

# INDO-U.S. Science & Technology Forum

Catalyzing over the years...



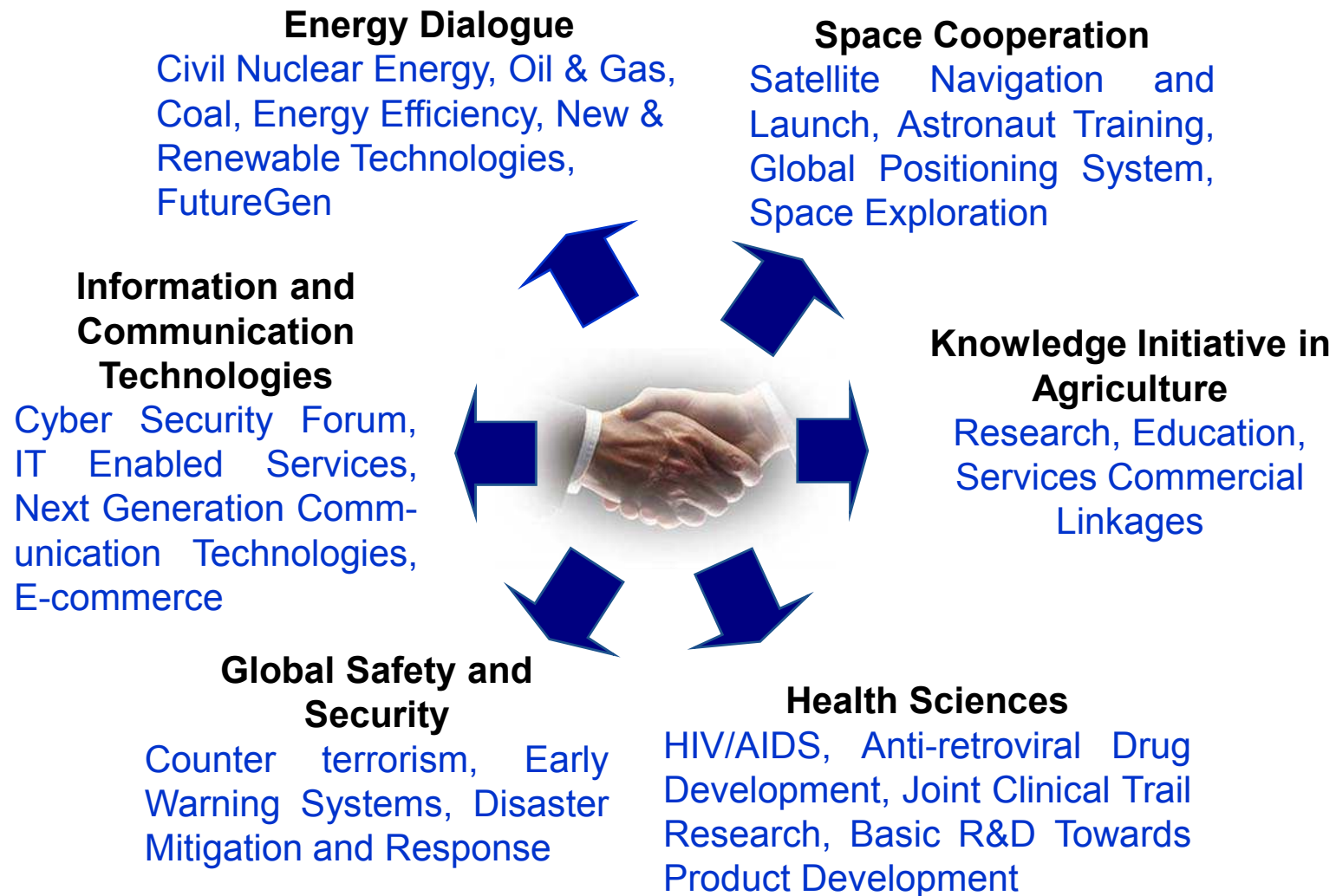
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# History of INDO - US S & T Cooperation

