

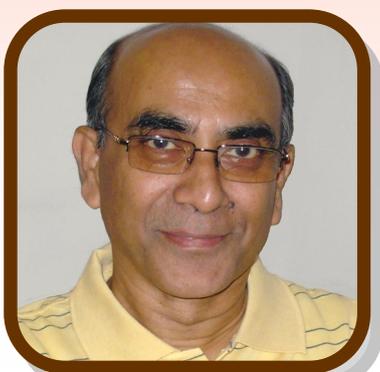
TIFR Alumni Association

December 2015



SAMPARK

TAA Newsletter



Prof. Amit Roy



Prof. J.N. Goswami



Prof. Jayant Narlikar

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Prof. P.C. Agrawal

Editor's Message



We are happy to bring to our TAA members this year's TAA Newsletter "SAMPARK". The online edition has gained excellent popularity among readers since 2008. As in the earlier editions, this year's Newsletter too has public lectures by distinguished alumni and their interviews on their work at TIFR and personal life.

We are happy to note that the TAA membership is increasing due to students' enrollment.

For updates please read our portal TAA-Red.com

Happy reading

Enjoy Reading!



Dr. R. S. Chaughule
rctifr@yahoo.com

Ex. Tata Institute of Fund. Research
Adjunct Professor
Ramnarain Ruia College
Mumbai



Dr. Sangita Bose
sangita@cbs.ac.in

UM-DAE Center for Excellence in Basic
Sciences, (CEBS)
Mumbai

Acknowledgement

We thank Mr. Mohan Kakade, TAA Admn. Secretary for his efforts in designing this newsletter.

From the Patron's Desk



The TAA has been active in the organization of Public Lectures, interviewing some of the distinguished speakers, recognizing the work of distinguished alumni through TAA Excellence awards and recognizing the students for their exemplary performance in their doctoral work. The special Cowsik awards have had exceptional works of young scientists being recognized.

This year, I am happy to note, that the TAA has introduced the award for Excellence in Teaching, and that four eminent scientists have been chosen in the field of Biology and Physics for this award. The idea was first mooted by the former Director Professor Jha, and due to the sustained efforts of the former President of the TAA, Professor Brij Arora, it has evolved into a prestigious award.

The first Indian Astronomy satellite Astrosat has the unique ability to observe the universe in multi-wavelengths simultaneously, and is aimed at performing cutting-edge research. I am proud of the contribution of TIFR researchers and engineers in the design, fabrication, and development of three out of the five payloads on board the Astrosat, a multi institutional effort led by ISRO. The instruments developed by TIFR Scientists will give us a capability unrivalled in the world for the next decade.

We are proud to inaugurate a new campus in Bengaluru north -- the International Centre for Theoretical Sciences (ICTS) -- this year. This Centre provides a platform and resources for researchers from all over the world to congregate over extended periods of time, encourages cross-disciplinary collaborations and interactions between theorists and experimentalists and fosters important new research areas in India by providing a platform for new science initiatives at the cutting edge of scientific exploration.

I am sure that the TAA Newsletter will go a long way in providing a link between the Alumni and also a link between the Alumni and the Institute.

We all look forward to the new edition of Sampark.

Sandip Trivedi

Director, TIFR and Patron of TAA

TAA President's Message



Greetings and best wishes to you all.

At the outset, I wish to thank the editorial team Ramesh Chaughule and Sangita Bose for their dedicated work in bringing the TAA Newsletter 'Sampark' 2015. Hope the 2015 edition of Newsletter would be interesting and useful to alumni. They have brought out some new features.

One of the major initiatives taken by TAA during the years 2013-14, namely the introduction of Associate Membership for students registered for their M.Sc./Ph.D. has been actively pursued during this year. This was earlier approved by the AGM held in March 2013 in which the constitution was amended to enable students to enroll as Associate Members as soon as they register for M.Sc./Ph.D. The TIFR Deemed University cell has taken active interest in enrolling students as Associate Members of TAA.

Another major initiative taken by TAA is the introduction of Excellence in Teaching awards. This was proposed and supported by Prof. S.S. Jha (former TIFR Director) earlier and Prof. B.M. Arora (Ex-President TAA) later. TAA formulated the guidelines for these awards which were subsequently implemented by Prof. Amol Dighe, Dean, Graduate Studies. Four TIFR members received these awards on Founder's Day October 30, 2015. As in the past years, TAA Cowsik Medals (Ramakrishna Cowsik and Saraswathi Cowsik) were also awarded to two members on the Founder's Day.

This format of TAA Newsletter, pioneered by Prof. K.P. Singh and his team, subsequently evolved into the current form thanks to the current editors (Dr. Ramesh Chaughule and Dr. Sangita Bose) and also to Mr. Nilesh Kulkarni and Ms. Margaret D'Souza. We would like to acknowledge the generous support provided by Prof. M. Barma, Ex-patron, TAA; and also take this opportunity to welcome Prof. Sandip Trivedi as Patron. We would also like to acknowledge the work done by Ms. Margaret D'Souza as TAA Admin. Secretary for 7 years till December 31, 2014.

Richard Pinto

President, TIFR Alumni Association

Director, Centre of Excellence in NanoScience and Technology

Sahyadri College of Engineering and Management

Sahyadri Campus, Adyar, Mangalore- 575 007

rpinto1942@gmail.com

TAA Public Lectures



TAA organized two public lectures in 2015. One was held on the National Science day, 27th February by Prof. Amit Roy , DAE Raja Ramanna Fellow at the Variable Energy Cyclotron Centre, Kolkata. The other was the TIFR–JRD Tata Public lecture on 30th July by Prof. P. C. Agrawal, UM-DAE Center for Excellence in Basic Sciences, Mumbai.



Tata Institute of Fundamental Research
टाटा मूलभूत अनुसंधान संस्थान
TIFR Alumni Association



TAA Public Lecture

Quest for the structure of matter and its spin-offs

Prof. Amit Roy

Date & Time: 27th February 2015 at 5 p.m.
Venue: Lecture Theatre (AG-66), TIFR, Mumbai

Abstract:

Ever since humans started thinking, they wanted to know the nature of things around. One way to understand objects is to see whether the object can be made out of smaller parts. These small parts can then be combined in different ways to form all the objects around us. Carrying on with this quest led to the discovery of molecules, atoms, electrons, nucleus, protons, neutrons, quarks, etc., which at different times were thought to be elementary particles or building blocks of matter. How were they found? How small are these objects? Is there a limit to our looking at smaller objects? This enterprise has been a heroic one and has extended our horizons to undreamt of levels. Although it has been a curiosity driven pursuit, this has led to many technological spin-offs of practical benefit to the society. I shall try to give an overview of this quest in this lecture.

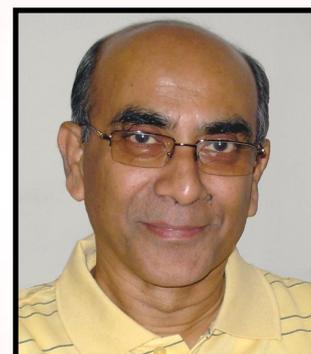
Speaker:

Amit Roy completed his M.Sc from Delhi University in 1968 and his Ph.D from Tata Institute of Fundamental Research, Mumbai in 1975, where he continued as faculty till 1990. He has worked at Florida State University, USA, KVI, Netherlands and Argonne National Laboratory, USA. He joined Inter-University Accelerator Centre in 1991 as senior scientist and was its director from 2001 till July 2013. Currently he is DAE Raja Ramanna Fellow at the Variable Energy Cyclotron Centre, Kolkata. He led the team for building the Superconducting Linac at IUAC and pioneered the development of Niobium superconducting cavities in India.

He is a Fellow of the National Academy of Sciences, India. His research interests are in the area of Nuclear Physics, Accelerator Physics and Atomic Physics. He is interested in science communication and has written the Great Experiments series in Journal of Science Education "Resonance".

All are Welcome
Entry Free – Non TIFR members are requested to carry valid photo I.D. card

Tata Institute of Fundamental Research, Homi Bhabha Road, Colaba, Mumbai 400 005



TAA -National Science Day Public Lecture on February 27, 2015 by Prof. Amit Roy , DAE Raja Ramanna Fellow at the Variable Energy Cyclotron Centre, Kolkata .

