The Road ICTS Travelled

Spenta R. Wadia
ICTS-TIFR, 5 January 2018

"Traveller, there is no road, the road is made by walking" - Antonio Machado

"Evolutionary tendency is to forget the past and focus on the present"
- Madhu Sudan (talk at `ICTS at 10')

2001: The idea of the ICTS

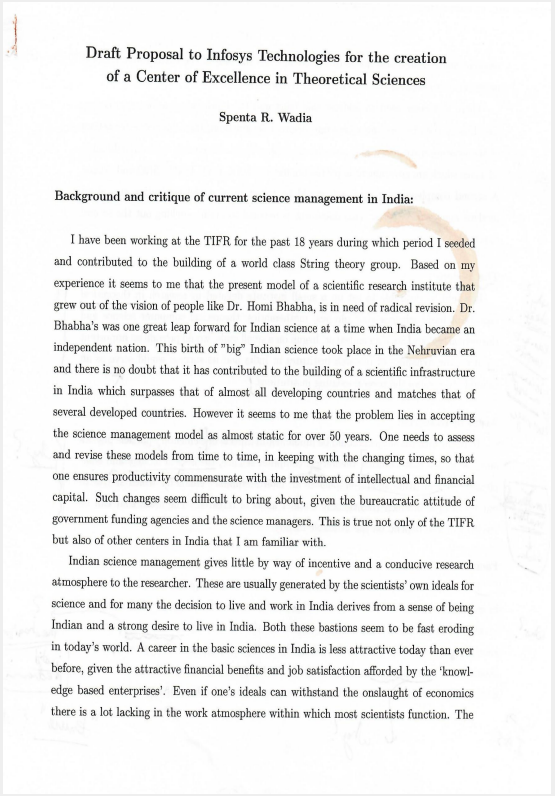
- Strings 2001 in TIFR, Mumbai
- Visit to Infosys Campus, Bangalore 12 Jan 2001 with Edward Witten

The idea to create a centre such as the ICTS was born in 2001, after the success of the Strings 2001 conference at TIFR Mumbai and a visit to the Infosys Campus in Bangalore.

The former boosted our confidence based on our achievement in fundamental physics and the latter assured us that institutional infrastructure and management of the highest international quality was possible in India. The visit to the Infosys campus happened at the insistence of Edward Witten who was keen to visit the 'temples of modern India.' This combination of highest quality science within a modern state of the art campus, managed along modern thoughts inspired the basic idea of the ICTS. What made ICTS unique in India was that it was to be an international science hub that would transform the ways of doing scientific research and advanced science education in India.

2001 : 1st Proposal for setting up ICTS was sent to Infosys on 12 Feb 2001

2004 : Discussion with David Gross at KITP, Santa Barbara



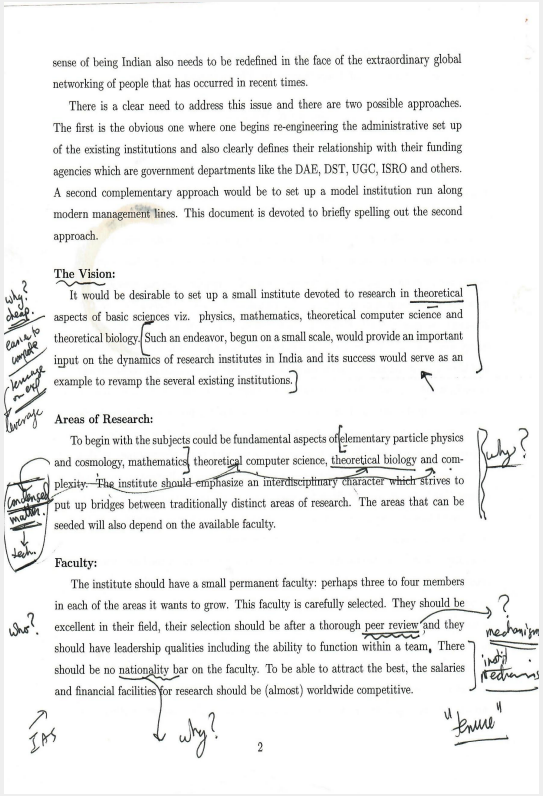
Draft Proposal to Infosys Technologies for the creation of a Center of Excellence in Theoretical Sciences

Spenta R. Wadia

Background and critique of current science management in India:

I have been working at the TIFR for the past 18 years during which period I seeded and contributed to the building of a world class String theory group. Based on my experience it seems to me that the present model of a scientific research institute that grew out of the vision of people like Dr. Homi Bhabha, is in need of radical revision. Dr. Bhabha's was one great leap forward for Indian science at a time when India became an independent nation. This birth of "big" Indian science took place in the Nehruvian era and there is no doubt that it has contributed to the building of a scientific infrastructure in India which surpasses that of almost all developing countries and matches that of several developed countries. However it seems to me that the problem lies in accepting the science management model as almost static for over 50 years. One needs to assess and revise these models from time to time, in keeping with the changing times, so that one ensures productivity commensurate with the investment of intellectual and financial capital. Such changes seem difficult to bring about, given the bureaucratic attitude of government funding agencies and the science managers. This is true not only of the TIFR but also of other centers in India that I am familiar with.

Indian science management gives little by way of incentive and a conducive research atmosphere to the researcher. These are usually generated by the scientists' own ideals for science and for many the decision to live and work in India derives from a sense of being Indian and a strong desire to live in India. Both these bastions seem to be fast eroding in today's world. A career in the basic sciences in India is less attractive today than ever before, given the attractive financial benefits and job satisfaction afforded by the 'knowledge based enterprises'. Even if one's ideals can withstand the onslaught of economics there is a lot lacking in the work atmosphere within which most scientists function. The



sense of being Indian also needs to be redefined in the face of the extraordinary global networking of people that has occurred in recent times.

There is a clear need to address this issue and there are two possible approaches. The first is the obvious one where one begins re-engineering the administrative set up of the existing institutions and also clearly defines their relationship with their funding agencies which are government departments like the DAE, DST, UGC, ISRO and others. A second complementary approach would be to set up a model institution run along modern management lines. This document is devoted to briefly spelling out the second approach.

