

# HiBB 2010: Workshop on High Performance Bioinformatics and Biomedicine

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## Foreword

High-throughput technologies such as microarray and mass spectrometry and clinical diagnostic tools such as medical imaging, are producing an increasing amount of experimental and clinical data. In such a scenario, large scale databases and bioinformatics tools are key tools for organizing and exploring biological and biomedical data with the aim to discover new knowledge in biology and medicine.

High-performance computing may play an important role in many phases of life sciences research, from raw data management and processing, to data integration and analysis, till data exploration and visualization. In particular, at the raw data layer, Grid infrastructures may offer the huge data storage needed to store experimental and biomedical data, while parallel computing can be used for basic pre-processing (e.g. parallel BLAST) and for more advanced analysis (e.g. parallel data mining). In such a scenario, novel parallel architectures (e.g. CELL processors, GPU, FPGA, hybrid CPU/FPGA) coupled with emerging programming models may overcome the limits posed by conventional computers to the mining and exploration of large amounts of data.

At an higher layer, emerging biomedical applications need to use bioinformatics tools, biological data banks and patient's clinical data, that require seamless integration, privacy preservation and controlled sharing. Service Oriented Architectures and semantic technologies, such as ontologies, may allow the building and deployment of the so called "collaboratories", where experimental research may be conducted by remote scientists in a collaborative way.

The *1st Workshop on High Performance Bioinformatics and Biomedicine* (HiBB) aimed to bring together scientists in the fields of high performance computing, computational biology and medicine to discuss the parallel implementation of bioinformatics algorithms, the application of high performance computing in biomedical applications, as well as the organization of large scale databases in biology and medicine. Furthermore, the use of novel parallel architectures and dedicated hardware to implement bioinformatics and biomedical algorithms has been discussed.

To be able to reach the parallel processing community, the workshop has been organized in conjunction with Euro-Par, the main European (but international) conference on all aspects of parallel processing. The Call for Papers for the HiBB workshop was launched early in the year 2010, and at the passing of the submission deadline we had received 16 submissions, which were of good quality and generally relevant to the theme of the workshop. The papers were swiftly and expertly reviewed by the program committee, each of them receiving at least three qualified reviews.

The program chair thanks the whole of the program committee and the additional reviewers for the time and expertise they put into the reviewing work, and for getting it all done within the rather strict time limit. Final decision on acceptance was made by the program chair based on the recommendations from the program committee. Being an half-day event, there was room for accepting only 8 of the contributions, resulting in an acceptance ratio of about 50%. All the accepted contributions were presented at the workshop yielding an interesting discussion on the role that parallel processing may play in bioinformatics and biomedicine.

Presentations were organized in two sessions: in the former (High Performance Bioinformatics) four papers discussing the parallel implementation of bioinformatics and systems biology algorithms were presented, while in the latter (High Performance Biomedicine) four papers describing the application of high performance computing in clinical laboratories and hospitals were presented. This post-workshop proceedings includes the final versions of the presented HiBB papers, taking the feedback from reviewers and workshop audience into account.

The program chair sincerely thanks the Euro-Par organization for providing the opportunity to arrange the HiBB workshop in conjunction with the Euro-Par 2010 conference. The program chair also warmly thanks the Faculty of Medicine of the University of Catanzaro and Euro-Par for financial support which made it possible to organize the workshop. Finally, the program chair thanks all attendees at the workshop, who contributed to a lively day. Based on the mostly positive feedback the program chair and organizers plan to continue the HiBB workshop in conjunction with Euro-Par 2011.

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