

ENSEMBLE

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Newsletter of the Indo-French Centre for the Promotion of Advanced Research



Indo-French Technology Summit 2013

Convergence & Connectivity



editor's note

Festive season is here. It also transcends to the celebration of knowledge. The celebration becomes more meaningful when two nations join in it. The scientific and technological communities of France and India are going to meet during the Indo-French Technology Summit on 23rd and 24th October 2013 at New Delhi. The objective of the Summit is to promote technological and trade exchanges between the two countries.

In consonance with this festive mood, in this edition, we bring out the efforts of CEFIPRA in forward chaining knowledge up the innovation chain. We are fortunate that Dr. R. Chidambaram, Principal Scientific Adviser to the Government of India has kindly set the tone with his leader article on Indo-French S&T cooperation. Enumeration of the patents emanated out of the CEFIPRA supported projects and our Intellectual Property Management Plan are the testimony of CEFIPRA's capacity to support knowledge to product pathway. The message of H.E. François Richier underlines the catalytic role of CEFIPRA in the emerging Indo-French S&T eco-system.

CEFIPRA will be present in the Indo-French Technology Summit to showcase our role in the Indo-French S&T cooperation over the last 25 years and beyond through an exhibition pavilion and three parallel sessions on "Knowledge forward chain"; "Indo-French opportunities for SMEs in Aerospace industries" & "Indo-French Design Collaboration: Emerging Opportunities".

We invite you to be there to take the next step forward together.

Meilleurs voeux de la saison des fêtes!

Best wishes for the Festive Season!



Debapriya Dutta
Director, CEFIPRA

Indo-French S & T Cooperation

From Mathematics to Space



R. Chidambaram
Principal Scientific
Adviser Govt. of India
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There exist many bilateral cooperative Science & Technology agreements between India and France in many specific fields. The creation of the Indo-French Centre for the Promotion of Advanced Research (IFCPAR/CEFIPRA) in 1987, operated by the Department of Science and Technology (DST), India and the Ministry of External Relations, France, however was an important landmark. This Centre was born from an idea shared by the Prime Minister of India Indira Gandhi and the French President Giscard d'Estaing a couple of years earlier. IFCPAR/CEFIPRA has helped to catalyze the growth of S&T cooperation between India and France over the last 25 years. The Centre has supported about 40 new projects in frontier areas of science covering the domains of computer & information technology, water, environmental science, health care, nanoscience and engineering, catalysis, mathematics and astrophysics, leading to nearly 250 publications in internationally peer-reviewed journals, over the last two years itself. The Centre's support accounts for nearly one-third of publications emanating from joint work between Indian and French scientists.

India's cooperation with France ranges from Mathematics to Space Science and Technology. The Indian Space Research Organization (ISRO) and its French counterpart Centre National de Etudes Spatiale (CNES) have a unique history of successful cooperation spanning over four decades, in the peaceful use of outer space. ISRO and CNES have recently realized two world-class joint space projects, whose outputs benefit not only their own scientific communities but also the international scientific community, specially on climate studies. Two of the satellites built jointly by ISRO and CNES, launched by the Polar Satellite Launch Vehicle (PSLV) of ISRO are MEGHA-TROPIQUES (mass 1000kg; meant for studying water cycle and energy exchange in the tropics – launched in October 2011) and SARAL (mass 410 kg; meant for oceanographic studies, viz. marine meteorology, sea state forecasting and climate monitoring-

launched in February 2013). Ariane Space, a major launch service provider based in France, has so far launched 16 Indian geo-stationary satellites on commercial basis, including the recent GSAT-7 in August 2013. Currently the two space agencies are planning to embark upon another joint mission in the field of earth system science and climate change studies.

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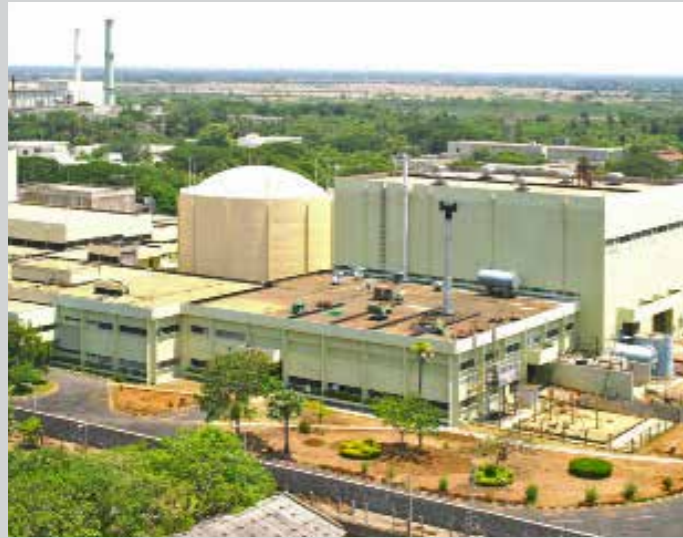
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corrector magnets to the construction of the Large Hadron Collider; and the Tata Institute of Fundamental Research (TIFR), Mumbai is the lead Indian group which contributed equipments and participated in the experiments with CMS (Compact Muon Solenoid) detector, which found the first signatures of the Higgs Boson. Though this Centre is in Geneva, two-thirds of the 100 metre deep 26 kilometer circumference tunnel, through which the colliding particles move, is located in France.