“Quest for the structure of matter and its spin-offs”

TAA Public Lectures



TIFR Alumni Association

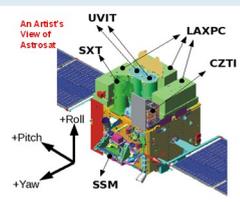
TAA-JRD Tata Public Lecture

Probing the Invisible Universe with ASTROSAT – Indian Multiwavelength Observatory

Professor P.C. Agrawal

UM-DAE Center for Excellence in Basic Sciences, Kalina, Mumbai

Abstract : Radiation from cosmic sources in the ultraviolet (UV) and X-ray spectral regions is invisible from the ground due to absorption in the overlying atmosphere. Satellite based experiments are most suitable for probing the high energy universe where stars and galaxies radiate much of their energy as UV and X-ray photons. India, and TIFR in particular, has a rich heritage of research contributions in this area mainly with balloon and rocket experiments and to some extent by satellites. ASTROSAT satellite mission was conceived to investigate the temporal and spectral properties of UV and X-ray emitting objects by multi-wavelength observations over a five decade wide spectral band. This unique feature of ASTROSAT is achieved by simultaneously observing an object in visible, near-UV, far-UV, soft X-ray and hard X-ray regions by a cluster of 3 X-ray Telescopes and a co-aligned UV Imaging Telescope (UVIT). The characteristics and sensitivities of the ASTROSAT instruments will be presented in addition to scientific advances expected from such observations, especially those related to understanding the nature of compact objects in X-ray binaries and Active Galactic Nuclei.





About the Speaker: P.C. Agrawal joined TIFR's cosmic ray group, conducting balloon-borne experiments, as a Research Associate in 1962. After his PhD from Mumbai University in 1972, he joined the California Institute of Technology, as a Research Fellow. He was involved in several balloon and rocket experiments in X-ray astronomy. He led the Indian X-ray Astronomy Experiment (IXAE) in 1996 which produced new insights on neutron star and black hole binaries. Focusing on the characteristics of various types of cosmic x-ray sources, he has made notable contributions in the area of Experimental High Energy Astrophysics. His research used a variety of instruments flown in balloons, rockets and satellites both in India as well as in the USA covering a wide spectral band from 0.1 keV to 100 keV.

He was NAS-NRC Research Associate at Jet Propulsion Laboratory, Pasadena in 1978-79 and at NASA Marshall Space Flight Centre in 1987-88. He was Visiting Professor at Institute of Space and Astronautical Sciences, Japan in 1984. He received the Vikram Sarabhai award for Space Sciences in 1985 and M.P. Birla award for Astronomy in 2003. He retired from TIFR in 2006 as a Senior Professor. He was ISRO Chair Professor from 2006-2009 and Satish Dhawan ISRO Professor from 2009-11. As Principal Investigator of ASTROSAT, the Indian satellite mission for astronomical studies, from its inception in 2001 till 2011, he was largely responsible for the design and development of the Large Area X-ray Proportional Counter (LAXPC) instrument.

30th July, 2015 at 4 p.m.

Venue
Lecture Theatre (AG-66), TIFR, Mumbai

Entry Free

All Are Welcome

Non TIFR members are requested to carry valid photo I.D. card

Tata Institute of Fundamental Research,
Homi Bhabha Road, Colaba, Mumbai 400 005

The JRD Tata Public Lecture on Thursday, July 30, 2015 by Professor P.C. Agrawal, UM-DAE Center for Excellence in Basic Sciences, Mumbai University Campus at Vidhyanagari, Kalina, Mumbai – 400098

“Probing the Invisible Universe with ASTROSAT – Indian Multiwavelength Observatory”

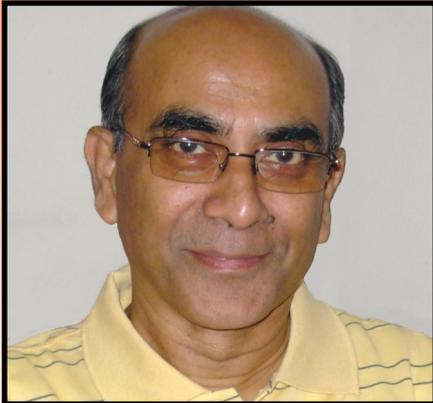


Prof. P.C. Agrawal delivering JRD Tata Public lecture at TIFR

Interviews



Interview of Prof Amit Roy conducted by Dr. R. S. Chaughule



“Do your work with passion. Don't be afraid of failure. It helps to have a short term and a longer term goal.”

Professor Amit Roy

TAA: Thank you for giving us an opportunity to talk to us for the TAA newsletter. To start with it would be nice if you could tell us how you got interested in physics?

SPEAKER: I was interested in gadgets from childhood and wanted to study engineering. As I was interested in mechanical devices, physics was the natural subject of choice for study. As I delved deeper, physics took precedence over engineering and I continued.

TAA: Can you tell us about your childhood, early education, and what got you interested in science?

SPEAKER: I spent my early childhood in a suburb of Kolkata. I was fascinated by books as far as I can remember and would devour any written material that came my way, even when I did not understand the meaning of what was written. My parents encouraged me to read and never stopped me from reading any book. It was in class VII, we had science as a separate subject and I enjoyed it more than any other subject. After that we moved to Delhi and I was very fortunate to have two excellent teachers of science in my school, our principal Shri Bhupati Ghosh who taught Physics and Shri R.S. Gaur, who taught Chemistry, with lots of practical demonstrations before the lectures. It is Gaur Sir, who encouraged me to think beyond what was in the school syllabus. After finishing school, I was lucky to be awarded the science talent search scholarship that brought me in contact with many top scientists of the country during the summer schools.

Interviews

Interview of Prof Amit Roy continued...



TAA: And then you decided to come to TIFR (experience getting into TIFR)

SPEAKER: You see, I had decided to do my Ph.D. in India and was interested in experimental physics. After finishing the M.Sc examinations, I came to TIFR for a summer school in 1968. Fortunately, that year TIFR had agreed to hold the summer school for Science talent scholars for the first time. I immediately knew that this was the place for me and I hoped that I would be accepted as a Ph.D. student (then called visiting member). Of course there were the regular two-tier grilling interviews and I managed to get through. The first one and a half years of the graduate school was a really tough



Prof. Amit Roy delivering lecture at TIFR

grind and we had to take courses in Astrophysics, Geophysics and Molecular biology in addition to the usual ones in Physics. But the atmosphere was very informal, thoroughly academic and there would be animated discussions on physics topics in the west canteen. We were encouraged to attend seminars on all subjects and of course the colloquia. We were also given freedom to choose the group. I joined the Nuclear Reactions Group with Prof. S.K.

Bhattacharjee. At that time foreign exchange was scarce and we had to make most of our equipment including the electronics in the lab. The scientific staff and the workshop staff were always cooperative and I was on good terms with most of them. So I never faced any difficulty to get my equipment fabricated. After finishing my Ph.D. in 1975, I was offered a regular position as Research Associate in the same group. After two years, I went to Florida State University for a post-doctoral stint of two years, returned to TIFR in 1979 and stayed on till December 1990.

TAA Tell us about the life of a researcher in Nuclear Reaction Group then.

Interviews

Interview of Prof Amit Roy continued...



SPEAKER: As a full time member, I was involved with most of my colleagues on experiments. The period of 1980s was a difficult one for the group as the accelerator facilities were inadequate. Many of the colleagues left the group and only a few of us survived, branching out on experiments in interdisciplinary areas of non-accelerator particle physics, accelerator based atomic physics, with equipment built in-house, till the Pelletron accelerator got installed.

TAA: What and who inspired you to reach to the current position?

SPEAKER: The person who influenced me most in my research is Prof. C.V.K. Baba, whom everyone called Babaji. His enthusiasm in doing physics was infectious. I learned the art of estimation and analysis from him. My guide, Prof. Bhattacharjee, was another big influence. He always encouraged me to think of new ideas and allowed me the freedom to do what I wanted. Whatever little I have been able to achieve is due to their influence.

TAA: What challenges did you face and how did you overcome those challenges during your journey so far?

SPEAKER: First was lack of equipment when I started in research. This forced us to innovate and make instruments ourselves. This training very early on has helped me throughout my career. Second challenge for me was to get a group of talented people to work together. Again my training during Ph.D. days did help as I had worked with a lot of my seniors who did not always get along with one another.

TAA: You have worked in many countries. Is there a national style of research? What is your take on and how things have changed in India over the last ten years?

Interviews

Interview of Prof Amit Roy continued...



SPEAKER: Well I do not think it can be called a national style, but there are differences. In India, cooperation between peers is very hard to achieve. We seem to work best in a hierarchical set-up with one strong leader in contrast to most western labs.

Over the last ten years, money flow has eased and we can really think of big projects, even on the international scale. But we need to prioritize the big projects. I find there is a tendency to rush into many projects at the same time.

TAA: Any comments regarding what you see at TIFR?

SPEAKER: There seems to be a more professional approach to research and specialization which is good. But I detect a lack of general interest in subjects other than your own. There is also less emphasis on making equipment in the lab.

TAA: Any suggestions for young students?