The Vision:

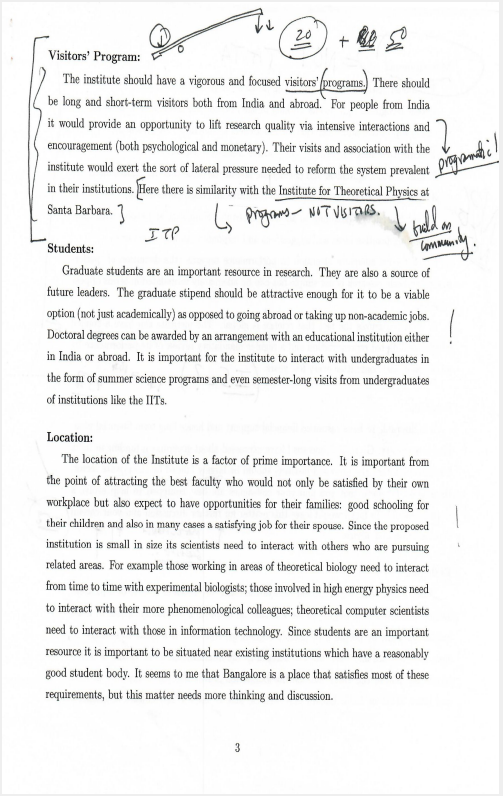
It would be desirable to set up a small institute devoted to research in theoretical aspects of basic sciences viz. physics, mathematics, theoretical computer science and theoretical biology. Such an endeavor, begun on a small scale, would provide an important input on the dynamics of research institutes in India and its success would serve as an example to revamp the several existing institutions.

Areas of Research:

To begin with the subjects could be fundamental aspects of elementary particle physics and cosmology, mathematics, theoretical computer science, theoretical biology and complexity. The institute should emphasize an interdisciplinary character which strives to put up bridges between traditionally distinct areas of research. The areas that can be seeded will also depend on the available faculty.

Faculty:

The institute should have a small permanent faculty: perhaps three to four members in each of the areas it wants to grow. This faculty is carefully selected. They should be excellent in their field, their selection should be after a thorough peer review and they should have leadership qualities including the ability to function within a team. There should be no nationality bar on the faculty. To be able to attract the best, the salaries and financial facilities for research should be (almost) worldwide competitive.



Visitors' Program:

The institute should have a vigorous and focused visitors' programs. There should be long and short-term visitors both from India and abroad. For people from India it would provide an opportunity to lift research quality via intensive interactions and encouragement (both psychological and monetary). Their visits and association with the institute would exert the sort of lateral pressure needed to reform the system prevalent in their institutions. Here there is similarity with the Institute for Theoretical Physics at Santa Barbara.

Students:

Graduate students are an important resource in research. They are also a source of future leaders. The graduate stipend should be attractive enough for it to be a viable option (not just academically) as opposed to going abroad or taking up non-academic jobs. Doctoral degrees can be awarded by an arrangement with an educational institution either in India or abroad. It is important for the institute to interact with undergraduates in the form of summer science programs and even semester-long visits from undergraduates of institutions like the IITs.

Location:

The location of the Institute is a factor of prime importance. It is important from the point of attracting the best faculty who would not only be satisfied by their own workplace but also expect to have opportunities for their families: good schooling for their children and also in many cases a satisfying job for their spouse. Since the proposed institution is small in size its scientists need to interact with others who are pursuing related areas. For example those working in areas of theoretical biology need to interact from time to time with experimental biologists; those involved in high energy physics need to interact with their more phenomenological colleagues; theoretical computer scientists need to interact with those in information technology. Since students are an important resource it is important to be situated near existing institutions which have a reasonably good student body. It seems to me that Bangalore is a place that satisfies most of these requirements, but this matter needs more thinking and discussion.

Management:

The model institute may be run along progressive management lines

1. that recognizes that people working in the institute are assets and does its best to provide a supportive administration for researchers to function. Also researchers should get a feeling that they can bring about positive changes when needed,

2. that is non-hierarchical and democratic and at the same time recognizes merit,

3. that does not necessarily discourage collective and team performance,

4. that has enough flexibility to allow the institute to innovate and evolve with time: Incorporating positive ideas and suggestions and responding to new situations,

5. that pays adequate attention to performance rewards (the definition of 'performance' in basic research is not simple but can be adequately formulated in terms of peer reviews)

6. that recognizes the fact that science is global. The institute can have a council which has a global representation and a regular mandatory review of its performance by an international committee every few years.

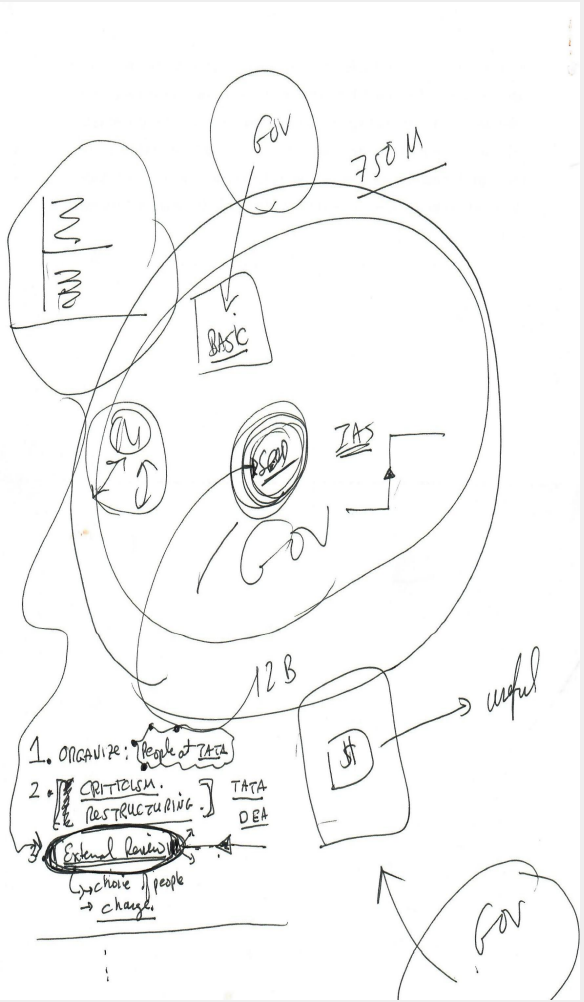
Funding:

It is desirable to have sustained financial support and hence long term financial planning is necessary. Given the concerns I have expressed about government funding in India I would think that the proposed institute should be largely funded by the private sector. Here again I believe that you and your colleagues are best equipped to help evolve a working model. In fact I would leave this matter for further discussion and your careful consideration and advice.

Epilogue:

When I was being taken around Infosys the other day I was in a state of a pleasant shock. What was encouraging to me was that an institution like Infosys exists in India and it was built by people with humble beginnings, who exercised great and timely vision, perseverance and team work to succeed at the international level. It also occurred to me that just as the Tatas had laid the foundation of IISc Bangalore way back in 1912 and later TIFR in 1945, Infosys may well be able to seed a new culture of scientific

institution-building in the new millennium. These initial thoughts, on which our conversation of January 14 was based, have now grown into this preliminary proposal. I am aware that there is a great challenge in adapting to scientific research, management principles (typically guided by definitive criteria like market and customer satisfaction) that ideally suit the business world. However, I believe that with the right vision the challenge can be met and we can succeed in building a working model that other institutes can emulate.