- 1950's**
  - Green Revolution with PL 480 Funds
  - Establishment of Land Grant Colleges
- 1960's**
  - Establishment of IIT Kanpur
  - Establishment of NCERT
  - Nuclear Cooperation Agreement
  - Tarapur Power Plant
- 1970's**
  - NASA-ISRO-SITE (Satellite Instructional Television Experiment)
- 1980's**
  - Indo- U.S. S&T Sub Commission
  - STI (Gandhi-Reagan Science and Technology Initiative)
  - USIF (U.S.-India Fund)
- 1990's**
  - Indo-U.S. S&T Fellowship Program
  - DST-NSF S&T Program
  - NASA-NOAA/ ISRO-DST MoU
  - DBT/ ICMR-NIH Health and Medical Science Programs
- 2000's**
  - INDO- U.S. SCIENCE & TECHNOLOGY FORUM**
  - Indo-US Strategic Partnership**
  - High Technology Cooperation Group**
  - Indo - US Science & Technology Agreement**
  - NASA-ISRO Agreement**
  - Indo-US Nuclear Agreement**

# INDO - US Strategic Partnership



# INDO - US S & T Agreement

Landmark agreement that will open the door to a wide range of scientific and technical cooperation between the scientific enterprises of the two countries

This agreement establishes for the first time the intellectual property rights protocols

Encourages Science based Public-Private Partnership

*“The new Science and Technology Agreement will complement the activity of the Indo-U.S. Science and Technology Forum by facilitating follow-on technical collaborations.”*

*- Fact Sheet  
U.S. Department of State  
Washington D.C.  
July 18, 2005*

# Objectives

**CATALYST to *facilitate, seed and promote* US-India bilateral collaboration in science, technology, engineering and biomedical research through substantive interaction among government, academia and industry**

**Create awareness through exchange and dissemination of *information and opportunities* in S & T cooperation**

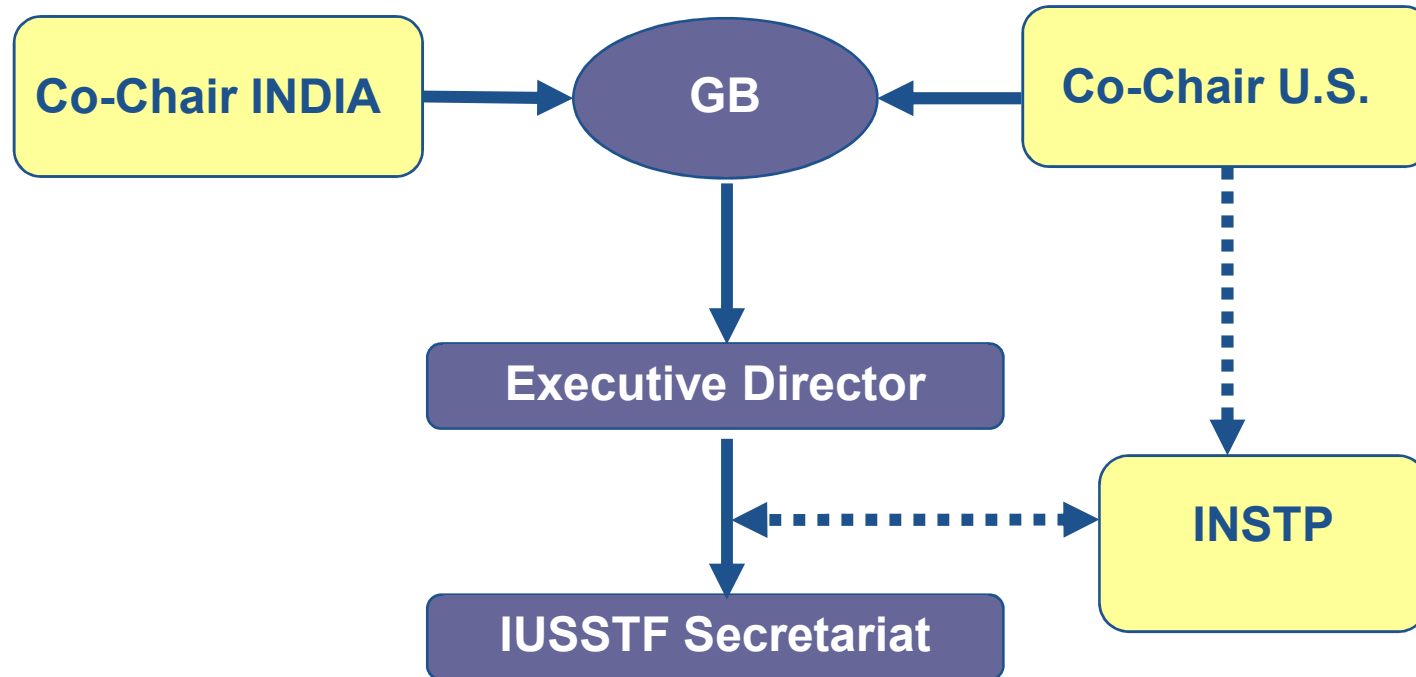
**Capitalize and build on the scientific and technological synergy leading to long term *partnership on shared values***

