FLAMES workshop - Fluid Simulations of the Left Atrium with Multi-source Experimental Studies

February, 2025

Description

The FLAMES (Fluid Simulations of the Left Atrium with Multi-source Experimental Studies) workshop, aims to foster collaboration, innovation, and knowledge exchange among researchers in the field of left atrium (LA) computational fluid simulations (CFD). It will provide a platform to benchmark modeling strategies, and promote best practices in verification and validation (e.g., V&V40 guidelines) tasks in the context of CFD simulations in the LA, overall enhancing simulation methods. Participants of the FLAMES workshop will jointly work on common medical imaging and phantom datasets, driving advancements in the field and contributing to a review paper on the state-of-the-art in LA fluid dynamics. By comparing the fluid simulations with clinical and phantom data, we seek to explore the variations in outcomes that arise from different modeling, boundary conditions, setup and solver approaches to compute the fluid analysis. Virtual participation will be available to encourage broad engagement.

To achieve this, we will provide participants with three distinct datasets for the design of a comprehensive pipeline for modeling LA haemodynamics. Depending on the modeling approach chosen by the participants, these datasets may require some post-processing:

1. In vitro data from a 3D-printed left atrium phantom using particle image velocimetry (PIV).
2. Patient-specific time-resolved segmentations from 4D flow magnetic resonance imaging (MRI) data.
3. Dynamic opacity data from left heart computed tomography (CT) imaging.

Participation in the challenge does not require to be involved in the three datasets. You are welcome to participate with one or two datasets. However, we strongly encourage you to engage with all three datasets to share your

expertise in LA fluid simulations, contributing to a more diverse and insightful discussion!

General Instructions

The **deadline** for submitting your results is set for the **16th of May 2025**. These outcomes will be presented in a special session at the 13th Functional Imaging and Modeling of the Heart International Conference (FIMHH25), which will take place from June 1-5, 2025, in Dallas, Texas. A second round of result presentations will take place during the 20th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE25), from the 3-5 September 2025 in Barcelona.

To exchange data and results, please make sure you can use GitHub for both downloading and uploading (`https://github.com/`). Additionally, verify that you can process your results in the formats supported by Paraview (`https://www.paraview.org/`) before submission.

If you wish to participate in the workshop, please e-mail us at **flameswork-shop25@gmail.com** to receive the necessary data and submission instructions. We look forward to your contributions and sharing our experience to advance towards the clinical application of numerical simulations!

Best regards,

Oscar Camara[1], Manal Barrouhou[1], Simona Celi[2], Emanuele Gasparotti[2], Emanuele Vignali[2], Juan Carlos del Álamo[3], Alejandro Gonzalo[3]

[1] Universitat Pompeu Fabra, Barcelona, Spain.
[2] Fondazione Monasterio, Massa, Italy.
[3] University of Washington, Seattle, USA.

Contact e-mail address: **flamesworkshop25@gmail.com**

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