International Advisory Board 2007 and 2017:for guidance and accountability

Michael Atiyah (University of Edinburgh)
Manjul Bhargava (Princeton University)
Roger Blandford (KIPAC, SLAC)
Edouard Brezin (ENS, Paris)
Michael Green (Cambridge University)
David Gross (KITP, Santa Barbara), Chair
M. S. Narasimhan (CAM-TIFR, Bangalore)
T.V. Ramakrishnan (BHU and IISC Bangalore)
Subir Sachdev (Harvard University)
Ashoke Sen (HRI, Allahabad)
K. R. Sreenivasan (Abdus Salam ICTP, Trieste)
Raman Sundrum (Johns Hopkins)
S. R. S. Varadhan (CIMS, New York University)

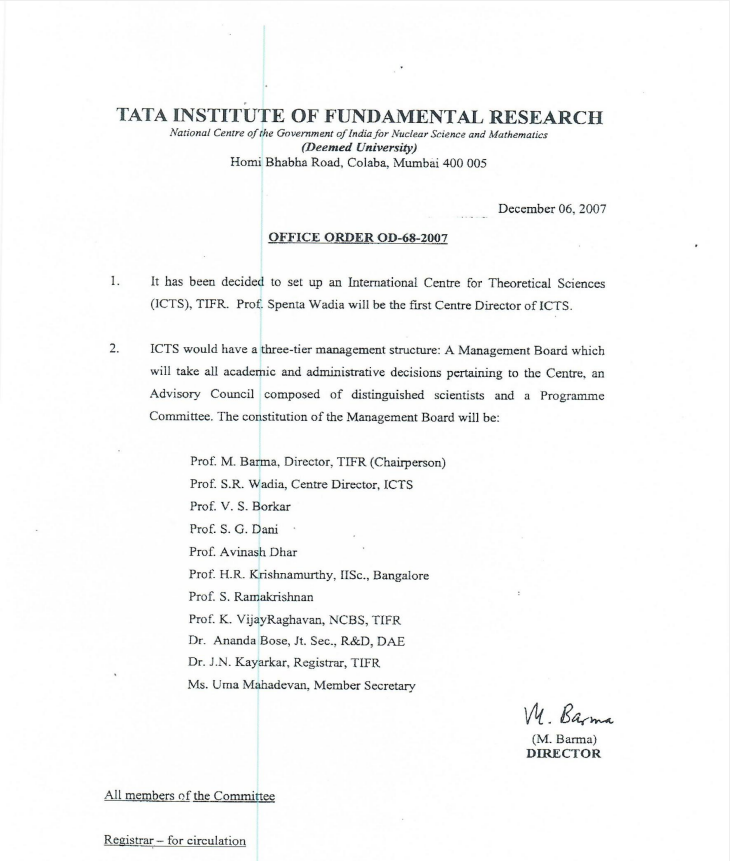
Nima Arkani-Hamed (IAS, Princeton)
Sanjeev Arora (Princeton University)
Michael Atiyah (University of Edinburgh)
Manjul Bhargava (Princeton University)
William Bialek (Princeton University)
Roger Blandford (KIPAC, Stanford University)
Jennifer Chayes (Microsoft Research)
Sankar Das Sarma (University of Maryland)
Rajesh Gopakumar (ICTS-TIFR)
Senapathy Gopalakrishnan (Co-founder and former CEO of Infosys)
Michael Green (Cambridge University)
David Gross (KITP, University of California, Santa Barbara), Chair
Juan Maldacena (IAS Princeton)
Roddam Narasimha (JNCASR)
Subir Sachdev (Harvard University)
Ashoke Sen (HRI)
Boris Shraiman (KITP, University of California, Santa Barbara)
Senthil Todadri, MIT
S. R. S. Varadhan , Courant Institute, New York University
Spenta R. Wadia, ICTS-TIFR

2006-7: ICTS approved by the TIFR Governing Council

The ICTS was approved by the TIFR Council in August 2007 to be a multi and interdisciplinary centre with 3 main goals (C.N. R. Rao):

- PROGRAMS that bring together physicists, astronomers, cosmologists, mathematicians, biologists, students and researchers from all over the world, under one roof, to work together to solve the most challenging questions posed by nature, to discover the underlying structures across the sciences and to strive for the unity of knowledge
- In-house RESEARCH by highest quality faculty in the theoretical sciences;
- SCIENCE OUTREACH that stimulate and harness young minds of India and connects with members of the public who are interested in the latest scientific developments.

ICTS would have three tier management structure with Advisory Council, Management Board and Program Committee.



TATA INSTITUTE OF FUNDAMENTAL RESEARCH
National Centre of the Government of India for Nuclear Science and Mathematics
(Deemed University)
Homi Bhabha Road, Colaba, Mumbai 400 005

December 06, 2007

OFFICE ORDER OD-68-2007

1. It has been decided to set up an International Centre for Theoretical Sciences (ICTS), TIFR. Prof. Spenta Wadia will be the first Centre Director of ICTS.

2. ICTS would have a three-tier management structure: A Management Board which will take all academic and administrative decisions pertaining to the Centre, an Advisory Council composed of distinguished scientists and a Programme Committee. The constitution of the Management Board will be:

Prof. M. Barma, Director, TIFR (Chairperson)
Prof. S.R. Wadia, Centre Director, ICTS
Prof. V. S. Borkar
Prof. S. G. Dani
Prof. Avinash Dhar
Prof. H.R. Krishnamurthy, IISc., Bangalore
Prof. S. Ramakrishnan
Prof. K. VijayRaghavan, NCBS, TIFR
Dr. Ananda Bose, Jt. Sec., R&D, DAE
Dr. J.N. Kayarkar, Registrar, TIFR
Ms. Uma Mahadevan, Member Secretary

M. Barma
(M. Barma)
DIRECTOR

All members of the Committee

Registrar – for circulation

Now that the Centre was approved the woods cleared and the true mountains appeared:
Centre starts operating from TIFR Mumbai
Begins programs within institutions (TIFR Mumbai, IUCAA, IISc) and other locations in India.

The next task was to create the Centre i.e. begin the programs and discussion meetings, find the government resources and land to build the campus, work with the architect for a design suitable for the ICTS mission, see through the execution of the architectural design, create a modern administrative support system, choose the research areas and attract outstanding faculty within each! This complex task involved a huge collective effort by members of TIFR (most notably Avinash Dhar), the Indian science community, and the Govt of India.

Besides basic Govt support it was significant that ICTS received generous and crucial support from the Airbus Corporate Foundation, the Simons Foundation, the Infosys Science Foundation and the Infosys Foundation.

Programs begin in 2007:

ICTS logo (due to Bhaskara-II) was unfurled in December

The inauguration of the programs of ICTS was done on Dec. 2, 2007 during its program, "Correlated Electrons and Frustrated Magnetism", at the International Centre in Dona Paola, Goa by Prof. T.V. Ramakrishnan. He also unfurled the ICTS logo and made a few remarks.

