.2025.02.011)
- 46 Praz F, Borger MA, Lanz J, Marin-Cuartas M, Abreu A, et al. 2025 ESC/EACTS Guidelines for the management of valvular heart disease. *Eur Heart J*. 2025;46:4635-4736. doi: [10.1093/eurheartj/ehaf194](https://doi.org/10.1093/eurheartj/ehaf194)
- 47 Praz F, Borger MA, Lanz J, Marin-Cuartas M, Abreu A, et al. 2025 ESC/EACTS Guidelines for the management of valvular heart disease. *Eur J Cardiothorac Surg*. 2025;67. doi: [10.1093/ejcts/ezaf276](https://doi.org/10.1093/ejcts/ezaf276)
- 48 Priego L, Mora MT, Llopis-Lorente J, Finsberg H, Daversin-Catty C, et al. Integration of electrophysiological and mechanical biomarkers in cardiac risk assessment models. *Comput Methods Programs Biomed*. 2025;269:108896. doi: [10.1016/j.cmpb.2025.108896](https://doi.org/10.1016/j.cmpb.2025.108896)
- 49 Sabbag A, Ajmone-Marsan N, Ezzeddine F, Ascione G, Guicciardi NA, et al. Characterizing Sustained Arrhythmias in Patients With Arrhythmic Mitral Valve Prolapse: Insights From the SAVE-MVP collaboration. *JACC Clin Electrophysiol*. 2025. doi: [10.1016/j.jacep.2025.10.004](https://doi.org/10.1016/j.jacep.2025.10.004)
- 50 Sabo S, Pettersen H, Bøen GC, Jakobsen EO, Langøy PK, et al. Real-time guidance and automated measurements using deep learning to improve echocardiographic assessment of left ventricular size and function. *Eur Heart J Imaging Methods Pract*. 2025;3:qyaf094. doi: [10.1093/ehjimp/qyaf094](https://doi.org/10.1093/ehjimp/qyaf094)
- 51 Sade LE, Faletta FF, Pontone G, Gerber BLM, Muraru D, et al. The role of multi-modality imaging for the assessment of left atrium and left atrial appendage. A clinical consensus statement of the European Association of Cardiovascular Imaging (EACVI), European Heart Rhythm Association (EHRA) of the European Society of Cardiology (ESC). *Eur Heart J Cardiovasc Imaging*. 2025. doi: [10.1093/ehjci/jeaf014](https://doi.org/10.1093/ehjci/jeaf014)
- 52 Savelev AA, Aabel EW, Svensson A, Dahlberg P, Christensen AH, et al. Signal-Averaged ECG in the Diagnostic Workup for Arrhythmogenic Cardiomyopathy: Insights From the Nordic ARVC Registry. *J Am Heart Assoc*. 2025;14:e037544. doi: [10.1161/JAHA.124.037544](https://doi.org/10.1161/JAHA.124.037544)
- 53 Sivaraj E, Lovstakken L, Corney R, Fadnes S, Espeland T, Andresen K, Marwick TH. Mechanical Wave Analysis at High Frame-Rate Echocardiography: Feasibility, Determinants, and Normal Ranges. *JACC Cardiovasc Imaging*. 2026;19:149-162. doi: [10.1016/j.jcmg.2025.08.006](https://doi.org/10.1016/j.jcmg.2025.08.006)

- 54 Smith E, Gasperetti A, Carrick RT, Protonotarios A, Syrris P, et al. Diagnostic Criteria and Disease Staging for Desmoplakin Cardiomyopathy. *medRxiv*. 2025. doi: [10.1101/2025.06.16.25329734](https://doi.org/10.1101/2025.06.16.25329734)
- 55 Solberg EE, Ingul CB, Edvardsen T, Grimsmo J, Haugaa KH, et al. Targeted cardiac screening of athletes. *Tidsskr Nor Laegeforen*. 2025;145. doi: [10.4045/tidsskr.25.0127](https://doi.org/10.4045/tidsskr.25.0127)
