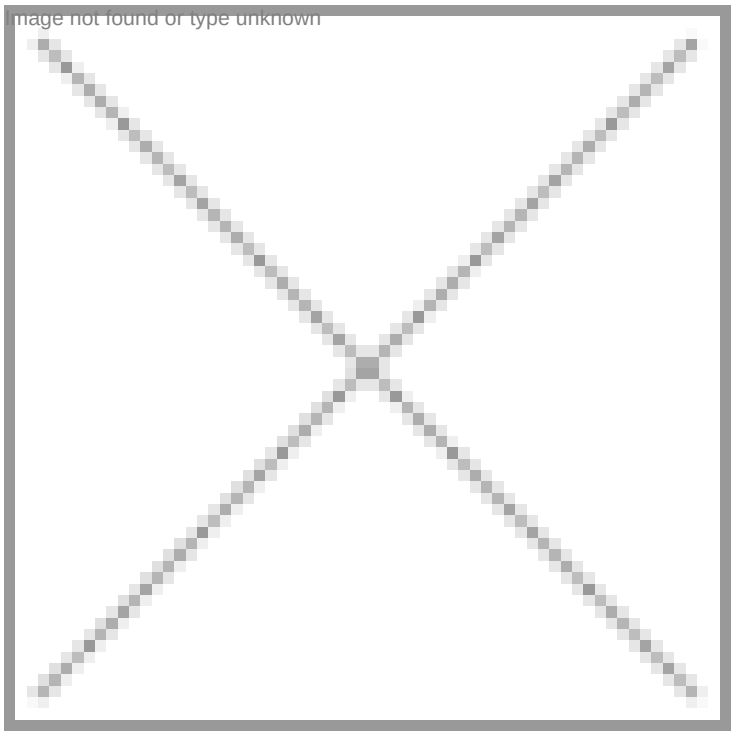
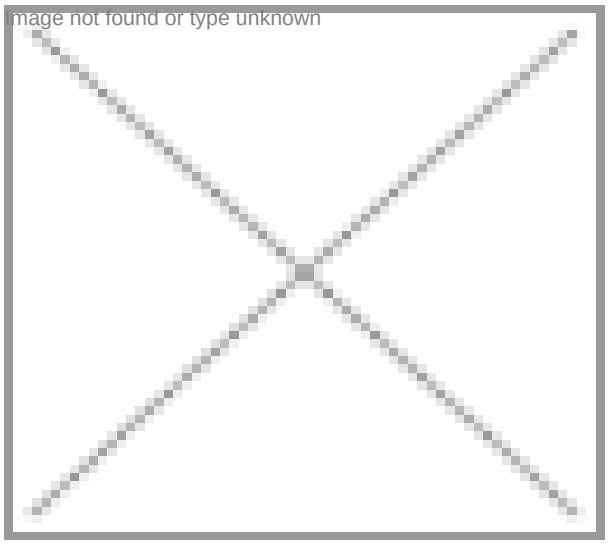
BioSpectrum the business of Bio & Health Sciences

Bioinformatics red hot

21 July 2003 | News





The last decade was rightly termed as the information technology decade. It dramatically altered the way Indians live and dream. This period witnessed Indian entrepreneurial spirits soaring with the rise of the dotcom wave which unfortunately lasted for a short span. But the resilience of the IT professionals soon found outlets in bioinformaticsâ€"application of IT to the management of biological information. It has propelled many familiar names from IT industry to explore the field of bioinformatics. Some big players in India are doing more than take a mere look at the scenario. These days media has been seeing, almost on a daily basis, how the Indian infotech, biotech and pharma sectors are joining hands to explore the tremendous potential of this new area.

Although India is expected to play a leading role in the bioinformatics revolution, it is widely recognized that we lack trained bioinformatics professional. At present a strong need is felt for a multi-disciplinary system of education which incorporates both these areasâ€"biology and computer science. Both universities and private institutions have started offering courses. Today, offline and online courses are available in the country. Take for example, Bioinformatics Institute of India (BII). It is engaged in providing education and training services in Bioinformatic sciences. According to

Puneet Mehrotra, technical director of the institute, "The total number of students enrolled in BII's regular and distant learning programs has reached up to 5,000. The need for talented professionals is high and the institute is creating a complete pool for bioin-formatics. We tend to provide almost all sorts of services in this specific areas."

