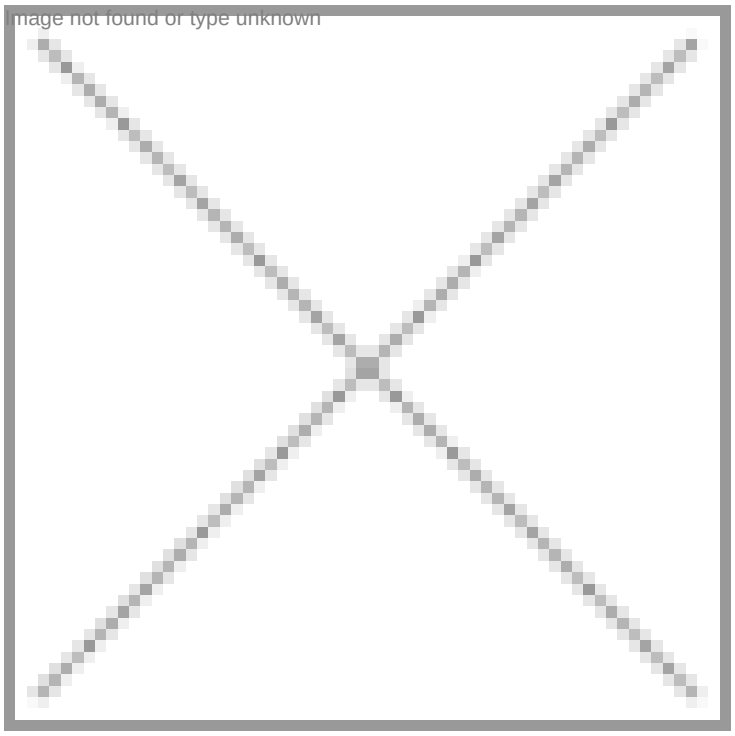
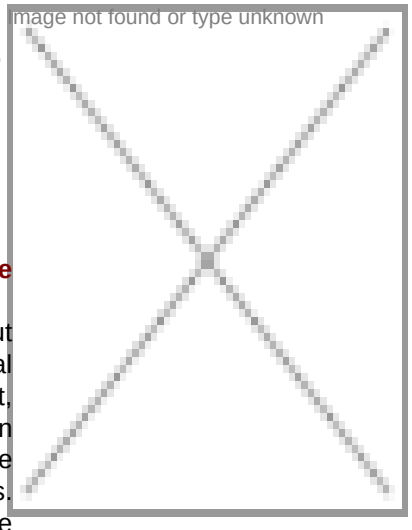
BioSpectrum
the business of Bio & Health Sciences

BioCareers

11 February 2005 | News



"The Next Wave in Bioinformatics is Systems Biology"



The Bangalore-based Institute of Bioinformatics (IOB) has recently developed a Plasma Proteome Database (PPD), which gives all the necessary information on the blood protein, in a single site. This work was based on an international grant from Human Proteome Organization (HUPO), the world's largest body for protein analysis and signifies the official recognition of IOB as a leading world player in the emerging field of bioinformatics. Dr Akhilesh Pandey, chief scientific officer, IOB, shares his views on the future of bioinformatics and development of human resources for this niche segment in India.

What is the potential or opportunity for the bioinformatics segment in India? Is the current buzz about bioinformatics justified?

Bioinformatics has immense opportunity and good potential and the current buzz about bioinformatics is justified. Bioinformatics is the use of computers for solving biological problems. Bioinformatics not only includes data storage, data mining and management, but also the computational methods and techniques like simulation/dynamics employed in biological systems to understand the underlying cellular phenomenon. Any system where the information can be represented digitally offers a potential application for bioinformatics. Genome sequencing projects have generated a vast amount of data that needs to be

analyzed thereby creating a thrust area for many bioinformatics initiatives.

An important part of the field of bioinformatics is the development of new technology that enables analysis, sharing and exchange of data to proceed at a very fast pace, for example, the Internet and the development of computer clusters and grid infrastructures. Many scientists find bioinformatics exciting because it holds the potential to dive into a whole new world of uncharted territory. Biological questions ultimately drive all bioinformatics experiments. Important biological questions that can be addressed by bioinformatics are many and include understanding the genotype-phenotype correlation for human diseases, understanding structure-function relationships for proteins, and understanding biological networks. The next wave in bioinformatics is Systems Biology, which involves the integration of genomics, proteomics, and bioinformatics information to create a whole system view of a biological entity. Needless to say, the opportunities in the bioinformatics segment are vast and there is a shortage of trained personnel in this field today.

What are the necessary skill sets for students to step in this field and meet the industry standards?
Ideally, a student should have sound knowledge of molecular biology, a passion for life sciences and an inquisitive mind. Apart from this, he or she should possess:

1. A knowledge of UNIX/Linux the operating system used for many computational biology programs;
2. A good grasp of the concept of relational databases, which are the heart of bioinformatics;
3. Programming languages such as Perl or Python, which are popular in the field of Bioinformatics. In the future, knowledge of object-oriented databases may be increasingly important.
4. Expert knowledge of sequence-analysis programs like BLAST is critical.
5. Web skills, of course, are necessary, including the ability to write Hypertext Markup Language (HTML).

What gives one applicant an edge over another?
Recruiters get excited over applicants who have applied computational biology skills in a practical way. Technical developments such as molecular genetics, transcriptomics, proteomics and metabolomics provide the analytical base to support this advance but demand novel statistical and computational skills. In this post-genomic era, bioinformatics is rapidly developing and it is essential that current and future researchers learn the most up-to-date applications and approaches. Post-genomic applications demand a level of informatics skill beyond that previously employed in biosciences. There is a shortage of individuals with the necessary multidisciplinary training to meet this demand but the availability of such individuals will be critical to future understanding/interpretation of the large amounts of available data.

What are the key characteristics of this segment as opposed to those in other biotech segments like biopharma and bioagri?
Biopharma and bioagri are the ultimate applications of bioinformatics. Without these applications bioinformatics could not have assumed the pride of place it has.

In spite of the large number of Indian students trained in bioinformatics, there is a big gap between the demand and expertise available. Where does the problem lie and how can it be addressed?
Some of the Indian universities have set fairly good standards of teaching bioinformatics but the same is not uniform and as far as the private institutes that have mushroomed to take advantage of the hype, I have no comment. The only thing I can say at this point is that if India has to enter the big league, it should focus on the quality of training of its young people in Bioinformatics. Further, I feel that the best training in this field can only be provided by those who are active in performing research in this area and not those who are simply teaching outdated concepts or those pertaining only to a particular sector such as the pharma sector.

Rolly Dureha