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Second international *AFM BioMed Conference* on AFM in life sciences and medicine, 16–18 October 2008, Monterey, CA, USA

Founded in June 2006, **AFM BioMed** organized its first international conference from 19 to 21 April 2007 in Barcelona (Pellequer *et al*., 2007). Hosted by Universitat de Barcelona, **IBEC**[1] and the **CEA**,[2] this event welcomed approximately 220 scientists from 24 countries reflecting the strong and rapidly growing enthusiasm for the use of AFM in the life sciences and medicine (Parot *et al*., 2007). The second edition, held at the Hyatt Regency in Monterey, California, from 16 to 18 October 2008, was hosted by **QB3**[3] and **CEA** with an organizing committee of Sanjay Kumar (Chairman: UC, Berkeley), Pierre Parot and Jean-Luc Pellequer (Co-organizers: CEA Marcoule). Conferences like these are simply not possible without extensive financial and logistical support, and Veeco Instruments, Hamamatsu, *Microscopy and Analysis*, Leica Microsystems and nPoint offered generous sponsorship to help cover both scientific and social events. Approximately 150 scientists from 16 countries attended the Monterey edition of AFM BioMed which was organized into five full-length oral sessions, two poster sessions and an evening session featuring short oral presentations of a few particularly outstanding posters. In addition to these sessions, a workshop was held the day before the conference that included lectures and demonstrations covering various applications of AFM in the life sciences ranging from single molecules to living cells. Examples included AFM imaging and force spectroscopy of biomolecules and cells, mechanical characterization of biological materials and micro-manipulation.

The first oral session, *New AFM-Based Instrumentation for Biology and Medicine*, was chaired by *Daniel Fletcher* (*University of California, Berkeley, USA*) and covered novel force microscopy techniques, combined AFM-optical microscopy systems and advanced probes. The second session, *Biomolecular Force Spectroscopy*, was chaired by *Christopher Yip* (*University of Toronto, Canada*) and covered single-molecule force spectroscopy, mechanical unfolding, simulation and analysis of single molecule unfolding and refolding and measurement of protein–protein and protein–surface interactions, including adhesive and receptor–ligand binding forces. The third session, *AFM of Biomaterial Surfaces*, was chaired by *Greg Haugstad* (*University of Minnesota, USA*) and covered imaging and chemical/mechanical characterization of biomaterial surfaces (particularly in the context of coating, adsorption and modification) and the interface of synthetic materials with biological tissues. The fourth session, *AFM of Cells*, was chaired by *Michel Grandbois* (*Université de Sherbrooke, Canada*) and covered the force spectroscopy, adhesion, imaging, mechanics and mechanotransduction and manipulation of living cells. The final session, *Biomolecular Imaging*, was chaired by *Simon Scheuring* (*Institut Curie, France*) and covered high-resolution AFM imaging of biomolecules, biomembranes, cells and biomedical nanostructures.

This special issue of *JMR* is dedicated to showcasing full-length papers based on some of the especially superb presentations made at the meeting. To pick just a few examples, Strauss and colleagues use AFM to comparatively characterize the structure and force spectroscopy of the lipopolysaccharide (LPS) layer across several *E. coli* strains and show that the length of the LPS layer correlates with adhesion to the AFM tip, which may lend insights into the earliest steps of infection. Jungbauer and colleagues creatively use AFM imaging to validate new strategies for fluorescently labelling Aβ amyloid fibrils, thereby creating new reagents for studying cellular and molecular mechanisms of Alzheimer's disease. Calderon and colleagues develop an elegant modelling framework with which to extract information about intramolecular frictional interactions from single-molecule unfolding experiments.

We are excited to report that there will be a third edition of AFM BioMed, with the meeting once again returning to Europe. The next AFM BioMed conference will be held from 10 to 15 May 2010, in Red Island (Roving, Croatia) and will be chaired by Professor Vesna Svetličić from the Ruđer Bošković Institute at Zagreb, Croatia.

We are confident that you will enjoy this special issue of *JMR*, and we hope to see you in Red Island!

[1]Institute for Bioengineering of Catalonia (**IBEC**) seeks to further the development of multidisciplinary research of excellence. In addition, it promotes teaching activities in biomedical engineering and acts as an international reference in this field.

[2]**CEA** is a French government-funded technological research organization. A prominent player in the European Research Area, it is involved in setting up collaborative projects with many partners around the world.

[3]**QB3**, the California Institute for Quantitative Biosciences, is a cooperative effort among three campuses of the University of California and private industry that harnesses the quantitative sciences to integrate our understanding of biological systems at all levels of complexity. The institute involves scientists housed in new facilities at UC San Francisco, UC Berkeley and UC Santa Cruz.

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