ENSEMBLE

Volume 2 (4) | September - October 2014

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

Nurturing Indo-French Science, Technology and Innovation Ecosystem

editor's note

Dr. Debapriya Dutta
Director, CEFIPRA

Growth of CEFIPRA during its journey of 27 years is best characterized by its willingness to expand the scope of its intervention across the knowledge innovation chain while concentrating on core competencies.

After supporting more than 450 projects between individual scientists across India and France, we have just launched the "High Impact Scientific Research Network Programme" for linking and harnessing the brain powers of the connected scientists and scientific groups for creating global common goods. Analysis of these projects supported over years brings out opportunities for further improvement. While CEFIPRA attracts large number of project proposals in the areas of Physics, Chemistry and Life & Health Sciences, we need to reach out to the communities of Mathematicians, Earth and Planetary Scientists, Computer and Information Scientists of both the nations. Discrepancy is observed in terms of our regional presence in both the nations. While highest number of CEFIPRA supported projects are concentrated in Il de France region of France, the same is true for Bangalore in Karnataka, India. With the focus on supporting the lower end of the knowledge innovation chain, it is not surprising that 95% of the projects supported by us till date are in the cutting edge areas of basic and applied sciences. Appreciating the emphasis on Innovation by both the Governments, our support to bridge the gap between academia and industry through the industrial research programme needs to widen through various Public-Private Partnership models to address the knowledge, discovery and innovation need of the private sector.

All the above needs motivate us to reach out to new stakeholders, for making them aware about the strength of Indo-French S&T collaboration and CEFIPRA as the fulcrum of the same. In this direction we have recently collaborated with Biotechnology Industry Research Assistance Council (BIRAC) and Saint Gobain Research India (SGRI) to catalyse the Indo-French innovation eco-system. Recognising that only 10% of CEFIPRA supported projects are in the eastern and north-eastern regions of India, we are planning to organize outreach sessions during 20-21 November 2014 on the sideline of our forthcoming meetings of the Scientific Council and Industrial Research Committee at Kolkata, India. We would like to meet many of you who are already part of the CEFIPRA family and will welcome many of you who are still not a part of the same.

Till we meet again, Au revoir!

inside

Editor-in-Chief
Debapriya Dutta
Director, CEFIPRA

Layout Design and DTP
Pramod Jha
Rahul Nautiyal

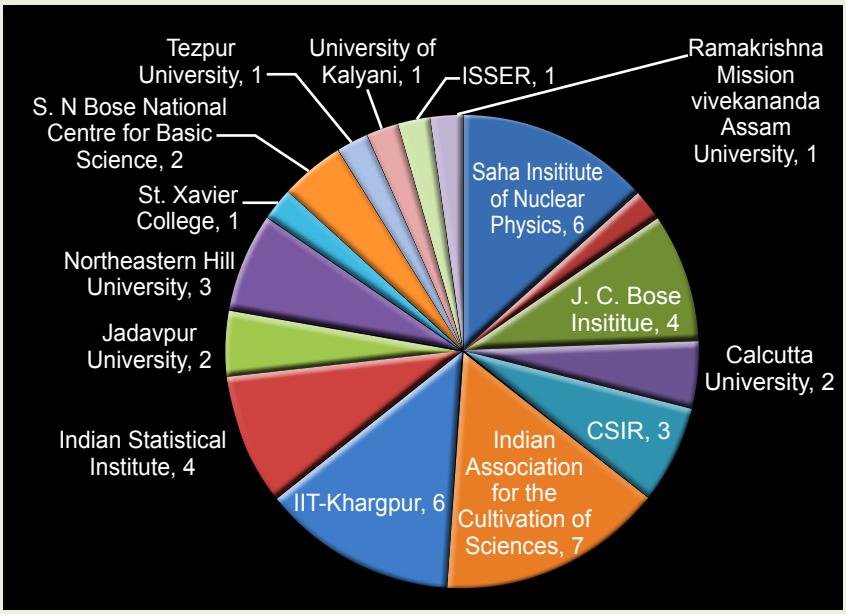
Design, Production and Circulation
Communication & Outreach Division
AFE Consultants Private Limited
Aravali House, 431/D-22, Chhatarpur Hills
New Delhi-110074, India