- 56 Stokke TM, Haugaa KH, Russell K, Edvardsen T, Sarvari SI. Three-Dimensional Speckle Tracking Echocardiography for Detection of Acute Coronary Occlusions in Non-ST-Elevation Acute Coronary Syndrome Patients. *Diagnostics (Basel)*. 2025;15. doi: [10.3390/diagnostics15151864](https://doi.org/10.3390/diagnostics15151864)
- 57 Sæter M, Johansen SH, Reinertsen KV, Thorsen L, Haugaa KH, et al. Cardiorespiratory fitness, cardiac morphology and function, and cardiovascular risk factors in long-term breast cancer survivors compared with non-cancer controls. *Cardiooncology*. 2025;11:1. doi: [10.1186/s40959-024-00296-0](https://doi.org/10.1186/s40959-024-00296-0)
- 58 Telle Å, Charwat V, Charrez B, Finsberg H, Healy KE, et al. Estimation of Active Tension in Cardiac Microtissues by Solving a PDE-Constrained Optimization Problem. *Int J Numer Method Biomed Eng*. 2025;41:e70034. doi: [10.1002/cnm.70034](https://doi.org/10.1002/cnm.70034)
- 59 Thomas JD, Edvardsen T, Abraham T, Appadurai V, Badano L, et al. Clinical Applications of Strain Echocardiography: A Clinical Consensus Statement From the American Society of Echocardiography Developed in Collaboration With the European Association of Cardiovascular Imaging of the European Society of Cardiology. *J Am Soc Echocardiogr*. 2025;38:985-1020. doi: [10.1016/j.echo.2025.07.007](https://doi.org/10.1016/j.echo.2025.07.007)
- 60 Tveten IE, Nyberg J, Grue JF, Helland RH, Melichova D, Nguyen TM, Brunvand H, Edvardsen T, Haugaa KH, Dalen H, et al. Deep Learning Segmentation and Quantification of the Left Ventricle from the Parasternal Short-Axis View in Echocardiography. *Ultrasound Med Biol*. 2026;52:385-400. doi: [10.1016/j.ultrasmedbio.2025.10.005](https://doi.org/10.1016/j.ultrasmedbio.2025.10.005)
- 61 Uv JJ, Maleckar MM, Arevalo H. Impact of Vernix Caseosa Distribution on Non-Invasive Fetal ECG Morphology: A Computational Study. *IEEE Trans Biomed Eng*. 2025;72:846-855. doi: [10.1109/TBME.2024.3476379](https://doi.org/10.1109/TBME.2024.3476379)
- 62 Van Linthout S, Stellos K, Giacca M, Bertero E, Cannata A, et al. State of the art and perspectives of gene therapy in heart failure. A scientific statement of the Heart Failure Association of the ESC, the ESC Council on Cardiovascular Genomics and the ESC Working Group on Myocardial & Pericardial Diseases. *Eur J Heart Fail*. 2025;27:5-25. doi: [10.1002/ehfj.3516](https://doi.org/10.1002/ehfj.3516)
- 63 Verdonshot JAJ, Kaski JP, Asselbergs FW, Behr ER, Charron P, et al. Clinical care of family members of patients with dilated cardiomyopathy. *Eur Heart J*. 2025;46:4569-4582. doi: [10.1093/eurheartj/ehaf571](https://doi.org/10.1093/eurheartj/ehaf571)
- 64 Vyver GV, Måsøy SE, Dalen H, Grenne BL, Holte E, et al. Regional Image Quality Scoring for 2-D Echocardiography Using Deep Learning. *Ultrasound Med Biol*. 2025;51:638-649. doi: [10.1016/j.ultrasmedbio.2024.12.008](https://doi.org/10.1016/j.ultrasmedbio.2024.12.008)
- 65 Windecker S, Fraser AG, Szymanski P, Gilard M, Lüscher TF, et al. Priorities for medical device regulatory approval: a report from the European Society of Cardiology Cardiovascular Round Table. *Eur Heart J*. 2025;46:1469-1479. doi: [10.1093/eurheartj/ehaf069](https://doi.org/10.1093/eurheartj/ehaf069)
