

TIFR Alumni Association



November 2014

SAMPARK TAA newsletter



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Prof. J. N. Goswami



Prof. P. Ganguli



Dr. Homi J. Bhabha

1909-1966

Editor's Message



A regular publication of TAA Newsletter, SAMPARK, which was started in 2001, significantly enabled TAA members to remain connected. The print edition of the Newsletter was generously supported by donors starting with late Prof. Karamjit Arya to SASKEN, TCS and TIFR till 2007. In 2008, we switched to the online edition only. The online avatar included important TAA events such as Public Lectures by distinguished alumni, and also their life and work at TIFR. One new TAA feature is the creation of TAA-Red.Com Portal linked to TIFR site www.tifr.res.in/~alumni. The portal has enabled in keeping the alumni connected; and some alumni have created their own home-page.

We are making efforts to increase the membership. One new approach we adopted is by enrolling student members as associate members as soon as they register for their M.Sc./Ph.D. Hence, TIFR deemed University is playing an important role in enhancing the future alumni. We also hope, the Newsletter would make a significant contribution in helping members to stay connected.

Enjoy Reading!



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Acknowledgement

We thank
Mr. Nilesh Kulkarni and
Ms. Margaret D'Souza
for their efforts in designing this newsletter.

From the Patron's Desk



I am delighted to note that TAA has been active in many activities, notably organization of Public Lectures in a sustained way over the years. One important initiative is the recognition of distinguished alumni through TAA Excellence awards. This initiative started in the Homi Bhabha Birth Centenary year, should be encouraged to continue in the future.

I also appreciate the initiative by TAA in the implementation Ramakrishna Cowsik and Saraswati Cowsik Awards founded by Prof. Ramanath Cowsik. This award, started in 2013, will become an annual feature. During this year, TAA decided in concurrence with Prof. Ramnath Cowsik that the awards would be conferred to young scientists, upto the age of 35 years, for their outstanding work done at TIFR. Two young scientists were presented the Cowsik Awards on October 30, 2014.

I hope the Newsletter would go a long way in providing link between alumni and also between alumni and the Institute. I look forward to the issues to follow in keen anticipation.

Mustansir Barma

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' 2013. Hope the 2013 edition of Newsletter was interesting and useful to alumni. They have brought out some new features.

During this year, TAA has taken two major initiatives. The first is the introduction of Associate Membership for students registered for their M.Sc./Ph.D. The AGM held in March 2013 amended the constitution 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. The second initiative is the creation of TAA-Red.Com Portal. The IT company Red.Com was kind enough to give this service free of cost to TAA. The TAA website is linked to <http://www.tifr.res.in>.

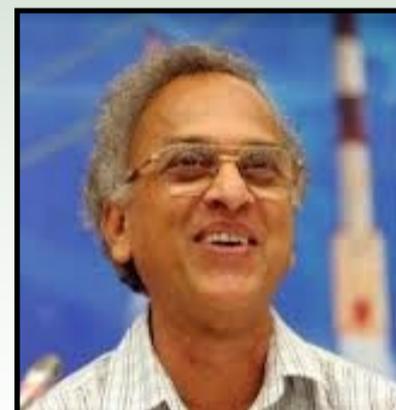
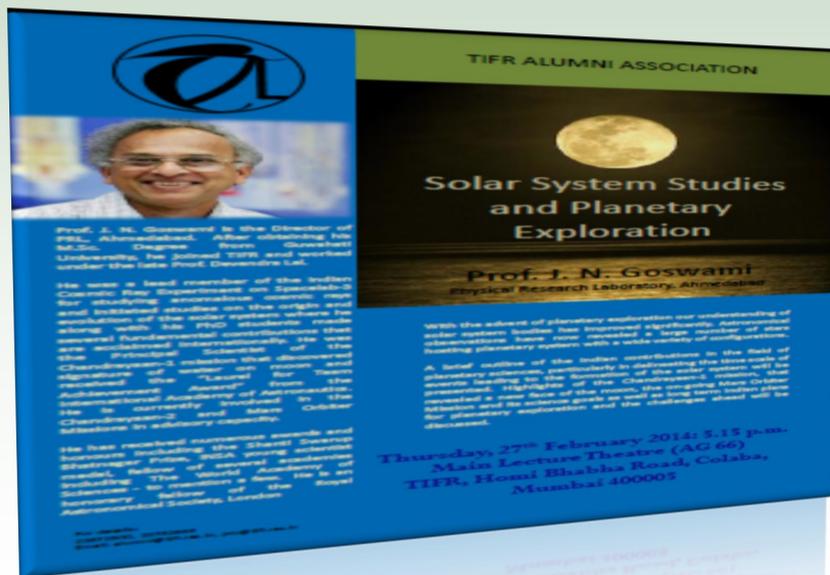
The TAA Excellence Award was instituted in the Homi Bhabha Birth Centenary Year 2009; during an award function held on October 31, 2009, 28 Pioneers of TIFR, 5 former Directors and 3 former TAA Presidents were felicitated. After a gap of 5 years, TAA has initiated TAA Excellence Awards and 4 distinguished alumni have received the awards during an award function held on October 30, 2014.

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TAA Public Lectures

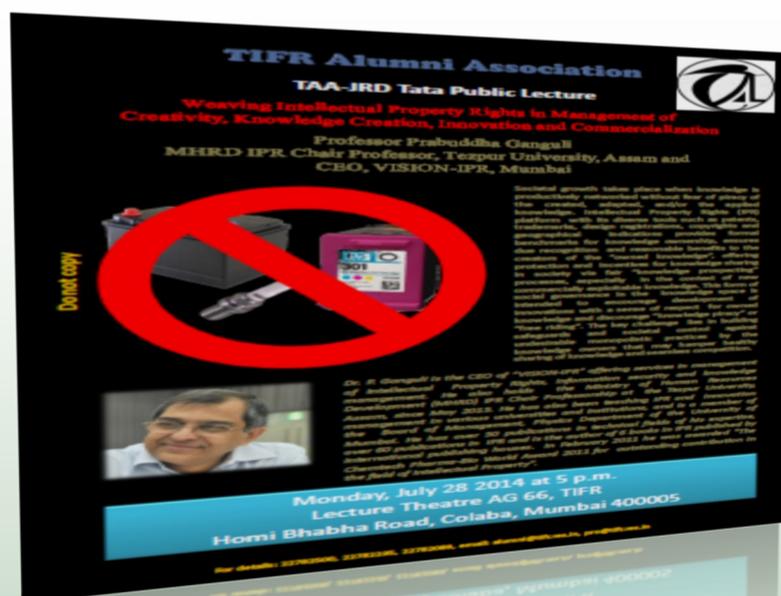


TAA organized two public lectures in 2014. One was held on the National Science day, 28th February by Prof. J. N. Goswami (PRL, Ahmedabad). The other was the TIFR-JRD Tata Public lecture on 26th July by Prof. P. Ganguli (MHRD IPR Chair Professor, Tezpur University, Assam and CEO VISION-IPR, Mumbai)



TAA -National Science Day Public Lecture on February 27, 2014 by Prof. J. N. Goswami, Director, Physical Research Laboratory, Ahmedabad

“Solar System studies and planetary Exploration”



TIFR-JRD Tata Public Lecture on Monday, July 28, 2014 by Dr. Prabuddha Ganguli a TIFR Alumnus and currently (MHRD) IPR Chair Professorship at the Tezpur University, Assam at 5 p.m. in the Main Lecture Theatre.