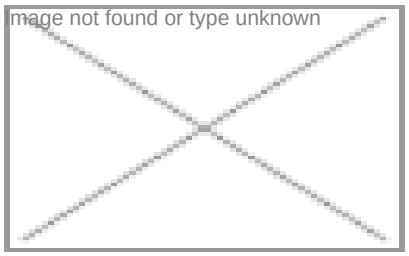
As for the application of bioinformatics, within 10 years, all new drug designs will be genomics-related. Here is a $300 billion pharmaceutical industry and a very fast-growing biotech industry to support. There is a $300 billion industry spending, $30-40 billion a year in R&D: huge efforts, no tools. There are very good sequencers around, with good instruments, but there isn't very much software to support it.

Jawaharlal Nehru University (JNU), New Delhi, is one of the early introducers of bioinformatics course in India. Prof. Alok Bhattacharya, dean, School of Life Sciences at JNU, shares some of his past experiences. "In the late Eighties, when we actually ventured into this field. The reaction from the industry was mixed. At that time, the use of computers had not reached to the top level, either. But, now the requirement of bioinformatics professionals has increased and it is the most emerging and efficient tool for research." Commenting on the number of students, he said, "We believe in a very selective human resource. We do not keep our focus to produce large number of computational biologists, because the industry is very selective about such workforce." His center would introduce MSc in Computational Biology from next year. "This name, Computational Biology, indicates a much larger canvas. Since the future lies in the hands of upcoming young talents, coming from combination of biology and computers, this new course will attract people from both the backgrounds," he added.

The combination of biology and computers is understandable. But what about biotech and management? This is a very futuristic thinking. But we are not behind here. Looking at the future needs and opportunities in biotechnology, University of Pune has launched a two-year full-time MBA program in biotechnology (MBA Biotechnology) last year. This is not only the first such program by any Indian university/institute but also probably the first of its kind in Asia. Says Dr (Capt.) CM Chitale, professor and head of the department of management sciences, "We want to give the basic inputs for managing the biotechnology products, on intellectual property rights etc., which are key for the growth of biotechnology in India." Added Dr Smita S Singhania, lecturer and course co-ordinator (MBA-BT), "The biotech companies are eagerly looking at the department. They want to absorb the top five."

The thrust on biotechnology education is scaling high. According to Dr MR Kurup, secretary, Kelkars Education Trust "The objective of the courses is to provide skills to the students for self-employment, to train students to suit to the industry requirements, to apply high technology in teaching and training and to establish industry â€“academic interface." Adds Dr SS Barve, head, department of botany and coordinator, department of biotechnology, in Pune University "All our students are working in well known organizations in India and other countries. This validates the point that there is ample demand for quality students in the biotechnology industry."
Is bioinformatics very prospective?

"A person needs to be a jack of all trades, and then he or she can become master of bioinformatics," Prof. K Kannan, dean, School of Biotechnology, Guru Gobind Singh Indraprastha University (GGSIPU)



Prof. K Kannan started his career as a scientist at the Center for Cellular and Molecular Biology, Hyderabad. He has the corporate experience too. He had served as general manager and associate director of biotechnology at Ranbaxy Research Laboratories. He has been advising several industries about diversification into biotechnology as a consultant. He shared his perspective on the biotech opportunities with BioSpectrum. Excerpts:

Is bioinformatics very prospective?

In the next few years, the bioinformatics sector will definitely offer at least 7,500 job opportunities. This is because bioinformatics will act as an active tool for almost every segment of biotech research, whether its is drug discovery or even environmental research work. Its application can ease the burden of research work. At least bioinformatics can indicate the scientist about what is needed in their research and what is unnecessary to work on. I am sure that in the coming few years, this will be attractive to young people.

Where are the opportunities?

These opportunities will come from corporate houses, research institutes and academic institutes. For example, if you see the industry today, a lot of big companies are coming up in the field of biotech and bioinformatics. Big players in IT and pharma industries are showing good interest in this field, and this is the correct time for youngsters to move in to this industry. Development in this segment is taking place at a high speed.