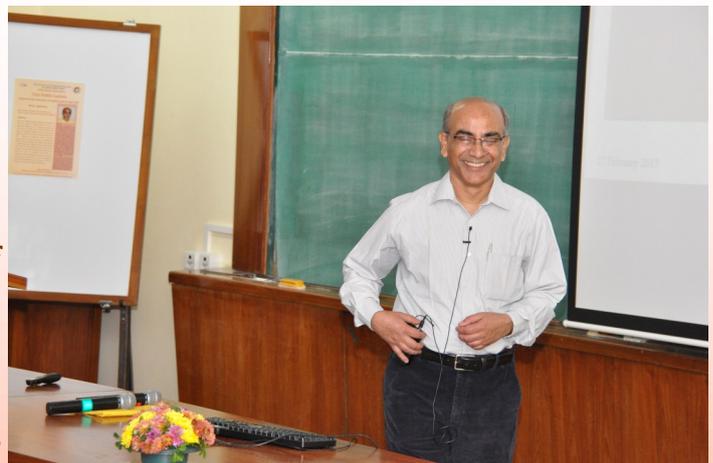
SPEAKER: Do your work with passion. Don't be afraid of failure. It helps to have a short term and a longer term goal.

TAA: What are your views on the role of teaching in research?

SPEAKER: I think every researcher should teach, specially the basic courses.

There is no better way to clear your concepts than a bunch of inquisitive bright students. Some of their questions may change the course of your work.

TAA: What do you think are the new research areas?



Prof. Amit Roy delivering lecture at TIFR

Interviews

Interview of Prof Amit Roy continued...



SPEAKER: There are many new possible areas. I can only talk about a subset of physics, in which I would like to name study of exotic nuclei, understanding nucleosynthesis, new materials for energy generation and storage, computing with atoms, photons. Cosmology and high energy physics will continue to provide surprises. I expect the interface of Biology, Physics and Chemistry to be an active area of research.

TAA: Is there a special incident that you would like to share with us?

SPEAKER: Yes, two of them from my time at TIFR. A few months after I joined as a Ph.D. student, I was having breakfast in the West canteen. Vijay Kapahi, who was my senior by a few years came and joined at the table and asked me what I was working on. I casually remarked that it was nothing interesting. He suddenly became serious and snapped at me “why the hell are you doing something if you don't find it interesting?” That completely changed my outlook to research. The other incident I have mentioned in my obituary of Prof. S.K. Bhattacharjee. As his student, in my first paper to be published on a detector simulation I had included his name in the authors list as I used to discuss with him the calculations regularly. He came down quite severely and asked me to delete his name as he did not think he had contributed enough to the work. The lesson in intellectual honesty I learned that day has stayed with me all these years.

TAA: What about non-physics activities?

SPEAKER: We had a lot going. Some of my friends started the Amateur Music Association. Some of us started the film club IMAGES. The tennis and volleyball courts used to be crowded. We would play cricket in the navy grounds. Some of us would go on hiking trips in the Western Ghats on weekends, though we hardly had any time in the first year of grad school.

TAA: How did so many years in TIFR change you?

Interviews

Interview of Prof Amit Roy continued...



SPEAKER: TIFR made me self-reliant, taught me to ignore hierarchies and the value of a work-centred administration.

TAA: Your TIFR connections continued even when you left and went to Nuclear Science Centre?

SPEAKER: Yes, it continued more in the form of exchange of ideas and planning together for future projects. Not so much for my personal research work.

TAA: How do you think TIFR can get leverage from its distinguished alumni, like IITs or IISc does, for example?

SPEAKER: Some of the alumni could be involved in teaching and collaborative research as adjunct faculty. However, unlike IITs and IISc, the industry connection does not exist for most alumni.

TAA: Professor Amit Roy, It was a pleasure to be in conversation with you. Thank you very much.

SPEAKER: Thank you for the opportunity.



Prof. Amit Roy with Director, TIFR

Interviews



Interview of Prof Jayant Narlikar conducted by Dr. R. S. Chaughule



“I have enjoyed science popularization, writing science fiction and interacting with school children. I wish more scientists do so.”

Professor Jayant Narlikar

TAA: *Thank you for giving us an opportunity to talk to us for the TAA newsletter. Can you tell us about your childhood, early education and what got you interested in science particularly mathematics at the beginning?*

Speaker: I was born in Kolhapur on 19th July, 1938. I grew up in Banaras Hindu University campus, as my father was stationed there. My father, who was the Professor and Head of the Mathematics Department at the BHU, was allocated a huge bungalow in the campus, complete with a badminton court. We had a huge collection of books at our house. We had all the copies of “Punch” (British weekly magazine of humor and satire) at my house. In fact, I read it even now. My father always encouraged me to take keen interest in sports along with reading and studies. He bought cricket kit for my brother and me and always pushed us to excel in indoor as well as outdoor games. My parents also made us independent from very early-on. We were always visited by famous educationists from Maharashtra and that had a very positive impact on me when I was a young boy.

My medium of education was Hindi. Relations, both my paternal and maternal sides were very strong in mathematics. All my maternal uncles were scholars. My father studied in Cambridge and was awarded “Wrangler” (First Class) degree for outstanding performance there. I was motivated by these examples and won very many awards during my school days. I must add here that I loved Sanskrit as much as I loved mathematics in school.

Interviews

Interview of Prof Jayant Narlikar continued...



Even though I stood first in the Intermediate exam, I chose B.Sc. with physics, statistics and mathematics over engineering. I topped the B.Sc. exam and continued my love for math and science.

TAA: What and who inspired you to reach to the current position?

Speaker: My father played an instrumental role in my life. Like him I wanted to study in Cambridge. Back in the early days, we had to channel our application through the Indian High Commission who nominated students for admission to Cambridge University. My father applied to Indian High Commission for my admission to Cambridge. And eventually I was selected to study at the Fitzwilliam House College in Cambridge where my father too had been a student.

TAA: What challenges did you face and how did you overcome those challenges during your journey so far?

Speaker: Money was always going to be one of the main challenges when I decided to go to Cambridge for higher education. I qualified for the J.N. Tata endowment scholarship for higher education. The trust even booked my ticket on the ship of P&O Company. As luck would have it, I met S.M. Chitre who had joined Cambridge as a student as well. This made our long ship journey very pleasant.

While at Cambridge, I lost almost six months due to an accident when I was knocked down by a scooter. The scholarship would last only for three years and I managed to finish the Tripos exam which normally takes four years of course work in three years in-spite of this forced break due to the accident.

During last term there, I opted for Astrophysics and Particle physics courses. I got the opportunity to learn from great professors such as Dirac, Scott, Powel, Lyttleton, Mestel, Hoyle, Beunmann and Polkinghorne there.

Because of excellent performance and career at the Cambridge, I was recommended

Interviews

Interview of Prof Jayant Narlikar continued...



by the college to avail the J.N. Tata scholarship for next three years to complete my Ph.D. I also received research maintenance grant from Cambridge University, and later research grants from the Department of Scientific and Industrial Research.

TAA: Your Ph.D. was from Cambridge University in UK. Tell us about the experience during and after the Ph.D. with respect to your original research idea.

Speaker: I remember my first talk at the Royal Astronomical Society, where I had to debate about our work on the steady state universe theory. My work on Mach's Principle and Creation of Matter gave me the prestigious Smith's Prize in 1962, which was awarded to an Indian after 36 years. Fitzwilliam appointed me Director of studies. In 1963, I was elected Bery Ramsey Fellow of King's College. This was the time when quasars were being discovered and were looked upon as sites of strong gravity. Later the idea of black holes was to become popular.

TAA: Tell us how you first came to India?

Speaker: After completion of my work at Cambridge, I was asked to join the Institute of Theoretical Astronomy as Founder Staff member. This was in 1969, and I was interested in solving the question of how to quantize action at a distance.

Since I was very keen to do research in Astrophysics in India, I wrote to the then Prime Minister Indira Gandhi about my intention to return to India and opted for TIFR or PRL. The PM replied positively and I joined TIFR in 1972.

TAA: Any comments regarding what you first saw at TIFR?

Speaker: The location, maintenance and facilities at TIFR were excellent and comparable to the best research institutions round the world.

At TIFR, the scientists gave importance to research only and were reluctant to get associated with educational institutes. They did not like to give lectures, teach courses or even admit Ph.D. students. However, I used to give lectures in Astrophysics. TIFR

Interviews

Interview of Prof Jayant Narlikar continued...



also did not like accreditation from outside. In the five year plan while asking funds from DAE, there was no monitoring within to ensure the grant was used properly in the previous five-year plan. TIFR was not in contact with the University Graduate and post-graduate students. Obviously TIFR could not attract intelligent students. Dr. Bhabha's vision was for the TIFR scientists to work with local universities to improve their standards. Unfortunately that did not happen and hardly any scientist was able to do much towards improvement of educational institutions.