- 66 Aaserud LT, Rootwelt-Norberg C, Olsen PAS, Five CK, Castrini AI, et al. Disease Progression in Exercise-Induced Arrhythmogenic Cardiomyopathy Compared With Arrhythmogenic Right Ventricular Cardiomyopathy. *JACC Cardiovasc Imaging*. 2025;18:853-863. doi: [10.1016/j.jcmg.2025.03.018](https://doi.org/10.1016/j.jcmg.2025.03.018)
- 67 Yttervoll I, Østvik A, Nyberg J, Kirkeby-Garstad I, Jakobsen EO, et al. Echocardiographic reference ranges of myocardial work indices from the HUNT4Echo study. *Eur Heart J Imaging Methods Pract*. 2026;4:qyaf159. doi: [10.1093/ehjimp/qyaf159](https://doi.org/10.1093/ehjimp/qyaf159)

Disseminations

1	Abdullah R	Anabole-androgene steroider og kardiovasukulær risiko - en oppfølgingsstudie.	RuskForsk OUS
2	Almaas VM	Anabolic androgenic steroids and cardiac function	23rd Annual Norwegian Symposium on Heart Research
3	Azad MA, Nyberg J, Dalen H, Grenne BL, Løvstakken L, Østvik A	Taming Modern Point Tracking for Speckle Tracking Echocardiography via Impartial Motion	IEEE International Conference on Computer Vision Workshop (ICCVW)
4	Balaban G	Everything you wanted to know about AI but were to afraid to ask	Podcast
5	Balaban G, Monopoli G, Malackar MM.	Can this AI model transform heart disease diagnosis?	kristiania.no
6	Bugge C, Five CK, Bergh J, Castrini AI, Hasselberg NE, Dejgaard L, Haugaa KH, Aabel EW	Management of arrhythmias in mitral valve prolapse: Are we making the right choices for our patients?	Department of Cardiology, OUS
7	Bugge C, Five CK, Bergh J, Castrini AI, Hasselberg NE, Dejgaard L, Haugaa KH, Aabel EW	Management of arrhythmias in mitral valve prolapse: Are we making the right choices for our patients?	ESC Congress Madrid
8	Chernyshov A	Automated analysis of the right ventricle with efficient deep learning methods in 2D echocardiography	Ph-defence NTNU
9	Dalen H	Systolisk og diastolisk funksjon hos atleter	Ekko Lofoten
10	Dalen H	Echocardiography for improved cardiac diagnostics	GE HealthCare seminar
11	Dalen H	This year in structural heart disease	Nordic Baltic Cardiology Conference
12	Dalen H	Kunstig intelligens i ekkokardiografi - nye metoder og veien videre	Ekko Lofoten
13	Dalen H	GLS - How to think in the multimodal/multivendor world	Nordic Cardiac Imaging
14	Dalen H	Early intervention in aortic stenosis - Valve, left ventricle or symptoms?	Nordic Baltic Cardiology Conference
15	Dalen H	Normalverdier for ekkokardiografi	Ekko Lofoten
16	Edvardsen T	Course director EchoNaples	EchoNaples
17	Edvardsen T	Prognosis and management of moderate aortic stenosis	Athens Medical Group Cardiovascular Imaging Congress
18	Edvardsen T	Where are the cardio-oncology patients?	EACVI Teaching Course on Transthoracic Echocardiography
19	Edvardsen T	HCM: clues to echo diagnosis and assessment	Ekko Lofoten
20	Edvardsen T	Hvilke ekko funn bør initiere henvisning til MR ?	Ekko Lofoten
21	Edvardsen T	Co-chair Norwegian Cardiology Spring meeting	NCS vårmøte
22	Edvardsen T	Assessment of asymptomatic patients at risk of cardiomyopathy and arrhythmias	The modern cardiac imaging and monitoring symposium