**Support exciting program portfolio that *lead to sustainable interactions and strengthens strategic partnerships***

**Nurture contacts between *young and mid career scientists* to develop mutual trust, foster excellence and explore new frontiers**

**Encourage *public-private partnership* to foster elements of innovation, application and enterprise**

# Organizational Structure



## Administrative Mechanism

- Autonomous
- Bilateral
- Non-Governmental
- Not for profit society

## Funding Source

- Annual Interest from US Endowment Fund with matching contribution from DST, Government of India
- Freedom to secure private and other funding

# Governing Body

## **Indian Co-Chair**

**T. Ramasami**

Secretary, Department of Science and Technology

## **Indian Members**

**Maharaj K. Bhan**

Secretary, Department of Biotechnology

**Samir Brahmachari**

Director-General, Council of Scientific and Industrial Research

**Sanjay G. Dhande**

Director, Indian Institute of Technology, Kanpur

**Swati Piramal**

Director, Nicholas Piramal Ltd.

**R. Seshasayee**

MD, Ashok Leyland India.

**Paul K. Pandian**

Joint Secretary & Financial Advisor

## **US Co-Chair**

**Norman P. Neureiter**

Director, Centre for Science, Technology and Security Policy, AAAS

## **U.S. Members**

**Michael Clegg**

Foreign Secretary, National Academy of Science

**Roger Glass**

Director, Fogarty International, NIH

**Aesook Byon Wagner**

Director

U.S. Department of Energy

**Gretchen Kalonji**

Director, International Strategy

University of California

**Kathie L. Olsen**

Deputy Director, NSF

**Suhas Patil**

CEO, Digite Inc.

# Program Portfolio

- **Bilateral Workshop/ Symposia**
- **Public – Private Networked Centres**
- **Knowledge R & D Networked Centres**
- **Training / Advanced Schools**
- **Travel Grants**

<b>Submission Deadlines</b>	<b>Award Announcements</b>
<b>February</b>	<b>May</b>
<b>June</b>	<b>September</b>
<b>October</b>	<b>January</b>