There have been many other important initiatives in which India has been at the forefront and one of the initiatives worth mentioning is the Memorandum of Understanding signed by the Department of Science and Technology (DST), Govt. of India and the French Research Agency (ANR) on 7th March 2012, to jointly fund Indo-French research projects. In India, CEFIPRA acts as a nodal agency to receive, shortlist and scrutinise proposals to provide funding on behalf of DST and, in France, the submitted proposals follow the ANR procedures. An Indo-French Partnership Centre/Laboratory in Applied Mathematics has been established at the Indian Institute of Science, Bangalore, through equal funding by DST and CNRS. In order to make it broad-based, other Indian institutions like, TIFR-CAM Bangalore, IIT Bombay and IIT Kanpur are also partners in this Centre. French President Francois Hollande visit to India in February 2013 led to initiation to set up several



new Indo-French joint laboratories, including the joint Laboratory in Neurosciences (between the Department of Biotechnology (DBT), Govt. of India and INSERM, France), and the Indo-French Cell on Water Sciences (between the Indian Institute of Science (IISc), Bangalore and IRD, France). The activities of other laboratories like the Joint Laboratory in Catalysis for Sustainable *(Contd. on page vi.)*

international community. This agreement was signed on 30th September 2008 during the visit of the Indian Prime Minister Dr. Manmohan Singh to France. But Indo-French nuclear cooperation predates that by several decades, particularly in the fast reactor field. The 40 MWe Fast Breeder Test Reactor, established at the Indira Gandhi Centre for Atomic Research (IGCAR) at Kalpakkam in the early eighties, closely followed the design of the French reactor Rhapsodie-Fortissimo, but with a power generating system added. India is now building an indigenous 500 MWe Prototype Fast Breeder Reactor (PFBR), which will be commissioned in 2014. Closing the nuclear fuel cycle is important for effective use of the uranium resources and to make nuclear power a sustainable mitigating technology in the context of the climate change threat. Under the French CEA-Indian DAE collaboration, inter alia the focus has been on structural mechanics and liquid-metal cooled fast reactor safety.

India is a participant of many international projects in France. India is a member of the International Thermonuclear Experimental Reactor (ITER) project, Cadarache, where it contributes some major equipments. The European Synchrotron Radiation Facility (ESRF) (one of the best synchrotron radiation facilities in the world), Grenoble, is also being accessed by Indian protein crystallographers using the connectivity of the multi-gigabit per second optical-fibre network NKN (National Knowledge Network) to the European Union Grid.

The Centre for European Nuclear Research (CERN) has recently announced the discovery of the elusive Higgs Boson. The Department of Atomic Energy of India contributed 40 million U.S. dollars worth of equipment, more than a thousand superconducting sextupole and other



H.E. François Richier
Ambassador of France

Born on 11 August 1963, he graduated from Sciences Po Paris and holds a degree in Law. He is also an alumnus of the French National School of Administration (ENA, 1989-1991).

Commencing his diplomatic career as Under-Secretary, Asia-Pacific Division, at the Ministry of Foreign Affairs (1991-1993) he served as Technical Adviser to the Minister of Foreign Affairs (Asian and American affairs - 1993-1995) and then was First Secretary in charge of strategic issues at the French Permanent Mission to the United Nations in New York (1995-1999). Following his stint as Second Counsellor at Embassy of France in Berlin (1999-2002), he worked in various capacities at the Non-Proliferation and Disarmament Division, Department for Political and Security Affairs (2002-2007). He was appointed as Adviser for Strategic and Security Affairs at the Presidency of the French Republic. He took over as Ambassador Extraordinary and Plenipotentiary of France to India on 17 October 2011.

H.E. François Richier, Ambassador of France to India spoke to ENSEMBLE about his views on various issues pertinent to S&T collaboration between India and France.

Ensemble : India and France share a history of engagement spanning over last 6 decades. What role can diplomacy play to enhance S&T cooperation and generation of new knowledge?

Francois Richier : Indeed, India and France share a long-standing and very fruitful cooperation in science. It is a cooperation between equals, which is attested by the high quality of the collaborative work between the scientists of both countries. Diplomacy has played a key part in reinforcing this relationship, firstly through the Inter Governmental Agreements for Cooperation signed in 1966 and 1978, and then through the visionary agreement to create an autonomous bilateral funding agency, the CEFIPRA, in 1985. It was the first joint international funding agency to be created in India. Nowadays, countries like the USA, and more recently Germany and Russia, have created similar schemes to foster and strengthen bilateral collaborations in science and technology. CEFIPRA has funded over 450 research projects in all scientific fields, which have generated nearly 1500 publications in international peer-reviewed journals.

On 14-15 February earlier this year, President François Hollande devoted his first State visit in Asia to India. On this occasion President Holland and Prime Minister Singh underlined the importance he attaches to scientific relations between the two countries. The President of the French Republic was accompanied by a large high-level delegation of ministers, including the Minister for Higher Education and Research, and several directors of universities and research centres. Several agreements were signed during the visit in the field of research and higher education.

Ensemble : Nuclear Energy, Transportation and Health are domains for which France is known for in India. On the other hand, India's growing economy and knowledge can be of an interest for France. Which are the new S&T domains where the two countries can join hands in the times to come?

Francois Richier : Indo-French cooperation is based on the principles of equality, reciprocity and mutual trust. As such, Indo-French S&T partnership must be structured around themes defined in accordance with the scientific strengths of both France and India and should allow for the discovery of scientific solutions to identified challenges. During the State visit of the French President in February 2013, Mrs Geneviève Fioraso, the French Minister for Research and Higher Education, and, Mr Jaipal Reddy, the Indian Minister for Science and Technology, discussed thematic research priorities related to global societal challenges: climate science, aging, life sciences and health sciences, innovation,

water. The two ministers confirmed their wish to hold the India-France Technology Summit with many players from the private and public sectors to further enhance Indo-French cooperation in many key sectors.

The Technology Summit will take place on 23-24 October with four large focus areas: Cities, Energy & Climate; Biotechnology, Agri-food & Health; Aerospace & Aeronautics; and Chemicals & Materials, with ICT as a transversal theme across the four focus areas. The Summit will inaugurate a closer scientific and technological partnership between France and India and create an ecosystem bringing together French and Indian actors in research, development, innovation and higher education. There are already more than 550 participants (research institutes, universities and companies) registered for the Summit. This important Indo-French event will create the opportunity to forge closer collaborations between our two countries on key technologies for tomorrow's world.

Ensemble : Small and medium enterprises form the backbone of manufacturing and services in India, where a maximum of innovation can happen. How can SME's cooperation be encouraged, so as public private partnership?