23	Edvardsen T	Athletes heart	EACVI Teaching Course on Transthoracic Echocardiography
24	Edvardsen T	Infiltrativ CMP	Ekko Lofoten
25	Estensen ME	Pasient og pårørendesamtaler	Åpen dag for VMH
26	Estensen ME	Kongenitt kardiologi (Kursleder og foredragsholder)	Fagkurs: Kongenitt kardiologi
27	Estensen ME	Hjertesvikt og koronarsykdom i svangerskap	Fagkurs: Koronar hjertesykdom og hjertesvikt
28	Estensen ME	Hjertesvikt og svangerskap	Norsk hjertesvikt Forum
29	Estensen ME	Medfødte hjertefeil (Kursleder og foredragsholder)	Fagkurs: Medfødte hjertefeil
30	Estensen ME	Medfødt hjertesykdom og svangerskap	Symposium TKA, OUS
31	Estensen ME	Nasjonal behandlingstjeneste for hjertesyke gravide	Internundervisning Kvinneklinikken OUS
32	Estensen ME	Svangerskap og SCAD	SCAD-DAGEN
33	Estensen ME	Åpent hjerte 8: Hjertefeil og kvinnehelse del 1	Podcast: Åpent hjerte VMH
34	Estensen ME	Åpent hjerte 9: Hjertefeil og kvinnehelse del 1	Podcast: Åpent hjerte VMH
35	Estensen ME, Sørli A	Forskning og sånn	Podcast, Forskning og sånn
36	Five CK	Mitral Valve Prolapse: Clinical Risk Stratification and Systemic Associations	PhD-defence UiO
37	Hasselberg NE	Dilatert kardiomyopati og ARVC	Ekko Lofoten
38	Hasselberg NE	CVI and pregnancy	SINERGY (Serbian Congress on INTerventional cardioloGY, cardiovascular imaging and drug therapy) 2025
39	Hasselberg NE	Genetics, exercise, arrhythmias and acute myocardial infarction	23rd Annual Norwegian Symposium on Heart Research
40	Hasselberg NE	Familial dilated cardiomyopathy - The importance of laminopathy	Grand rounds lecture, University of Minnesota
41	Hasselberg NE	(+) Presenterte om nye ESC-retningslinjer: – Tiden hvor legen bare bestemte at «du kan ikke bli gravid» er forbi	Dagens medisin
42	Hasselberg NE	Heart disease in pregnancy: new therapeutic opportunities	ESC Congress Madrid
43	Hasselberg NE	Guidelines on Cardiovascular disease and Pregnancy: Ask the task force	ESC Congress Madrid
44	Hasselberg NE	Guidelines on Cardiovascular disease and Pregnancy: clinical cases	ESC Congress Madrid
45	Hasselberg NE	Arytmogen Mitralklaff-syndrom / MAD, utredning og konsekvenser	Ekko Lofoten
46	Hasselberg NE	Heart failure and reduced ejection fraction: the bread and butter of cardiovascular imaging	EACVI Vienna
47	Hasselberg NE	New frontiers in cardiomyopathies	EACVI Vienna
48	Haugaa KH	Clinical care of family members and athletes heart	EACVI webinar
49	Haugaa KH	ESC Guidelines on Cardiovascular disease and Pregnancy	ESC Congress Madrid
50	Haugaa KH	Behandling av amyloidose	NCS vårmøte
51	Haugaa KH	New perspectives in technologies and diagnostics	23rd Annual Norwegian Symposium on Heart Research
52	Haugaa KH	Arrhythmias in practice	NCS Høstmøte

Disseminations

53	Haugaa KH	2025 ESC Guidelines on Cardiovascular Disease and Pregnancy: management of heart failure and arrhythmias	ESC webinar
54	Haugaa KH	Opening session ESC guidelines Cardiovascular disease and Pregnancy	ESC Congress Madrid
55	Haugaa KH	Trening som medisin tilpasset pasienter med kardiomyopati	Webinar: Trening som medisin