“Weaving Intellectual Property Rights in Management of Creativity, Knowledge Creation, Innovation and Commercialization”.

Interviews



“We need to create strong and targeted portfolios of patented technologies which can be transferred to the industry for exploitation in the market place.”

Professor Prabuddha Ganguli

Interviews

Interview of Prof Prabuddha Ganguli conducted by Dr. R. S. Chaugule



“A course on basic elements of IPR and the use of the patent system as a live information source should be introduced as a formal elective credit course in the university curriculum. .”

Professor Prabuddha Ganguli

Dr. Prabuddha Ganguli is the CEO of his consulting firm “VISION-IPR” offering services in management of Intellectual Property Rights (IPR), information security and knowledge management. He is a leading international expert on IPR and a Consultant to the World Intellectual Property Organisation (WIPO) for IPR capacity building programmes in developing countries, an elected Fellow of the Maharashtra Academy of Sciences. After several years in academic research, he worked in industry for 2 decades in diverse managerial roles including R&D, Technology Assessment, Forecasting and Transfer, Knowledge Management, Factory Management and Business Planning..

RC : Thank you for giving us an opportunity to talk to us for the TAA newsletter. When you returned to India in 1980, you joined BARC as a visiting scientist and then left BARC to join industry. Was there a specific reason for this move which was surprising at that point in time? Wasn't this move unconventional?

PG : After I completed my PhD in TIFR in 1977, I went to Germany for my post-doctoral as an Alexander von Humboldt Fellow. I returned to India in 1980 to join BARC as a visiting scientist. After spending a very successful year in BARC in which I had the opportunity of collaborating with several scientists in work related to materials, I decided to look for places in India that would offer challenging and demanding options



Prof. P. Ganguli giving his public lecture at TIFR

Interviews



Interview of Prof. P. Ganguli continued...

with a focused purpose. I felt that the BARC was a good place to be in, but lacked the focus of demanding time-bound results that would see the light of the day unless you were involved in mission oriented projects. I did not see myself either being a part of, or leading any mission oriented projects at that point in time and even in the very near future. In 1981, I therefore left BARC to join Hindustan Lever Ltd (now Hindustan Unilever Ltd) in the Research Centre where I got involved in basic and applied work related to business interest of Hindustan Lever Ltd (HLL) and Unilever. At that stage, HLL Research was both involved in advancing scientific concepts of interest in consumer based products and processes and also developing and transferring promising research findings to the HLL business. After about 8 years in Research, I worked as the factory manager in one of the HLL factories, in which we were converting the research-developed processes into profitable business opportunities. During this period I also had the opportunity of being a member of teams that transferred research findings into production units, setting up new plants based on technology developed within HLL and also acquired from other sources. I agree with you that it was indeed unconventional at that point in time for a basic scientist involved in basic research to move to industrial research, but I must say that HLRC was the best fit for me, which I gradually realized after joining the organization.



Prof. P. Ganguli giving his public lecture at TIFR

Interviews



Interview of Prof. P. Ganguli continued...

RC: Was it not a big change of transforming yourself from the conventional stream of academic research in the early 80's to working in industry oriented problems? How did you cope with the change?

PG: Yes it was indeed a fairly big change because in the early 80's very few scientists especially from TIFR like institutes actually found it attractive to move to industry and commercial enterprises. During that period it was not too fashionable for industry to invest in R&D. Further there was little or no meaningful interaction between academia involved in research and industry. The initial few months for me were quite confusing. However, I must confess that the research leaders during that period in Hindustan Lever Research had the vision and will to facilitate this transition for new-comers into the world of industrial research. We were actually showed diverse pathways to newer thinking and had the benefit of several stalwarts in the research centre who had already demonstrated how creative and good scientific research forms the backbone for the transformation of ideas to plausible applications and thereafter crystallize them into commercial realities. For me this exposure opened up new avenues in scientific thinking as I started looking at new and effective chemical processes with targeted applications, developing materials for applications in the field of fabric wash and personal care. All these were based on a very advanced understanding of the structure of existing and newly created materials which required some of the most sophisticated investigative tools such as small angle X-Ray scattering, magnetic resonance, theoretical simulations to explore structural compatibilities and evolving processes (including scale up) to produce efficient products which either led to the use lesser raw materials and/or showed enhanced effects in the



Prof. P. Ganguli giving his public lecture at TIFR

Interviews



Interview of Prof. P. Ganguli continued...

desired end products and/or led to easier and cost effective processing. I have immensely benefitted from this experience and do believe that our academic world must get exposed to such opportunities so that they can be made to stretch their capabilities, develop desirable skills and knowledge base to hopefully contribute as much to the real world of opportunities.

RC: During the period you were doing research in industry, did you feel isolated from the academic community?

PG: This is an interesting question. In principle, one could have got isolated from the main stream of the academic community. However during the early 80's when I joined the Hindustan Lever Research Centre (HLRC), there was a very conscious effort by the research management team to proximate with the academic community. We were encouraged to maintain active links with the academic community, publish our non-commercial investigative work in good peer reviewed journals, participate in national and international conferences, involve selected scientists and technologists from the academic community in our research projects or even engage them in exploratory projects to deepen our understanding of the cause and effects, model processes, etc. We were also encouraged to participate as working members in national and international scientific committees. Another activity of considerable significance was our weekly colloquium in the research centre, when we had several invited speakers addressing us from time to time. We were indeed fortunate that we had some of the best research luminaries in HLRC, who had seen beyond the horizon to create systems and processes so that the new generation of scientists like me who got initiated into industrial R&D in India would have sufficient opportunities to continue our links with the academic world, synergize with the academic community while focusing on our work in industry.

Interviews



Interview of Prof. P.Ganguli continued...

RC : At what stage of your career did you get interested in Intellectual Property Rights (IPR)?

PG : During my tenure of 8 years in HLRC, some of my research work got patented by HLL and I began to realize the value of patents in business competitiveness. Protecting the research findings and technologies using patents attracted my attention and I moved into the field of IPR in 1991. Though fairly late in my career, I thought of setting up IP management systems within the company as part of the research and business process. Since then it has been an exciting journey.

RC: So what according to you are the key differences between conducting research in and industrial R&D Centre and in Academics?

PG: In leading industrial research centres, research is managed in various ways. One of the approaches is viewing market opportunities and designing research to service such identified market needs. Concurrently opportunities in futuristic products and processes are explored based on advances in science and technology. In several organizations parallel emphasis is laid on conducting basic research to expand the science base in the organization to enhance the S&T capability within the organization to facilitate the absorption of emerging advances during the process of technology transfer from academic institutions. Such approaches keep the spirit of S&T live in lead industrial R&D centres as they continue to contribute to technology and business leadership. In all these activities a lot of importance is given to management of intellectual property rights, landscaping of technologies vis-à-vis their IPR status, monitoring markets and IPR, enforcing IPR, transacting IPR, monetizing IPR, etc.