Sample early programs across disciplines

1. Correlated Electrons and Frustrated Magnetism (Nov-Dec 2007)
2. Monsoon Workshop on String Theory (June-Aug 2008)
3. Cosmology with the Cosmic Microwave Background (Jul-Aug 2008)
4. Scientific Discovery through Intensive Data Exploration (Feb 2011)
5. Random matrix theory and applications (Jan 2012)
6. The Role of Theory in Biology (Oct 2012)
7. Mathematical Perspectives on Clouds, Climate and Tropical Meteorology (Jan 2013)
8. Numerical Relativity (June-July 2013)


IUCAA


QUANTITATIVE Biology
SYSTEMS Bio
WHY IS A LIVING SYSTEM
DIFFERENT FROM A MOUNTAIN?

2007-08 : Search for the campus site ...

Principles/criteria in selecting the location:

1. A vibrant, excellent and diverse scientific atmosphere in critical areas of research to provide the necessary intellectual eco-systems for organization and participation

2. Critical mass of researchers (in-house faculty, adjunct faculty of nearby institutes and abroad) to organize and maintain high level of activity at the Centre

3. Attractive ambience and pleasant weather to successful organize year round programming activity at the Centre

4. Good communication infrastructure and connectivity (proximity to the international airport)

2007-08 : Search for the campus site

TIFR-Mumbai and vicinity: (2006--2008)

Pune and vicinity: *NCRA April 2006; Talegaon and Lonavala Feb. 2008*

Bangalore and vicinity: (Jan 2007)
a possible site at Bidadi / Ramanagaram; IISc Bangalore Campus and its new campus in Chitradurga about 190 Kms from Bangalore; Bangalore University

Mysore University: (Feb 2007)

Hyderabad (Jan. 2008)

Bangalore (revisited, Jan.-Oct. 2008)

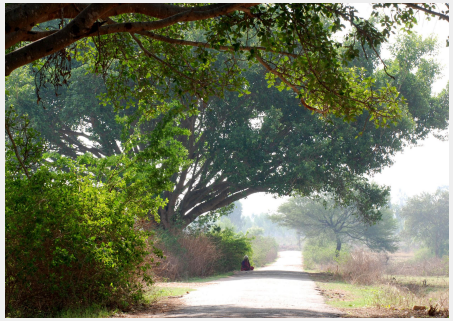
Campus land in Bangalore?

1. IISc Bangalore?

2. State Govt connect: Dr Leena Chandran-Wadia made it possible to get Avinash and myself an appointment with Principal Secretary to Chief Minister. Govt changes and proposed site is no more available.

3. Subsequent involvement of Dr Kasturirangan and Prof CNR Rao enables the next connect with the CM's office. This time the govt remains in power so that the land deal is finalized.

2008: Site for Campus in North Bangalore



24 October 2008, the Government of Karnataka approved ICTS request and allocated land for setting up the campus on a long lease for a nominal lease amount.

The new ICTS campus is located in north Bangalore and spread over 78,000 square metres.

2009: Centre approved by Atomic Energy Commission (took 2 meetings!!)

2 November 2009, the Atomic Energy Commission gave a final approval with a budget for construction of the campus in Bangalore.

2009: Foundation Stone unveiled during “Science without Boundaries” inaugural event

The ICTS Inaugural event was organized during 27-31 December, 2009 in the campus of IISc, Bangalore.

On 28th December 2009, the foundation stone of the new Centre, the ICTS of TIFR, was unveiled by Prof. C.N.R. Rao in the presence of Prof. David Gross, Dr Sreekumar Banerjee and Prof. Mustansir Barma, in the J.N. Tata Auditorium, IISc, Bangalore.


CEREMONY,
ICTS CAMPUS
SWITCH OFF MOBILES
6 39
EXIT


Ashoke Sen HRI
Anirvan Sengupta
K. R. Sreenivasan
Andrew Strominger
Raman Sundrum
Ajay Sood IISc
Tarun Souradeep IUC
Eitan Tadmor
Sandip Trivedi TIFR
Mukund Thattai NCB
S. R. S. Varadhan
Ashvin Vishwanath
Avi Wigderson IAS, P
ORGANIZING COMM
Vivek Borkar TIFR
Vinash Dhar TIFR
VijayRaghavan NC
nta R. Wadia TIFR
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TATA INSTITUTE OF FUNDAMENTAL RESEARCH
A HOMI BHABHA BIRTH CENTENARY & ICTS INAUGURAL EVENT
INTERNATIONAL
CENTRE for
THEORETICAL
SCIENCES
science without boundaries
27 - 31 December 2009 | Indian Institute of Science, Bangalore


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27 - 31 December 2009 | Indian Institute of Science, Bangalore


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27 - 31 December 2009 | Indian Institute of Scie

2010: ICTS began functioning from the TIFR Centre in IISc Bangalore: The One Corridor Institute

Academic and program activities began in ICTS, Bangalore.

Pre-project activities for the campus construction project began from the ICTS office in the TIFR-CAM.

2010: …. Activities at the “One Corridor Institute”


01 03 2014


What is Barkhausen Noise?
Stream-function and vorticity formulation
∇× NS equation
$\partial_t \omega = J(\psi, \omega) + \nu \nabla^2 \omega - \alpha \omega + f_\omega$,
$\omega = -\nabla^2 \psi$;
ψ: stream-function;

ICTS as a Platform for New Initiatives

Within India:

IndiaLight (India Open Research Exchange Facility for Global Scientific Cooperation in Bangalore), a large data, high speed network for Bangalore institutions at TIFR-CAM (pilot phase) with international connectivity e.g. GLORIAD (was available till October 2013) via a grant from Tata Communications and NSF (USA). 7.3 tbs of data were downloaded and mirrored in biology and the earth sciences during this period.

