mathematics. Physics and mathematics are covered under a similar programme sponsored by the ICTP.

Joint lectureship/professorship programme: The lectureship programme enables eminent scientists, worldwide, to deliver five lectures in developing countries. This gives an opportunity for scientists from the Third World to interact with them. This programme of TWAS is in collaboration with International Council of Scientific Union (ICSU) and the United Nations Educational Scientific and Cultural Organization (UNESCO). In the year 1994, the professorship programme was initiated, through which a distinguished scientist could visit thrice, a chosen institution over a period of five years.

Awards and prizes

Outstanding contributions to the advancement of science are recognized through awards to individual scientists from developing countries. These are the TWAS Awards in Basic Sciences, TWNSO Prizes in Applied Sciences, TWAS History of Science Prize, TWAS Medal Lectures, The Abdus Salam Medal for Science and Technology and prizes for Young Scientists in developing countries.

Information services

TWAS has several publications that include a quarterly 'Newsletter', Annual Report on TWAS activities, Proceedings of TWAS General Conferences and specialized meetings, Year Book, Profiles of Institutions for Scientific Exchange and Training in the South, booklets on science, technology and development in the South and various other information about TWAS' programmes.

In addition, TWAS collaborates with TWNSO and the Third World Organization for Women in Science (TWOWS). Collaboration with TWNSO has been in the areas of (a) sustainable utilization of biodiversity in arid and semi-arid zones, (b) promoting best practices for sustainable use of medicinal and indigenous food plants in developing countries, and (c) promoting best practices for conservation, management and sustainable use of water resources in the South. With the formation of TWOWS, the project undertaken is 'Postgraduate training to female students from sub-Saharan Africa'.

About TWNSO: Established in 1988 with the help of TWAS, its goal is 'to help build political and scientific leadership in the South for science-based economic development and promote sustainable development through South–South and South–North partnerships in science and technology'.

About TWOWS: Facilitated by TWAS and launched in Cairo in 1993, it has now more than 2000 members from over 80 countries in the South. Its goal is to 'promote women's leadership in science and technology in the South, with a view to strengthening their effective participation in science-based development and in decision-making processes'.

The forthcoming TWAS' 8th General Conference and the 7th General Meeting of TWNSO in Delhi would consist of the Council Meeting of TWAS, meetings of the various committees of TWAS, the TWAS 13th General Meeting, presentation of TWAS and TWNSO awards, TWAS Medal Lectures, Induction Ceremony of New Members and Symposiums and Special Lectures. This meeting, the first of its kind to be held in India since TWAS was founded, would be of particular interest to the scientific community in India and also others around the world, especially for those in the developing countries.

For more information on the TWAS log on to their website at www.twas-online.org.

Nirupa Sen

A public–private partnership agreement signed in the area of bioinformatics, and announcement of the complete genomic sequencing of Indian isolate of hepatitis-C

On 25 August 2001, an agreement was signed in New Delhi between the Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad, represented by S. E. Hasnain and J. Gowrishankar and the Tata Consultancy Services (TCS), Secunderabad, represented by M. Vidyasagar. Under this three-year agreement, stated to be 'the first of this magnitude and value between public and private sectors' in the area of bioinformatics, the level of fruitful interaction is slated to increase. This is proposed in the form of a three-pronged strategy. Firstly, CDFD would be organizing training programmes of nine-months duration, every year for a period of three years. The programme would consist of training a batch of about twenty-five persons with backgrounds in either engineering or biology. These trainees would be employees of TCS. Secondly, research and development in the area of bioinformatics is to be undertaken at CDFD, with funds provided by TCS. Finally, both sides would identify and develop niche software packages in bioinformatics, that TCS would market globally. All intellectual property, generated as a consequence of this agreement would rest jointly with both TCS and CDFD. As a first instalment under this agreement, TCS presented a cheque of Rs 12.5 lakhs to CDFD.

Vidyasagar, spoke of TCS being the largest Information Technology (IT) company in Asia and the fourth largest growing company in the world. He stated that TCS was moving out of the traditional confines of IT, and that the quantum of support provided for bioinformatics by TCS under the agreement was unprecedented in the annals of such collaboration.