In most academic research institutions of excellence such as in TIFR, IITs, Regional Research Centres, CSIR, IISc, universities, etc., the chosen research problems are investigated to unravel new phenomenon, explain observations through mechanisms, prepare new materials, develop new processes, etc. In most (barring selected few)

Interviews



Interview of Prof. P. Ganguli Continued...

such institutions, little or no emphasis is placed on patents search as most of the work is based on literature search involving academic journals, conference reports, etc. It is not uncommon to find that in expanding areas of commercial significance such as nanotechnology, biotechnology, advanced materials, devices, etc. much of the knowledge appears in patent literature and not in the standard journals, etc. As a result, the academic world involved in work in such areas is quite oblivious to the knowledge dynamics in terms of patents (as most of them seldom search and study patents in their respective and allied fields), and so come up with products and processes that are either already known or though new are obvious variants of patented inventions or are infringing claims of granted patents causing problems during the process of technology/knowledge transfer from academics to industry especially in areas that are of commercial significance.

We need urgent changes in the manner in which academic research is managed especially in our country if we are to make optimal use of our national infrastructural and human resources.

RC: Can you illustrate with an example of an area of commercial significance which in your opinion is also a scientific thrust area in India which needs to be managed in a different way to get the fruits of our academic endeavors to the industry?

PG: I would take the example of nanotechnology. India has invested handsomely in this field over the last few decades. I am told that we have invested over 4.5 billion dollars in this field already. This is a thrust area with the establishment of several centres of excellence in the country. We need to conduct a detailed due diligence on what has been the impact of the work that has been done in our country in this field both in terms of its contribution to the advancement of science (through the quality of scientific papers published in leading journals, and how these have been cited / used) and the number of patents filed and granted which have at least shown some promise

Interviews



Interview of Prof. P. Ganguli Continued...

of being taken into the commercial phase. The research in our centres needs to get consolidated. We need to create strong and targeted portfolios of patented technologies which can be transferred to the industry for exploitation in the market place. I do not think that we have moved in that direction in a concerted manner. We need to revisit our national strategy on how to manage our research nanotechnology to derive meaningful returns on our national investments. In my opinion we have fallen short of the promises we made and investments committed in this field in our country.

We have several lessons to learn from other countries on how they have been managing their research in such fields.

RC: You have worked in industry and now continue to be associated with academics. How do you think that we can enhance the quality education in our universities to prepare our students for their life after the university education?

PG: Our academic institutions should continue to on their mission to become and sustain as centres of excellence engaged in the creation of discerning minds that can critically observe, analyze, take decisions and act with a sense of purpose. In short our academic institutions should continue to be the spring fields of classy human resource.

Our industries should function as irrigated tracks for utilization of the created human resources. The industry system ought to train and utilize the human resource effectively. Our courses in the academic institutions have to carve out components that would help to familiarize our students with approaches that are followed in industry so that they are able to adapt quickly and begin to function as per expectations of the industry.

The infusion of structured and focused “adjunct faculty” from industry into our academic system should be a first step. This has not happened in our country to the desirable extent. Such activated interactions have their silent benefits and help to

Interviews



Interview of Prof. P. Ganguli Continued...

create changes in the system with both the parties (academics and industry) appreciating and servicing each other's complementary needs our technical students should be exposed to the system of intellectual property rights and how it is used as a real time information source to map the technologies and their ownership trends through patents and how commercial organizations use the patent system to sustain competitiveness. A course on basic elements of IPR and the use of the patent system as a live information source should be introduced as a formal elective credit course in the university curriculum. Such courses are best conducted by professionals who may come in as adjunct faculty if appropriate human resources are not available in the institution. We have introduced such courses for our undergraduate, post graduate and PhD students in Tezpur University. These courses have become hugely popular and useful.

RC: What attracted you to science?

PG: I am extremely grateful to my teachers in school who presented science to us as a live and vibrant topic. Even as early as in early 50's my school had a well-equipped science laboratory in which we were taken every week to conduct simple experiments to understand the concepts that were being taught to us during that week. Our school teachers made us relate science to our daily lives which made the subject so exciting.

When we were in college in Mumbai, in the mid 60's, we had a small study group of science students from a few colleges in Mumbai who were very lucky to have come in early contact with Professor Udgaonkar and Professor Siddique in TIFR. Professor Siddique and Professor Udgaonkar together with several other researchers in TIFR facilitated our study group discussions and spent several hours guiding us with reading material. Interestingly even the TIFR library was available to us. We were even encouraged to attend the Wednesday colloquia in TIFR and these interactions catalyzed our excitement and boosted our interest in science. The momentum then

Interviews



Interview of Prof. P. Ganguli Continued...

kept us going. Later, I was fortunate to have been selected to join TIFR for my PhD. I must confess that TIFR ecosystem has played a great role in shaping my thought process and approach to life.

RC: What are some of your fine thoughts during your time in TIFR especially say from 1971 to 1977?

PG: The academic vibrancy and the informal mode of working in TIFR during that period were positively infectious. The course work offered by the people of eminence in their individual fields was tough and challenging. Experimental researchers were encouraged to design & construct instruments and in several cases upgrade existing equipment for use in their research work. The west canteen would hum with debates throughout the day. The Wednesday Colloquia and the tea that followed in the west canteen was the “facebook”, “twitter” and live social interactive media which brought in researchers from all the disciplines. This paved the way for a lot of interdisciplinary research, cross fertilization of ideas, and built the bridges across seemingly unrelated concepts. A fond and enriching memory of those times is the range of lectures held in TIFR by the constant stream of eminent visitors from various institutions across India and the globe. Lying on the sprawling lawns late in the evening and watching the stars in the background of the splashing waves was indeed refreshing. These were unique to TIFR.

The other aspect in TIFR during that period was the deep commitment to education of some members of the academic community. I fondly remember the lecture demonstrations that were arranged on Saturdays for the school children under the auspices of “The Bombay Science Education (BASE)” led by Professor Balu Venkataraman. The educational and teachers training programme in the Bombay Municipal Schools by Dr. V.G. Kulkarni and Professor Udgaonkar, which later led to the formation of “The Homi Bhabha Centre for Science Education”, the “Kishore Bharati” which was the science teaching programme in Hoshangabad, Madhya Pradesh and the

Interviews



Interview of Prof. P. Ganguli Continued...

Program which was related to “The Satellite Instructional Television Experiment (SITE)” using the ATS 6 satellite borrowed from the USA. My deep involvement in all these programs parallel to my research work gave me an opportunity contribute to the society at large and also to develop my communication skills and discover several of my potential strengths which otherwise would have remained unknown to me and possibly unutilized.

The newly built TIFR hostel in which we were the first inmates was of course buzzing with our film club, music club, chess and a range of sports activities. All these helped to round off the rough edges in us, develop our personality, realize our role in society and prepare well for the life that lay ahead.

RC: What inspired you to take on the diverse activities in the last decade and a half?

PG: After I left Hindustan Lever Ltd in 2001, I set up my own consulting firm “VISION-IPR” to offer services in Intellectual Property Rights, Information Security and Knowledge Management. I was inspired by the lack of awareness on these subjects in our institutions both in commercial and academic organizations. Without proper management of these aspects, I was convinced that we cannot derive and realize the optimal output of our innovations. I felt that a lot of the research going on in our research institutions was “reinventing the wheel” as most researchers were not doing patent searches as an integral part of their R&D.