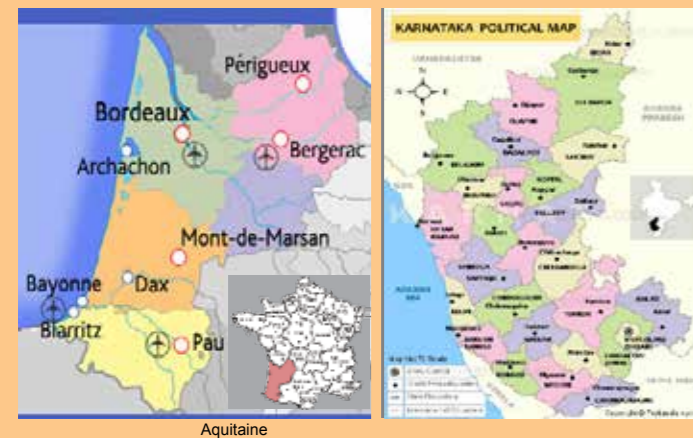
Francois Richier : With France's "Innovation 2030", the EU's "Innovation Union" and India's "Decade of Innovation" strategies, innovation is a real priority and this should be developed together by promoting collaborations in a Public Private Partnership model. Collaborations between the private sector and academia are necessary in order to transfer the results of research towards society for sustainable growth. Already, more and more French companies are investing with increasing volumes in research with Indian partners and are opening research and innovation centres in India, such as the recent launches of the L'Oréal R&I India hub and the Saint-Gobain R&D centre. Furthermore, the new "innovation window" of CEFIPRA will provide a platform for French and Indian industries to collaborate with research institutions and universities towards benefits for the economy and the growth of our businesses. I wish to congratulate the CEFIPRA in working to set up two new targeted research and fellowship programs with French companies, Saint Gobain and EADS-Astrium.

As you know, it is important to foster collaborations with SMEs to optimize benefits for the economy and society. The French Competitiveness Clusters bring together SMEs, larger companies, research laboratories & educational establishments in a specific

Contd. on pg. X

REGION TO REGION COOPERATION

Every region of a country has its own historical momentum and affinity to certain types of industrial/commercial activity domains. This also results in academic institutions of higher learning to come up in and around the region to meet the demand of training and research. It is understood that if regions with similar industrial/academic affinity and compatible ST&I ecosystems can be paired together through focused knowledge/business exchange development efforts, it can result in significant cross learning with attendant innovation driven commercial possibilities of mutual benefit.



Recognising the scope and benefits of regional synergy CEFIPRA has embarked on an ambitious INDO-FRENCH REGION TO REGION COOPERATION PROGRAM. The aim is not only exchange of ideas and expertise but also to exploit complimentary capabilities at various stages of the knowledge innovation chain. Cooperation at regional level provides an opportunity to state level stakeholders to be able to leverage the strong platform being provided through CEFIPRA to establish links that could be carried forward by them.

The program has two components:

Knowledge Cooperation under which knowledge institutions of both regions are linked through focused programs and projects, and

Business Cooperation that connects small and medium enterprises of the two identified regions.

The first step taken up in this regard has been in the form of cooperation between the State of Karnataka, India and the Region of Aquitaine, France, which are having relatively better ST&I eco-systems in each country. Both these regions are known for their concentration of academic institutions/business enterprises in biotechnology and aerospace domains. This gives rise to a large number of possibilities of collaboration at various levels. ●

From Mathematics to Space

(Contd. from page iv.)

and Environmental Chemistry (CSIR – National Chemical Laboratory, India and CNRS-University Lille, France) have been extended through an agreement in 2012.

India has been identified as one of the few countries by The French National Strategy for Research and Innovation (SNRI) with which France must strengthen its S&T cooperation. Research involves generation of new knowledge and Innovation involves deriving economic value and societal benefit from such knowledge. The five priority fields identified by SNRI are : Water, Life Sciences & Biotechnologies, Nanotechnologies & Materials, ICT and Innovation. The Government of India, in the field of Electronics and ICT, has taken up a number of new initiatives. There are two Centres of Excellence in Nanoelectronics, established at the Indian Institute of

Science, Bangalore and the Indian Institute of Technology, Bombay, which boast of the best nanofabrication facilities in the world, leading to various international academic institutions collaborating programmes with them. There is a scope of increased Indo-French R&D collaboration in the field of network engineering and cyber security. Today India seeks international cooperation on an ‘equal partner’ basis. Institutional arrangements can be facilitated by international cooperation but for them to be successful and sustainable there is a need for scientists’ groups to be cooperative and collaborative with each other. CEFIPRA has a major role to play in the enhancement of the level of S&T cooperation between the two countries considering the level of enthusiasm and research ideas existent at both ends. ●

BRAINSTORMING SEMINAR ON “CEFIPRA - BEYOND 25 YEARS”

Being a flagship institution to facilitate and promote Indo-French scientific cooperation CEFIPRA has consistently sought to promote cutting edge scientific research that builds upon expertise of both India and France in the field. As an outcome of its endeavors CEFIPRA has evaluated over 1050 projects and has supported the setting up of over 380 scientific collaborations since its inception.



In the course of its journey it is important for an agency to take stock and refine its approach for the future. To realise this objective and to also enlist various outputs emerging from CEFIPRA supported projects, a meeting of PIs of various projects was organised at New Delhi on August 21, 2013. The primary aim of the meeting was to use the inputs received to further fine tune CEFIPRA’s mechanisms for knowledge generation. Twenty eight participants attended the meeting including experts, successful PIs and dignitaries from various backgrounds. This included Prof. R.C.Budhani (Director, National Physics Laboratory, New Delhi) and Prof. C. S. Dey (School of Biological Sciences, Indian Institute of Technology, Delhi).

Following specific points constituted the agenda of the meeting:

- The value of the knowledge generated by the projects supported by CEFIPRA
- Scope of improvement in CEFIPRA’s intervention mechanism of knowledge generation
- Important linkages that need to be strengthened/built up to enhance knowledge generation through Indo-French S&T cooperation.

The proceedings commenced with a briefing by Dr. Debapriya Dutta (Director, CEFIPRA) about activities of CEFIPRA during the last 25 years in support of the Indo-French S&T cooperation. An analytical assessment on CEFIPRA’s impact in bilateral knowledge generation during the last 25 years was presented by Dr. Sujit Bhattacharya, Senior Principal Scientist, CSIR-NISTADS, New Delhi.