Published and Printed by :
V.V. Rao on behalf of CEFIPRA from
5B, India Habitat Centre
Lodhi Road, New Delhi-110 003
INDIA

CEFIPRA

No resting on the oars

Indo French Centre for the Promotion of Advanced Research(IFCPAR)/Centre Franco-Indien pour la Promotion de la RechercheAvancée is a bilateral organization, established in 1987 for promoting collaborative research between the scientists of the two countries in India and France. This institution has been beacon for bilateral cooperation between any of the two countries in the world, being a role model for bilateral cooperation.



CEFIPRA commenced its activities in 1987 in a small way. The Scientific Council at that time had consolidated all on-going collaborations, cutting across disciplines. Using its wiser counsel, the members had retain many of the on-going collaborations in project mode, while evolving a structured system of supporting projects through the platform of CEFIPRA. While the system evolved has been retained in its core form, small and subtle changes have been made to make the system conducive to the needs of the scientists of the two countries and at the same time become efficient.

During the process of its evolution emphasis had been made on strengthening collaboration between established group of the two countries. Over the years, the Scientific Council has made specific efforts to bring into the fold more groups from across important institutions in incipient areas of research of relevance to the two countries. This has been done at multiple levels. The traditional path of holding seminars and workshops in thematic areas involving new nucleating groups from the two countries had been followed systematically by the Council. Another mechanism which was adopted was reach out programmes at the time of the meetings of the Scientific Council and Industrial Research Committee.

Recognising that these efforts have been supportive, Secretariat of CEFIPRA has taken a proactive role over the last 5 years to sensitize the scientific community of the two countries about the programmes of CEFIPRA. In both the nations, there are regions which have not been truly explored vis-à-vis scientific ability. It is essential for CEFIPRA to explore and target these regions and bring them into the fold of the activities of CEFIPRA so that we are in a position to deliver the global common goods at the appropriate level to have the right impact through Indo-French S&T cooperation.

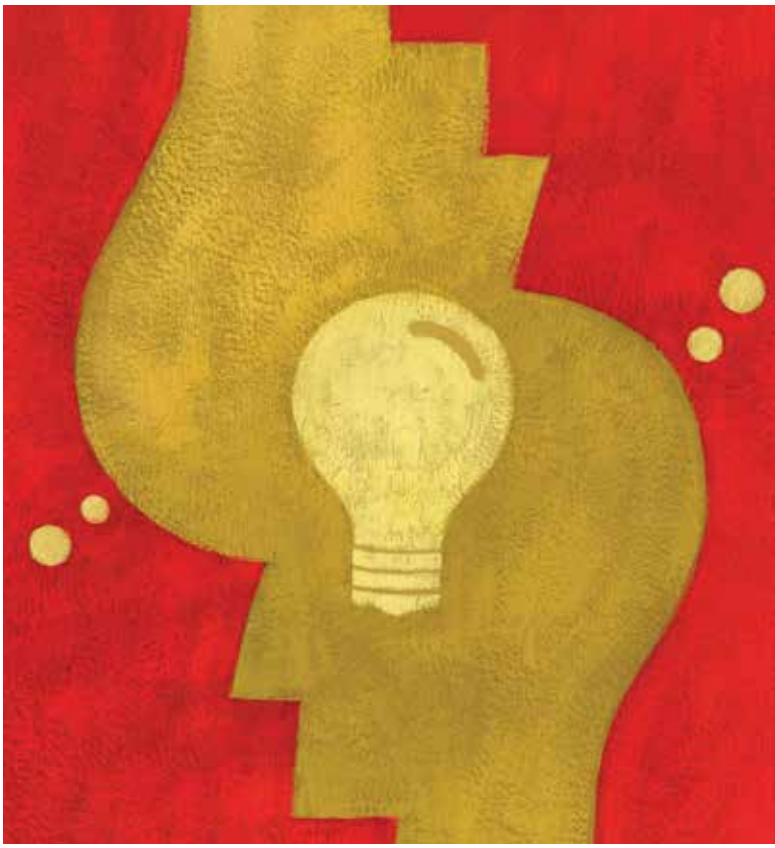
In this context it is necessary to harness the core strengths available, but waiting to be tapped. The field of pure mathematics and computer sciences is an important area of collaboration between India and France. Considering the number of institutions which not only give formative education but support research in this important area, it would be imperative to tap various regions in India and France to strengthen collaboration through CEFIPRA in this domain.

