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Preface

Cardiac image analysis has remained an active research field in medical imaging. Numerous studies have focused on developing statistical atlases and computational models of the heart to enhance our understanding of cardiac structure and function. These models provide valuable insights into the complex dynamics and behaviour of the heart, allowing for improved diagnosis and treatment of various cardiac conditions. Additionally, the use of artificial intelligence and machine learning algorithms in cardiac image analysis has further revolutionized the field.

However, clinical translations of these methods are still constrained by the lack of complete and rigorous technical and clinical validations, as well as benchmarking with common data. The Statistical Atlases and Computational Modelling of the Heart (STACOM) workshop aims to achieve these goals by providing a platform for researchers to exchange ideas, present their advancements, and collaborate on the development of robust and validated computational models of the heart.

The 16th edition of STACOM (<https://stacom.github.io/stacom2025/>) was held in conjunction with the 28th MICCAI conference in Daejeon, South Korea, on 27 September 2025. It followed the fifteen previous successful editions (<https://stacom.github.io/>): STACOM 2010 (Beijing, China), STACOM 2011 (Toronto, Canada), STACOM 2012 (Nice, France), STACOM 2013 (Nagoya, Japan), STACOM 2014 (Boston, USA), STACOM 2015 (Munich, Germany), STACOM 2016 (Athens, Greece), STACOM 2017 (Quebec City, Canada), STACOM 2018 (Granada, Spain), STACOM 2019 (Shenzhen, China), STACOM 2020 (Lima, Peru), STACOM 2021 (Strasbourg, France), STACOM 2022 (Singapore), STACOM 2023 (Vancouver, Canada), and STACOM 2024 (Marrakesh, Morocco). Throughout these sixteen years, the STACOM workshop has provided a forum to discuss the latest developments in various areas of computational cardiac imaging, cardiac modelling, application of artificial intelligence and machine learning to cardiac image analysis, electro-mechanical modelling of the heart, novel methods in preclinical/clinical imaging for tissue characterization and image reconstruction, as well as statistical cardiac atlases.

The STACOM 2025 workshop attracted a total of 32 paper submissions, of which 26 were accepted for presentation during the workshop. Topics ranged from cardiac segmentation to modelling, motion estimation, statistical shape analysis, and quality control. Deep learning methods were still the predominant approach to performing automated cardiac image analysis. Left atrial image analysis and modelling gained more attention in this workshop, with atrial fibrillation being the common area of interest.

The workshop awarded the best paper to **Paula Casademunt** from Universitat Pompeu Fabra, Spain, for her paper entitled *Comprehensive 4D flow MRI characterization of left atrial hemodynamic flow components in hypertension and hypertrophic cardiomyopathy*.

The best poster presenter was awarded to **Irene Mancebo-Laguna** from Universidad Carlos III de Madrid, Spain, for her paper entitled *Deep Learning-Based Segmentation of 3D Left Atrial Meshes from Electroanatomical Mapping: Left Atrium Mesh Segmentation*.

This year, STACOM 2025 also hosted the Cardiac MRI Reconstruction Challenge (CMRxRecon 2025: Towards Foundation Model, <https://cmrxrecon.github.io/2025>). The challenge aimed to establish a benchmark that empowers the research community to accelerate CMR imaging through universal approaches, facilitating diverse applications and enhancing real-world performance. We released over 600 cardiac multi-parametric raw k-space datasets from over 10 centres, covering 20 different diseases, attracting more than 200 teams from over 40 countries. The challenge featured two standard tasks—multi-centre evaluation and multi-disease evaluation—along with two special tasks: ultra-high-field evaluation and pediatric imaging evaluation. Overall, the CMRxRecon challenge attracted 22 paper submissions, of which 8 are presented in this volume.

Finally, the STACOM workshop organizers would like to express our gratitude to external reviewers from King’s College London (UK), University of Auckland (New Zealand), Inria (France), University of Oxford (UK), Fudan University (China), Imperial College London (UK), Technische Universiteit Delft (the Netherlands), and Universitat Pompeu Fabra (Spain). Special thanks go to Jieyun Bai, Edward Ferdian, Xinqi Li, Jun Lyu, Cheng Ouyang, Chen Qin, Michael Tänzer, Fanwen Wang, Shuo Wang, Vicky Wang, Zi Wang, Hao Xu, Chenyu Yue, Yi Zhang, Debbie Zhao, and Yidong Zhao, who gave their time to meticulously review papers in these proceedings. Finally, we would like to thank all authors who participated in this workshop.

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