After presentations and panel discussion, following various unmet needs were identified :

1. Need to build a “Think Tank” consisting of successful PIs from diversified domain of expertise to get periodic feedback.
2. Need to venture into unexplored but promising areas in terms of greater societal relevance and identify major thrust areas of research of mutual interest to both the countries.
3. Need to enhance the degree of networking linkages among the groups of scientists and S&T institutions through improved mode of communication channels viz. invitation letters, periodic newsletter, blogs and identification of potential targets.
4. Need to provide funding to a group of scientists instead of funding to individual scientist by setting up virtual centres.
5. Need to provide French language tutorials to Indian students working in French laboratories to overcome the language and societal barrier.
6. Need for a long term funding for young researchers to enhance the level of cooperation and collaboration between the Indian and the French institutions.
7. Need to create a database of Indian students residing in France to form an Indian Student Association to ensure necessary logistical/moral support to the new comers.
8. Need to devise a mechanism to reach to vast untapped talent pool of Indian biologists having expertise in the areas of drug discovery, disease model and pharmaceuticals. The areas of intervention can be diabetes, cancer, cardiovascular, metabolic, photonics biology (laser operated medico-surgery) and infectious diseases etc.

Dr. Dutta concluded the meeting by proposing that some of the promising technologies which were patented but currently suffer from lack of suitable industrial partners for commercialization to showcase their technologies in India-France Technology Summit to be held in the month of October, 2013 at New Delhi for wider dissemination. ●

EXPOSING INDIAN SMEs TO FRENCH INDUSTRIAL ECOSYSTEM

Small and Medium Enterprises (SMEs) hold a strategic significance in the process of economic growth and equitable development of a country. India is no exception to this general rule. SMEs are driving force behind large proportion of S&T innovations that are critical for a country's economy for their contribution in terms of employment creation, new investments and enhanced exports.

In the backdrop of the critical role of SMEs in the development of a nation, a meeting of stakeholders in the SME space was organised at the India International Center, New Delhi. The purpose of the meeting was to elicit inputs and insights from professional/entrepreneurs engaged in the SME sector in India on the S&T challenges confronted by the Indian SME sector and identify areas where collaboration with French SMEs can be facilitated by CEFIPRA for obtaining the required results.

Thirty eight participants of the meeting included Prof. R. Kumar, Member, Industrial Research Committee, CEFIPRA; Dr. Debapriya Dutta, Director, CEFIPRA; Dr. H.P Kumar, MD, National Small Industries Corporation (NSIC); Dr. Arabinda Mitra, Advisor, International Cooperation (IC), Department of Science and Technology (DST), Govt. of India; Dr. Veronique Briquet-Laugier, Science Counselor, French Embassy in India; Dr. H.K Mittal, Secretary, Technology Development Board (TDB) and dignitaries from various backgrounds.

In his welcome address Dr. Debapriya Dutta recounted the activities being carried out by CEFIPRA over the last 25 years in support of Indo-French S&T cooperation. Dr. Dutta

emphasized upon the need for an internal assessment of impact of CEFIPRA on bilateral knowledge generation.

The broad scenario of growth and development of SMEs in India was discussed by an expert panel consisting of Dr. H.P Kumar, MD, NSIC; Dr. Arabinda Mitra, Advisor, IC, DST; Dr. Veronique Briquet-Laugier, Science Counselor, French Embassy in India; Dr. H.K Mittal, Secretary, TDB; Mr. Rajive Chawla, Director, IamSME.

Important takeaways that emerged out of various presentations and ensuing discussions are:

- Urgent need to upgrade current technology level and quality of the products coming out of SMEs.
- Benefits of diversifying production from automobiles to aerospace domain given the similarity in technological base and penetrate new markets through increased exposure to international practices and possible collaboration with suitable partners.
- Need to support knowledge creation in aerospace and automobile sectors through financing new projects involving SMEs in areas of common interest.
- Need for focused interactions between short-listed companies to explore willingness to follow the ASTM's aerospace material standards through knowledge/skill/technology up gradation.
- Utility of an interaction with an expert from the aviation sector for increased awareness about ASTM's aerospace material standards and selection of industrial organisations collaborate with French SMEs based ASTM's aerospace material standards.
 - It was decided that selected companies will be asked to identify their problems and outline the support they wish to have from their French counterparts. CEFIPRA, in this context, will provide support via exposure visits and facilitate to link those companies with the French counterparts. ●



SEMINAR ON "DYNAMICS OF EARTH AND PLANETARY CORES"

Although observation of the Earth's magnetic field has a long history, theoretical investigations into the origin of planetary magnetic fields are relatively new. Planetary dynamo models are complex because they involve solving the equations of momentum, temperature/composition and the magnetic field in spherical geometries subject to several assumptions, initial conditions and boundary conditions. The equations used by the planetary and astrophysical dynamo communities are broadly similar, but scientists from the two communities rarely interact.

The workshop on **DYNAMICS OF EARTH AND PLANETARY CORES** organized by Centre for Earth Sciences, Indian Institute of Science, Bangalore (23-26 September 2013) brought to the fore the most recent developments in the modeling of planetary dynamos, and the need to improve field measurements from satellites. Several features of the geomagnetic field such as its dipole structure, secular variation, mantle control and polarity reversals were discussed in depth. The magnetic fields of terrestrial planets like the Earth and Sun (and galaxies) were compared, and the physical mechanisms that generate these fields were analyzed threadbare.

Participants discussed observational, experimental and theoretical aspects of Earth, planetary and astrophysical dynamos. The workshop, perhaps the first of its kind, can be considered as an important step in the direction of popularizing Deep-Earth research in India by establishing some common ground between the planetary and astrophysical dynamo community.

The workshop provided an opportunity to Indian doctoral students to showcase their research before the international community. Tutorial-style review lectures, pitched at the graduate student level, on challenges in planetary dynamo modeling were complimented by

30-minute research presentations made by scientists working on fringe areas of the subject. The purpose was to give starting point ideas to budding scientists in planetary core dynamics to initiate their research efforts in this field. In the final session PhD students from both India and France were made aware of postdoctoral opportunities in Deep Earth research.