Nodal Centre of LIGO-India in Bangalore; LIGO tier-2 data centre

Internationally:

- ICTP-ICTS Biology Program (Dec 2013-)
- Asian Winter School on Strings, Particles and Cosmology (Jan 2010-) (KAWS since 2018)
- Mathematics of Planet Earth 2013 Programs and Math Exhibition (22 Nov-1 Dec 2013)
- UIUC-STRAND-ICTS Discussion Meeting on Computational Genomics, July 2013


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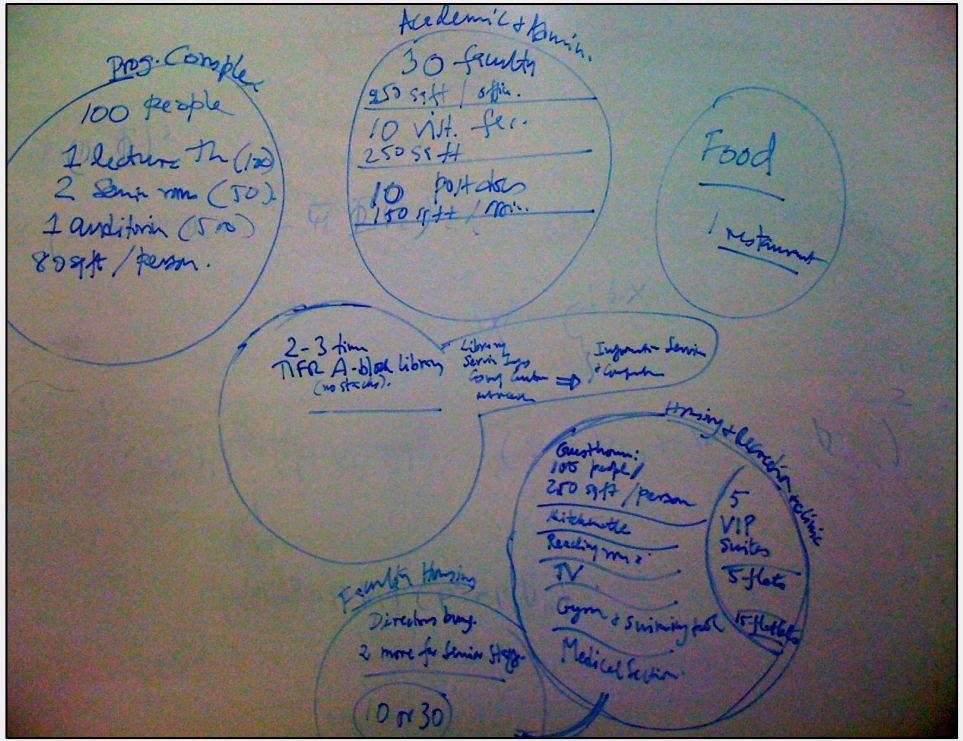
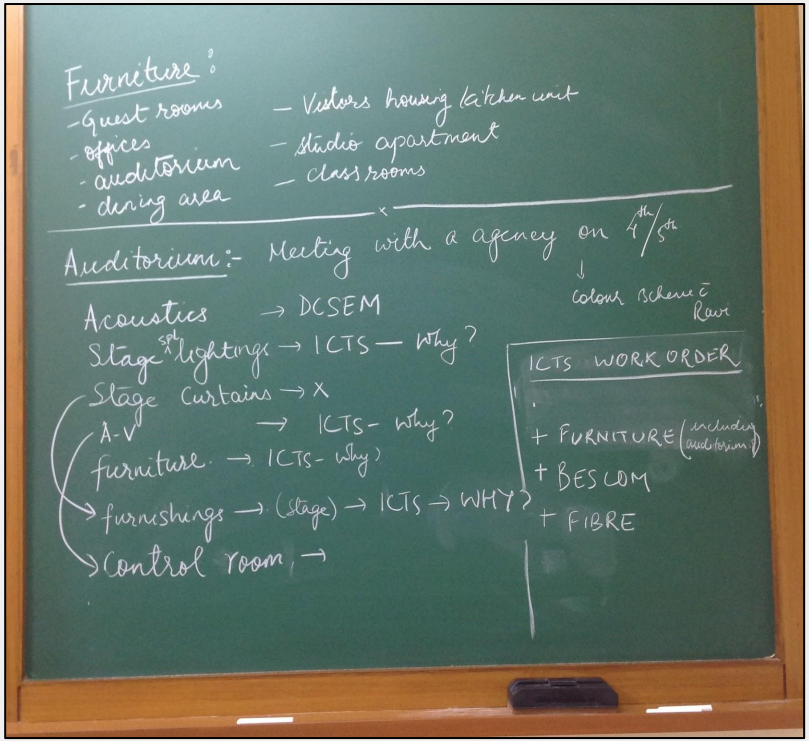
2010-12:
Campus design and Architectural Plans





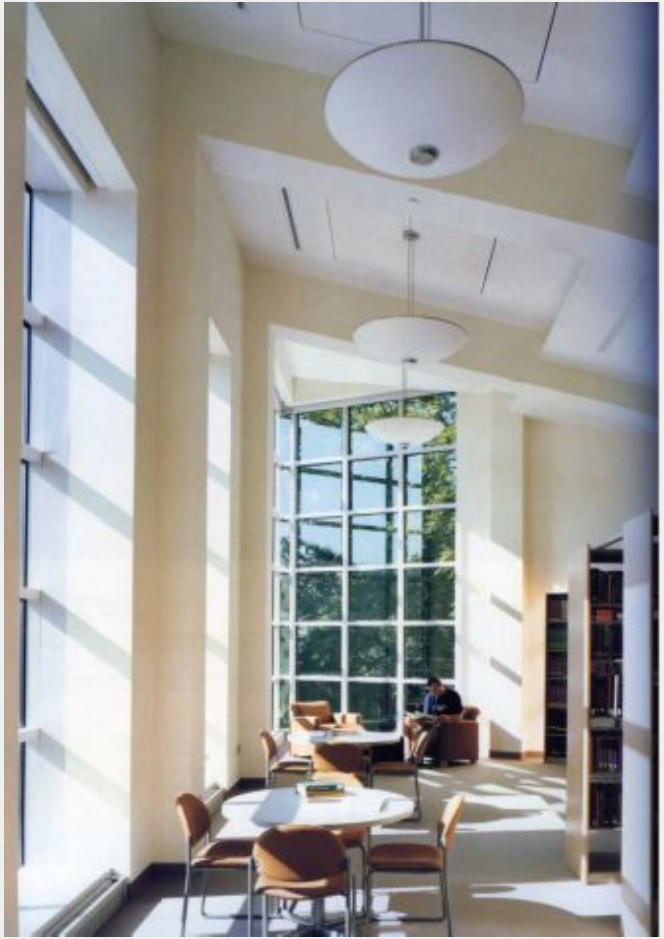
Lecture hall, Dickinson College, Pennsylvania