Shouldn't academia focus more on this subject?

Yes, since it has a potential for growth and its industry is in need of specialized people. Biotech has been added in CBSE syllabus for class 12th. The students are also showing good interest in it. There are many educational institutes that have shown active interest in imparting the biotech and bioiformatics courses.

What is necessary to be a good bio-informatian?

It requires a computer background. It would be a plus point if someone has biology background as well. But, bioinformatics requires quite a fair amount of knowledge of statistics and mathematical calculations. So, in my view a person needs to be a jack of all trades and then he or she can become master of bioinformatics.

What is the prime focus area in this field?

Systems biology is an up coming term in the field of research. It is a handy tool in the research work. Although bioinformatics is itself one of the most unique dimensions of biotech field as it offers the customized solutions, its application in the research work made its progress faster and result-oriented.

Will biotechnology replace chemistry in academics?

Biotech is not replacing any subject, though it is true that the academic institutions are talking more about biotech rather than chemistry.

PIONEERS

BIC at Jawaharlal Nehru University, New Delhi

The Bioinformatics Centre (BIC) at Jawaharlal Nehru University, New Delhi is among the pioneers of bioinformatics education in the nation. BIC was set up in 1989 funded under the Biotechnology Information Systems Programme (BTIS) of DBT. The center, which was functioning at the School of Computer Systems Sciences building from its inception in 1988, shifted to its present location in 1995. The centre is well equipped with all the necessary facilities in terms of hardware, software, networking, etc. BIC-JNU is offering one-year post MSc Diploma in Bioinformatics and PhD program in bioinformatics. Computational genomics is the thrust area of BIC.

Bioinformatics Institute of India, Noida UP

This institute is engaged in education and training services in bioinformatic sciences. It offers three PG Diploma courses via distance learning program to graduates, biologists, software professionals and professionals in other related fields. These courses are provided through local study centers in cheminformatics, bioinformatics and biomedical informatics all over the country. The total number of students enrolled in BII's regular and distant learning programs has reached up to 5,000. The courseware and methodologies of BII have been developed on par with international standards in consultation with industry experts and academicians. It plans to set up of a state-of-the-art development center to provide a world class R&D facility to budding scientists. The R&D areas of the organization are wide ranging from biotech to pharmaceuticals and medicine. The institute assists in technology outsourcing, identification of joint ventures and marketing tie-ups for various products and services of pharmaceutical and other product organizations.

CBT at Anna University, Chennai

The Center for Biotechnology (CBT) at Anna University, Chennai is one of the oldest biotech education institutions in the country. Started in 1987 with funds from the University Grants Commission, Department of Biotechnology and Anna Univesity, CBT has played a pioneering role in biotech education. In 1992, the center started a B Tech program in industrial biotechnology. It is supported by a large consortium of industries who have set up a corpus fund to the run the program. Recently, CBT got a boost with more funds donated by a well-known biotech company, Amersham Biosciences. Two more positions of lecturers were created using these funds. CBT also offers a two-year M Tech (biotech) and PhD programs in biotechnology. Students are admitted through an entrance examination.

Anna University is the largest Technology University in the country with 222 engineering colleges in Tamil Nadu affiliated to it.

Center for DNA Fingerprinting and Diagnostics

This is an autonomous institution supported by the Department of Biotechnology (DBT). It is India's premier center providing services in the areas of DNA fingerprinting, molecular diagnostics, and bioinformatics. CDFD is now poised to initiate basic research in fields relevant to its objectives. CDFD is also the bioinformatics national node for the European Molecular Biology network (EMBnet). The node currently provides bioinformatics services in the form of browsing biomolecular sequence databanks, macromolecular structure databank, genome and other useful databases.

Indraprastha University, Delhi

Guru Gobind Singh Indraprastha University (GGSIU) is offering BTech course in bioinformatics. It has some unique features in its course curriculum. This special academic program is a result of successful alliance between School of Information Technology and School of Biotechnology at GGSIU. The four-year B Tech program in Bioinformatics was first started in 1999 with 30 students. Recently, a fourth year student of School of Biotechnology, Amit Aggarwal, was selected for the PhD program in neuro sciences at Cottingham University, Germany. The university is also offering an integrated five-and-half year M Tech program in biotechnology.