New ideas generated through the seminar:

- Improved numerical methods of solving the coupled Magneto-Hydro-Dynamic (MHD) equations for planetary dynamos are necessary. Observations are constantly improving with the help of satellite-based measurements and fly-by missions.
- Numerical simulations of planetary cores must be backed up by simple laboratory experiments and linear theory, as simulations alone cannot improve our understanding of planetary cores as there are competing physical phenomena whose effects cannot be isolated easily.
- French and Indian scientists need to meet more often to help build the planetary core community in India. India could be the host for one of the future 'Study of the Earth's Deep Interior' (SEDI) meetings.
- Apart from interactions at the PhD student and postdoctoral student levels opportunities for French students to spend a semester in India either in the final year of their undergraduate program or the first year of their Masters through Erasmus Mundus programs needs to be explored.

Ideas for Future Collaboration

Two significant areas of collaborative work between IISc Bangalore and French Universities were identified at the workshop. The tentative titles of forthcoming project proposals are as follows:

1. Development of a new algorithm for parallelizing geodynamo models in real time (Binod Sreenivasan, IISc Bangalore & Alexandre Fournier, IPGP, Paris).
2. Crystallization at the Earth's inner core boundary under rotation and magnetic field: an experimental study (Binod Sreenivasan, IISc Bangalore & Stéphane Labrosse, ENS, Lyon)



In addition to the above projects, collaboration in solar/astrophysical dynamos between IISc and French Universities was discussed. A compact disk containing all the talks given at this workshop was also released. ●

IP MANAGEMENT AT CEFIPRA

The subject of Intellectual Property (IP) has assumed international importance considering its role in promoting invention and innovation. Things are a little more complicated when S&T programs are pursued by multi-institutional teams spread across international borders, as is the case with most projects supported by CEFIPRA. In such a setting it is extremely important to lay down clear guidelines for protecting intellectual property emanating from the collaborative research work.

Given the importance of IP issues in the context of CEFIPRA, the Governing Body of CEFIPRA has been focusing on the question of protection of intellectual property rights for patentable results. Way back in 1992 itself, CEFIPRA had decided to constitute a working group with representatives from both India and France to examine the issue and evolving the guidelines. The working group members devoted considerable effort and there were several discussions and meetings held to find a common ground.

In its 9th meeting in December 1995 at New Delhi, the Governing Body of CEFIPRA considered the recommendations made by the working group which led to a framework document. This has been used for resolving IP issues related to CEFIPRA projects since it was adopted.

The main pillars of CEFIPRA IP management regime are:

- Acceptance of Prior Knowledge existence on both sides
- Equitable IP Sharing Basis
- Scope of Arbitration by 2 Co-Chairs of the Governing Body of CEFIPRA

The significance of these points lies in the way they bring new dimensions of equity. By accepting the fact that prior

knowledge about the research issue exists on both sides, both parties acknowledge and accept the scientific levels already achieved by each side. Equitable IP sharing was a unique phenomenon in such type of IP plans since it bounds both partners to accept each other as equal partners of the output generated from the project. This echoed the principles of inter-governmental agreement that lies at the root of CEFIPRA. The provision for arbitration by the two Co-Chairs of CEFIPRA on any dispute arising between the partners gives an additional conflict resolution mechanism where matters can be negotiated at the governmental level at the first instance, instead of directly taking recourse to International Court of Justice.

Since India became a partner to the Patent Cooperation Treaty in the year 1970, Indian Patent Laws have been changed to bring them in conformity with the international regime. In response, and given the nature of CEFIPRA's work linking industry and research efforts across international borders, IP guidelines to be followed by CEFIPRA's grantees were modified by the Indo-French Working Group. This culminated in the introduction of a system where a Technology Management Plan had to be agreed by each partner prior to the commencement of a project.

Operational for last 10 years now, IP Guidelines have formed the basis for many agreements that have been implemented covering projects across the knowledge innovation chain. This has also led to a large number of patents filed based on work pursued under CEFIPRA's supported projects. For more details on these patents see page xii ●

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region to develop common strategy of development, aiming at detecting synergies on innovative projects toward specific markets. Resulting from local initiatives, competitiveness clusters are currently active in most activity sectors, both in emerging technologies (nanotechnology, biotechnology, eco-technology, etc.) as well as more mature sectors (ICT, automotive, aerospace, etc.). The active Clusters include 7200 companies of which 73% are SMEs. I think that setting up bilateral collaborations between these French Competitiveness Clusters and Indian clusters is key to create the Indo-French innovation ecosystem, and to foster the co-development of new products and services. In this spirit, I would also like to underline the recent agreement signed during the State visit of the French President between BPIFrance, the French innovation agency, and the Indian Technology Development Board to launch new calls for proposals targeting Indian and French SMEs.

Ensemble : What is your key message to S&T professionals of both countries on collaborative projects?











Francois Richier : Firstly I would like to congratulate French and Indian researchers for their enthusiasm to collaborate. It is thanks to their hard work and audacity that we have such a strong bilateral relationship in science and technology. I would also like to ask them to, not only continue this good work by multiplying and strengthening their collaborations, but also to help to encourage further exchanges between researchers and companies from France and India, in particular at the level of Master's and PhD students. Of course, I would also like to encourage them to come to the India-France Technology Summit taking place next week in Delhi, where we hope to see many more Indo-French collaborations in science, technology and innovation be developed and strengthened.

Congratulations!! Raman – Charpak Fellows - 2013





H.E. Mr. Francois Hollande, Honourable President of France and Dr. Manmohan Singh, Honourable Prime Minister of India launched the “Raman – Charpak Fellowship” during the state visit of the President of France to India during February 14-15, 2013. On behalf of the Department of Science and Technology (DST), Government of India and the French Embassy in India,

Ministry of Foreign Affairs, Government of France, CEFIPRA had invited applications from the PhD students of India and France. Based on a rigorous selection process 15 students have been selected for the fellowships (see details below). ENSEMBLE congratulates all of them for their success and wishes them the best in their resultant endeavors. ●

Indian Students

Discipline	Name & Institute	
Life Sciences	V.V Reddy Manipal University	
Mathematical & Computational Sciences	Bapan Ghosh Bengal Engineering & Science University	
Material Sciences	Sreekuttan M Unni Academy of Scientific & Innovative Research	
Physical Sciences	Purushottam Jha Homi Bhabha National Institute	
Chemical Sciences	K.H.V Reddy Osmania University	
Atmospheric and Earth Sciences	Sneha C. Sagarkar, RTM Nagpur University	
Engineering Sciences	W.R.T Navaraj Academy of Scientific and Innovative Research	
Life Sciences	Shubhra Singh IFTM University Moradabad	
Life Sciences	Dhanendra Tomar Pune University	
Chemical Sciences	Konala Karnakar Kakatiya University	

French Students

Discipline	Name & Institute	
Physical Sciences	Jonathan A Freundlich, J.G.A. Marthelot Université Pierre et Marie Curie	
Life Sciences	Ghania Ramdani Paris Descartes University	
Life Sciences	Esther Dalko Université Lille 1	
Chemical Sciences	Simon Donck Université Paris Sud	

Patents from Projects Supported by CEFIPRA

A patent is a set of exclusive property rights granted by a sovereign state to an inventor or their assignee for a limited period of time in exchange for the public disclosure of the invention. Patents are a form of intellectual property, and like any other property rights, it may be sold, licensed, mortgaged, assigned or transferred.