**Current Submission Deadline: 15 June 2009**

# Program Portfolio

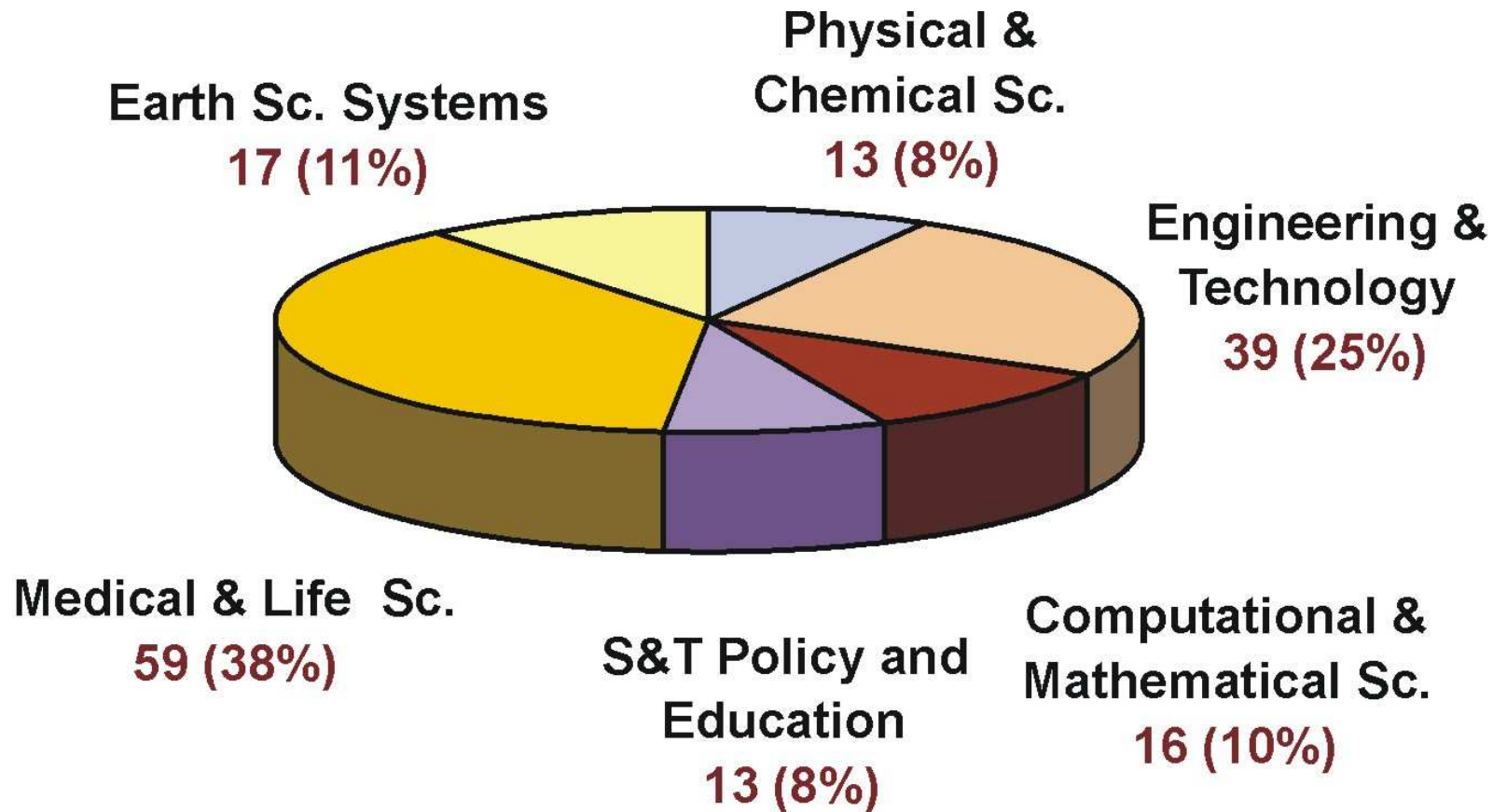
- **Flagship Programs**
  - Frontiers of Science (FOS)
  - Frontiers of Engineering (FOE)
- **Special Initiatives on Strategic Partnership**
- **Initiatives of National Relevance**
- **Industry – Academia Connect Programs**
- **Visitation & Exchange Programs**
  - Internships/ Fellowships
- **Program with Professional Societies**