There was also an announcement of the complete genomic sequencing of the Indian isolate of hepatitis-C. Hepatitis-C virus (HCV) is termed the 'silent killer'. In the world today, there are estimated to be about 170 million carriers of HCV; of them about 12.5 million are in India. Mainly transmitted through blood transfusion, HCV is responsible for human

liver disease to a large extent and also for cancer of the liver. To assure safety of blood, pre-transfusion screening for HIV and hepatitis-B is already mandatory in all blood banks in India and screening for hepatitis-C has commenced in the year 2000.

In view of the seriousness of hepatitis-C to cause infection, the sequencing of the Indian isolate gathers importance. Using facilities provided by the Department of Biotechnology (DBT), New Delhi at the Deccan College of Medical Sciences and Allied Hospitals, Hyderabad (DCMS), Indian scientists in collaboration with industries such as Sudershan Biotech Ltd and Shantha Biotech Pvt Ltd have completed the sequencing. Currently, there is no vaccine available against HCV and it is hoped that ultimately this could be realized.

C. M. Habibullah (DCMS), while presenting the results said that under the Indo-US Vaccine Action Programme (VAP), the DBT had sanctioned a project 'Molecular characterization and immunodiagnosis of hepatitis-C virus infection in India', where an attempt was made to develop an indigenous peptide-based ELISA kit. Partnership with Ramareddy V. Guntaka at the University of Tennessee, who is also associated with Sudershan Biotech Ltd, resulted in cloning work being taken up at the DCMS and Shantha Biotech Pvt Ltd, and the whole genome sequencing was carried out in Guntaka's laboratory.

According to Habibullah, the hyper variable region (HVR-1) is involved in viral binding to the receptor and is also the region that is responsible for the genetic variation among different groups of HCV. The genetic heterogeneity of Indian isolates is not well understood and it is proposed that molecular epidemiological studies all over India would be undertaken. It is hoped that identification of critical regions in the viral genome and screening drugs for antiviral activity would be accomplished.

Manju Sharma (Secretary, DBT) said 'the sequencing of the Indian isolates of hepatitis-C virus has opened up enormous opportunities for development of diagnostics, vaccines and new drug targets'.

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Fund for improvement on S&T infrastructure in universities and higher educational institutions (FIST)

It is universally acknowledged that the universities are cradles of innovation, and research in universities has a three-tier effect. These are the quality of undergraduate and post-graduate education and the value of research. This mode of research and generation of high-quality manpower is the most cost-effective and *sine quo non* for the development of India. There has been a serious neglect of support for research in universities and there is a dire need to extend support for infrastructure for research and training. The launching of the FIST programme by the Department of Science and Technology (DST) has been widely acclaimed by the scientific community and has aroused aspirations.

The Government approval for the FIST programme was given in December 1999, with an allocation of Rs 75 crores during the duration of the 9th Plan. The programme was formally announced subsequently. The response to this scheme has been extraordinary and DST processed the proposals (1158 proposals received) in a very efficient and exemplary manner, with the involvement of a large number of highly respected scientists. A strict and highly objective scrutiny has resulted in identification of over 200 departments from 89 academic institutions throughout the country, for support at bare minimum levels, designated as Level-I and Level-II. In Level-I, it is expected to provide funds for improving quality of teaching and research through modernization of laboratories and by augmentation of library facilities. In Level-II, it is envisaged to support state-of-the-art equipment and setting up laboratories conforming to good laboratory practices (GLP) norms, for conducting internationally competitive research. In both the levels, support would be provided for infrastructure facilities, networking facilities and maintenance of equipment. These recommendations were arrived at, through different expert committees and presentations by prospective departments and a final scrutiny by the FIST Advisory Board (FISTAB). In this very first exercise, the Advisory Board has recommended Rs 112 crores. It is expected that during the 9th Plan, Rs 112 crores may be made available against the allocation of Rs 75 crores.

The availability of funds for the approved programme is inadequate. The fund (Rs 20 crores) available for the programme during 2000–2001 was fully utilized and that (Rs 35 crores) available

Table 1. Number of proposals received for the programme

Subject area	Level-I	Level-II	Total
Life sciences	290	121	411
Physical sciences	95	38	133
Engineering sciences	231	115	346
Chemical sciences	88	35	123
Earth and Atmospheric sciences	54	20	74
Mathematical sciences	54	17	71
Total	812	346	1158

Source: DST Annual Report 2000–2001.