The necessity of the patent lies in the fact that they provide incentives to individuals by offering them recognition for their creativity and a material reward for their marketable innovation.

S. No.	Patent Name Number	Inventors	Brief Description
1	A PROCESS FOR THE PREPARATION OF AMORPHOUS SILICON BASED SOLAR CELLS 243361 (Indian)	Chaudhuri P, Dutta Gupta N, Ray P P (Indian Association For The Cultivation Of Science): Longeaud C, Roy D (Laboratoires De Genie Electrique De Paris); Meaudre Robert, Vignoli Stephane (University Of Lyon, Lyon)	A process for the preparation of an amorphous silicon based solar cell having the structure, Glass/SnO ₂ /p-a-SiC:H/i-a-Si:H/n-a-Si:H/A
2	A PROCESS FOR THE PREPARATION OF MONOSUBSTITUTED CYCLOALKANONES 197324 (Indian)	Raju SVN, Subramaniam S, Ponrathnam S, Srinivasan KV, Rajan CKMR (National Chemical Laboratory, Pune)	A process for the preparation of monosubstituted cycloalkanones by reacting cycloalkanone with 4-amino benzaldehyde in the presence of an alcoholic solution of alkali metal hydroxide in an inert atmosphere.
3	HYDROPHOBICALLY MODIFIED POLY (ACRYLIC ACID) [PAA] AND PREPARATION THEREOF 248798 (Indian)	Virupax BM, Purushottam WP, Kishore LA, Subhash SA (National Chemical Laboratory Pune)	Development of hydrophobically modified polymers [HMPs], which have emerged as promising materials in diverse fields such as paints, cosmetics, oils, food and textiles.
4	SINGLE-STEP CATALYTIC PREPARATION OF PARA-AMINOPHENOL EP 2058050 A1	Figueras F (Institut de Recherchessur la Catalyse): Deshpande A, Katuri JR, Kantam ML, Nujilla SS, Ragireddy (Indian Institute of Chemical Technology, Hyderabad); Menos SR	Use of a bi-functional catalyst for the one-step preparation of para-aminophenol, said catalyst comprising a mixture of a hydrogenation noble metal and a zirconium sulfate.
5	BIOCOMPATIBLE AND BIODEGRADABLE BIOPOLYMER MATRIX PCT/IN2008/000818	Alexandre L (Jouy en Josas, France): Biji B (Mumbai, India): Denis L (Biomateriaux et Polymeres, Centre d'Etudes Pharmaceutiques.): Jayakrishnan A (Kerala University, Thiruvananthapuram): Umashankar P R (Trivandrum India)	Preparation of a biocompatible, biodegradable biopolymer matrix based on natural polysaccharide chitosan and dextran .that can be formed in situ very rapidly.
6	AN IMPROVED PROCESS FOR THE PREPARATION OF MONO-CODENSED BENZYLIDINE CYCLOALKANONES 199594 (Indian)	Raju SVN, Ponrathnam S, Sonpatki VM, Rajan CKMR, Srinivasan KV (National Chemical Laboratory Pune): Noel C (Laboratoire De PhysicochimieStructurale Et Macromoleculaire Unite Associee Au Cnrs, France)	Preparation of monocondensed benzylidene cycloalkanones.
7	A PROCESS FOR THE PREPARATION OF DISUBSTITUTED CYCLOALKANONES BASED MONOMERS 242198 (Indian)	Raju SVN, Subramaniam S, Srinivasan KV, Rajan CKMR, Ponrathnam S (National Chemical Laboratory, Pune)	A process for the preparation of disubstituted cycloalkanone based monomers.
8	A PROCESS FOR THE PREPARATION OF POLY BIS (NAPHTHALIMIDO) SULPHIDES 221645 (Indian)	Ponrathnam S, Yemul OS, Yemul SO, Rajan CKMR (National Chemical Laboratory, Pune)	A process for the preparation of poly bis (naphthalimido) sulphides.