I therefore decided to create a platform to actively interface with industry, academia, governments, legal fraternity, S&T Managers, and a wide range of international institutions such as the World Intellectual Property Organization (WIPO), UNESCAP, etc. I got involved in developing Institutional IPR policies, designing and implementing IPR strategies for various companies, providing techno-legal support in major court cases related to patent infringements, patent revocations, etc. A very exciting part of my work has been interacting with the scientists in commercial and

Interviews



Interview of Prof. P. Ganguli Continued...

academic Institutions and assessing their work for patentability, working out ways and means of protecting their inventions, assessing whether their inventions can be introduced into the markets without the fear of infringing others' patents (this is known as freedom to operate or FTO), training scientists and science managers on how to conduct patent searches, how to do technology landscaping, technology transfer, etc. Being a part of several technology transfer negotiations between various organizations, institutions and commercial entities has continued to be educative and satisfying.

I have also been a consultant to the World Intellectual Property Organizations in this activities related to IPR capacity building in developing and least developed countries so that they can come up to speed in the field of IPR.

A couple of years ago, the Vice-Chancellor of Tezpur University requested me to take the MHRD IPR Chair Professorship in the University to develop the IPR ecosystem in the university and in the North East Region. I took up this opportunity immediately and I must say that in the last two years it has been fun being a part of the active academic set up, developing and introducing new interdisciplinary courses related to IPR which includes technology transfer methodologies within the university curricula. The initial results have been very promising and I believe that the model we have adopted in Tezpur University is scalable and can be adopted in any of our universities and academic institution.

Prabuddha Ganguli

Interviews



Interview of Prof. P. Ganguli Continued...

RC: Professor Ganguli, it was a pleasure to be in conversation with you. Thank you very much and congratulations for being a recipient of the TAA Excellence Award in 2014. We wish you the very best and look forward to your continued contribution.



TAA Red.Com webportal



Realizing the need for a dedicated portal for alumni, TAA has initiated the installation of a portal with the help of IT company Red.Com, who are kind to provide free operation and maintenance of the portal. Red.Com would however, charge a nominal fee of Rs. 100/- per year to members who would like to upload their homepages on the portal.

The portal is active since last 3 months and almost all members who have email addresses have registered on the portal. The portal is linked to the TIFR site; www.tifr.res.in/-alumni. We thank the Registrar and Director TIFR for the approval of Red.Com services for the TAA portal.



kindly visit TAA web portal
<http://www.alumni.tifr.res.in>

For further details and any help, if required, please contact any one of the following who administer the TAA web portal.



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Awards and Honors :



National and International

Membership of Academies

- ◆ Prof. Pushan Ayyub: Elected as a Fellow of the Indian National of Science Academy, New Delhi.
- ◆ Prof. Ravi Rao: Elected as a Fellow of the Indian National of Science Academy, New Delhi.
- ◆ Prof. Amol Dighe: Elected as a Fellow of the Indian National of Science Academy, New Delhi.
- ◆ Prof. Shobhona Sharma: Elected as a Fellow of the Indian National of Science Academy, New Delhi.
- ◆ Prof. Vidita A. Vaidya: Elected as a Fellow of the Indian National of Science Academy, New Delhi.
- ◆ Prof. C.S. Rajan: Elected as a Fellow of the Indian National of Science Academy, New Delhi.
- ◆ Prof. K.V.R. Chary: Elected as a Fellow of the World Academy of Sciences (TWAS) for the advancement of science in developing countries.
- ◆ Prof. V. Srinivas: Elected as a Fellow of the World Academy of Sciences (TWAS) for the advancement of science in developing countries.
- ◆ Prof. Mandar Deshmukh: Selected as a TWAS Young Affiliateship-2014-18 from the Central and South Asian Region by the TWAS, Trieste, Italy.
- ◆ Prof. K. Vijayraghavan: Selected for the TWAS Young Affiliateship 2014, South Asian Region, TWAS, Trieste, Italy.
- ◆ Prof. K. VijayRaghavan: Elected to the US National Academy of Sciences, 2014.
- ◆ Prof. S. Ramakrishnan: Appointed as the "Vice-Chairman" of the IUPAP C5 Commission (Low Temperature) by the IUPAP General Assembly.

Awards and Honors :

National and International

Membership of Academies



- ◆ Dr. B. Satyanarayana: Elected as a Senior Member of the IEEE, Bombay Section.
- ◆ Prof. Sunil Gupta: Elected as a Vice Chair of Astroparticle Physics Commission (C4) by IUPAP General Assembly.
- ◆ Prof. Gautam Mondal: Elected as Fellow, Indian Academy of Sciences, Bangalore.
- ◆ Prof. G. Krishnamoorthy: Elected Member of the Indian Academy of Sciences, Bangalore.
- ◆ Prof. G. Krishnamoorthy: Elected Member of the Indian Academy of Sciences, New Delhi.
- ◆ Prof. G. Krishnamoorthy: conferred JC Bose Fellowship.
- ◆ Prof. Prof. K.V.R. Chary: Elected as a Fellow of The World Academy of Sciences (TWAS) for the advancement of science in developing countries.
- ◆ Prof. R.K. Shyamasundar: Elected as Fellow, Institution of Electronics and Telecommunication Engineers, 2013.
- ◆ Prof. V. Srinivas: Elected as Fellow of The World Academy of Sciences (TWAS) for the advancement of science in developing countries.
- ◆ Prof. Satyajit Mayor: Elected as Fellow, EMBO, 2013.
- ◆ Prof. Uma Ramakrishnan: INK Fellow, 2013.
- ◆ Prof. Krishanu Ray: Elected as President, Indian Society for Developmental Biologists, India.
- ◆ Dr. Mahesh Sankaran: Elected as Kavli Frontier of Science Fellow, 2013.
- ◆ Dr. Aswin Sai Narain Seshasayee: Elected as Associate of the Indian Academy of Sciences, 2013.

Awards and Honors :



National and International Awards

- ◆ Prof. R.V. Hosur: Padma Shri, Government of India, 2014.
- ◆ Prof. M. Barma: Awarded the Jawaharlal Nehru Birth Centenary Lecture (2014) by the Indian National Science Academy, New Delhi.
- ◆ Prof. Shuba Tole: Awarded the Infosys prize, 2014.
- ◆ Prof. Sushil A Majumdar: Awarded the NASI (National Academy of Sciences, India) Scopus Young Scientist Award 2014.
- ◆ Prof. Pratap Raychaudhuri: Awarded Shanti Swarup Bhatnagar Prize for Science & Technology” in the area of Physical Sciences for the year 2014, by the Council of Scientific & Industrial Research, New Delhi.
- ◆ Prof. Roop Malik: Awarded Shanti Swarup Bhatnagar Prize for Science & Technology” in the area of Biological Sciences for the year 2014, by the Council of Scientific & Industrial Research, New Delhi.
- ◆ Dr. Rahul Vaze: Awarded Young Engineer Award, Indian National Academy of Engineering, 2013.
- ◆ Dr. Rahul Vaze: Awarded Young Scientist Award, Indian National Science Academy, 2013.
- ◆ Dr. Madhusudhan Venkadesan: Awarded Human Frontier Science Program (HFSP) Young Investigator Award, 2013.
- ◆ Prof. Satyajit Mayor: Awarded Distinguished Alumnus Award, IIT –B, 2013.
- ◆ Dr P Ajith: Conferred the Ramanujan Fellowship, Department of Science and Technology.
- ◆ Dr. A Chattopadhyay: Conferred the Ramanujan Fellowship of Department of Science and Technology.
- ◆ Dr. P.V. Shivaprasad: Conferred the Ramanujan Fellowship, Department of Science and Technology.