# Snapshot

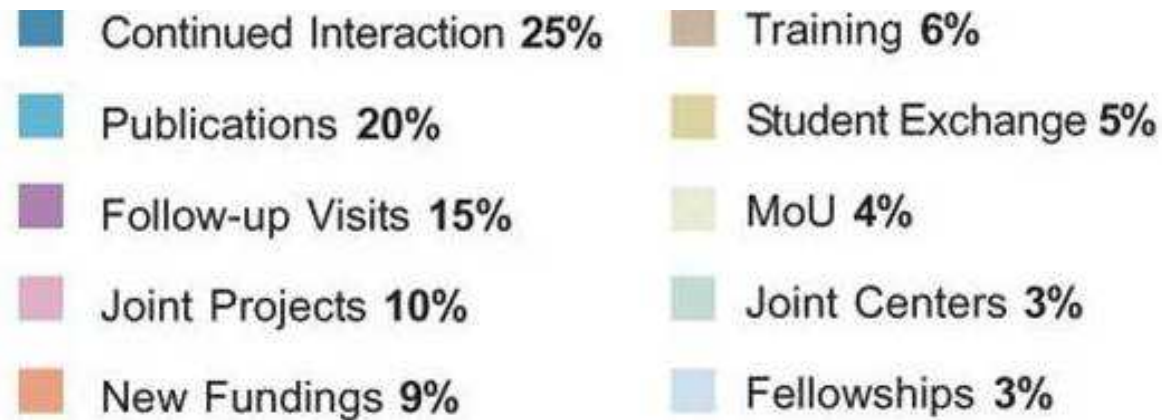
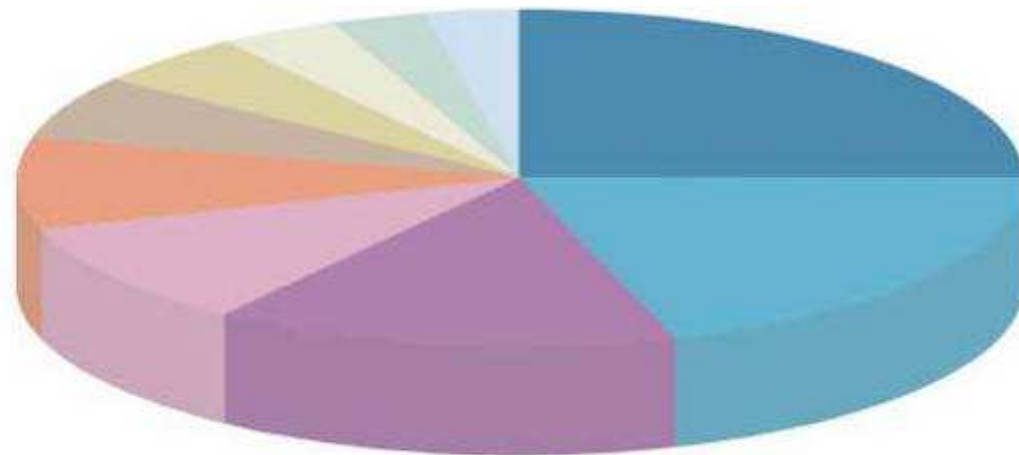
<b>Programmatic Activities</b>	<b>Accomplished 2001-2008</b>	<b>Planned Activities 2009</b>
<b>Bilateral Workshops/ Round Tables</b>	<b>128</b>	<b>11</b>
<b>Training Programs/ Advanced Schools</b>	<b>21</b>	<b>3</b>
<b>Joint Centers</b>	<b>13</b>	<b>5</b>
<b>Support to International Events</b>	<b>74</b>	<b>5</b>
<b>Travel grants</b>	<b>33</b>	<b>2</b>

**Events have led to interaction of over 8000 US and Indian scientists**

# Cutting Across Disciplines (2001-2008)



# Outcome of Workshop / Symposia



**65 % events have resulted into various outcomes**

**Source: NISTADS Report 2007**

# Industry Linkages

- **RFID & wireless sensors** : Boeing & IIT Kanpur
- **Nanomaterials for batteries** : NEI Corp. & United Nanotechnolgies
- **Rapid prototyping** : Stratyss & GTRE
- **Microwave technology** : Pradeep Metals & Penn State University
- **Aero-elasticity** : Boeing & NAL
- **Nano coatings** : NEI Corp. & ARCI
- **Cryptology** : Microsoft & IISc
- **Design engineering** : General Motors & IISc
- **Cyber security Standards** : Software industries & STQC
- **Telecom Engineering** : Santech Intl. Inc. & IIT Khargpur
- **Semiconductor equipment fabrication**: Applied Materials & IISc