Patents from Projects Supported by CEFIPRA

S. No.	Patent Name Number	Inventors	Brief Description
9	A PROCESS FOR THE PREPARATION OF NOVEL MONOMERS BASED ON DISUBSTITUTED CYCLOALKANONES 215169 (Indian)	Subramaniam S, Srinivasan KV, Rajan CKMR, Nadimpaliraju SV, Ponrathnam S (National Chemical Laboratory, Pune)	A process for the preparation of novel monomers based on disubstituted cycloalkanones,
10	AN IMPROVED PROCESS FOR THE PREPARATION OF BIS (HALO-NAPHTHALIMIDO) ALKYLENES 215158 (Indian)	Fradet A (Laboratoire De Synthese Macromoleculaire, 4, Place Jussieu): Yemul OS, Ponrathnam S, Rajan CKR (National Chemical Laboratory, Pune)	An improved process for the preparation of Bis (halonaphthalimido) alkylenes.
11	A PROCESS FOR THE PREPARATION OF PHOTOCROSSLINKABLE POLYARYLENE SULPHIDES 214584 (Indian)	Rajan CKMR, Ponrathnam S, Yemul SO (National Chemical Laboratory, Pune): Fradet A (Laboratoire De Synthese-Macromoleculaire ,4, Place Jussieu)	A process for the preparation of photocrosslinkable copolysulfides by reacting 2, 6 Bis (4-chloro benzyldene) cyclohexanone with alkali metal sulfides in an inert atmosphere
12	A PROCESS FOR THE PREPARATION OF ALIPHATIC - AROMATIC COMPATIBILIZERS 226544 (Indian)	Gopakumar TTGN, Ponrathnam S, Rajan CKMR (National Chemical Laboratory, Pune): Fradet A (Laboratoire De SyntheseMacromoleculaire,4, Place Jussieu)	A process for the preparation of aliphatic-aromatic compatibilizers.
13	A PROCESS FOR THE PREPARATION OF COMPATIBILIZED POLYMER BLENDS 215019 (Indian)	Gopakumar TTGAN, Ponrathnam S, Rajan CKMR (National Chemical Laboratory, Pune): Fradet A (Laboratoire De SyntheseMacromoleculaire,4, Place Jussieu)	A process for the preparation of a compatibilized polymer blend.
14	A COMPOSITION AND A PROCESS FOR THE PREPARATION OF POROUS CERAMIC CAPILLARY TUBES BASED ON CLAY ALUMINA MIXTURE 2284/DEL/2011 A	Sibdas B (Ceramic Membrane Division, Central Glass & Ceramic Research Institute, Kolkata): Andre L (InstitutEuropéen des Membranes UMR 5635 Campus CNRS-1919 Place Eugene Bataillon, CC 047 Route de Mende 34293 Montpellier cedex 5 France)	The porous ceramic capillary tube based on clay- alumina mixture is having high surface area:volume ratio with required physical characteristics.
15	AN IMPROVED ELECTRO-CHEMICAL COAGULATION PROCESS FOR THE REMOVAL OF NITRATE FROM DRINKING WATER US 08/671,264; 08/457,040; US 5,935,392; US 5,376,240; US 5,614,078; US 5,306,400	S. Vasudevan (Electroinorganic Chemical Division, Central Electrochemical Research Institute, Tamil Nadu)	An electrochemical coagulation process for the removal of nitrate from drinking water, wherein the nitrate is removed by adsorption of metal hydroxide, formed by 'in-situ' anodic oxidation.
16	NOVEL BIOACTIVE PLANT SAPONIN COMPOSITIONS AND METHOD FOR ISOLATION AND CHARACTERIZATION OF SAME 1278/DEL/2007 A	Kaushik N (The Energy and Resources Institute, New Delhi): Dubois MAL (Laboratoire de Pharmacognosie, Unite de Molecules d'interetBiologique): Offer A C M, Acharya D	Isolation and characterization of the novel bioactive plant saponin compositions from Chlorophytumborivilanum, inclusive of, but not confined to, furostane and spirostane type.
17	A KIT FOR BIOEXTRACTION OF METALS & METHOD OF WORK WITH FSR SAME 1146/DEL/2010 A	Adholeya A (The Energy and Resources Institute, New Delhi)	A device/kit/apparatus for the bio-mediated extraction of Chromium (Cr) from the tannery wastes to not only secure the release of the trapped metal but also to ensure its recycled reusability in the tanneries.





MOBILITY OF SCIENTISTS SUPPORTED UNDER CEFIPRA PROJECTS

August - September 2013

S. No.	Project Title	Name Institutional Affiliation	Institute Visited
1	Nutrient sensing in plants	Dr. Narendra Tuteja International Centre for Genetic Engineering & Biotechnology, New Delhi	Biochimie et Physiologie Moléculaire des Plantes, Montpellier
2	The Kosi river alluvial dynamics and associated risks	Prof. Rajiv Sinha Indian Institute of Technology, Kanpur	Laboratoire de Dynamique des Fluides Géologiques Institut de Physique du Globe de Paris, Paris
3	Extreme QCD in the LHC Era	Prof. Rajiv V Gavai Tata Institute of Fundamental Research, Mumbai	Institut de Physique Théorique CEA Saclay, Gif-sur-Yvette
4	The Kosi river alluvial dynamics and associated risks	Dr. Vikrant Jain Physical Research laboratory, Gandhinagar	Laboratoire de Dynamique des Fluides Géologiques Institut de Physique du Globe de Paris, Paris
5	Role of Chromatin Architecture in cellular senescence	Prof. Sanjeev Galande Indian Institute of Science Education and Research, Pune	Unité d'Organisation Nucléaire et Oncogénèse Institut Pasteur, Paris
6	Reversals of a large scale field on a turbulent background	Prof. Mahendra Kumar Verma Indian Institute of Technology, Kanpur	Laboratoire de Physique Statistique Ecole Normale Supérieure, Paris
7	Two dimensional electron gas physics in oxide heterostructures	Dr. Anjana Dogra National Physical Laboratory, New Delhi	Laboratoire de Physique et d'Etudes des Matériaux(LPEM), Paris
8	Kinetics and spectroscopy in Extreme Environments: Application to Astrophysics and Astrochemistry	Prof. Elangannan Arunan Indian Institute of Science, Bangalore	Département de Physique Moléculaire, Université de Rennes, Rennes
9	Kinetics and spectroscopy in Extreme Environments: Application to Astrophysics and Astrochemistry	Prof.K.P.S. Reddy Indian Institute of Science,Bangalore	Département de Physique Moléculaire, Université de Rennes, Rennes
10	Anti-factor H autoantibody associated hemolytic uremic syndrome	Dr. Aarti Gupta All India Institute of Medical Sciences, New Delhi	Centre de Recherche des Cordeliers, Paris
11	All polymer flexible gas sensors	Dr. Dine K Aswal Bhabha Atomic Research Center, Mumbai	Interfaces, Traitements, organisation et Dynamique des Systèmes(ITODYS), Université Paris Diderot-CNRS, Paris
12	Effect of the correlations in the statics and the dynamics of extended systems	Dr.P.K. Mohanty Saha Institute of Nuclear Physics, Kolkata	Laboratoire de Physique Théorique et Modèles, Statistiques, Orsay
13	Screening for K-RAS and B-RAF mutations in tumor tissues and circulating nucleic acids present in blood-plasma and urine of Colorectal Cancer patients in India	Dr. Alain R Thierry Sysdiag Centre for Cellular and Molecular Biology, Hyderabad	Universités Montpellier 1 SysDiag, Montpellier
14	Tilling in cucurbits: a non-transgenic reverse genetic approach for muskmelon crop improvement	Dr. Abdelhafid Bendahman Bench Bio Pvt.Ltd., Gujarat	URGV Lab(INRA), Evry University, France