With our expanded mandate to be a catalyst for Indo-French S&T ecosystem across the knowledge innovation chain, it is mandatory to reach out to the stakeholders accordingly, particularly to the Universities, the small and medium scale sectors of the industries, the student community and the major industrial players in these regions.

The outreach programme being organized in Kolkata, India on 21st November is step in this direction. It is hoped that with this kind of effort CEFIPRA would be in a position have a stronger presence in the region. ●

CEFIPRA FOR RESEARCHERS

Bringing Minds Together



Since its inception CEFIPRA has been supporting projects under collaborative scientific research programme by bringing together scientists from both the countries to work towards common goals.

Collaborative Scientific Research programme

The research projects funded by CEFIPRA essentially complement the core strengths of the individual scientists or research groups in cutting-edge science and technology areas.

Since its establishment, CEFIPRA has supported 463 projects in Basic and Applied sciences under 12 thrust areas.

One of the key characteristics of CEFIPRA funded projects is promoting scientific research that has high merit for developing research competency of the scientists, evident from the highly significant outputs of these projects resulting in 1515 scientific papers in highly referred journals, 143 processes, 22 products, 24 patents and 27 designs.

Since CEFIPRA is essentially an Indo-French organisation proposers should keep in mind that:

- Participation of researchers must be reasonably balanced in terms of each country's participation, effort, contribution and budget.
- Project should clearly demonstrate an added value coming out of the proposed collaboration.

Though the benefits of projects being supported by CEFIPRA are numerous, the procedure to apply for research funding from CEFIPRA is simple. This is especially so with the recent introduction of online proposal submission system which is available at www.cefipraonline.in

Thrust Areas

Pure and Applied Mathematics	Earth & Planetary Science
Pure and Applied Physics	Material Science
Pure and Applied Chemistry	Environmental Sciences
Computer science	Biotechnology
Life & health sciences	Water
Instrumentation	Information & Communication Technology

Eligibility Criteria

- One Indian and one French scientist should jointly submit a proposal (any number of joint collaborators on either side are also allowed)
- Should hold a permanent position in an Indian/ French institution/University respectively
- Fulfil national level eligibility criteria w.r.t operation of grants and age of retirement

Some of the significant achievements in Basic Sciences are as below:

DERIVATION OF NEW ESTIMATES ON THE NON-LINEAR INTERACTION OF SOLUTIONS

Project: 'Mathematical Topics on Hyperbolic Systems of Conservation Laws'

The collaborators investigated the properties of weak (discontinuous) solutions of some non-linear partial differential equations of hyperbolic type, mainly systems of conservation laws arising in continum physics, and brought about the derivation of new estimates on the non-linear interaction taking place in solutions of the augmented hyperbolic system, including wave interactions involving resonant waves.

UNIQUE ARRANGEMENT OF NUCLEOSOMES

Project: 'Epigenetics of Transcription by RNA polymerase'

The study discovered a unique arrangement of nucleosomes near the yeast pol III-transcribed genes. The genes reside in a nucleosome-free region (NFR), bordered by positioned nucleosomes and these nucleosomes change positions under repressed state, pre-dominantly at 3'ends of the genes. Expression of different genes shows different response to nutrient starvation. However, gene expression does not show correlation with location in the nuclear space.

