Presentation of EMBnet nodes associated in 2009

Bioinformatics at Nile University: Perspectives for Egypt and the whole Region

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Nile University is a non-profit research university established in 2007 as part of the Egyptian Government's Strategic Plan aiming at building-up an IT society in Egypt. The Center for Informatics Sciences (CIS) at Nile University (www.cis.nileu.edu.eg) was established in January 2008 as a research center dedicated to the development and application of informatics methods for the management and interpretation of scientific information. The center's research agenda focuses on the areas of health, agriculture, and environment. Currently, CIS has 40 researchers working in six groups including the Bioinformatics one. The research direction and coordination of the groups is led by Dr. Moustafa Ghanem.

Bioinformatics at NU

The Bioinformatics Group at Nile University is leading an effort to promote the field of Bioinformatics in Egypt and the Arab region. The group was established in early 2008 under the leadership of Dr. Mohamed Abouelhoda. International scientific advisors include Professors Robert Giegerich (Bielefeld University, Germany) and Hani Gabra (Imperial College London). The group is committed to the following objectives: 1) building a national bioinformatics computational infrastructure, 2) running fundamental and applied research with focus on food and healthcare applications, and 3) conducting an ambitious human capacity building program in bioinformatics in response to the growing molecular biology research base in Egypt and the region.

In 2009, the pilot phase of the bioinformatics infrastructure plan at Nile University was completed with installation of a cluster of 21 servers with 160 cores and total 1TB RAM with 24 TB total Storage. Our infrastructure is well connected to the internet and expandable by design to include other computational resources in collaborating sites through Grid technology, which renders it ideal for local needs and for international collaboration.

NUBIOS (Nile University Bioinformatics Server) is a web-based portal running over the existing computational infrastructure. The server was developed as part of an internally-funded research project conducted in collaboration with the Department of Computing at Imperial College London in the UK and the Practical Computer Science Department at Bielefeld University in Germany. NUBIOS hosts public and local biological databases. It also provides access through web and programmatic interfaces to a wide variety of popular bioinformatics tools and novel tools developed by Nile University. Beneficiaries

Figure 1. Nile University.

of the infrastructure and NUBIOS services include, among others, Animal Health Institute, Agriculture Genetic Engineering Institute, and National Cancer Institute in Egypt as well as researchers in the Medical School at Imperial College London in the UK.

The group is currently engaged in a number of research projects. Over the past eighteen months, a major focus has been on building a cancer bioinformatics facility for the management, integration, and interpretation of Bladder and Ovarian Cancer data. This effort is conducted in collaboration with the Department of Oncology, Imperial College London, the Egyptian National Cancer Institute, and InforSense Ltd. Other projects for the application of advanced data management and analysis methods to pathogen detection and virus research are in preparation with partners from Europe, USA and Australia.

The group has well established research collaborations with international software companies. In 2008, it successfully completed a pilot project with Microsoft for building bioinformatics tools running on Microsoft Windows Cluster and released WinBioinfTools, an open source package for sequence analysis running under Windows HPC Server 2008. The group is also collaborating with IBM for developing tools designed to run on massively parallel architectures and the IBM Blue Gene technology.

Developing a strong base of competent bioinformaticians in Egypt and the region is a self-commitment of the group. Its efforts in this area include a dedicated bioinformatics stream in the Nile University Masters program and regular engagements in a number of regional and international activities. For example, the head of the group, Abouelhoda, is currently mentoring the ISCB Regional Student Group of North Africa.

The bioinformatics group is optimistic that EMBnet membership will help it in achieving its goals. Through EMBnet, wider international and regional collaboration is guaranteed and wider dissemination of the group work will be accelerated. Nile University will act as a dissemination node for all research and educational information of EMBnet to the Egyptian and regional community by means of its local and regional connections and by means of NUBIOS, which will host a local mirror of the EMBnet site.

The New South Wales Systems Biology Initiative

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The New South Wales Systems Biology Initiative (SBI) was established in 2008, funded by the New South Wales Office for Science and Medical Research (OSMR) and the University of New South Wales (UNSW). The mission of SBI is to become Australia's foremost centre for Systems Biology, undertaking basic and applied research in the development and application of bioinformatics for genomics and proteomics, and providing collaborative bioinformatics services in these areas.

The SBI is based in the school of Biotechnology and Biomolecular Sciences at the University of
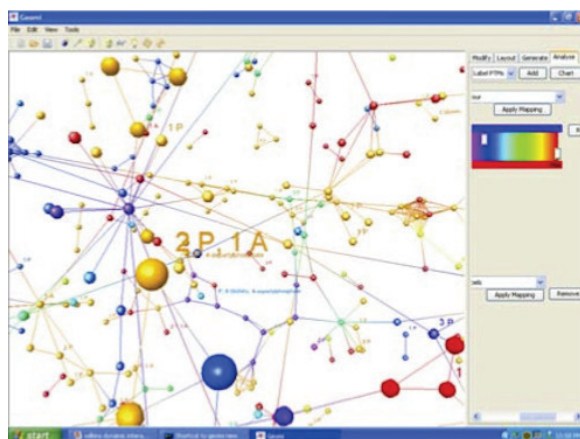
Figure 1. Screenshot of GEOMI, a network visualisation tool developed by Dr. Seokhee Hong (National ICT Australia). This version of GEOMI has been specifically tailored by the SBI to allow co-visualisation of protein- protein interaction networks or complexome networks with multiple protein parameters (e.g. abundance, half-life, function, localization) or gene expression data.