# Training Programs

- **Monitoring and Assessment of Biodiversity (MAB)**
- **Science Technology and Innovation Program (STIP)**
- **Monitoring of Stem Cell Phenotype, Proliferation and Apoptosis**
- **Weather Research & Forecasting Modeling**
- **Computational Methods in Aeroelasticity**
- **Enrichment of Science Communications in Museums**
- **Microsoft Summer School on Cryptology**
- **Electronic Structure in Computational Materials Theory**
- **Parasite Immunology**
- **Lecture Series on Mathematical Chemistry**
- **Flow cytometry and Signal Transduction**
- **Digital Visualization of Archaeological Sites**
- **Integrated Water Resource Management**
- **Complex Systems in Physical and Life Sciences**
- **School on Immunology**

# Indo – US Joint Center

## R & D Knowledge Networked Center

- R & D labs and academia partnership (2+2)
- Network focal areas of thematic research
- Provide opportunities for integrating research and education
- Leverage existing infrastructure and funding
- All partners to have stake

## Public-Private Networked Center

- Foster academia - R & D lab - industry partnership (2+2)
- Promote pre-commercial R & D with application potential
- Frontier areas and bottom of the pyramid technologies
- Leverage existing infrastructure and funding
- All partners to have stake

## IUSSTF Funding (Period - 2 years)

- Exchange travel support and hospitality
- Database development and dissemination/ publication

# Indo-US Knowledge R & D Networked Center

## □ **iGEON - India (Geological Information Networking)**

- **University of California, San Diego**
- **University of Oklahoma**
- **Penn State University**
- **University of Hyderabad**
- **Jammu University**
- **Pune University**

## □ **Joint Center for Silk Protein Scaffolding**

- **Indian Institute of Technology, Kharagpur**
- **Indian Institute of Technology, Bombay**
- **University of California, San Diego**
- **Tufts University, Massachusetts**
- **Burnhan Institute of Medical Research, San Diego**

# Indo-US Knowledge R & D Networked Center

## ❑ **Correlated Electrons in Materials**

- **S.N. Bose National Center for Basic Sciences, Kolkata**
- **Indian Association for Cultivation of Science, Kolkata**
- **University of Arizona, Tuscon**
- **Mississippi State University, Drawer**

## ❑ **Nanoparticle Aerosol Science & Technology**

- **IIT Bombay**
- **C-DAC, Pune**
- **Washington University, St. Louis**
- **University of Iowa**
- **University of Maryland**

# Indo-US Knowledge R & D Networked Center

## ❑ **Joint Center on Climate Change and Impact on Arabian Sea**

- University of South California, LA
- Old Dominion University, Norfolk
- Bigelow Laboratory for Ocean Sciences, Maine
- National Institute of Oceanography, Goa
- Space Application Center, Ahmedabad

## ❑ **Joint Centre on Tissue Engineering**

- Georgia Institute of Technology, Atlanta
- University of Washington, Seattle
- Sree Chitra Tirunal Institute for Medical Sciences, Trivandrum
- Manipal Academy of Higher Education, Bangalore

# Indo-US Knowledge R & D Networked Center

- ❑ **Joint Center on Highway & Airport Pavement Engineering**
  - **Indian Institute of Technology, Kharagpur**
  - **Worcester Polytechnic Institute (WPI), Massachusetts**
  - **Indian Institute of Technology Madras, Chennai**
  - **University of Texas, El-Paso, Texas**
  
- ❑ **Joint Center on Nano-medical & Cellular Engineering**
  - **Purdue University, IN**
  - **University of Illinois at Urbana-Campaign**
  - **University of Notre Dame**
  - **Center for Cellular and Molecular Biology, Hyderabad**
  - **IIIST, Trivandrum**
  - **IICT, Hyderabad**

# Indo-US Public- Private Networked Center

- ❑ **Joint Center for Bioremediation & Phytomediation of Chemopollutants**
  - Colorado State University
  - Agarkar Research Institute, Pune
  - High Energy Materials Lab, Pune
  - Praj Industries Ltd, Pune
  
- ❑ **Joint Center on Composites through Microwave Processing**
  - Penn State University
  - Michigan Technological University
  - Indian Institute of Technology, Kanpur
  - Pradeep Metals, Mumbai
  