Hall of Sciences, Levine Science Research Centre, Duke University

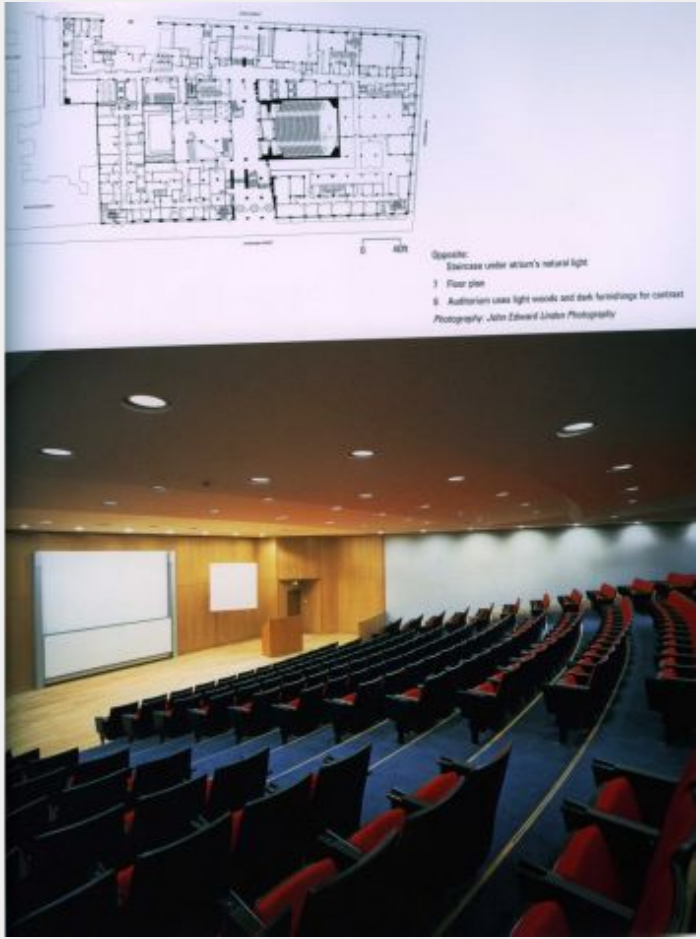
New Lecture Hall,

Bowdoin College,

Brunswick, Maine



Library, Dickinson College, Pennsylvania



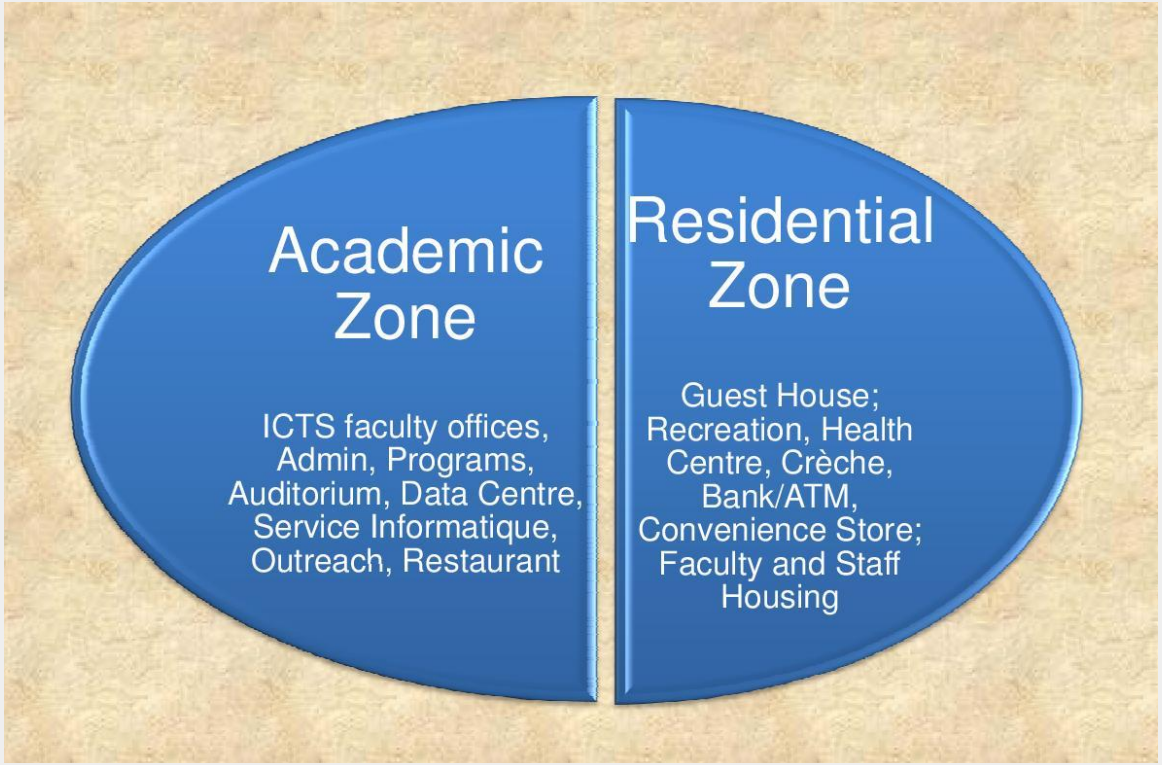
Auditorium, King's College, UK

Levine Science Centre- Duke University

Archaeological and Ethnological Museum Granada, Spain (1539)

Floating Restaurant,
Infosys Campus, Mysore

Guest House units,
Infosys Campus, Mysore


Academic Zone
ICTS faculty offices, Admin, Programs, Auditorium, Data Centre, Service Informatique, Outreach, Restaurant
Residential Zone
Guest House; Recreation, Health Centre, Crèche, Bank/ATM, Convenience Store; Faculty and Staff Housing

Academic Zone

Academic

- Offices for ICTS researchers
- Discussion spaces
- Seminar rooms

Administration

- Admin offices (Director's office, Dean's office and offices for Tech and Admin staff)
- Conference rooms and meeting rooms

Program

- Office space for participants and program staff
- Discussion spaces
- Lecture Halls – must have tiered seating; audio-visual control room

Residential Zone

Housing for Participants, Students and Post-Docs

- Pleasant, bright and airy units, with plenty of greenery around
- Low-rise, low-density guest house units
- Double occupancy rooms which may be flexibly used as double, single or twin

2010: Competition of Architects for designing the campus

- 52 agencies expressed interest for designing campus
- 18 Agencies found technically competent
- 6 Agencies were invited to present their concept and design to a committee of experts (including Bijoy Jain, Chitra Vishwanath, Sen Kapadia, the Principal, JJ School of Architecture, and the Head Architect, BARC).
- Architectural design submitted by M/s Venkataramanan Associates Pvt. Ltd., Bangalore was selected by the committee after evaluating the designs and concepts of a total of 6 competing agencies on 02 December 2010 at TIFR.

Ravindra Kumar,
Partner & Design Architect,
M/s Venkataramanan
Associates Pvt. Ltd., Bangalore

Campus design finalized

Ground-breaking Ceremony, 13 Dec 2012

2012-15: Campus construction project managed by DCSEM, DAE and constructed by JMC Pvt. Ltd.