During the period of 1972-1989 when I was in TIFR, I noticed the onset of bureaucratic tendencies at TIFR. During the times of Dr. Bhabha, lot of importance was given to cleanliness, neatness and beauty/aesthetics. It was critical for the director to provide personal attention to these things.

I also noticed increased interference from DAE in day-to-day functioning of the institute around this time. In my opinion this happened because the Directors after Prof. Menon did not show dedication and willpower to stand-up to DAE authorities and not succumb to pressures.

TAA: How did this change you?

Speaker: In 1986, I was a member of "Science Advisory Council to the Prime Minister" formed by Rajiv Gandhi. We were to give suggestions for the upliftment of science and technology or to suggest new projects. I prepared one report on photonics. Formation of C-DAC came through our suggestions. Another report suggested was waterway transport. I had taken initiative for this report.

I gradually got disillusioned at TIFR and felt like moving to another place where I could interact with universities. I took inspiration from Fred Hoyle. The way he started IOTA (Institute of Theoretical Astronomy), I felt the need for a centre for astronomy in Pune. In 1988, as luck would have it I was given the challenge of forming a new centre "Inter-University Centre for Astronomy and Astrophysics (IUCAA)".

Interviews

Interview of Prof Jayant Narlikar continued...



TAA: *Did you implement any academic changes in the functioning of IUCAA then?*

Speaker: Dr. Yash Pal, the then chairman of UGC, supported the commissioning of IUCAA (December 1988). The evaluation of IUCAA is done every alternate year by external committee including members from India and abroad. Now IUCAA is recognized as one of the leading centres in Astrophysics in the world.

TAA: *Can you name important awards you achieved so far?*

Speaker: In India some important awards I received are Padma Bhushan award, Padma Vibhushan award, Bhatnagar award, INSA Vainu Bappu award, Indira Gandhi Science award, R. D. Birla award, Pylee award of Kerala, Punyabhushan award, Maharashtra Bhushan Award from the Government of Maharashtra, UNESCO Kalinga award and so on.

TAA: *How do you think TIFR can get a leverage from its distinguished alumni like IITs or IISc does, for example?*

Speaker: I believe this is already happening but needs more aggressive pushing.

TAA: *What would you like to tell to young scientists?*

Speaker: Please keep your minds open to receiving new ideas.

TAA: *What about non-physics activities at present?*

Speaker: I have enjoyed science popularization, writing science fiction and interacting with school children. I wish more scientists do so.

TAA: It was a pleasure to be in conversation with you. Thank you very much.

Interviews

Interview of Prof. J.N. Goswami conducted by Dr. Sangita Bose



"In today's world of specialization, one needs to learn a lot by discussing, collaborating and working with people from different disciplines"

Professor J.N. Goswami

TAA: Thank you for giving us an opportunity to talk to you for the TAA newsletter. To start with, it would be nice if you could tell us how you got interested in physics.

SPEAKER: In our schooldays, we had to decide at class VIII, whether we want to pursue studies in the science or arts stream. I opted for the science stream. My uncle taught chemistry in a college and was my science mentor. When I was in Std. XI and could not solve some physics problems, my elder brother, who was starting research after doing M.Sc. in Physics, used to help me. In the final board examination, I got highest marks in Physics. I did well in Chemistry also, but felt Physics will be more interesting and I opted for honors course in Physics in College along with courses in Chemistry and Mathematics.

TAA: Can you tell us about your childhood and early education.

SPEAKER: I was born in a small town, called Jorhat, in Assam, and lived in a suburb, about five km away from the town. My early education was in a school close to home. We had a wonderful time with lots of free time to play and gossip. Even though most of our teachers were not graduates, they were very devoted and imbibed in us many societal and personal values that helped us enormously when we grew up. I moved to the Govt. Higher Secondary School in the town after sixth standard. It was a different environment and I felt good except that I had to walk five km each way to school, something unthinkable today. We used to go in a group and after a few months walking the distance became routine. I had a bicycle in tenth standard and it was very helpful. We had excellent teachers at school and they encouraged us a lot and we initiated several science related activities under their guidance. Once, one teacher asked me to join in the school debating competition and I enjoyed it. I also liked football and cricket, but physically not strong enough to play well, and choose debating as a hobby and pursued it till my M. Sc. days. I did well in the School leaving examination got a

Interviews

Interview of Prof Goswami continued



rank amongst the top ten at State level and enrolled in the premier college in the state, the Cotton College, in Guwahati.

TAA: Can you tell your experience at TIFR and who inspired you to reach to the current position?

SPEAKER:

I was a recipient of the Science Talent Scholarship and attended summer program in Delhi University and saw most major research laboratories, including NPL, TIFR, BARC, IISc and SINP during an academic excursion tour. I was fascinated by the overall ambience of TIFR and sent a letter to Dean, TIFR, just before my M.Sc. examination; I received an application form, filled and sent it back, and I was called for interview at TIFR.

Soon I received three letters, from TIFR, PRL and an US university, about admission for PhD studies. I asked my brother, who was in USA and did his Ph.D. in theoretical Physics, where he would like to work if he comes back to India and TIFR was first in his list. I joined TIFR in August 1970 for my Ph.D. even before our formal M.Sc. results were out!

As a part of our course work at TIFR, we were supposed to do a project and I wanted a project in experimental high energy particle physics and realized that the experiments are not conducted at TIFR. I asked for alternative and was told I can join Geophysics. I think I told I do not want to study “rocks”. Dr. Mitra, who was talking to me, said “they are analyzing moon rocks”. I got very curious and asked what is being studied, and he said cosmic ray records! I agreed without thinking what I may encounter and reported to Prof. Devendra Lal. He asked me to study and analyze some meteorite samples and gave lots of assignments; mostly mathematical problems, puzzles and equations to solve, but no moon samples. It was only after several months, I think I passed the tests and became a part of the large group analyzing lunar samples.

It was a lively group that worked very hard and at the same time could enjoy life. I learnt a lot from senior faculty members in the group, Drs. N. Bhandari, V. S. Venkataradan, A. S. Tamhane, S. Krishnaswami, K. Gopalan, M. N. Rao; a good number of my friends at TIFR were also very helpful. I feel the broad scientific exposure I received during my early career, and Prof. Lal’s emphasis on doing something novel, drove me later to work in multiple fields and pursue difficult research problems.

Interviews

Interview of Prof Goswami continued



TAA: What challenges did you face and how did you overcome those challenges during your journey so far?

SPEAKER: I moved to PRL in late 1973 with Prof. Lal, and the initial years went very smoothly and it was a very productive period scientifically. However with time, the lunar studies have become a bit repetitive and I was looking for other emerging ideas. I put up a proposal for setting up a major facility at PRL in the early eighties. However, with no experience to handle such expensive equipment, it was clear that the Dept. of Space (DOS) would not be going to take a risk. One of my friends has established such a facility in USA and was happy to conduct the proposed experiments. I made several trips and we published a series of important papers within a couple of years. Finally DOS provided the grant. It was a long wait for five years! Prof. Lal left PRL by then and I had to shoulder responsibilities assigned to PRL for this project. The project helped me in understanding the vast difference in approaches in conducting laboratory experiments and space experiments that was very helpful when I was later involved with the Indian mission to Moon, Chandrayaan-1. I also realized the need to be patient and to keep thinking of new ideas that can be pursued as and when the opportunities arise.

Early this century, I had to move back again to where I started. With India (ISRO) aiming for the moon, I was asked to take responsibility of the mission as its Principal Scientist. I was a bit hesitant and someone, whom I respect, reminded me it is payback time for a national cause. ISRO also wanted the mission to be a Science mission that should deliver novel results. We had good ideas but the high end detectors we needed to test the ideas became a stumbling block. The detectors are developed in USA, Europe and Japan, and unfortunately we could not import them at that time due to embargo. One way out was to provide opportunity to the international scientific community to participate in a collaborative mode with Indian scientists. ISRO agreed, and we received a large number of very good proposals, from Indian and foreign scientists and selected nearly a dozen, with majority from India or in collaboration with European countries. Chandrayaan-1 become a wholesome mission with International character. We did face another roadblock when US laws prohibited shipping of US instruments for the mission unless a very peculiar agreement is signed. This was flatly refused by ISRO. Finally, US Administration made an exception and we had a great mission. Chandrayaan-1 mission will be remembered for long as a fine example of in-

Interviews

Interview of Prof Goswami continued



ternational cooperation and also for the science return, particularly, the discovery of water on the moon.

TAA: Any memorable incident/anecdote?