Awards and Honors :



National and International

Awards

- ◆ Dr. Suvrat Raju: Conferred the Ramanujan Fellowship, Department of Science and Technology.
- ◆ Dr. V. M. Prabhakaran: Conferred the Ramanujan Fellowship, Department of Science and Technology.
- ◆ Dr. S. Hanasoge: Ramanujan Fellowship, Department of Science and Technology.
- ◆ Dr. R. Vijayaraghavan: Ramanujan Fellowship, Department of Science and Technology.
- ◆ Dr. M. Gopalkrsihnan: Conferred the Ramanujan Fellowship, Department of Science and Technology.
- ◆ Prof. Vikram Tripathi: Conferred the Swarnajayanti Fellowship, Department of Science and Technology.
- ◆ Prof. Ulhas Kolthur: Elected as a Swarnajayanthi Fellow of Department of Science Technology.
- ◆ Dr. Nissim Kanekar: Elected as a Swarnajayanthi Fellow of Department of Science Technology.
- ◆ Dr. Sayan Chakraborti: Awarded INSA Medal for Young Scientist , 2014.
- ◆ Dr. Imran Habib Biswas: Awarded INSA Medal for Young Scientists, 2013.
- ◆ Dr. Suvrat Raju: Awarded INSA Medal for Young Scientist , 2013.
- ◆ Mr. A. Ghaisas: Awarded Yadunath Thatte Puraskar for Marathi Book "Akash Kase Pahaave", Government of Maharashtra.

Awards and Honors :



National and International

Awards

- ◆ Ms. K. Hema Chandra: Student Research Achievement Award, American Biophysical Society.
- ◆ Dr. Nissim Kanekar: The Delta Lectureship Award - 2014, National Central University, Taiwan, 2014.
- ◆ Dr. K.K. Mishra: Awarded: Bharatiya Bhasha Pratishthapan Samman Patra, 2014.
- ◆ Dr. Vivek Polshettiwar: Asian Rising Stars Award, Asian Chemical Congress (ACC), Singapore, 2013.

Awards and Honors :

TAA Excellence Awards



Prof. S. Ramani
TAA Excellence Award

“For his outstanding work and contributions to the advancement of the global Internet and for being inducted into the Internet Hall of Fame”

Prof. S. Ramani, receiving the TAA Excellence Award 2014
from Prof. M. Barma, Director, TIFR.



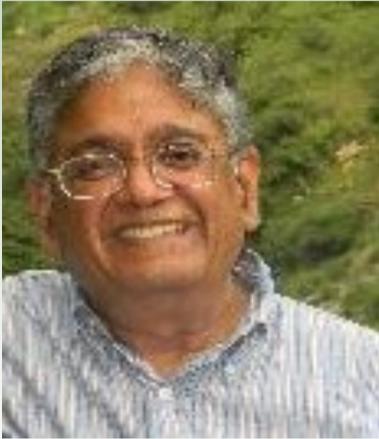
Prof. Prabuddha Ganguli
TAA Excellence Award

“For his outstanding work in the field: Intellectual Property Rights, information security and knowledge management”

Prof. Prabuddha Ganguli receiving the TAA Excellence Award 2014
from Prof. M. Barma, Director, TIFR.

Awards and Honors :

TAA Excellence Awards



Prof. Kailash Rustagi
TAA Excellence Award

“For his outstanding work on Electronic structure of quantum dots and excitons, Modelling of optical non-linearities in organic molecules and composite systems and Lattice dynamics of heteropolar semiconductors”



Prof. Ravi Subrahmanyam
TAA Excellence Award

“For his outstanding work in the field of Radio Astronomy specifically for pioneering contributions to the understanding of variety of radio sources and cosmology”

Awards and Honors :

Cowsik Awards 2014



Dr. Rahul Vaze
Ramakrishna Cowsik Medal

*“On the capacity and diversity-multiplexing tradeoff of the two-way relay channel”,
IEEE Transactions on Information Theory, Vol. 57, June 2011.*

Dr. Rahul Vaze receiving the Ramakrishna Cowsik award,
2014 from Prof. M. Barma, Director, TIFR



Dr. R. Rajeev
Saraswathi Cowsik Medal

*“A compact laser-driven plasma accelerator for mega electronvolt energy neutral atoms”,
Nature Physics 9, 185-190 (2013).*

Awards and Honors : *TAA best thesis awards 2013-2014*



Name of the Award: TAA-Geeta Udgaonkar
Recipient : Sachin Kasture
Thesis Title: Enhancing optical properties using
nano-patterned metallo-dielectric structures.



Name of the Guide: Prof. A. V. Gopal
Jointly to:

Name of the Award: TAA-Geeta Udgaonkar
Recipient : Dr. Jayanta Roy
Thesis Title: A software backend for the GMRT and its
application to pulsar studies.



Name of the Guide: Prof. Yashwant Gupta

Name of the Award: TAA-Harish Chandra Memorial
Recipient : Dr. Shirshendu Chowdhury
Thesis Title: Control of linearized compressible
Navier-Stokes equation.



Name of the Guide: Prof. Mythily Ramaswamy
Jointly to:

Name of the Award: TAA-Harish Chandra Memorial
Recipient : Dr. Vaibhav Vaish
Thesis Title: Weight-truncated cohomology of algebraic
varieties.



Name of the Guide: Prof. Arvind Nair

Honourable Mention:

Name of the Award: TAA-Harish Chandra Memorial
Recipient : Dr. Sandip Singh
Thesis Title: On the arithmeticity of certain symplectic
hypergeometric groups.



Name of the Guide: Prof. T. N. Venkataramana

Awards and Honors :

TAA best thesis awards 2013-2014



Name of the Award: TAA-Zita Lobo Memorial award
Recipient : Dr. Dhiraj Bhatia
Thesis Title: Enhancing optical properties using nano-patterned metallo-dielectric structures.
Icosahedral DNA Nanocapsules for targeted functional bioimaging in cellulis and in vivo .



Name of the Guide: Prof. Yamuna Krishnan

Honorable mention:

Name of the Award: TAA-Zita Lobo Memorial award
Recipient : Dr. Vinayak Rane
Thesis Title: Study of electron spin polarization and relaxation in photo chemical and photophysical processes.



Name of the Guide: Prof. Ranjan Das

Honorable mention:

Name of the Award: TAA-Zita Lobo Memorial award
Recipient : Dr. Supriya Ghosh
Thesis Title: Generalized fear, stress and the amygdale: from neurons to networks.



Name of the Guide: Prof. Sumantra Chatterji

Name of the Award: TAA-Sasken Best Thesis Award
Recipient : Dr. Simoni S. Shah
Thesis Title: Unambiguity and timed languages: automata, logics, expressiveness.



Name of the Guide: Prof. P. K. Pandya

Awards and Honors :

TAA best thesis awards 2013-2014



Name of the Award: TAA-B.M. Udgaonkar award

Recipient : Dr. Farhat Ara

Thesis Title: Investigating students', teachers' and designers' ideas about design and developing design active ties for Indian middle school students.



Name of the Guide: Prof. Sugra Chunawala

Jointly

Name of the Award: TAA-B.M. Udgaonkar award

Recipient : Dr. Shamin Padalkar

Thesis Title: Spatial cognition and visualization in elementary astronomy education.



