



**Call for Papers - Special Track on
Grid and Cloud Computing in Biomedicine and Life Sciences
CBMS 2013**

20-22 June 2013 University of Porto, Portugal

<http://cbms2013.med.up.pt/>

<http://sara.unisalento.it/cbms2013/>

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Important Dates:

Submission of papers: 31st January 2013

Notification of Acceptance: 10th March 2013

Final Submission: 10th April 2013

Scope

Life sciences researchers routinely deal with large data to be analyzed by applications that need considerable computing power, including advanced parallel and distributed infrastructures, such as grids/clouds, clusters, and many-cores, multicores and FPGA architectures. Managing these data, typically terabytes or petabytes in size (usually referred to as Big Data), and optimizing the applications for these architectures is one of the challenges that must be tackled. Big Data computing applications need to process large volumes of data by using a parallel approach. Therefore, there is a clear need for design and implementation of new scalable algorithms for searching and processing of massive amounts of data.

High-throughput techniques for DNA sequencing, gene expression analysis, healthcare data analysis, etc., have led to an exponential increase in the volume of biological data, which in turn are geographically spread in several laboratories and data repositories.

Other questions, such as climate change impact on the life sciences, and the disciplines to address them, are adding to the deluge of data: many prevalent human diseases are linked to climate fluctuations, from heat stress, cardiovascular mortality and respiratory illnesses due to heat waves, to altered transmission of infectious diseases and malnutrition connected to crop failures.

Bringing together and correlating data among different and heterogeneous data sources will allow inference of new knowledge from these databases. There is a

tremendous potential for end-users in many fields of life sciences, to routinely conduct large scale computations on distributed resources by using a combination of the following technologies:

- Distributed middleware for connecting data/cluster computing centers: this includes grid computing middleware for users' authentication and accounting, remote job submission, resource scheduling/reservation, and data management;
- Virtualization technologies capable of providing on demand application-specific execution environments: this involves a style of computing, cloud computing, in which on-demand resources are provided as a service over the Internet.

Grid for the Life Sciences is an environment that allows sharing of resources, in which heterogeneous and dispersed health data as well as applications can be accessed by all users as a tailored information providing system according to their authorization.

Cloud computing is emerging as a model for enabling convenient, on demand network access to a shared pool of configurable resources that can be rapidly provisioned and released with minimal management effort or service provider interaction. Institutions and medical professionals who frequently do not have enough storage and computing resources can manage their biomedical information through applications built on top of these types of services, accessing advanced computing infrastructures that they could not afford otherwise. While many companies, like Google, IBM, Amazon, and Microsoft, were early adopters of cloud computing, its application to biomedicine has been only recently proposed, mainly for bioinformatics applications. Several reviews and research papers have reported on these, while in contrast, applications in medical informatics have been infrequent. Now, medical applications are increasingly proposed and implemented, though reports are still scarce from a research and academic perspective.

The main goal of the track is to exchange ideas and results related to on going big data, grid and cloud computing research in Biomedicine, Life Sciences and correlated disciplines, such as Climate Change, that impact on human health, focusing on different aspects of middleware, technologies and applications.

Main Topics

- Grid/cloud infrastructures, middleware and tools;
- Grid/cloud applications: service and/or algorithm design and implementation; best practices related to solving large-scale problems on grid/cloud infrastructures;
- Parallel algorithms using MPI or OpenMP to address scalable processing of data;
- Exploiting modern parallel architectures including applications;
- GPGPU parallel algorithms using OpenCL or CUDA;
- Security and privacy preserving in grids/clouds;
- Innovative approaches for the exploration, storage, processing, delivery and/or visualization of biomedical information;
- Big Data computing platforms to attain high levels of reliability, efficiency, availability, and scalability;
- Identification of novel applications that can exploit Big Data computing and determining how this paradigm should evolve to support emerging data-intensive applications;
- Workflow Management Systems;

- Scientific gateways and user environments;
- Inferring new knowledge from databases by using data and text Mining methodologies and techniques;
- Web services and cloud computing for biomedical applications: comparative studies;
- Using biomedical ontologies for advanced cloud requirements, experiences, limitations;
- Real cases, testbeds and international projects facing
 - (a) Biomedicine, bioinformatics and healthcare;
 - (b) Climate change models and health challenges, etc.;
 - (c) Applications for developing countries.

Submission

Please submit full paper according to the guidelines (CBMS web site is <http://www.easychair.org/?conf=cbms2013>)

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