SPEAKER:

The designation “Visiting Member” for research scholars once helped us in confusing a past Navy officer, who appeared to be very authoritative and was perhaps in charge of ensuring order and decorum in the campus. Some of us used to sit and gossip in the lounge near the west canteen during lunch break. One day, a few of us were sitting in a reclining posture with one person putting up his leg on the table in front. Suddenly, the Navy Officer appeared and asked us if we belong to TIFR; one of us just uttered, we are visiting members; he appeared confused and told us politely that we should not be casual and put legs on the table and keep decorum of the place and moved away. I understand he even told Prof. Lal, who used to wear very colorful shirts sometimes, that he is a Senior Professor and should dress modestly.

For us, in Assam, drinking was a taboo and I was confused when beer was served during an International Carbon-14 conference dinner at TIFR in early seventies. Of course by the time I left TIFR, Mumbai became a wet city and I recall during a couple of trips for dinner with friends and at my farewell party beer was flowing and I have also taken a sip or two. Of course my movement to Gujarat, that was and still a dry state, ensured I am out of it.

We had a break after our first year at TIFR and when we came back, it was raining very heavily in Mumbai with lot of water logging. We were at the University Hostel near Churchgate and movement including going to TIFR was difficult and many activities were at standstill. With nothing much to do, I and one of my batch-mate at TIFR (R. R. Navalgund; later Director of Space Application Center, Ahmedabad) decided to go for movies every evening. We walked in rain and through water logged roads, and saw close to a dozen movies, something we thought a record. Last year a past Director of TIFR told at a get together at PRL about the early days at TIFR when a few colleagues have seen more than a hundred movies over a few years!

TAA: What about non-physics activities?

Interviews

Interview of Prof Goswami continued



SPEAKER:

I like to listen to music; I have learnt a bit of playing the “Tabla” that helped, as I can keep beats while listening to music. I used to be a voracious reader; remember reading the “Midnight Children” during a three day train trip to Assam. I was involved initially in the film appreciation group at PRL; we were part of the Mumbai circuit and had the opportunity to enjoy many classic movies. We also called a couple of film directors visiting Ahmedabad to PRL for interactions. I also use to watch Football and Cricket in Mumbai, which diminished significantly in Ahmedabad. My wife turned out to be a sports enthusiast, and there were times when we used to watch European Football on TV, often at mid-night, along with our two young sons. At present, I try to attend occasional musical event, rarely go to a movie, and mostly follow the standard routine of reading during travel, glancing through newspaper and periodical.

TAA: You have worked in many countries. Is there a national style of research? What is your take on how things have changed in India over the last ten years?

SPEAKER:

I feel there is some influence of our own culture in the way we do research. While it is easier to interact with US and European scientists, it takes quite a while before you may get strong criticism from a Japanese colleague; the same is true for Russian colleagues as well; the occasional exceptions only prove the rule.

I feel significant changes are taking place in India. First of all, young people today are much smarter and confident than what we were in our younger days. The social behavior pattern is also changing with people being more open with their views. I am only worried about the fast pace at which everybody wants to move forward. Often, this does not allow sufficient time for synthesizing one’s thought before moving ahead. I do not think this is conducive for doing front rank research in basic sciences.

TAA: Tell us something about Chandrayan 1: its success story.

SPEAKER:

Chandrayaan-1 is no doubt a great success story but by now it is an old story. Mangalyaan has followed and demonstrated unprecedented technological achievement of ISRO. Of course, as the first Indian planetary mission, Chandrayaan-1 has contributed much more than one could anticipate. Apart from scientific success of Chandrayaan-1, that is now acknowledged globally, it was a very strong demonstration of India’s

Interviews

Interview of Prof Goswami continued



openness in the field of space exploration by having more than ten other countries contributing to India's very first planetary mission. This also demonstrates the confidence others have in the Indian capability in this field. I may add that the freedom I had, as the Principal Scientist, to contact and invite people for scientific discussion is something unbelievable. We had joint meetings of the Chandrayaan-1 Mission team with representative of Japanese Moon mission (Kaguya) and of NASA as well, at least twice a year during the 2007-2010 period that led to constructive discussion and common calibration protocol for some of the payloads. Chandrayaan-1 has become more like an international mission led by India and will be remembered for posterity for discovery of water molecules on the lunar surface.

The success of these two missions also owes to the meticulous planning of ISRO, that takes into account all aspects, including potential problems that may arise and their possible solutions, backed by extensive documentation to support all mission related activities.

TAA: What do you think is the future of India's planetary missions?

SPEAKER:

We have a good beginning and I am confident that ISRO can scale new heights. After the success of Chandrayaan-1 mission that yielded novel science results and that of Mangalyaan mission, that demonstrated our technical capability of very high order, we now need launch vehicles that can be used for probing Mars from close quarters and Rover and Landers for Lunar and Mars exploration. To go beyond Mars we need energy resources other than the Sun and also enhancement in communication and tracking capabilities. Of course one has to keep in mind that ISRO's primary goal is to provide the country with Remote Sensing and Satellite Communication support. However, with the success of the first two missions, I am confident that Planetary Exploration will be a new addition to ISRO's agenda from now on.

TAA: Learning's and insights from your overall experience that will be useful to TIFR community and particularly to the youngsters

SPEAKER:

India is acknowledged globally for having an extraordinary talent pool. Even though a large fraction of it moves away from academics, there is still a good number who opt for research. There is a concentration of this elite group in places like TIFR working at

Interviews

Interview of Prof Goswami continued



the cutting edge of knowledge. Even though each institute or individual can devise their own preferred way of doing research, I personally feel that younger people should expose themselves to multiple areas during their PhD and Post-Doctoral period. Of course one needs to be careful that this does not dilute the primary goals of their thesis or post-doctoral research.

In today's world of specialization, one needs to learn a lot by discussing, collaborating and working with people from different disciplines. It is often not possible to do cutting edge research alone and I would urge all young researchers to keep this in mind.

TAA: Professor Goswami, it was a pleasure to be in conversation with you. Thank you very much.

Awards and Honors :



National and International

Membership of Academics

Awards and Honors: National and International

Membership of Academies

- Prof. V. Srinivas of the School of Mathematics has been elected as a Fellow of The World Academy of Sciences (TWAS) for the advancement of science in developing countries.
- Prof. S.K. Gupta of the Department of High Energy Physics has been appointed as Vice-Chairman of the Astroparticle Physics Commission (C4) by the IUPAP General Assembly.
- Prof. S. Ramakrishnan of the Department of Condensed Matter Physics and Materials Science has been appointed as the Vice-Chairman of the IUPAP C5 Commission (Low Temperature) by the IUPAP General Assembly.
- Dr. Vivek Polshettiwar of the Department of Chemical Sciences has been admitted as a Fellow of the Royal Society of Chemistry, UK.
- Prof. Satyajit Mayor, Centre Director, National Centre for Biological Sciences (NCBS), has been selected as a Foreign Associate of the US National Academy of Sciences (NAS).
- Prof. D.K. Ojha of the Department of Astronomy & Astrophysics has been elected as a Fellow of the Indian Academy of Sciences, Bangalore. He has been also elected as a Fellow by the National Academy of Sciences, India (NASI), Allahabad in the year 2015.
- Prof. Gobinda Majumder of the Department of High Energy Physics has been elected as a Fellow of the Indian Academy of Sciences, Bangalore
- Prof. Kalobaran Maiti of the Department of Condensed Matter Physics & Materials Science has been awarded the J. C. Bose Fellowship.
- Prof. Ritabrata Munshi of the School of Mathematics has been awarded the B.M. Birla Science Prize in Mathematics for the year 2013.
- Prof. Amalendu Krishna, School of Mathematics has been awarded the 2015 Ramanujam Prize for Young Mathematicians from Developing Countries by the International Centre for Theoretical Physics (ICTP).

Awards and Honors :



National and International

Membership of Academics

- Mr. Nihit Saigal of the Department of Condensed Matter Physics and Materials Science (DCMP&MS) has been jointly awarded the third prize at the colloquium for Young Physicists organized by The Indian Physical Society.
- Ms. Anupama Yadav of the Department of Biological Sciences has won two prizes: Best Oral Presentation and Best Question Asked at the 27th International Conference on Yeast Genetics and Molecular Biology (ICYGMB) in Levico Terme, Trentino, Italy.
- Mr. Kolahal Bhattacharya of the Department of High Energy Physics has been awarded a Special Prize for the paper entitled "Method of Images in the Light of Geometrical Optics" in the colloquium for the Young Physicists (2015) held by The Indian Physical Society, Kolkata.
- Prof. Sandip P. Trivedi, Director- TIFR, has been elected as a Member to the Council of Indian National Science Academy (INSA). He has also been awarded the TWAS Prize in Physics for 2015.
- Prof. Kalobaran Maiti of the Dept. of Condensed Matter Physics & Materials Science (DCMP&MS) has been elected as a Fellow of the Indian National Science Academy (INSA).
- Prof. Tariq Aziz, Department of High Energy Physics has been elected as a Fellow by the Indian National Science Academy (InSA), New Delhi.
- Prof. G.D. Veerappa Gowda, TIFR Centre for Applicable Mathematics, Bangalore has been elected as a Fellow by the National Academy of Sciences, India (NASI), Allahabad in the year 2015. He has also been elected as a Fellow by the National Science Academy (INSA), New Delhi.
- Prof. Shubha Tole of the Department of Biological Sciences has been awarded the Infosys Prize 2014 for Life Sciences for her significant contributions to studying the hippocampus and amygdale - centers of learning and memory in the brain.

