Journal of Imaging

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Techniques and Applications in Quantifying Fluid Flow in Medical Imaging

Guest Editors:

Dr. Roshan M. D'Souza
Department of Mechanical Engineering, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin, WI, USA

Dr. Isaac Bernabe Perez Raya
Department of Mechanical Engineering, Kate Gleason College of Engineering, Rochester Institute of Technology, Rochester, NY, USA

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Message from the Guest Editors

It is known that hemodynamics interactions play an important role in initiation and progression of cardiovascular diseases. Traditionally, patient-specific hemodynamic analysis has been conducted using computational fluid dynamics (CFD). However, the fidelity of this approach is severely limited by modeling assumptions and the uncertainty in inputs such as boundary conditions, vascular geometry, and model parameters. Recently, there have been significant advancements in methods including 4D-flow MRI, ultrasound vector flow imaging, diffuse optical spectroscopy, and 4D-CT to non-invasively image in vivo flows in the human vascular system. While imaging techniques are not limited by the aforementioned modeling issues, they suffer from issues such as imaging artifacts, low SNR, and low spatiotemporal resolution. Recent publications have explored techniques such as Kalman filtering, deep learning, and variational data assimilation to address the limitations of flow imaging by incorporating flow physics. In vivo flow image enhancement is a promising research area that will lead to diagnostic clinical tools for patient-specific diagnosis and prognosis of cardiovascular diseases.

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Editor-in-Chief

Prof. Dr. Raimondo Schettini
Department of Informatics, Systems and Communication, University of Milano-Bicocca, viale Sarca, 336, 20126 Milan, Italy

Message from the Editor-in-Chief

The imaging term, specific with journal, is to be considered in its broadest sense. Image processing, image understanding and computer vision are all terms related to imaging acquisition, its processing and the extraction of relevant information from the scene to obtain the underlying knowledge. All tasks related to the above items are oriented toward specific applications in a broad range of areas and topics. The *Journal of Imaging* is conceived as an efficient vehicle in the scientific community for the communication and transmission of the progress and research results in the topics covered.

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Journal of Imaging Editorial Office
MDPI, St. Alban-Anlage 66
4052 Basel, Switzerland

Tel: +41 61 683 77 34
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