Other significant outputs: SCI Journal publications: 3; Mobility support: for collaborators: 1

LIGANDS ISOLATED AND CHARECTERISED

Project: 'Biological Peroxide Sensing': The Bacterial Regulator PerR, Synthetic Analogues and Biomimetic Reactivity

Several 5N, 4N, 2N2O ligands were isolated and characterised, apart from Fe (II) and Mn(II) complexes. The catalytic activities of these isolated complexes contributed towards oxidation of imidazoles. Also crystal structure of the active PerR protein was solved.

Other significant outputs: SCI Journal publications: 5; Mobility support: for collaborators: 3, for students: 1

Some of the significant achievements in Applied Sciences are as below:

IMPROVED GROUND WATER PURIFICATION

Project 'Enhanced process for the removal of nitrate from water'

Developed highest active and selective Catalysts PdSn/Al_2O_3 & PdSn/TiO_2 and superior nano-electrocatalysts PdSn/Ti &PdAg/Ti. Developed a 25A (1.5L/hr) capacity electrochemical nitrate removal unit to treat maximum of 1000 ppm nitrate. Additionally, an electrocoagulation process (0.5L/hr) was developed for nitrate removal without intermediates.

Other significant outputs: Journal publications: 2; joint patents were filed in India and PCT.

NOVEL HMPs FROM NATURAL PRODUCTS

Project: 'Novel hydrophobically modified polymers: Synthesis, characterization and rheology'

The newly designed HMPs based on PAA-g-3-PDCA showed enhanced rheological properties as compared to their unmodified precursors. This is one of the first examples of thermo-associating polymers where viscoelastic properties can be controlled from very low to high temperatures. Successfully synthesized a new hydrophobic compound namely 3, 4, 5-tris dodecyloxy benzoyl acide starting from gallic acid. It was subsequently utilized for synthesizing hydrophobically end-capped PEGs. These polymers exhibited excellent rheological properties in the presence of surfactants.

Seminars/ Workshops and Schools

Formulating collaborative research projects require knowledge sharing between researchers. CEFIPRA supports seminars/workshops/schools, aimed at developing future collaborations and forward-chaining of developed knowledge between India and France.

More than 120 workshops/seminars/ schools have been supported till date with CEFIPRA's support, in high priority areas of mutual interest.

The proposals for workshops and seminars can be easily submitted via the web-online submission system of CEFIPRA (www.cefipraonline.in).

Seminar Proposal Guidelines

- Submitted jointly by Indian and French scientists
- Organized in either of the two countries
- Participation of researchers from institutions active in the relevant areas in both countries.

Targeted Programmes

With increase in contribution of national funding agencies in the S&T systems in India and France over the past years, CEFIPRA's role as a connector of the two national S&T systems has only expanded. Targeted Programmes provide a platform to National S&T supporting agencies of both the countries to collaborate in specific areas for creation of global common goods. Some examples of ongoing targeted programmes of DST in collaboration with some French National S&T funding agencies are:

1. Project on "Adaptation of Irrigated Agriculture to Climate Change", in collaboration with Institute National de la Researche Agronomique.
2. Information Communication Sciences and Technology (ICST) in collaboration with Institut National de Recherche en Informatiqueet en Automatique (INRIA) in the domains of Big Data, Cyber-Physical Systems, High Performance Computing, Computer Science for Biology and Life Science & Reliable and Scalable Computation.
3. On Infectious diseases; Neurosciences; Engineering Sciences (Sub-areas: Material Science, Chemistry, Intelligent Transport System and Energy in collaboration with Agence Nationale de la Recherche.

Target areas for collaboration may vary from time to time. For latest information, please visit www.cefipra.org

CEFIPRA FOR STUDENTS

Attracting New Talent

CEFIPRA has reached out to students pursuing science in India as well as France in order to expose them to the ST&I environment of the partnering country.