JMC
B5- GUEST
ROOMS
20 06 2013 15:18


21 03 2014

2012-15: Campus construction

2012-15: Campus construction

2015: Inauguration of the Campus on 20 June 2015

The new ICTS campus was inaugurated on June 20, 2015 with an event "Science at ICTS"

ICTS starts functioning from its campus since July 2015 even though work to complete the campus continued

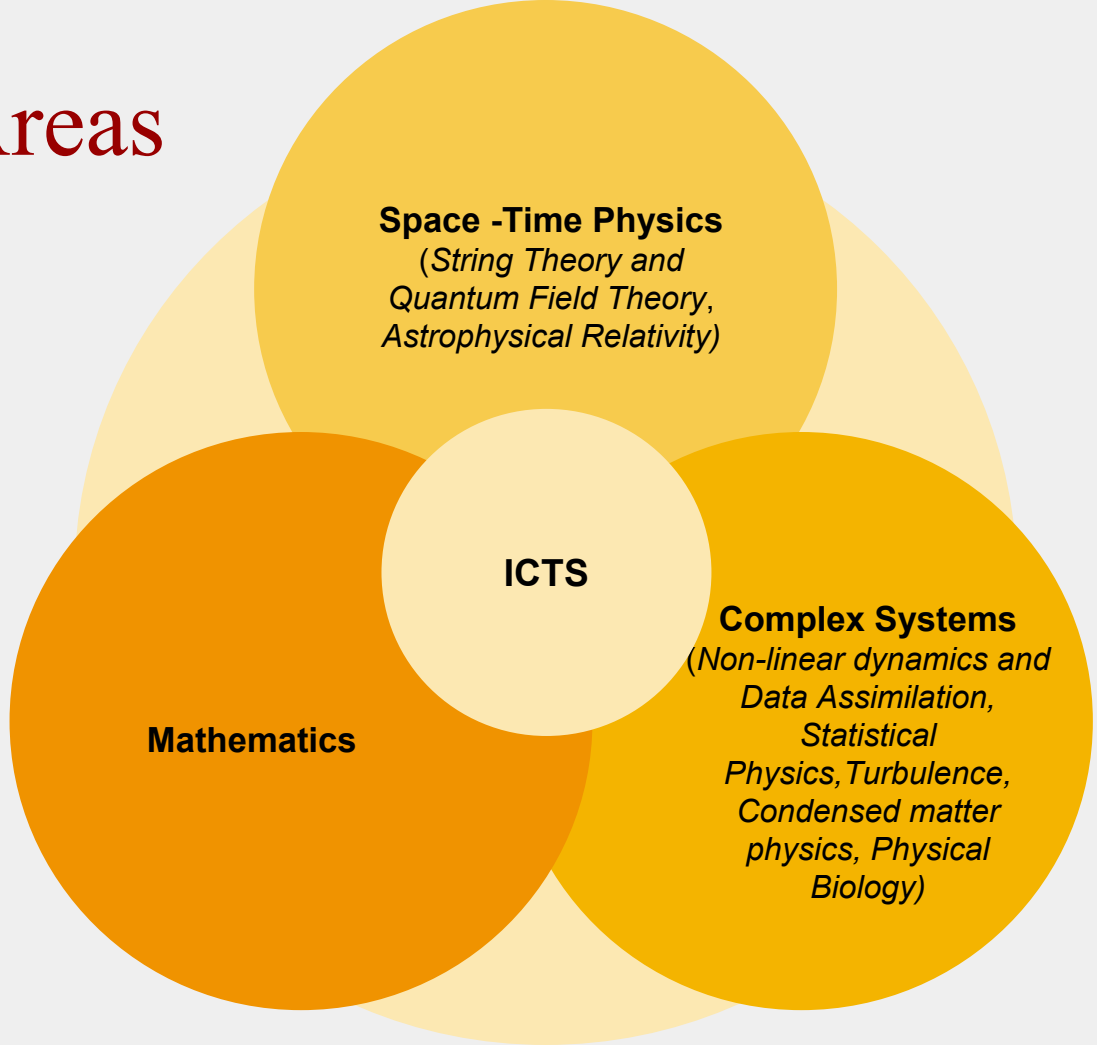
ICTS Campus a couple of weeks ago...

Present Research Areas

Buildings can be made but prospective faculty has to be available; even if they are available they should want to join the a very young institute.

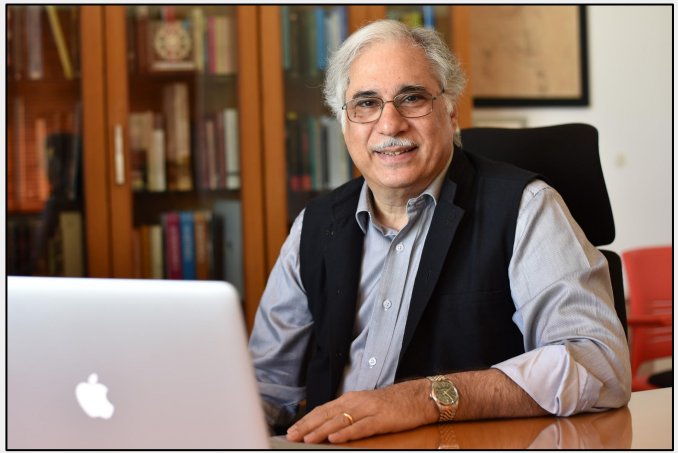
Also the areas you can grow depends on the the availability of faculty.

The ICTS Appointments Committee made a determined and bold effort and succeeded!

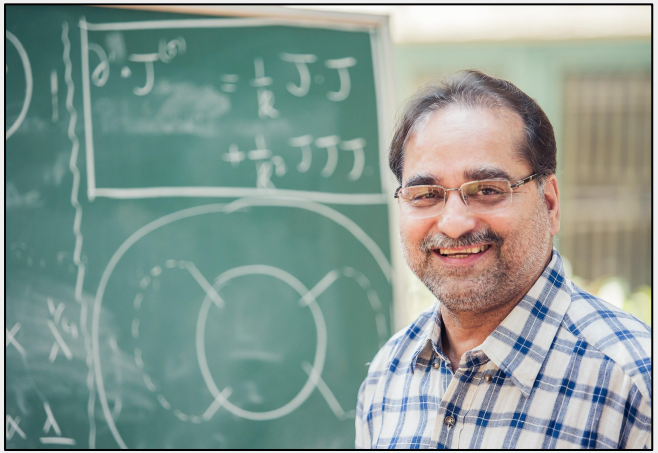


2007: Faculty creation began

A most difficult and crucial task! The buildings are but a shell!



Spenta R. Wadia (ICTS, TIFR)
String Theory, Quantum Gravity, Statistical Mechanics



Avinash Dhar (ICTS, TIFR)
High Energy Physics, String Theory

Avinash Dhar (2007)

Abhishek Dhar (2012)

Suvrat Raju (2012)

P. Ajith (2013)

Pallab Basu (2013)

Amit Apte (2013)

Samriddhi Ray (2013)

Vijay Kumar Krishnamurthy (2014)

Rajesh Gopakumar (2015)

Rukmini Dey (2015)

Subhro Bhattacharjee (2015)

Anupam Kundu (2015)

Vishal Vasan (2015)

Sivaram Ambikasaran (2015)

Loganayagam R. (2015)

Rama Govindarajan (2016)

Riddhipratim Basu (2017)

Students and Postdocs…

First batch of 4 graduate students joined in Aug 2013.