Name of the Guide: Prof. Jayashree Ramadas

Contributory Articles

The Mathematical Story behind the Cowsik medal of 2013



On the Founder's Day last year (30/10/2013), Dr. NEENA GUPTA was awarded the inaugural Saraswathi Cowsik Medal for her outstanding work on the celebrated "ZARISKI CANCELLATION PROBLEM" in mathematics. I shall narrate something about Zariski after whom the problem is named, the branch of mathematics in which the cancellation problem occurs, the cancellation problem itself and the significance of Neena's work on the problem. A few well-known terms in mathematics will be put inside quotation marks for the reader familiar with them; others may skip those terms.

Who was Zariski?

OSCAR ZARISKI (1899-1986), a great mathematician of the 20th century, played an important role in laying the foundations of modern Algebraic Geometry. As the name suggests, the subject called algebraic geometry treats geometry algebraically. In a sense most of us have studied some algebraic geometry in High School when we studied "Co-ordinate Geometry" where geometric problems involving straight lines, circles and conic sections were transferred to algebraic problems involving solutions of linear or quadratic polynomial equations in one or two variables. The coordinate geometry that we

By Prof Ravi Rao

now learn in high-school was developed mainly by Rene Descartes (1596-1650) in the 17th century. Much more advanced and sophisticated results in geometry were obtained subsequently, especially by the Italian algebraic geometers of the 19th and early 20th century. But the progress of the subject came at a price. The algebraic geometers of the "Italian school" were unable to develop a sufficiently precise axiomatic foundation of the subject. Consequently they had to write about their interesting results in an informal style; their methods lacked the rigour of modern mathematics.

It was Oscar Zariski (along with Andre Weil) who began the process of reformulating the subject of algebraic geometry so as to bring it under a rigorous algebraic framework. Just as Descartes used high-school algebra as the basis for Coordinate Geometry, Zariski used the modern subject of "Commutative Algebra", developed by the German algebraists Emmy Noether (1882-1935) and W. Krull (1899-1971), to provide a firm foundation for "Algebraic Geometry".

Apart from contributing deep theorems in both Commutative Algebra and Algebraic Geometry, Zariski was also the mentor of several big names of 20th century Algebra and Algebraic Geometry. His PhD students include Shreeram Abhyankar, Heisuke Hironaka, David Mumford, Daniel Gorenstein, Irvin Cohen, Abraham Seidenberg, Pierre Samuel, Michael Artin, Robin Hartshorne, Steven Kleiman and many other important mathematicians.

Oscar Zariski was born in the city of Kobrin, then a part of the Russian Empire. His original Russian name was Ascher Zaritsky. He pursued his initial mathematical career in

Contributory Articles



Italy (where he westernized his name) obtaining his doctorate from the University of Rome under G. Castelnuovo (1865-1952), a leading algebraic geometer of the Italian School. Zariski eventually settled in Harvard University, making it a world centre for algebraic geometry.

We at TIFR are indirectly indebted to him for his contributions to Algebraic Geometry and Commutative Algebra, two of the subjects in which TIFR members have made a mark in world mathematics.

Affine Algebraic Geometry

Let me now say a few words about a branch of Commutative Algebra and Algebraic Geometry known as AFFINE ALGEBRAIC GEOMETRY.

Problems in Affine Algebraic Geometry are usually very simple to state (at least for the mathematicians) but very difficult to solve. That makes the area both charming and formidable. Any significant progress in the area requires the development of new and powerful methods and their ingenious applications. Although the problems in the area are interesting, not many researchers take up these problems as one usually has absolutely no clue as to how to go about a particular open problem.

Roughly speaking, Affine Algebraic Geometry focusses on properties of what are called "Affine Spaces" over a "field" or over a "ring". A "field" can be thought of as a collection (like the collection of real numbers R , the collection of complex numbers C , the collection of rational numbers Q) where one can perform addition, subtraction, multiplication, and division (except by 0). On the other hand, a "ring" is a collection (like

the set of integers) where one can always perform $+$, $-$, \times but not necessarily \div .

An affine n -space over a "field" K is simply K^n the collection of all n -tuples of elements coming from the "field" K . (The collection is given some additional structures called "Zariski topology", "sheaf of regular functions", etc, but we will not get into that.) An example of an affine space is C^2 , the collection of all pairs of complex numbers.

I mention here two major Indian achievements in the area during the 1970s. C.P. Ramanujam (1938-74) of TIFR gave a beautiful "topological characterisation" of the affine space C^2 , i.e., he showed that C^2 is the only algebraic surface which satisfies certain topological properties. Another major breakthrough was the "Epimorphism Theorem" of Abhyankar-Moh and Suzuki. S.S. Abhyankar (1930-2012), one of the most illustrious students of Zariski, was a pioneer and a vigorous exponent of the area of affine algebraic geometry.

The most famous and challenging problems on Affine Spaces are the "Jacobian Problem", "Zariski Cancellation Problem" and the "Embedding Problem" (including the Abhyankar-Sathaye Conjecture). [Note: A nice discussion on these problems is made in the article Challenging problems on affine n -space by H. Kraft, S'eminare Bourbaki, 37 (1994-1995) 295-317; also available at <https://eudml.org/doc/110203>.]

Zariski Cancellation Problem

The Zariski Cancellation Problem asks whether every affine n -space K^n over a field K has the cancellative property. That is, if V is a space defined by a system of polynomials over the field K such that $V \times K$ is isomorphic

Contributory Articles



to $K^{(n+1)}$, does it follow that V is isomorphic to K^n ?

For readers familiar with polynomial rings, the question takes a simple algebraic form: If K is a field and R is a ring containing K such that the polynomial ring $R[X]$ is isomorphic to the polynomial ring in $n + 1$ variables over K , does it follow that R is isomorphic to the polynomial ring in n variables over K ?

Affirmative answers were provided for the affine 1-space K (also called the affine line) by Abhyankar-Eakin-Heinzer (1972) and for the affine 2-space K^2 (also called the affine plane) by Fujita-Miyayoshi-Sugie (1980) in “zero characteristic” and Peter Russell (1981) in “positive characteristic.” [Note: Certain fields contain a relation of the form $1+1+\dots+1 = 0$; they are said to be of “positive characteristic”; otherwise a field K is said to be of “zero characteristic”. An example of a field of positive characteristic is the binary set $\{0, 1\}$ with usual addition etc, except that $1 + 1$ is defined to be 0. The structure of this field with two elements is precisely the mathematical principle (binary arithmetic) for the computer. The field of real numbers, the field of complex numbers, the field of rational numbers are all of zero characteristic.]

The outstanding work of Neena Gupta

Before returning to the next episode of the cancellation story, let me give a brief background of Neena Gupta, the winner of the Cowsik Medal.

Neena Gupta studied M.Math. (2006-08) from ISI Kolkata and then did her PhD (2008-11) again from ISI Kolkata. She had been selected for the TIFR PhD programme in 2008 and although she did not join us at

worked with Prof. S.M. Bhatwadekar. I was requested by ISI to conduct her Viva Voce (February 2012). Her thesis work (on Laurent polynomial fibrations) was truly impressive.

In May 2012, Neena joined TIFR as a post-doctoral fellow and sometime in the month of July she was asked to give a Colloquium talk where she gave a masterly presentation of her thesis work. We were congratulating her for her thesis, for her talk, etc, but we had no idea of what she had quietly accomplished during that month.