Awards and Honors :



National and International

Awards

- Dr. Amit D. Lad of the Department of Nuclear & Atomic Physics has been awarded the Pervez Guzdar Young Scientist Award 2014 for his outstanding research contributions in the field of Intense Laser Matter Interactions, by the Plasma Science Society of India (PSSI) and IPR, Gandhinagar.
- Prof. Sushil A. Majumdar of the Department of Nuclear & Atomic Physics has been awarded the Swarna Jayanti Fellowship in physical sciences for the year 2013-14.
- Prof. Mustansir Barma, Department of Theoretical Physics has been awarded the Gujar Mal Modi Award for Innovative Science and Technology 2015.
- Following four members of the Institute have been selected for the Shanti Swarup Bhatnagar Prize for Science & Technology for the year 2015.
 - Prof. Ritabrata Munshi- School of Mathematics- for Mathematical Sciences
 - Prof. K. Sandeep- TIFR Centre for Applicable Mathematics, Bangalore- for Mathematical Sciences.
 - Prof. Vidita A. Vaidya- Dept. of Biological Sciences- for Medical Science.
 - Prof. Mandar M. Deshmukh- Dept. of Condensed Matter Physics & Materials Science- for Physical Sciences.
- Following two members of the Institute have been awarded the Infosys Prize 2015.
 - Prof. Mahan Mj- School of Mathematics- in Mathematical Sciences
 - Prof. G. Ravindra Kumar- Dept. of Nuclear & Atomic Physics- in Physical Sciences.
- Prof. K.K. Mishra of the Homi Bhabha Centre for Science Education (HBCSE) has been conferred the "Rajbhasha Gaurav Puraskar" by the Department of Official Language, Ministry of Home Affairs, Govt. of India for his book on "Khanpan aur Rasayan" brought out by Vigyan Prasar (DST).

Awards and Honors :

Excellence in Teaching Awards 2015



The TAA- Excellence in Teaching Award in Physics



Prof. H. M. Antia

(Department of Astronomy and Astrophysics)

for his excellent and rigorous teaching of numerical techniques and computational methods in physics to generations of graduate students. His textbook on numerical methods and the famously-tough assignments have been instrumental in teaching subtle aspects of the subject.



Prof. G. Ravindra Kumar

(Department of Nuclear and Atomic Physics)

for his immense commitment to the TIFR graduate school, having taught many and varied courses over the years, from electrodynamics to lasers and plasma physics. His enthusiastic style of teaching has inspired many students, and introduced them to the cutting edge of research in lasers, plasma, and optics.

Awards and Honors :

Excellence in Teaching Awards 2015



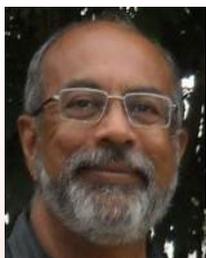
The TAA- Excellence in Teaching Award for Biology



Prof. Gotam K. Jarori

(Department of Biological Sciences)

for his teaching of Biochemistry, Biophysics and Proteomics for more than fifteen years. He has been an interactive and thought-provoking teacher, with innovative methods of teaching and a great depth of knowledge in these subjects



Prof. M.K. Mathew

(National Centre for Biological Sciences)

for being instrumental in setting the traditions of teaching at NCBS, especially with his annual Physical Biochemistry course for over two decades. He is universally regarded as an innovative and inspiring teacher, and has recently developed an advanced course on “Light in Biology”.

Awards and Honors :

Cowsik Awards -2015



Dr. Arpan Rai

for his outstanding work in the paper

*“Molecular adaptations allow dynein to generate large forces inside cells”,
Cell 2013 Jan 17; 152 (1-2): 172-82*

Ramakrishna Cowsik Medal



Dr. Suvrat Raju

for his outstanding work in the paper

*“The black hole interior in AdS/CFT and the Information Paradox”,
Phys. Rev. Lett. 112 (2014) 051301*

Saraswathi Cowsik Medal

Awards and Honors :

TAA best thesis awards -2015



Name of the Award: TAA-Geeta Udgaonkar
Recipient : Dr. Amaresh Jaiswal
Thesis Title: Formulation of relativistic dissipative fluid dynamics and its applications in heavy-ion collisions.



Name of the Guide: Prof. Subrata Pal

Honourable Mention:

Name of the Award: TAA-Geeta Udgaonkar
Recipient : Dr. Ravitej Uppu
Thesis Title: Statistical characterization and control of emission from random lasers.



Name of the Guide: Prof. Sushil Majumdar

Name of the Award: TAA-Chemistry Awards
Recipient : Dr. Aditi Bhattacharjee
Thesis Title: The Role of CH and SH Group as Hydrogen Bond Donors in Stabilizing Molecular Complexes.



Name of the Guide: Prof. Sanjay Wategaonkar

Honourable Mention:

Name of the Award: TAA-Chemistry Awards
Recipient : Dr. Hema Chandra Kotamarthi
Thesis Title: Mechanical unfolding studies on single-domain SUMO proteins and multi-domain periplasmic binding proteins.



Name of the Guide: Prof. A.S. Rama Koti

Awards and Honors :

TAA best thesis awards -2015



Name of the Award: TAA-Harish Chandra Memorial
Recipient : Dr. Debdip Ganguly
Thesis Title: Semi-linear PDEs on Hyperbolic space and related problems.
Name of the Guide: Prof. K. Sandeep



Honourable Mention:

Name of the Award: TAA-Harish Chandra Memorial
Recipient : Dr. Anand Sawant
Thesis Title: A^1 connected components of schemes
Name of the Guide: Prof. V. Srinivas



Name of the Award: TAA-Zita Lobo Memorial award
Recipient : Dr. Sonali Saha
Thesis Title: Clensor: A nucleic acid based ratiometric chloride ion sensor for intracellular applications.
Name of the Guide: Prof. Yamuna Krishnan



Honorable mention:

Name of the Award: TAA-Zita Lobo Memorial award
Recipient : Dr. Umesh Srinivasan
Thesis Title: Demographic responses of understorey bird species to human-induced habitat degradation in the eastern Himalaya.
Name of the Guide: Prof. Mahesh Sankaran



Awards and Honors :

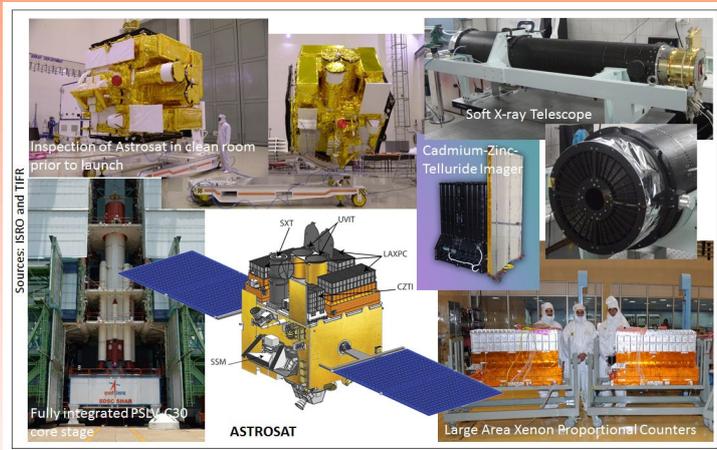
TAA best thesis awards -2015



Name of the Award: TAA-Sasken Best Thesis Award
Recipient : Dr. Karthyek R.A. Murthy
Thesis Title: Rare events in heavy tailed stochastic systems: algorithms and analysis.



Name of the Guide: Prof. Sandeep Juneja



ASTROSAT and TIFR

India's first dedicated astronomy satellite, ASTROSAT was launched by ISRO on September 28, 2015. Its major objective is to observe relatively bright objects simultaneously in wavelengths ranging from optical up to hard X-rays. The satellite was conceived of and initially guided by Prof. P C Agrawal almost 15 years ago. There are five co-aligned instruments on the satellite.