University of Pune (MBA Biotechnology)

University of Pune has taken a path-breaking initiative to catalyze the biotechnology revolution. It has launched a two-year full-time MBA program in biotechnology in the academic year 2002-03. This is the first such program by any Indian university or institute. This is probably the first in Asia too. The course has been envisaged to create managers with domain specific knowledge for the biotech industry. The syllabus is based on the requirements of the industry. Sixty percent of the syllabus covers the managerial aspects and 40 percent biotechnology. The institute received overwhelming response for the course during the first year. The program admits 60 students each year. There will be a provision to admit international students also. The fee per year is Rs 18,500.

VG Vaze college, Mumbai

Kelkar Education Trust's VG Vaze College offers degree-level courses in biotechnology. The college has a state-of-the-art biotechnology lab and a scientific research center. The center under takes research in areas relating to medical, aromatics, cosmetics and environmental biotechnology. DST and University of Mumbai have bestowed the center as a recognized institution for research. Students will be admitted at the center for MSc (by research) and PhD in life sciences. The center is focusing on the development and mass propagation of medicinal and aromatic plants. The college, in collaboration with the research center and industry, has plans to offer certificate and diploma courses and training in perfumery, cosmetics, horticulture and tissue culture techniques, agricultural applications, etc. These courses are expected to commence from this academic year 2003-04. They will be offered to the science stream students. These diploma courses will be simultaneously offered to the students pursuing other degree courses too.

Rai University, Bangalore

Founded by Rai Foundation, this group has spread its educational arms across the nation with campuses in Bangalore, Behror, Bhopal, Dehradun, Gurgaon, Hyderabad, Kolkatta, Kosi, Lucknow, Mumbai, New Delhi, Pathankot and Pune. It is offering BSc in biotechnology, BSc(Hons) in environment management studies, Graduate Diploma (Hons) in biotechnology and patent laws and GPD (Hon) in forensic sciences. It also offers post graduate diploma in bioinformatics and in industrial microbiology.

RGCB, Kerala

Rajiv Gandhi Centre for Biotechnology (RGCB) is an autonomous research institute that functions under the umbrella of Science, Technology and Environment department of the Government of Kerala. Established in its present form in 1994, RGCB has come to occupy an important position among the research institutes of the country devoted to research in the cutting edge areas of modern biology and biotechnology. It occupied a new building in January 2002. With the support of the DBT it has established research facilities required for carrying out modern biological research. Currently, the research

activities are being carried out in seven major divisions: infectious diseases, plant molecular biology, environmental biotechnology, molecular human genetics, neurobiology, cancer biology and molecular endocrinology.

New Institutes

East West Institute of Technology

Recognized by the Government of Karnataka, affiliated to Vishwe-shwaraiah Technological University and approved by All India Council for Technical Education (AICTE), New Delhi, the East-West institutions have been functioning in Bangalore for over three decades catering to the needs of quality and integrated system of education. All the institutions are having their own buildings and are centrally located.

The East West Educational institutions have earned very good reputation for providing meaningful education and for maintaining high standardsâ€”both in professional and nonprofessional courses.

East West offers Bachelor of Engineering courses in biotechnology engineering. This is an eight-semester course, affiliated to Vishweshwaraiah Technological University. It also offers graduate and postgraduate courses in biotechnology.

Edubiotech

Edubiotech is a technology driven organization, providing world-class biotech technical support to educational institutions and corporate sectors. Edubiotech accelerates innovative ideas by providing good quality R&D and lab facilities. Each one has a place and is given the opportunity to excel in their field of interest.