- ❑ **Joint Centre for Nanomaterials for Energy**
  - Purdue University, IN
  - JNCASR, Bangalore
  - GE India Technology Centre, Bangalore

# Indo-US Public- Private Networked Center

## ❑ **Joint Centre for Ecoinformatics**

- **University of Massachusetts, Boston**
- **Ashoka Trust for Research in Ecology and Environment, Bangalore**
- **HP India, Bangalore**

## ❑ **Joint Center on Biomaterials for Healthcare**

- **Indian Institute of Technology, Kanpur**
- **Indian Institute of Technology, Bombay**
- **National Metallurgical Lab, Jamshedpur**
- **University of Washington, Seattle**
- **University of Texas, San Antonio**
- **Materials Processing Inc.**

# INDO - US Center for Research Excellence

## Center for Research Excellence on Fabronics

- University of Illinois, Urbana Champaign
- Northwestern University, Evanston
- University of California, Irvine
- Indian Institute of Technology, Kanpur
- Indian Institute of Technology, Kharagpur
- CMERI, Durgapur
- Bengal Engineering College, Shibpur

## Center for Research Excellence on Advanced Materials Research

- Northwestern University, IL
- Argonne National Laboratory
- JNCASR, Bangalore
- Indian Institute of Science, Bangalore

# Exchange Programs

- **MIT - IUSSTF Student Internships**
- **Student Visitation Program with APS**
- **Visiting Professorship in Microbiology with ASM**
- **Visiting Professorship / Lectureship with APS**
- **Khorana Exchange Program with University of Wisconsin, Madison & DBT**
- **UC-Berkeley – IIT Kharagpur Exchange Program**



# Indo-US Research Fellowships

**Partners: SERC (DST) - IUSSTF**

**Objective:**

**Enable young Indian researchers to carry out research in frontier areas of S & T at premier institution in USA**

**Fellowship includes**

- **Monthly stipend**
- **Return airfare**
- **Preparatory allowances**
- **Conference allowances**

**Fellowship period**

**3 months to 12 months**

**Program Announcement: April 2009**

# Flagship Events- Frontiers of Science

- **1st Indo-US Frontiers of Science, January 2005, Bangalore  
IISc, Bangalore / US National Academy of Sciences**
  
- **2nd Indo-US Frontiers of Science, January 2007, Irvine, CA  
ARCI, Hyderabad / US National Academy of Sciences**
  
- **2nd Indo-US Frontiers of Science, January 2007, Irvine, CA  
IISER, Pune/ US National Academy of Sciences**
  - ▶ **Atmospheric Haze**
  - ▶ **Infection and Cognition**
  - ▶ **Cellular Mechanisms for Encoding Information**
  - ▶ **Particle physics at the Energy and Intensity Frontiers**
  - ▶ **String Theory and Geometry**
  - ▶ **Cosmic Microwave Background radiation: Evolution of Universe**
  - ▶ **Bioinspired Chemistry**
  - ▶ **Changing Brain**

# Flagship Events- Frontiers of Engineering

- **1st Indo-American Frontiers of Engineering Symposium, 2006, Agra  
IIT Kanpur / US National Academy of Engineering**
  - **Interface between engineering and biology**
  - **Wireless communication, electronics and security**
  - **Natural disaster modeling and simulation**
  - **Micro- and nanoscale manufacturing**
  
- **2nd Indo- American Frontiers of Engineering Symposium, 2008, Irvine  
IIT Madras / US National Academy of Engineering**
  - **Manufacturing (Automobile and Chemical)**
  - **Clean Energy (Nuclear and Coal)**
  - **Infrastructure (Transport and Water)**
  - **Biomedical Engineering**

# Strategic Initiatives

- **Space Science: Applications and Commerce**  
Partners: ISRO-NASA-NOAA
- **IndoFlux**  
Partners: DST- University of South Dakota
- **Health Science & Technology**  
Partners: DBT and MIT- Harvard
- **Stanford – India Biodesign Program**  
Partners: DBT - Stanford University
- **Airborne Cyclone Tracking**  
Partners: MES - NCAR
- **International Partnership in Hydrogen Economy**  
Partners: MNES - US DOE
- **Blue Sky Regional Carbon Sequestration Program**  
Partners: DST - NWPL
- **International Linear Collider Program**  
Partners: DST / DAE – US DOE