MOBILITY OF STUDENTS' VISITS SUPPORTED BY CEFIPRA

August - September 2013

Domain	Name & Institute	
Quantum nano-electronics	Mr. Tanay Roy Tata Institute of Fundamental Research, Mumbai Institute Visited UJF-ESONN Maison des Magistères, Grenoble	
Materials Science	Ms. Neelima Basavappa CSIR-National Institute of Oceanography, Goa Institute Visited Laboratoire de Chimie de la Matière Condensée de Paris, Paris	
Quantum nano-electronics	Ms. Neha Sharan Indian Institute of Science, Bangalore Institute Visited UJF-ESONN Maison des Magistères, Grenoble	
Quantum nano-electronics	Mr. Shammy Verma Inter University Accelerator Centre, New Delhi Institute Visited UJF-ESONN Maison des Magistères, Grenoble	
Interface between Physics and Biology	Ms. Nandini Bhandaru Indian Institute of Technology, Kharagpur Institute Visited UJF-ESONN Maison des Magistères, Grenoble	
Interface between Physics and Biology	Mr. Harshad Harde National Institute of Pharmaceutical Education and Research, Mohali Institute Visited UJF-ESONN Maison des Magistères, Grenoble	
Interface between Physics and Biology	Mr. C.Jayaseelan C. Abdul Hakeem College, Tamil Nadu Institute Visited UJF-ESONN Maison des Magistères, Grenoble	
Environmental Sciences	Ms. Bharti Garg International Centre for Genetic Engineering & Biotechnology, New Delhi Institute Visited Biochimie & Physiologie Moléculaire des Plantes, Montpellier	
Life and Health Sciences	Dr. Suresh Institute of Entomology, Czech Republic Institute Visited Centre de Neurosciences de Paris Sud, Orsay	
Materials Science	Dr. Durga Prasad Indian Institute of Science, Bangalore Institute Visited Laboratoire de Chimie de Coordination du CNRS,Toulouse	

Forthcoming Events

- October 23-24, 2013, New Delhi, India-France Technology Summit 2013
E-mail : info@indiafrancesummit.org
- November 15-19, 2013 Madurai/Kodaikanal, India Scientific Council meeting of CEFIPRA
E-mail : director@cefipra.org
- November 20-21, 2013, Madurai, India Industrial Research Committee meeting of CEFIPRA
E-mail : director@cefipra.org
- November 25-27, 2013, France, Meeting on Indo-French Region to Region Cooperation between Karnataka and Aquitaine
E-mail : director@cefipra.org
- January 20-22, 2014, Madurai, Seminar on "Filamentous fungi pathogens: Current trends and future perspectives"
E-mail : director@cefipra.org

DST-ANR JOINT CALL FOR PROPOSALS

Department of Science and Technology (DST), Govt. of India and Agence Nationale de la Recherche (ANR), France have collaborated to support scientific R&D in cutting edge areas of common interest. In India, on behalf of the DST CEFIPRA invites pre-proposals from the Indian scientists / researchers under this targeted program for the year 2014..

Thrust areas of research for this call are: a) Neurosciences, b) Engineering Sciences (Sub-areas: Material Science, Chemistry, Intelligent Transport System and Energy)

PI's of shortlisted pre-proposals will be requested to submit full proposals. The research projects will be funded for a maximum of three years.

For more details regarding application procedure & format, funding mechanism, proposal evaluation process and criteria please visit www.cefipra.org, or contact:

A Sathidevi

Scientific Officer, CEFIPRA, 5B, Ground Floor, India Habitat Centre, Lodhi Road, New Delhi 110 003 (India)
Tel: (+91-11) 2468 2251-52 Email: sathidevi@cefipra.org Email: director@cefipra.org Website: www.cefipra.org

Proposal Submission Deadline | **23 October 2013**

DST-INRIA JOINT CALL FOR PROPOSALS

Department of Science and Technology (DST) and Institut National de Recherche en Informatique et en Automatique (INRIA) invite proposals for Information and Communication Science & Technology for the year 2014. In India, on behalf of the DST, CEFIPRA invites proposals from the Indian scientists / researchers under this targeted program.

Thrust areas of research for this call are: a) Big data b) Cyber physical systems (sub area: embedded system) c) High performance computing. The research projects will be funded for a maximum of three years, starting from February 2014.

For more details regarding application procedure & format, funding mechanism, proposal evaluation process and criteria please visit www.cefipra.org, or contact:

A Sathidevi

Scientific Officer, CEFIPRA, 5B, Ground Floor, India Habitat Centre, Lodhi Road, New Delhi 110 003 (India)
Tel: (+91-11) 2468 2251-52 Email: sathidevi@cefipra.org Email: director@cefipra.org Website: www.cefipra.org

Proposal Submission Deadline | **31 October 2013**

INDUSTRIAL RESEARCH PROGRAM

Special Call for Proposals in the field (s) of Automotive and Aerospace Engineering

Industrial Research Program of CEFIPRA is designed to support collaborative research projects involving academic and industrial partners. The objective is to promote the development of new processes or products or the improvement of existing processes and products, thus offering industrial partners an enhanced competitiveness at the international level.

Concept Notes (2-3 pages) are invited from Automotive and Aerospace sector industrial organisations (including ancillaries) for examination by Industrial Research Committee of CEFIPRA, comprising of experts from India and France. Shortlisted applicants will be asked to submit detailed proposals subsequently. For detailed terms and conditions visit www.cefipra.org

For further information please contact:

Dr. Debapriya Dutta

Director, Indo-French Centre for the Promotion of Advanced Research (CEFIPRA)
Email: director@cefipra.org Website: www.cefipra.org

Last date for the receipt of applications | **30 October 2013**



Indo-French Centre for the Promotion of Advanced Research (IFCPAR) is a model for international collaborative research in advanced areas of science and technology. The centre was established in 1987 with support from Department of Science & Technology, Government of India and the Ministry of Foreign Affairs, Government of France.



For further information please contact:

Pour toute information complémentaire, veuillez contacter:

Director

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