Oxford Group, Bangalore

The Oxford Group of Educational Institutions is a group that yearns at strengthening the concept of value based education. There are 22 educational institutions in all the branches of this institution. The Group has a separate College of Engineering as well as a college of Science in Bangalore. Today the Group is offering engineering as well as graduate and postgraduate programs in biotechnology. The Oxford College of Engineering is affiliated to Vishweshwaraiah Technological University and approved by AICTE, New Delhi and offers four-year BE in biotechnology engineering. The Oxford College of Science offers BSc in biotechnology and related fields such as microbiology, genetics and biochemistry. It also offers postgraduate courses in microbiology, biotechnology, and biochemistry.

Padmashree Institute, Bangalore

Padmashree Institute of Information Science (PIIS), affiliated to Bangalore University, is offering courses in Biotechnology at both undergraduate and postgraduate levels. The biotech program at the institute has been designed to bridge the gap between industry requirements and the growing demand for skilled manpower in the sector. The institute also offers services to the industry. The areas include protocol development for micro-propogation of ornamental and medical plants, maintenance of mother cultures, supply of planting material for cultivation, testing of microbial activity, testing microbial load in food cosmetics, drugs and extracts and also it has the provision of services for research fellows in the areas of plant tissue culture, biochemistry, microbiology and diagnostics.

RK Institute of Management and Computer Science

RK Institute of Management and Computer Science, recognized by the Government of Karnataka, affiliated to Bangalore University and approved by AICTE is offering courses in biotechnology at both under graduate and post graduate levels. The institute has a highly sophisticated research lab. The lab meets the requirements of the Bangalore University curriculum. The labs are well equipped with air conditioned tissue culture chamber and advanced models of laminar flow bench, UV-Vis Spectro photometer, incubators, autoclave, microscopes, electrophoretic units, optical instruments charts, models and other useful instrument to impart and enhance the practical aspects. Such progressive instruments and equipment contribute to the richness and variety of the courses offered by the institute.

STG

Software Technology Group (STG) is a technology driven company established in 1993 in San Jose, California, providing world class software consulting and training solutions to organizations and professionals in several countries. STG is a leading provider of advanced software education and has strategic alliance with IBM, Microsoft, Red Hat and Sun Microsystems amongst others. STG trains thousands of professionals each year on leading edge technologies. Bioinformatics becoming an increasingly important competitive differentiator for public and private life science companies, STG entered into this emerging field to provide extensive and expert training. Bioinformatics @STG is structured and designed to meet the industry's requirements and has collaborated with several institutions and research organizations to value add to its students. Live projects are provided and there will be an opportunity for the students to work in the horticulture department laboratory under the guidance of professors and research scientists at UAS.

Wageningen, Bangalore

Europe's premier institution, Wageningen University, recently launched its educational module for biotechnology in Bangalore for the first time. Wageningen University in the Netherlands was established in 1918 and had over 10,000 students emerging from its portals annually. As one of the leading centers of education and research in plant, animal, environmental, agro-technological, food and social sciences, Wageningen had been offering quality programs in Asia. The mission statement of the university is to develop and disseminate scientific knowledge needed to sustain and supply society's demands for sufficient healthy food and a good environment for humans, animals, and plants. Wageningen had tied up with two service providers in Indiaâ€”Bioinfraa and C-Lift, both Bangalore-based companies.

SS Infotech, Bangalore

SS Infotech started in the year 1999 as a non-profitable organization to provide high quality education to less fortunate students at an economical cost. Started with MSc (IT), BSc (IT), MBA and BBA courses, presently it is offering one year PG diploma in bioinformatics through Bioinformatics Institute of India, Noida. The objective of the course is to provide adequate knowledge and training to the student with hands on experience in the field of bio-informatics. The institute has developed a course keeping in mind the requirements of the industries and to equip the students with the latest advances in the field of bioinformatics. The institute also offers correspondence courses in biomedical-informatics, bioinformatics and cheminformatics.

Biotech Education Services &Training (BEST), Bangalore

BEST was started as a company incorporated to undertake activities in imparting quality research and training in biotechnology. The objective of BEST is to promote quality hands on training program in biotech education. Besides training the company has successfully forged into contract research services, protocol development, water analysis and waster water management. BEST is equipped with state of art facilities, competent and dedicated technical manpower. Its network has helps the students in placements and career counseling. It offers one-year PG diploma, short-term course of 10-50 days and advanced diploma courses of three months duration in biotechnology.