

academic, even if he or she were enthusiastic about working in the field. On the other hand, outside the university sector, several research institutes and observatories had come up, the last of these being the Giant Metrewave Radio Telescope (GMRT) of the Tata Institute of Fundamental Research located about sixty miles from Pune.

That was in 1987, when Yash Pal, himself originally a cosmic-ray physicist from TIFR but at the time occupying the position of Chairman, UGC, felt the need to set up an IUC in A&A. And out of the brainstorming he initiated, the IUCAA was born. The Inter-University Centre for Astronomy and Astrophysics was formally set up in Pune on December 29, 1988, and I was entrusted with the responsibility of a founder director. What follows is a brief history of IUCAA (which is now into its second decade of existence) as well as some future projections. More details can be found at our website: <http://www.iucaa.ernet.in/>

The Eightfold Way

The IUCAA campus is in the pleasant area of the 411-acre campus of Pune University. Built by the famous architect Charles Correa, it has become one of Pune City's landmarks. The visitor at once feels relaxed and impressed with the spacious surroundings, in which mathematical and astronomical concepts have been integrated with the buildings and the landscape.

The Centre itself is autonomous, being a registered society as well as a charitable trust. Its major source of funds is the UGC, whose Chairman is the President of IUCAA's Council. The *Council*, a body of 24 members including scientists, vice-chancellors and heads of scientific agencies, has a 12-member subset which is the *Governing Board*, whose chairman is a distinguished scientist. Currently Dr Hari Gautam is the President of the Council, while the eminent mathematician Professor R.P. Bambah is the Chairman of the Governing Board. IUCAA's project report drafted in 1988 talked of an eightfold way in which the Centre's academic programs would have to be framed. Rather than enumerate them, we summarize them below.

IUCAA's mandate is to provide material facilities and intellectual guidance to those faculty members and students from universities and colleges who wish to pursue research in A&A, to help the concerned university departments in introducing the A&A option in their physics (or mathematics, even engineering) curricula, and to provide a lead to these departments in building instruments and teaching-level telescopes. To meet these objectives, IUCAA has set up an up-to-date library in A&A and related subjects, an excellent computer centre with astronomical and mathematical software, a data centre which provides computer access to remote databases in the world, and an instrumentation laboratory for instrument building. And, to enable the visiting faculty and students to visit IUCAA for using these facilities, the UGC has provided IUCAA with travel funds for such visits.

To ensure a continued relationship of the interested visiting faculty, those who are seriously interested in having such interaction are made Visiting Associates of IUCAA, with certain privileges. However, apart from supporting such visits, the IUCAA regularly organizes scientific meetings ranging from introductory schools to specialized workshops. IUCAA also helps the associates in organizing observing programs in national and international facilities.

Last but not the least, the IUCAA is able to provide intellectual stimulation to visitors because it has its own core faculty of high caliber carrying out research and teaching. Of a projected strength of 20, the core faculty at present consists of 12 scientists with interests covering cosmology and structure formation, optical observational astronomy of stars and galaxies, classical and quantum gravity, data analysis techniques for gravitational radiation, galactic dynamics, radio astronomy, and astronomical

instrumentation. There is also a post-doctoral program which attracts young talent from India and abroad, and a research scholar program for those aspiring for a Ph.D. In a comparatively short period, IUCAA has made a name for itself nationally as well as internationally.

Future Projections

With the Giant Metrewave Radio Telescope getting ready to be dedicated to the Nation, the IUCAA looks forward to research collaborations with the TIFR radio astronomers, in which faculty members from universities will also take part. IUCAA is planning to have its own 2-meter new technology optical telescope within about 2- hour driving distance from Pune. It continues to be on a lookout for talented young astronomers and astrophysicists to add to its Core Faculty.

In the last analysis, the problem boils down to generating human resources. Currently, this is a major challenge facing the Indian scientific establishment. To attract new talent, one needs to go right down to school level and create conditions in which bright students aspire to do science. IUCAA is adding its modest contributions to what should be a nationwide effort of science popularization. Every second and fourth Saturday, its 500-seater Chandrasekhar auditorium is filled with teenagers attending some lecture demonstration in science. In their summer vacation, students from Pune schools do mini-projects working with the IUCAA academics. The addition of an open air science park adjacent to the auditorium has added to these public outreach programs.

IUCAA is optimistic that the world-wide spurt of interest in A&A will help its various programs in making these subjects popular amongst the younger generation in India.

IUCAA: A Novel Experiment in the Indian University Sector

Jayant V. Narlikar

When India became independent in 1947, its scientific base was largely within the university sector. M.N. Saha, S.N. Bose, C.V. Raman, L.S. Kothari, N.R. Sen and V.V. Narlikar were some of the stalwarts who emerged and operated in universities in pre-Independence India. The situation changed, however, slowly but surely after independence. Several new research institutes and research laboratories came up in well-focussed areas of S&T, but outside the universities. Rightly or wrongly, a decision was taken by the science policy-makers of the day, including scientists like Shanti Swarup Bhatnagar and Homi Bhabha, that the country needed to boost scientific research and that this could happen typically in an environment wherein the scientist can work without the hassles of teaching and struggling with administrative restrictions found in a university.

The outcome was that, while research flourished outside the university sector, it declined rapidly within that sector. The political expectations from a typical university were also not conducive to research. University faculty was expected to shoulder large teaching loads and research was not considered an important element in the career advance of a scholar. Thus excellent facilities for research exist in any given field in any given university only as an exception or as a historical accident, rather than as a rule.

IUCs: A New Experiment

In the mid-1980s and early 1990s, the University Grants Commission (UGC) took a new step towards correcting this growing imbalance, by setting up a few *Inter-University Centres (IUCs)*. The typical IUC was created with a specific mandate, to provide top-class facilities for the university academics to aid their research, development and teaching. These facilities would be shared by all universities. If created individually in all universities, these facilities would be prohibitively expensive; and worse, they would remain grossly under-utilized. In some cases, the IUC provided access to an already existing facility outside the university sector, by entering into a suitable Memorandum of Understanding with a national laboratory or scientific agency. Thus, while the Nuclear Science Centre (NSC) in Delhi, the first IUC to be created, has its own pelletron nuclear accelerator, the Inter-University Consortium for DAE Facilities (IUC-DAEF) at Indore provides access to the nuclear reactors and particle accelerators of the Department of Atomic Energy.

In creating an IUC, the UGC followed a few policy guidelines. An IUC was created in a field not well covered in a typical university. The IUC was sited in a university campus. Thus the NSC came up in the campus of the Jawaharlal Nehru University, while the IUC-DAEF is headquartered in the Ahilyabai University. The UGC also wished to promote a new work-culture at these institutions, with a small staff sharing jobs and managing without a huge infrastructural manpower that has been a bane to the efficient running of most Indian institutions.

IUCAA at Pune

The subjects of astronomy and astrophysics (A&A) had been neglected in Indian universities despite seminal achievements of doyens like Saha and Kothari. While the subject has been flourishing in the advanced countries, practically no facilities for research were available to a typical university