CEFIPRA has supported students at masters, doctoral, post doc levels to not only work on S&T projects but also engage with their peers and senior faculty members in India or France. Over the years, CEFIPRA has supported more than 1500 students, including about 850 at doctoral and post doc levels, across 450 collaborative S&T research projects. An equal number of students have been supported by CEFIPRA to work with PIs of collaborative projects as technical assistants, engineers, etc. This underscores the commitment of CEFIPRA towards building critically required human resources to meet future needs of S&T research, especially in an Indo-French Context.

Facilitating interaction between students working on similar issues in two countries is at the core of CEFIPRA's strategy to attract talented youngsters to collaborative research programmes between India and France. Students hired to work on collaborative research projects are the important component CEFIPRA's strategy to strengthen human resources in the S&T sector.

An Indian Student who wishes to work with a French Scientist can avail doctoral or a Post-Doctoral grant from CEFIPRA subject to eligibility and credentials. Conversely, a French Student who wishes to come to India for carrying out his/her research under the supervision of an Indian Scientist can also seek CEFIPRA's assistance.

Based upon the requirement of various collaborative projects, a student can be selected as a Doctoral or Post-Doctoral student in a Research Institute/University of France and as a Junior/Senior Research Fellow, Research Associate, etc. at a Research Institute/University in India.

Components of Support

- International Travel
- Fellowship of Euro 1300 p.m. & Euro 1850 p.m. for doctoral & Post-Doctoral students respectively to pursue research in France.
- Fellowship of Rs. 24000 p.m. and accommodation allowance up to Rs. 45000 p.m for French doctoral and post-doctoral students in India.
- Support for Indian students to work as JRF, SRF and RA in an Indian Research Institute/University as per DST/CSIR/UGC guidelines.

Students interested in associating with CEFIPRA projects are encouraged to upload their CVs on CEFIPRA website (www.cefipra.org) in order to bring their interests and background to the attention of Principal Investigators of CEFIPRA supported projects who may contact them directly. Such engagements are beneficial to young scholars to achieve a smooth transition from the doctoral level to a post-doctoral level, wherever applicable.

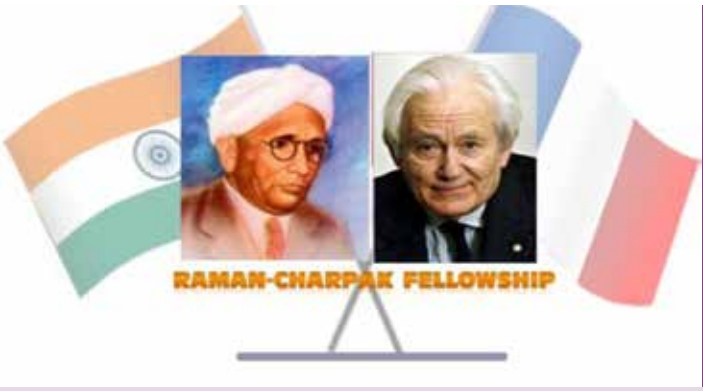
This proactive approach to attract young talent and to mentor them to next level of academic pursuit not only benefits Indo-French research programs, they eventually account for a significant contribution to global science.

Understanding the value of mobility support for students in the context of the bilateral S&T cooperation, CEFIPRA has extended opportunities of supporting students by launching 'dedicated student mobility support programmes' since 2013 viz.

Raman Charpak Fellowship

During the visit of French President, H.E. Monsieur François Hollande to India in 2013, a bilateral fellowship scheme was launched for Indian and French doctoral students named "**Raman Charpak Fellowship**". This fellowship program is in honour of two Nobel Laureates in Physics, Prof. C.V. Raman, Indian Nobel Laureate, 1930 and Prof. Georges Charpak, French Nobel Laureate, 1992.