Till she dropped the bombshell (sometime in late July) that she has solved the Zariski Cancellation Problem for the affine 3-space in “positive characteristic”, by answering the question of Asanuma. In spite of her brilliant academic and research record, the first reaction was of sheer disbelief. Her paper was short (only 8 pages) and elementary, but intricate. [Note: Neena Gupta, On the cancellation problem for the affine space A^3 in characteristic p , to appear in *Inventiones Mathematicae*, available online at <http://link.springer.com/article/10.1007%2Fs00222-013-0455-2>]. Soon Prof. Bhatwadekar and Amartya Dutta confirmed that they have indeed checked the details. The official confirmation from the prestigious *Inventiones mathematica* arrived in January 2013.

Sometime in December 2012, Neena Gupta went back to ISI Kolkata with the INSPIRE Award. She was flooded with congratulatory mails from experts, job offers, and so on.

I was given the pleasant job of informing her about her selection for the Cowsik Medal. Hardly had the excitement faded, when she

Contributory Articles



announced her follow-up work. This is a much deeper insightful probe into a class of three-dimensional rings culminating in a theorem proving the equivalence of ten conditions! This amazing result gives a unified treatment of several apparently different-looking questions which had been of long interest to mathematicians (including the Cancellation Problem, the Embedding Problem, Affine Fibration Problem, the non-triviality of Asanuma threefolds and the Russell-Koras threefold and so on). More recently she showed that the Zariski Cancellation Problem has negative solution for ANY affine space of dimension greater than two when the underlying field is of positive characteristic. Needless to add that her work has opened up interesting possibilities.

Though on paper Neena is not a PhD alumnus of TIFR, we can justifiably be proud of her achievement. As she acknowledged in her talk on 31 October, she is an out-and-out product of the TIFR School of Algebra, directly and indirectly influenced by the algebraic styles of Amit Roy and S.M. Bhatwadekar. Her M.Math. Algebra teacher and PhD Guide was a student and collaborator of Amit Roy and Bhatwadekar; and she has direct interactions with Bhatwadekar. In her talk she also recalled the heritage of TIFR in solving cancellation problems for Quadratic Spaces and problems for Quadratic Spaces and Projective Modules where Amit Roy, Bhatwadekar and their students and collaborators were involved.

Neena's achievement should act as an inspiration for youngsters.



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A special tribute to Dr Homi J. Bhabha
Rare collection of photos from his life



**Homi with his parents and
his brother**



'Mehrangir', ancestral house of the Bhabha's

A special tribute to Dr Homi J. Bhabha
Rare collection of photos from his life



Prince Philip's visit to 'Mehrangir'



Left to Right - H.J. Bhabha, President of Indian Science Congress and President Pan Indian Ocean Science Congress 1951, Prime Minister Jawaharlal Nehru, Maharaja of Mysore January 2, 1951 Indian Institute of Science, Bangalore

A special tribute to Dr Homi J. Bhabha

Rare collection of photos from his life



H. J. Bhabha, President of "Atoms for Peace" conference, in Geneva, addressed a meeting of the General assembly's 1st (Political and Security) Committee on the question of the peaceful uses of atomic energy on October 12, 1955.

This picture taken before the meeting, shows Homi Bhabha with V.K. Krishna Menon, Chairman of the Indian delegation to the Assembly, Arthur S. Lall, India's Permanent representative to the United Nations, U.N. Secretary-General Dag Hammarskjöld

Bhabha with F. Perrin,
Opening of the Conference
on the statute of IAEA
September 21, 1956



M.L. Oliphant, director of the Research School of Physical Sciences at the Australian National University, Canberra, explains a laboratory drawing to Homi Bhabha



Homi Bhabha

A “Pratapi Purush”

Dinesh K. Daftary *



Recently the memory of Homi Bhabha was brought alive, and many of us and I would remember him for his constructive and creative influence on us which led to many changes in our lives and careers directly and indirectly into the pattern of science that we were following and at some stage, our changes had a direct beneficial impact to the nation also.

Many times I feel that it is a quirk of fate that drives careers and life.

I had done my post-graduation in Oral Pathology from Nair Hospital Dental College (NHDC) and I was giving a presentation at

Bangalore on a scientific topic *vis-à-vis* bacteriology of dental caries. A very renowned authority of the world, Prof. Jens J. Pindborg of Royal Dental School, Copenhagen, Denmark, was in the audience, in his capacity of visiting WHO consultant.

After the presentation we had an interaction which led to further meetings in

Bombay where he was a visiting professor at the Government Dental College (GDC). That



Dinesh K. Daftary

** Former, Hon. Prof. Nair Hospital Dental College, Former, Consultant, Tata Institute of Fundamental Research and Member, Council of Bharatiya Vidya Bhavan, Mumbai.*



Dr. Fali Mehta, Prof. Pindborg and myself had interactions for discussion on these cases as India faced a serious problem of oral cancer. All the hospital studies so far did point towards tobacco as the main factor. But no prospective studies were ever undertaken to follow up a tobacco associated lesion for a period of time, to see the eventual clinical picture.

accidental meet was a turning point.

At NHDC, I was involved with Dr. Fali Mehta, another great person of the dental profession in India, and he being attached to Bombay police, our interest became focussed on the tobacco habits among the Bombay policemen and its ill effects. Oral cancer was then a big issue and policemen were greatly affected. We could follow these cases to understand the significance of progression of leukoplakia lesions into probable cancer.

Dr. Fali Mehta, Prof. Pindborg and myself had interactions for discussion on

these cases as India faced a serious problem of oral cancer. All the hospital studies so far did point towards tobacco as the main factor. But no prospective studies were ever undertaken to follow up a tobacco associated lesion for a period of time, to see the eventual clinical picture.

Dr. Fali Mehta's interest was aroused and so also of Prof. Pindborg because this study could provide a wealth of information regarding this disease and its pathology. Preliminary discussions with Dr. Mehta resulted in a consensus thinking to establish a research protocol covering the study in different parts of rural



India where there is a wide spectrum tobacco habits in different forms apart from tobacco chewing and bidi smoking. We both were attached to NHDC and Dr. Mehta was a dental surgeon of Tata Institute of Fundamental Research (TIFR), an institute widely acclaimed world over for basic studies in nuclear physics, mathematics and other fields.

Dr. Homi Bhabha was the director at TIFR. A suggestion was mooted by Dr. Fali Mehta that TIFR could be considered a base to undertake this ambitious and extensive epidemiological and histological study of oral pre-cancer and cancer lesions in rural areas of five different states in India to be followed up on an annual basis for at least the next 3 years.

The natural corollary after our meeting with Fali Mehta was that Homi Bhabha should meet me to assess the feasibility of whether TIFR be the base and if I can be accepted to carry on this work at TIFR with Dr. Fali Mehta, who would be the

principal investigator for this study.

One Saturday morning, Mr. Bhabha sauntered in with his dog at Dr. Fali Mehta's office. I vividly remember Mr. Bhabha coming in his shorts, from his residence at Hanging Garden in Mumbai. I was a youngster and had thoroughly prepared for this interview of my life. I never realised that this interview could change my perception of the profession as my career in such a dramatic fashion, and that so many opportunities would open up.

We were in one of the rooms of Dr. Mehta's office and the meeting went on for about 2-3 hours, covering both oral precancer and cancer, its various ramifications, and all other facets of life, living and profession. We touched many facets of academics as well as research and science.

