11th World Congress on

Heart and Cardiovascular Diseases

April 18-19, 2026 | New York, USA

Volume: 17

Advanced Cardiac Imaging and Myocardial Mechanics in Heart Failure: From Diagnosis to Precision Therapy

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Heart failure remains one of the most complex cardiovascular disorders, requiring accurate diagnosis and individualized treatment strategies to improve survival and quality of life. This presentation examines recent advances in multimodality cardiac imaging, myocardial deformation analysis, and hemodynamic assessment that are transforming the diagnosis and management of heart failure.

Innovations in echocardiography, cardiac magnetic resonance imaging (CMR), strain imaging, and three-dimensional imaging have enhanced the evaluation of ventricular function, myocardial fibrosis, and diastolic dysfunction. These technologies enable clinicians to identify early myocardial abnormalities, monitor disease progression, and guide personalized therapeutic interventions.

The presentation also reviews recent developments in imaging-guided heart failure management, integration of artificial intelligence into image analysis, and the use of imaging biomarkers to predict prognosis and treatment response. Advances in cardiac mechanics research are improving the understanding of myocardial function and supporting the development of targeted therapies for patients with preserved and reduced ejection fraction.

Future perspectives include precision imaging, digital cardiology, and machine learning-based diagnostic systems that will further improve clinical decision-making and patient outcomes.

Biography

Otto A. Smiseth is Professor of Cardiology at the University of Oslo, Norway, and Senior Consultant at Oslo University Hospital. He is internationally recognized for his expertise in echocardiography, myocardial mechanics, cardiac imaging, and heart failure. His research has significantly advanced non-invasive assessment of cardiac function and imaging-based cardiovascular diagnosis.