

# ***Advances and Imaging Challenges in Micro and Nanofluidics***

*Thematic Session within VipIMAGE 2019*

*VII ECCOMAS Thematic Conference on Computational Vision and Medical Image Processing*

*Porto, Portugal, 16-18 October 2019*

[www.fe.up.pt/vipimage](http://www.fe.up.pt/vipimage)

[web.fe.up.pt/~vipimage/nav/conference/sessions.htm](http://web.fe.up.pt/~vipimage/nav/conference/sessions.htm)

## **Description**

The analysis of flows in microfluidic devices is an interdisciplinary subject that demands an integration of several research fields such as biotechnology, medicine, chemistry, informatics, optics, electronics, mechanics and microtechnologies. Over the years, flow visualization techniques based on image processing and analysis have been applied in an effort to make the invisible visible, with the help of experimental and computational technology. Hence, flow visualization techniques have become an indispensable tool to understand the flow behavior of several biological fluids (e.g. DNA solutions, blood and other physiological fluids) in living systems and biomedical devices. Doppler ultrasound, computer tomography (CT) and magnetic resonance imaging (MRI) are the most commonly used medical instruments to investigate physiological flow both in vivo and in vitro. However, due to limited spatial resolution and signal noise, it is difficult to obtain quantitative flow information. In recent years, as a result of advances in computers, optics, fluorescent probes and image analysis, several new visualization techniques have been developed for applications in microflows. One example of success is the micro-scale particle image velocimetry (PIV) technique, which can be used to quantify the velocity field of biological flows. Other developments have been focused, for instance, on techniques for the characterization and evaluation of nanoparticles in microflows or techniques for measurement of cells deformability in biological fluids, which can be an indicator of different pathologies. This thematic session will provide an opportunity to the engineering and biomedical community to exchange knowledge and information on the latest advances and challenges in microflows visualization technologies and its application to lab-on-chip devices research and industry. We hope to bring together researchers who are interested in the general field of flow visualization, especially in its applications to biomedical areas.

## **Topics of interest include (but are not restricted to):**

- Biomedical Signal, Image Processing and Analysis for Microflows
- Imaging of Flows in Lab-on-chip Devices
- Visualizations and Measurements of Nanofluids in Microfluidic Devices
- Imaging Techniques to Assess Heat Transfer Phenomena of Micro/Nanofluids
- Imaging Techniques for Characterization and Visualization of Nanoparticles in Microflows
- Visual Computing and Visualization Techniques for Lab-on-chip Devices Flows
- Image Processing Algorithms for Cells Detection and Measurement in Microflows
- Diagnostic Imaging based on Lab-on-chip Devices Flow Analysis
- Cellular and Molecular Imaging

- Computational Bioengineering and Biofluid Mechanics
- Cardiovascular Fluid Dynamics Analysis from Images
- Hematology, Biorheology, Hemorheology Imaging
- Biomedical devices, BioMEMS, and Microfluidics for Lab-on-chip Devices Flows Analysis

## Publications

The **proceedings book** will be **published by Springer** under the book series "[Lecture Notes in Computational Vision and Biomechanics](#)" and **indexed by Elsevier Scopus**.

A **special issue** of the **Taylor & Francis international journal** "[Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization](#)", indexed in Clarivate Analytics Emerging Sources, Elsevier Scopus and dblp, **will be published**. All authors of works presented in VipIMAGE 2019 will be invited to submit an extended version to the special issue.

## Important dates

- **Submission of extended abstracts: May 31, 2019** (final deadline)
- Final Papers (non-mandatory): July 15, 2019

## Organizers

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