By Monday morning I received a letter of appointment as an honorary oral pathologist at Basic Dental Research Unit (BDRU) of TIFR at a princely



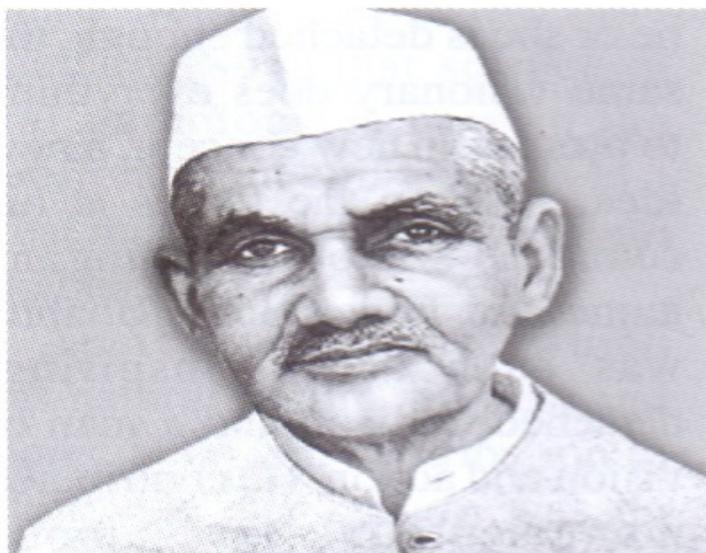
sum of ₹ 300/- per month. It was a turning point, not so much in my career as a dentist, but in my evolution as a researcher in this important field of oral pathology, especially oral precancer and cancer. The doors of research had opened and my journey of oral precancer and cancer was set into motion for the following 30 years. Louis pasteur had aphorized, that chance comes to a prepared mind. And he was right.

It was decided that we should apply for a grant from National Institutes of Health, (NIH), Bethesda, USA for this important scientific work. The decision was implemented and we started working on the grant application. This extensive study contained the research protocol to study of the life cycle of leukoplakia and other oral conditions like Sub Mucous Fibrosis (SMF) and so forth. The people to be examined in a house to house survey was estimated at ₹ 50,000/- plus and the annual follow up for the next 3 years to begin with. The states to be covered were Kerala,

Andhra Pradesh, Gujarat, Bihar and Maharashtra.

We had subsequently few more meetings with Dr. Homi Bhabha. But the one that has left an indelible imprint on my mind is the one where I remember that Dr. Fali Mehta and myself met Dr. Bhabha on a Saturday morning at TIFR as he was leaving by Kashmir Princess (Air India) for Geneva. The words were very clear. We had requested a grant for ₹ 35 lakhs and Homi Bhabha said “If NIH reduces even 1 paisa from your grant, do not accept it, I shall fully support you”. We did not realise that these were the last words and the last interaction with Homi Bhabha because as we all know, this journey was a fateful one, as the plane crashed into the Alp’s mountain range in Switzerland.

During the same period of time, Prime Minister Lal Bahadur Shastri also expired in Russia, and with the deaths of these two giants, the nation suffered a heavy loss. I remember vividly, a gardener at TIFR



Lal Bahadur Shastri

commenting, “If this man (Homi Bhabha) were alive, he would have employed the entire nation”. Such was the man, such was his vision, and such was the respect that he commanded. Such was the faith the common Indian had posited upon him.

I wish to reflect upon the deeper impact of our research that the dental surgeons, way back in 1966 initiating oral precancer and cancer studies and that too because of Dr. Fali Mehta’s initiative and insight, along with researcher Prof. Pindborg, associated with Dr. Homi Bhabha’s appreciation and backing us completely that this research saw the light of the day.

Those days dentistry was like ‘Tooth and nothing but the tooth, and that was the truth’. Today we see dentistry has become a science and a great profession. The basic research of those yesteryears is reflected today as there is a ban on *paan masala* and *gutkha* in Maharashtra and the Govt. Gazette refers to the TIFR studies as one of the key scientific work leading to such bans.

The awareness on tobacco is being percolated into the country at different levels. TIFR became known in many medical and dental universities the world over. The TIFR group became famous for their vision by way of books, chapters and so forth. They laid the foundation of a great research and individually many TIFR persons achieved recognition the world over.

Homi Bhabha had promised us that he would give us a separate dental research institute. The man’s vision can also be seen when he brought in TMH under the aegis of Atomic Energy Dept. and today TMH is one of



the institutes for cancer in our country, and a highly recognised institute the world over.

Molecular biology unit of TIFR under Prof. Siddiquie is another example of Homi Bhabha's thinking and visionary mind.

I remember Dr. Bhabha for various reasons, but the visionary in him always and in all ways could see through the significance of the research proposal and its long range effects. He always thought beyond the confines of the departmental parameters. This can be reflected as seen in our oral cancer research as well as the molecular biology section of TIFR.

Many of us had felt that Dr. Bhabha would choose a person and build a department around him rather than have a department and then bring the man. Such is the quality of the people who were not just there at the head for the position but showed the leadership values and changed the scenario benefitting many people and the nation at large.

A visionary has new ideas. If

he or she is detached enough, the same visionary does everything to promote a new concept, a new idea, with all the forces at his command, without expecting any name and fame. Homi Bhabha was such a man-inspiring, detached, radical, and a man of vision and action. He contributed monumentally for atomic research and institutes in India, the outcome of which is very obvious for the empowerment in India. If he was a man of the moment for atomic science in India, he equally proved momentous for the study of oral pathology at the TIFR. People familiar with oral precancer research, but not with TIFR, presume that the entire TIFR is engaged with dental and public health research.

Such honour was accorded on this research where TIFR basked in the glory of the dental profession in many quarters. Even World Health Organisation (WHO) gave recognition to Basic Dental Research Unit at TIFR as WHO Center for Prevention of Oral Cancer. No



mean achievement by any standard. Now, that science of oral pathology is now in the forefront of an eminence, is in a great measure, a tribute to Homi Bhabha.

Apart from science which was natural to him, his zest and appreciation and contribution to art, music and culture was no less. His aesthetic values and his regard and respect for environment and Nature is reflected in all that he did and accomplished. TIFR is one of the

prime examples because of its natural settings, landscapes in serenity, great architectural design with interiors, so well interacting with exteriors of TIFR, the sea, the garden and the natural sky light. He nurtured all he created, with the tenderness and care that one would give a growing tree.

Homi Bhabha left a legacy in many fields, in many places and in many lives, rightly regarded as a "*Pratapi Purush*" who continues to live in his legacy.

TIFR balloons helped break world record



On October 24, 2014 in New Mexico, one of the balloons provided by TIFR Balloon Facility, Hyderabad for the Stratospheric Explorer (StratEx) program of Paragon Space Development Corporation, USA took Mr. Alan Eustace (Google's Senior Vice President) in a space suit to 136,401 feet (41.58 km) from where he successfully space dived back to Earth, setting the world record. Here is a link to a brief video (<https://vimeo.com/109992331/>). TIFR therefore holds a world record manned balloon flight using balloons made at Balloon Facility, Hyderabad. Paragon approached TIFR in the year 2012 for supply of zero pressure stratospheric balloons for conducting several trials and for actual skydiving (manned). TIFR Balloon Facility exclusively designed and fabricated zero pressure balloons as per Paragon's requirement.



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