- 1) The Ultraviolet Imaging Telescope (UVIT), capable of observing the sky in the Visible, Near Ultraviolet and Far Ultraviolet regions of the electromagnetic spectrum
- 2) Large Area X-ray Proportional Counter (LAXPC), is designed for study the variations in the emission of X-rays from sources like X-ray binaries, Active Galactic Nuclei and other cosmic sources
- 3) Soft X-ray Telescope (SXT) is designed for studying how the X-ray spectrum of 0.3-8 keV range coming from distant celestial bodies varies with time.
- 4) Cadmium Zinc Telluride Imager (CZTI), functioning in the X-ray region, extends the capability of the satellite to sense X-rays of high energy in 10-100 keV range.
- 5) Scanning Sky Monitor (SSM), is intended to scan the sky for long term monitoring of bright X-ray sources in binary stars, and for the detection and location of sources that become bright in X-rays for a short duration of time.

TIFR News

Launch of Astrosat - first Indian astronomy satellite



Two of the five instruments (2, 3 and 4 in the list above) were entirely designed and manufactured in TIFR. The LAXPC consists of 3 large area, high pressure proportional counters for high resolution spectroscopic studies. Work on the instrument was initiated by Prof. P C Agrawal and then Prof. Ravi Manchanda designed the instrument. Prof. K S Yadav and Prof. H M Antia took the project to its logical conclusion. Prof. K P Singh conceived of and executed the work on SXT that is designed to image the objects in soft X-rays. Prof. A R Rao conceived of and executed the CZTI project for hard X-ray imaging of objects. Prof. Rao also made a charge particle monitor that will help in monitoring the satellite environment. All the instruments are working up to their design specifications and initial papers on instrumentation, transient events, and important sources have already started to appear on appropriate forums.



Astrosat model displayed at TIFR on Founder's Day

By Prof. M.N. Vahia

Contributory Articles

Infosys Prize in Physical Sciences



Prof. G. Ravindra Kumar

Here is a short write up on Prof. G. Ravindra Kumar, Senior Professor at TIFR, Department of Nuclear & Atomic Physics. He has been recently awarded The Infosys Prize in Physical Sciences.

Bio-data

Prof. Gattamraju Ravindra Kumar holds a B.E. (Hons) in mechanical engineering and M.Sc. (Hons) in physics, both from the Birla Institute of Technology and Science, Pilani, in Rajasthan, India. He obtained his Ph.D. from the Department of Physics at IIT Kanpur in 1990. After a year of postdoctoral work there, he joined the Tata Institute of Fundamental Research, in Mumbai, in 1992, in the group now known as UPHILL (Ultra-short Laser Pulse High Intensity Laser Laboratory) in the Department of Nuclear and Atomic Physics. At TIFR, he has established a strong laboratory for studying the physics of hot dense matter produced by ultra-short laser pulses. He is now a Senior Professor at TIFR, and a Fellow of the Indian Academy of Sciences and the Indian National Science Academy.

Scope and impact of work

Prof. G. Ravindra Kumar is an experimental physicist, studying plasma at high energy densities created by ultra-short laser pulses interacting with a variety of targets. The physics of this state of matter is of great contemporary interest in the context of the efforts in major international laboratories to achieve thermonuclear fusion by multiple converging laser beams. His laboratory at TIFR was the first to observe and quantify turbulent magnetic fields created by instabilities of the high current electron beams driven by the laser pulse. The control of these instabilities, using a novel carbon nanotube based target, allowed transport of the current over distances of up to a millimeter, many times what was earlier achieved. The rapidly varying spatiotemporal profile of the plasma generated by these pulses was probed by using reflection of different frequencies from different layers. In the context of fusion, minimizing reflected energy is a major goal and Ravindra Kumar has demonstrated the effectiveness of surface plasmon excitation in sub-wavelength structures in achieving near complete absorption. More recently he has discovered a new terahertz acoustic mode in a laser produced hot dense plasma.

Contributory Articles



All these studies called for a variety of sophisticated diagnostic tools - polarimetry X-ray, ion and electron detection. They have opened up new areas for follow up, and directly impact the laser fusion effort. Novel tabletop X-ray and energetic particle generators based on these studies are already envisaged. The work has significant implications for laboratory testing of high energy astrophysics scenarios for supernova explosions and high energy particle production.

Short Citation

The Infosys Prize in Physical Sciences is awarded to Prof. G. Ravindra Kumar for his pioneering experimental contributions to the physics of high intensity laser matter interactions. In particular for providing, for the first time, unequivocal evidence of turbulent magnetic fields and the discovery of terahertz frequency acoustic waves, in laser produced hot dense plasmas. These results have significance to testing stellar and astrophysical scenarios.

Citation by the Jury

The Infosys Prize in Physical Sciences is awarded to Prof. G. Ravindra Kumar for his pioneering experimental contributions to the physics of high intensity laser matter interactions that probe matter at extreme densities and temperature. Significant contributions include i) the first measurement of mega-gauss turbulent magnetic fields in laser plasma interactions; ii) experimental demonstration of large distance electron beam transport in the carbon nanotube system; iii) the use of the Doppler effect from the 'critical surface' to map the density dynamics of an expanding plasma cloud and iv) discovery of a terahertz hydrodynamic mode in a hot laser plasma. His results have significant implications for laboratory testing of astrophysical scenarios like supernova explosions and high energy particle production.

By Prof. B.M. Arora

Contributory Articles

Infosys Prize in Mathematics



Prof. Mahan MJ

Here is a short write up on Prof. Mahan Mj, who is now a Faculty in School of Mathematics. He has been recently awarded The Infosys Prize in Mathematics.

Bio-data

Prof. Mahan Mj was born Mahan Mitra in 1968 and went to St Xavier's Collegiate School in Kolkata. He went to IIT Kanpur, initially to major in Electrical Engineering, but switched later to mathematics. He graduated with a Masters degree in 1992. He received his Ph.D. in 1997 from the University of California, Berkeley. His thesis was called Maps on Boundaries of Hyperbolic Metric Spaces. After a few months at the Institute of Mathematical Sciences, Chennai, he joined the Ramakrishna Mission in 1998 and received his saffron robe in 2008 and became a monk. He received the Shanti Swarup Bhatnagar award in 2011. He is currently at TIFR, Mumbai.

Scope and impact of work

Prof. Mahan Mj has had a substantial impact on the fields of geometric group theory, low-dimensional topology and complex geometry. His work in all these fields is characterized by its creativity and clever use of delicate geometric arguments.

In the 1970's, Thurston introduced a far-reaching program to study hyperbolic 3-manifolds which complemented his approach to his Geometrization Conjecture. In the last decade, tremendous progress has been made on Thurston's original program and most of his conjectural picture has now been verified. One highlight of this success was Mahan Mj's proof that every Kleinian surface group admits a Cannon-Thurston map. This result has already had many applications within the study of hyperbolic manifolds and Mahan Mj and his co-authors have generalized the techniques involved to apply to much more general situations arising in geometric group theory.

More recently, Mahan has expanded his research program to the study of complex geometry. His work has clarified which groups can arise as fundamental groups of various classes of complex manifolds. For example, in collaboration with Indranil Biswas, he characterized exactly which one-relator groups arise as fundamental groups of Kahler manifolds.

Contributory Articles



Short Citation

The Infosys Prize in Mathematics is awarded to Professor Mahan Mj for his outstanding contributions to geometric group theory, low-dimensional topology and complex geometry. In particular, Prof. Mj established a central conjecture in the Thurston program to study hyperbolic 3-manifolds and introduced important new tools to study fundamental groups of complex manifolds.

Citation by the Jury

Mahan Mj's most prominent result is a proof of Thurston's conjecture that every Kleinian surface group admits a Cannon-Thurston map. A Kleinian surface group is a properly discontinuous action of the fundamental group of a closed surface on hyperbolic 3-space by isometries. A Cannon-Thurston map is a continuous equivariant map from the boundary of the surface group into the boundary of hyperbolic 3-space. In many cases, the Cannon-Thurston map will be a sphere-filling curve. As a consequence Mahan Mj proves that if the limit set of a finitely generated Kleinian group is connected, then it is locally connected. This result has already had many applications in the study of hyperbolic 3-manifolds and Mahan Mj and his co-authors have studied Cannon-Thurston maps in more general geometric group theoretic settings. The Jury was also impressed by Mahan Mj's varied work on pattern rigidity and fundamental groups of complex manifolds.

Prof. Mahan was recently interviewed by NDTV news channel. The webpage link for this interview is given below:

<http://www.ndtv.com/topic/infosys-mathematics-award>

By Prof. Ravi Rao

Contributory Articles

Science at ICTS, Bengaluru



Introduction

The International Centre for Theoretical Sciences (ICTS) celebrated the inauguration of their new campus at Shivakote, Hesaraghatta Hobli in Bengaluru north with a day-long event named **Science at ICTS** on June 20, 2015. This event marked the culmination of a process begun six years ago when the campus foundation stone was unveiled by CNR Rao in the presence of David Gross and Michael Atiyah during 'Science without Boundaries' held in December 2009.

