Preface

An object's *shape* and its *motion* are important cues in understanding imaging data. Their study is an emerging research area with a plethora of key applications in medical diagnosis, scene understanding (e.g., video surveillance), affective and behavioral computing, computer animation, HMI, robotics, and cultural heritage conservation, to cite a few. The external boundary of an object is available in various forms, they include landmark configurations, object contours (closed curves), 3D surfaces, and dense point clouds. Their analysis requires precise mathematical representations, rigorous methodologies to filter out undesirable transformations, and sophisticated computational solutions. The *motion* in turn, describes the *shape*'s evolution or animation over time. One can cite the examples of facial shape evolution with a person's age, the evolution of a cancer cell over weeks or months, or the evolution of the body's skeletal or silhouette data over time and their use to predict a person's activity. Despite the development of mathematically solid methodologies, the question is still open from both methodological and application perspectives. The challenges are even more acute with the new fields of application such as human brain understanding, body kinematic data analysis for rehabilitation and physical therapy, esthetic and reparation surgery, and 3D/4D microscopy. In addition, the rapid development of sophisticated medical imaging devices, cost-effective depth (Kinect-like) cameras, and new generations of microscopes push forth to develop suitable mathematical representations and design relevant geometric tools and set up computational solutions for advanced modeling, analysis, and understanding.

The International Workshop on Representations, Analysis and Recognition of Shape and Motion from Imaging Data (RFMI)[1] is one of the earliest events launched to study these questions. Its ultimate goal is to promote interactions among researchers from different disciplines, differential geometry, statistics, topology, computer vision and animation, and medical imaging to share their scientific results. Thus, the workshop keeps contributing to strengthen the relationship between many research areas that meet in facing similar challenges and using common tools.

The current edition (sixth) of the workshop received the endorsement of the prestigious International Association of Pattern Recognition (IAPR) and the current volume was accepted for publication in the CCIS series of Springer. The Program Committee of the workshop received 24 papers, among them nine were accepted as regular papers (i.e., 37.5% acceptance rate) and five were presented as short papers. In addition, the workshop's program included four outstanding tutorial-oriented invited talks. International speakers were invited – Dr. Anuj Srivastava (IAPR Fellow, IEEE Fellow, Professor at Florida State University in USA) presented "On Advances in the Role of Differential Geometry in Computer Vision and Pattern Recognition"; Dr. Xavier Pennec (Senior Research Scientist at INRIA in France) talked about "Riemannian and

[1] http://www.arts-pi.org.tn/rfmi2016/index.html.

Affine Structures for Statistics on Shapes and Deformations in Computational Anatomy"; Dr. Stefanos Zafeirou (Senior Lecturer at Imperial College London in UK) focused on "Building the First Large-Scale 3D Morphable Model of Faces"; and Prof. Mubarak Shah (Founding Director of the Center for Research in Computer Vision and Professor at University of Central Florida in USA) reviewed "Spatio-temporal Graphs for Object Segmentation and Human Pose Estimation in Videos." Around 60 researchers attended the workshop, among them 35 young PhD and Master students.

The workshop was organized in the authentic village of Sidi Bou Said, located north Tunis in Tunisia during October 27–29, 2016.

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