Today there are 43 students.

First post-doc Tapan Mishra joined in Oct 2011

Rich and vibrant post-doctoral fellowship programme includes, apart from the usual institute post-doctoral fellows, special highly competitive prized positions, namely the Airbus and the Simons Postdoctoral Fellowships, and now those supported through Max-Planck partner groups of individual faculty members.

Presently there are 29 postdocs.

Named Lecture Series with associated discussion meetings

Subrahmanyan Chandrasekhar Series* (physical sciences):

Ashoke Sen, Andrew Strominger, Lyman Page, Ludwig Faddeev, Subir Sachdev, Dam Than Son, Uriel Frisch, Satya Majumdar, Nima Arkani Hamed, Sankar Das Sarma, Antoine George, Robert Myers, T. Senthil, Itamar Procaccia, Herbert Spohn, John Ellis, Ajay Sood, Bernard Derrida, David Kaplan, K.S. Sreenivasan,

Srinivasa Ramanujan Series* (mathematics):

Peter Sarnak, Andrew Majda, Peter Scholze, Chandrasekhar Khare, Giovanni Jona-Lasinio

Alan Turing Series* (biology, computer science, engineering and related areas):

Sanjeev Arora, Robert Schapire, Ravi Kannan, William Bialek, Cristopher Moore, Paul B. Rainey

These series have been very successful especially because a discussion meeting is organized around the theme of the lectures

Since 2016, supported by Infosys Foundation:Infosys - ICTS lectures

Special Lectures

Abdus Salam Lecture (to commemorate the memory of Salam a great physicist and a champion of science for the developing world):

Fernando Quevedo, R. Ramaswamy, K. VijayRaghavan, C.N.R. Rao, K. Kasturirangan

ICTS Distinguished Lecture:

Ashoke Sen, Cumrun Vafa, Valery Rubakov, Jennifer Chayes, Manjul Bhargava, François Bouchet, David Gross, Juan Maldacena, Peter Saulson, Edward Witten, M.S.Narasimhan, Pierre Hohenberg, Philip Candelas

Outreach

ICTS Public Lectures:

Juan Maldacena, Francois Bouchet, Marc Kamionkowski, Joseph Silk, Lyman Page, Avi Wigderson, David Gross, Albert Libchaber, William D. Phillips, Klaus von Klitzing, Istvan Hargittai, Kip S. Thorne, J. Richard Bond, P. James Peebles, John Ellis, Benedict Gross, Terence Tao, Etienne Ghys, Peter Sarnak, Nima Arkani-Hamed, Sydney Brenner, Sankar Das Sarma, Cumrun Vafa, Boris Shraiman, Stuart Parkin, Manjul Bhargava, Nima Arkani-Hamed, Bernard Fanaroff, Joel Lebowitz, Ken Ono, Edriss S. Titi, Latha Venkataraman, Stanley Whitcomb, Leon Takhtajan, John Ellis, Joachim Frank, Robbert Dijkgraaf

Einstein Lectures (to commemorate the Centenary of General Relativity):

Bruce Allen, Bala Iyer, Rajesh Gopakumar, Parameswaran Ajith, Chandrakant Mishra, Clifford M Will, Spenta R. Wadia, Archana Pai, Suvrat Raju, Nils Andersson, Rama Govindarajan, Manas Kulkarni

Kaapi with Kuriosity (talks to stimulate the curiosity of the public towards the myriad aspects of science):

Ashoke Sen, Sulochana Gadgil, Sanjay Sane, David Gross, C S Aravinda, Vijay Chandru, Mustansir Barma, Bard Ermentrout, S. Seetha, Kater Murch, Julia Mary Yoemans, Hugo Touchette, Roddam Narasimha, Mahan Maharaj, Harmit Malik

Vishveshwara lectures:

Kip S Thorne

The creation of the ICTS was a massive collective effort involving many many people from India and abroad. ICTS is grateful to all of them.

I take this opportunity to thank some of them for their help, effort, guidance and commitment.

It is difficult to imagine that this Centre would be what it is without them.

David Gross

CNR Rao

Avinash Dhar

K Kasturirangan and Leena Chandran-Wadia

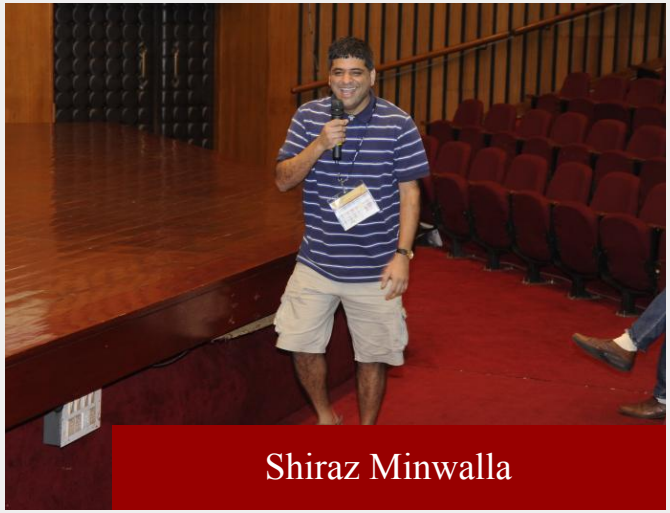
Mukesh Dodain

Rajesh Gopakumar

Manjul Bhargava

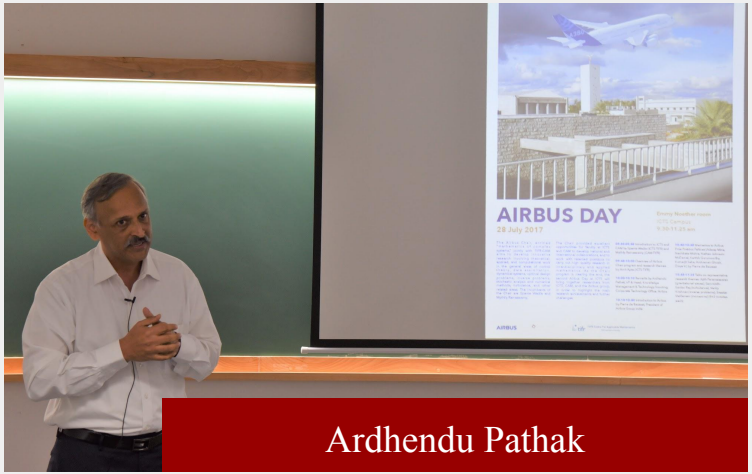
H R Krishnamurthy

K VijayRaghavan



Shiraz Minwalla

Andy Millis



Ardhendu Pathak

Narayana Murthy