Science at ICTS began with an invocation by Carnatic vocalist Srimatha Ramanand followed by a series of ceremonial speeches by the following distinguished panel of lecturers:

E.V. Sampathkumaran

Director, TIFR

Ratan Kumar Sinha

Secretary, DAE and Chairperson, AEC (Speech read out by Spenta Wadia)

Sabyasachi Bhattacharya

TIFR & Presidency University, Kolkata

David Gross

KITP Santa Barbara and Chair, ICTS International Advisory Board

Roddam Narasimha

JNCASR & Member, ICTS International Advisory Board

K. VijayRaghavan

NCBS-TIFR and Secretary, Department of Biotechnology, Ministry of Science and Technology, Ministry of Earth Sciences & Member, ICTS Management Board

Andrew Millis

Columbia University and Associate Director for Physics, MPS-Simons Foundation

Kris Gopalakrishnan

Co-founder and former CEO of Infosys and Member, ICTS International Advisory Board



Prof. Spenta Wadia

Contributory Articles



Michael Atiyah

University of Edinburgh and Member - ICTS International Advisory Board

Spenta R. Wadia

Director, International Centre for Theoretical Sciences of TIFR

For the detailed speeches, please visit <https://www.icts.res.in/science-at-icts>

These talks were followed by the ceremonial planting of saplings by a group of academics and friends of ICTS. These include Nima Arkani-Hamed, S. Batni, Manjul Bhargava, M. Bhaumik, Vivek Borkar, S. Bhattacharya, Avinash Dhar, Michael Green, David Gross, Kris Gopalakrishnan, Ravindra Kumar, Andrew Millis, Roddam Narasimha, Ashoke Sen, Boris Shraiman, Subir Sachdev, E.V. Sampathkumaran, Director DCSEM, Fernando Quevedo, Cumrun Vafa, K. VijayRaghavan, Spenta Wadia, Bernard de Wit and others.

Prof. Spenta Wadia, K. VijayRaghavan and David Gross planting saplings



Academic session

The afternoon session comprised scientific lectures on topics ranging from a possible low energy derivation of the Veneziano amplitude as the unique consistent classical completion of gravity, the role of higher spin particles and symmetries in inflation and string theory, the universality of fluctuations in the neighborhood of third order phase transitions and the mathematical modelling of the evolution of the flu virus. The speakers were Boris Shraiman, Satya Majumdar, Subir Sachdev, Rajesh Gopakumar and Nima Arkani-Hamed.

Chair: Vivek Borkar, Indian Institute of Technology, Bombay, India

Boris Shraiman: Emergent simplicity of evolutionary dynamics and the possibility of predicting evolutionary future

Contributory Articles



Satya Majumdar - Top eigenvalue of a random matrix: Tracy-Widom distribution and third order phase transition

Chair Fernando Quevedo, ICTP, Trieste, Italy

Subir Sachdev Exploring quantum matter in the high temperature

Rajesh Gopakumar Simplifying String Theory

Nima Arkani-Hamed Quantum Mechanics and Spacetime in the 21st century

Poetry, Drumming and Mathematics

In the evening, Field's Medal winner Manjul Bhargava (Princeton University) delivered a public lecture titled "Poetry, Drumming, and Mathematics" at the Christ University auditorium. In his lecture Bhargava described remarkable mathematical advances that were made over two thousand years ago by classical Sanskrit poets and musicians who attempted, for instance, to count the number of distinct rhythms that can be encoded in a given number of beats. This lecture was delivered to an enthralled audience of almost 1000 people. The day ended with a celebratory dinner at Christ University.

Participants at the "Science at ICTS"



This centre provides a platform and resources for interactions between theorists and experimentalists and fosters important new research.

ICTS also carries out research in-house at the frontiers of research and has a vigorous graduate studies program for Ph.D students. The scientific questions that drive the current ICTS faculty research are from the broad areas of Astrophysical Relativity, Data Assimilation and Dynamical Systems, Statistical Physics, Condensed Matter Physics, Physical Biology, String Theory and Interdisciplinary/exploratory Mathematics."

By Prof. Avinash Dhar

Contributory Articles

Indian Women Scientists



Prof. Riddhi Shah

Dr Riddhi Shah, obtained B.Sc. in Mathematics from St. Xavier's College, Gujarat University, Ahmedabad (1984). She obtained M.Sc. in Pure Mathematics from IIT, Mumbai (1986). She obtained Ph.D. in Mathematics from Tata Institute of Fundamental Research (University of Mumbai). Presently, she is a professor of Mathematics at the School of Physical Sciences, JNU. She is a recipient of the Young Scientist Award of IN-SA (1995), and a recipient of the Alexander Von Humboldt Fellowship (1997-98).

Vigyan Prasar, Department of Science and Technology (DST) in collaboration with CSIR-NISCAIR, has developed inspirational films titled "Scientifically Yours" on Indian Women Scientists who have contributed significantly to Indian Science. These are inspirational programmes for younger generation to take up a career in science.

Here is the link to the video of Prof. Riddhi Shah.

<http://scm.niscair.res.in/videos/273/dr-riddhi-shah,-professor,-school-of-physical-sciences,-jnu>.

The talks by all other women scientists are also available on this website <http://scm.niscair.res.in/category/scientifically-yours/>

By Prof. Ravi Rao

Contributory Articles

Prof. Richard Pinto, Alumnus of TIFR initiates Nano Center at SCEM



Prof. Richard Pinto



Sahyadri College of Engineering & Management

Sahyadri College of Engineering & Management (SCEM) is in the process of establishing a Center of Excellence in Nano-science and Technology at its campus at Mangalore. SCEM is the first institution to set up such a centre in the undivided Dakshina Kannada district. The new research centre will be established under the guidance of Prof. Richard Pinto, Ex-Professor, Tata Institute of Fundamental Research and IIT Bombay. CENT has experienced faculties with enthusiasm to contribute for the advancement of science and technology and make an effort to bridge the vast gap between industry and academia.

The college is affiliated to Visvesvaraya Technological University (VTU), Belgaum and is approved by the Government of Karnataka, All India Council for Technical Education (AICTE), New Delhi, Ministry of HRD, Govt. of India and certified by IAO and ISO. The college is unique and is one among the few who can take pride in having a dedicated department for research and analyzing & developing effective methods of imparting quality education. The college is ranked 83rd in top private engineering colleges in India according to a research survey by the Week Magazine and Hansa 2015.

The College was established in 2007 by the visionary founder Dr. Manajunath Bhandary through Bhandary Foundation which is a philanthropic trust with focus on social outreach. Hence, the Foundation offers scholarships and free education to the deserving students in engineering and Business Management. The high quality teaching offered at Sahyadri is well complemented by the state-of-the-art infrastructure and modern facilities like Govt. Research Center, Incubation, Placement & Training Center, Sahyadri Center for Social innovation which includes Hands-on Experience Lab, Engineering Sense Lab, Innovation Lab, and Product design Lab. Sahyadri has started an Entrepreneurship cell to ignite the creative thinking of students towards innovation and thereby mentor them to become successful entrepreneurs by providing the right entrepreneurial ecosystem.

Contributory Articles



One of its unique schemes is Sahyadri Science Talent Hunt (SSTH) which identifies young creative minds via funded science projects for the students at the pre-university level. The college has also initiated Student Project Support Scheme (SPSS) via financial support to encourage students to work on engineering and technology projects. The institution regularly invites experts from industry and academia for interaction with the students and organizes orientation courses for students. The institute building is architecturally conceived to provide natural light and air circulation with four courtyards at the four corners. The total built-up structure of the main building is about 350,000 square feet with spacious class rooms, laboratories and administrative offices.

With the above backdrop, the creation of Center of Excellence in Nano-science and Technology at SCEM to achieve the next level of research was conceived in April 2015 with a vision to create, establish and sustain CENT with a multidisciplinary character involving most of the departments for R&D in both novel and nanomaterials, growth and characterization of thin films and new devices & technology. To achieve the above goal advanced research infrastructure would be established in phased manner with funds both from the Management and Govt. projects. With the above vision, CENT is expected to be one of the best in the west coast. Prof. Pinto agrees this is a challenging task; but he hastens to add that it has taken many years for building advanced research infrastructure earlier at TIFR and later at IITB in the creation of a Nano Fabrication facility (IITB-NF) at IIT Bombay.

By Prof. B.M. Arora

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TIFR Alumni Association
Tata Institute of Fundamental Research
Homi Bhabha Road, Mumbai 400005
Telephone : 91-22-22782119 (Mr. Mohan Kakade)
Fax : 91-22-2280 4610 / 4611
Email : alumni@tifr.res.in
Website : <http://www.tifr.res.in/index.php/en/about-us/alumni.html>
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