56	Haugaa KH	Ventricular arrhythmias	Kurs i kardiologi, Legeforeningen
57	Haugaa KH	Multimodality approach to the thick heart	EACVI webinar
58	Haugaa KH	A new era of sudden cardiac death prediction	ESC Congress Madrid
59	Haugaa KH	Guidelines on Cardiovascular disease and Pregnancy: clinical cases	ESC Congress Madrid
60	Haugaa KH	Risk stratification of sudden cardiac death in arrhythmic mitral valve prolapse	EHRA conference
61	Haugaa KH	Spyttprøve kan finne farlig hjertesykdom hos barn, ifølge forskere	Forskning.no
62	Haugaa KH	Toppidrett og hjertet: Hva leter vi etter?	Verdens hjertedag
63	Haugaa KH	Guidelines on Cardiovascular disease and Pregnancy: Ask the task force	ESC Congress Madrid
64	Haugaa KH	Samhandling mellom akademia og industri	Arendalsuka
65	Haugaa KH	The Precision Health Center for optimized cardiac care and Innovation	Innovasjon Norge
66	Haugaa KH	Case presentation: CPVT	Case presentation, Karolinska instituttet
67	Haugaa KH	Is this dilated cardiomyopathy? Left dominant arrhythmogenic cardiomyopathy	EAVCI Vienna
68	Haugaa KH	Diagnose og risikostratifisering for ventrikulære arytmier ved arytrogen mitralklaffprolaps	Privatpraktiserende kardiologisk forum
69	Haugaa KH	Pregnancy as a cardiovascular stress test	Womens health conference, Copenhagen
70	Haugaa KH	How to succeed with your proposal – SFI perspective	Researchmeeting at Heart Lung and vascular clinic, OUS
71	Haugaa KH	Åpent hjerte 4: Hva er genetisk hjertefeil	Podcast: Åpent hjerte VMH
72	Haugaa KH	Åpent hjerte 5: Å leve med genetisk hjertefeil	Podcast: Åpent hjerte VMH
73	Solberg SH	Når hjertet svikter uten forvarsel - Jakten på de skjulte genene	OUS - Innsikt
74	Holmstrøm V, Smistad E, Østvik A, Holte E, Stølen SB, Løvstakken L, Dalen H, Grenne BL	Deep learning in echocardiography: real-time measurements of left ventricular wall thickness and chamber dimensions in the parasternal long-axis view	European Heart Journal-Cardiovascular Imaging
75	Hunt TEF	Patients with atrial fibrillation and obstructive sleep apnea: Impact of continuous airway pressure treatment	PhD-defence UiO
76	Jakobsen EO, Østvik A, Padeloup D, Smistad E, Nyberg J, Stølen SB, Løvstakken L, Grenne BL, Holte E, Dalen H.	Novel automated quality indicators for echocardiography and their importance for left ventricular strain	EuroEcho-Imaging 2024 abstract book
77	Maleckar MM	Mechanism, insight, and predicting the future: how to get along with your robot colleagues.	Finding Your Inner Modeler" (FYIM) workshop, UC Irvine
78	Maleckar MM	A new generation: approaches for synthetic ECG	ECGi Summit
79	Maleckar MM	Modeling atrial electrophysiology and fibrillation	Computing in Cardiology

80	Monopoli G, Haas D, Singh A, Aabel EW, Ribe M, Castrini AI, Hasselberg NE, Bugge C, Five CK, Haugaa KH, Forsch N, Thambawita VLB, Balaban G, Maleckar MM.	DeepValve the first automatic detection pipeline for the mitral valve in CMR	Mohn Medical Imaging and Visualization Centre & Presimal 2025
81	Monopoli G, Sadeghinia J, Sundnes J, Aabel EW, Ribe M, Castrini AI, Hasselberg NE, Five CK, Bugge C, Haugaa KH, Forsch N, Maleckar MM.	Arrhythmic mitral valve syndrome insights from left ventricular shape analysis	Gordon Research Conference