# India Innovation Pioneers Challenge 2009

**DST - INTEL Technology Business Plan Competition in partnership with IUSSTF**

## **Areas**

- ▶ **Biotechnology** ▶ **Education** ▶ **Electronics & Communications**
- ▶ **Energy & Environment** ▶ **Health & Biomedical Devices**
- ▶ **IT for Agriculture** ▶ **IT for Disabled** ▶ **Manufacturing**
- ▶ **Social Sustainable Ventures** ▶ **Software & Web services**

**Scholars Sparks Category: 30 April 2009**

**Student teams**

**Champions of Champions Category: 31 May 2009**

**Top three teams of prominent B-plan competition**

**Young entrepreneurs incubating their companies in any technology business incubator in India**

# Programs in Partnership with Industry

- **DST - INTEL Technology Entrepreneurship**
  - **India Innovation Pioneers Challenge 2009**
  - Global Faculty Colloquium at University of California, Berkeley
  - National Curriculum Workshop on Entrepreneurship
- **HP Innovate**

Recognize and reward engineering graduates with outstanding and creative ideas and expose them to best practices in US.
- **IBM-IUSSTF Visiting Fellowship in Nanotechnology**
  - spintronics ▪ nanoelectronics ▪ nanophotonics,
  - materials and devices for energy conversion
  - materials for memory devices
- **DST- Lockheed Martin - FICCI - Univ. of Texas, Austin- IUSSTF India Innovation Growth Program**
- **Agilent Technologies Clean Air Challenge**

# Programs...

- **Develop initiatives of mutual relevance and national importance**
- **Expand American University- India Connect Programs in R & D**
  - **RISE (Research Internship in Science & Engineering)**
  - **Faculty fellowship & guest researchers program**
- **Build academia - industry connect programs**
  - **Innovation & entrepreneurship**
  - **S & T clusters**
  - **Internships**
- **Establish Indo- US Centers of Research Excellence**
- **Promote Indo- US Collaboration on Engineering Education**

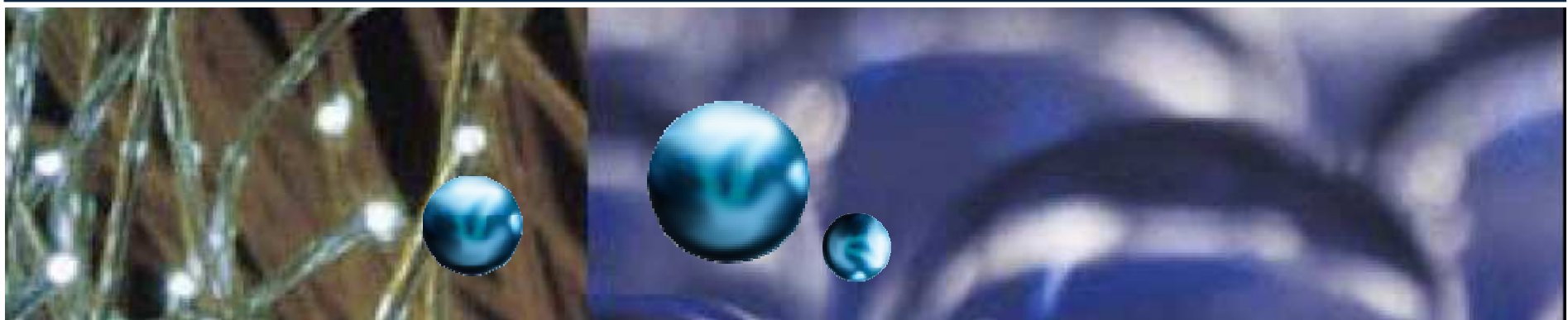
**We at the IUSSTF value your interactions and partnerships**



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**Thank you**