82	Monopoli G, Sadeghinia J, Sundnes J, Aabel EW, Ribe M, Castrini AI, Hasselberg NE, Five CK, Bugge C, Haugaa KH, Forsch N, Maleckar MM.	Arrhythmic mitral valve syndrome insights from left ventricular shape analysis	Functional Imaging and Modeling of the Heart
83	Monopoli G, Sadeghinia JM, Aabel EW, Ribe M, Castrini AI, Hasselberg NE, Bugge C, Five CK, Haugaa KH, Balaban G, Forsch N, Maleckar MM.	Arrhythmic Mitral Valve Syndrome: Insights from Left Ventricular End-Systolic Shape Analysis	Functional Imaging and Modeling of the Heart
84	Monopoli G, Wifstad SV, Kihldal H, Sadeghinia J, Sundnes J, Aabel EW, Ribe M, Castrini AI, Hasselberg NE, Five CK, Bugge C, Løvstakken L, Haugaa KH, Forsch N, Maleckar MM.	MRI derived mitral valve and ventricle shape biomarkers for arrhythmic mitral valve syndrome	Computing in Cardiology
85	Myklebust L	Modeling the Electrophysiology and Mechanics of Ventricular Arrhythmia	PhD-defence UiO
86	Nyberg J	Strain echocardiography in healthy and diseased populations using speckle tracking and deep learning	Phd-defence NTNU
87	Olsen PAS	Isbading: Populær trend uten vitenskapelig bevis for helsefordeler	Faktisk.no
88	Padeloup D, Østvik A, Smistad E, Nyberg J, Jakobsen EO, Grenne BL, Holte E, Løvstakken L, Dalen H.	Effect of apical foreshortening and transducer angulation on strain measurements: a quantitative investigation	European Heart Journal-Cardiovascular Imaging
89	Sara Hassing Johansen	Overrasket over nye funn: - Dette er en marsjordre	tv2.no
90	Sara Hassing Johansen	Unik norsk studie: - Vi fikk litt sjokk	tv2.no
91	Sara Hassing Johansen	Kreftoverlevar Monica trenar i fem månader: Resultata er oppsiktsvekkande - Norges idrettshøgskole	nih.no
92	Savelev A, Dahlberg P, Christensen AH, Bugge C, Haby i, Svensson A, Kock TO, Gardovic T, Markljung M, Ringborn M, Lundin C, Larsson N, Goldenberg I, Rydberg A, Zareba W, Bungaard H, Haugaa KH, Platonov PG.	Genetic factors in risk stratification of concealed long QT patients with no history of β -blocker use	ESC Congress Madrid

Disseminations

93	Savelev A, Dahlberg P, Christensen A, Bugge C, Haby I, Svensson A, Gardovic T, Kock T, Markljung M, Ljungstrom E, Ringborn M, Lundin C, Larsson N, Goldenberg I, Zareba W, Bundgaard H, Haugaa KH, Platonov PG.	Genetic factors in risk stratification of concealed Type 1 Long QT syndrome patients	Heart Rhythm Society Meeting
94	Savelev A, Larsson N, Dahlberg P, Christensen A, Bugge C, Haby I, Gardovic T, Ljungstrom E, Ringborn M, Lundin C, Goldenberg I, Zareba W, Haugaa KH, Platonov PG.	Phenotypic characterization of long QT syndrome in 112 scandinavian patients with KCNQ1 P.GLN530TER variant.	Heart Rhythm Society Meeting
95	Skiningsrud B	Koronavaksine-utløst hjertebetennelse	Stabsmøte HLK, OUS
96	Skiningsrud B, Vlaisavljevic K, Oppedal LS, Endresen J, Mohn V, Fladseth K, Gulseth HL, Olsen DB, Bosse HGS, Suther LKR, Möller T, Estensen ME, Haugaa KH, Broch K, Hasselberg NE.	Long-term follow-up after COVID-19 vaccine-associated myocarditis shows normal cardiac function but discrete myocardial tissue characterization findings by magnetic resonance imaging	23rd Annual Norwegian Symposium on Heart Research
97	Skiningsrud B, Vlaisavljevic K, Oppedal LS, Endresen J, Mohn V, Fladseth K, Gulseth HL, Olsen DB, Bosse HGS, Suther LKR, Möller T, Estensen ME, Haugaa KH, Broch K, Hasselberg NE.	Normal cardiac function but discrete late gadolinium enhancement findings after COVID-19 vaccine-associated myocarditis – a nationwide long-term follow-up study	ESC Congress Madrid
98	Skiningsrud B, Vlaisavljevic K, Oppedal LS, Endresen J, Mohn V, Fladseth K, Gulseth HL, Olsen DB, Bosse HGS, Suther LKR, Möller T, Estensen ME, Haugaa KH, Broch K, Hasselberg NE.	Normal cardiac function but discrete late gadolinium enhancement findings after COVID-19 vaccine-associated myocarditis – a nationwide long-term follow-up study	ESC Congress Madrid, Posteraften
99	Sundnes J	Uncertainty quantification in cardiac mechanics	Computing in Cardiology
100	Sundnes J	Polynomial Chaos Expansion, AI and data assimilation for uncertainty quantification of cardiac mechanics	Computing in Cardiology
101	Sørli A	SCAD og Forskning, en oppdatering	SCAD-DAGEN
102	Sørli A	NOR-SCAD prosjektet, en oppdatering	Internundervisning Ahus HF
103	Sørli A	NOR-SCAD prosjektet, en oppdatering	Fagdag for sykepleiere ved hjerteavdelingen på Kalnes, Sykehuset Østfold HF
104	Sørli A	NOR-SCAD prosjektet, en oppdatering	Foredrag for hjerterehabiliteringsteamet på Kalnes, Sykehuset Østfold HF
105	Sørli A	NOR-SCAD prosjektet, en oppdatering	Internundervisning hjerteavdelingen Sørlandet Sykehus HF
106	Sørli A	NOR-SCAD	Webinar Nordisk faggruppe for hjerte- og lungefysioterapeuter
107	Sørli A	Introduction and practical demonstration of echocardiography	Simula Research days

108	Tangen J	Disease manifestations and prognostication by imaging and echocardiography in covid-19 patients and in patients with myocardial infarction	PhD-defence UiO
109	Uv J	Computational Study of the Fetal ECG	PhD-defence UiO
110	Wifstad SV, Kildahl HA, Berg EAR, Holte E, Grenne BL, Salvesen ØO, Dalen H, Løvtakken L.	EasyPISA: Automated Real Time Assessment of Mitral Regurgitation from Color Flow Imaging	IEEE International Ultrasound Symposium
111	Wifstad SV, Kildahl HA, Berg EAR, Holte E, Grenne BL, Salvesen ØO, Dalen H, Løvtakken L.	Automatic measurements of mitral insufficiency from color flow imaging: complicated or EasyPISA?	The 2025 Artimino Conference on Medical Ultrasound
112	Wifstad SV, Kildahl HA, Berg EAR, Holte E, Grenne BL, Salvesen ØO, Dalen H, Løvtakken L.	Phenotyping mitral valve disease with AI-based measurements	Leuven Meeting on Myocardial Function Imaging
113	Witsø MHL, Luo H, Holm T, Kristiansen HM, Frostelid VC, Aalen J, Sørensen K, Fadnes S, Nyrnes SA, Løvtakken L, Flattum M, Stugaard M, Kongsgaard E, Skulstad H, Remme E.	Feasibility of non-invasive echocardiographic estimates of intraventricular pressure differences by blood speckle tracking in adults	European Heart Journal-Cardiovascular Imaging

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