CEFIPRA implements this fellowship programme on behalf of Department of Science and Technology (DST), Government of India and S&T Department of the French Embassy in India while receiving joint funding from them. The programme enables both countries to improve and reinforce their scientific cooperation through close collaboration between students of India and France. It is designed to enable highly qualified PhD research scholars from Indian or French Research Institutes / Universities to carry out part of their



AREAS
Atmospheric & Earth Sciences, Life Sciences, Medical Sciences, Chemistry, Material Sciences, Engineering Sciences, Mathematical and Computational Sciences , Physical Sciences

ELIGIBILITY
- Applicants from India must be Indian citizens residing in India and registered for a PhD in a recognized university or research institution in India.
- Applicants from France must be residing in France and registered for a PhD in a recognized university or research institution in France (no nationality requirement).
- Maximum age of the candidate should be 30 years.
- Master's degree (in science, technology or medicine) from recognized University/Institute with top grades.
- Students once supported by CEFIPRA and students who have a permanent position in institutions/universities are not eligible.

FELLOWSHIP BENEFITS
- For Indian students in France: 1300 Euros per month including accommodation charges plus Social Security charges, paid through Campus France.
- For French students in India: Rs. 40,000 per month plus accommodation charges not exceeding Rs. 45,000 per month.
- Return Air fare, Insurance cover.

DURATION
3-6 months

HOW TO APPLY
Apply online at www.cefipra.org/raman-charpak/

Raman- Charpak fellowship provided me an opportunity to work with F Martin-Laurent group, which is a leading research group aiming at understanding the mechanism responsible for adaptation of soil microflora to pollutant biodegradation especially pesticide biodegradation.

Sneha C. Sagarkar
Raman Charpak Fellow 2013

The Raman-Charpak fellowship enabled me to work beyond mouse models and to correlate plasmatic heme levels with the immune response and malaria severity from patients in Odisha.

Esther Dalko
Raman Charpak Fellow 2013

research work in a University / Research Institute based in France or India respectively. The fellowship allows the doctoral students not only to improve upon the PhD programme but also to get access to laboratories better equipped for their research work, in turn improving their overall doctoral skills. Moving across the cultural and language barriers, the fellowship offers an exposure to contemporary research methods and research trends in France or India. Keeping in mind the future needs of both the countries and expectations of young researchers, the Raman Charpak Fellowship offers support across a wide variety of S&T domains.

In last 2 years, the centre has implemented stringent two stage selection procedures for evaluation of the candidates by involving experts from various fields of science and technology and developing criteria which is based on scientific excellence. During its first year in 2013, 11 Indian and 5 French fellows were awarded this fellowship to do part of their PhD work in their host institution and for the year 2014, a total of 17 Indian fellows and 5 French fellows have been awarded this fellowship.

CEFIPRA also hosted a debriefing session for Raman Charpak Fellows of 2013 in New Delhi and Paris to share their experience of work in their host institution and provide their feedback for improving upon the programme.

The Center would work towards evolving the Raman Charpak Fellowship as a flagship international student exchange program which could be implemented in such a way that it increases understanding of doctoral students to the S&T ecosystems of both the countries. The next phase of Raman Charpak Fellowship will focus on connecting more PhD scholars of two nations along with making their present and host Universities/ Institution as a part of a greater network. CEFIPRA will take the initiative to raise the bar so that the fellowship matches the best in the world. Efforts are also underway to help Raman Charpak Fellows in their transition from PhD Programme to Post-Doctoral level (if any).

European School on Nanosciences and Nanotechnologies (ESONN)

ESONN Programme was a useful learning experience as it gave an excellent overview of many new technologies. The faculty, drawn from top of the line institutions, was extremely inspiring and made a sterling effort to explain cutting edge advancements in field of nano-electronics.

Neha Sharan
ESONN FELLOW 2013

Appreciating the rapid development of nanotechnology in India and the requirement of quality research in this field, CEFIPRA joined hands with Université Joseph Fourier, Grenoble, France, to support the participation of Indian doctoral students in the European School On Nanosciences and Nanotechnologies (ESONN). This prestigious school affords the opportunity to students from various countries to be trained in different areas of nanotechnology. ESONN training programme is a three-week course structured to highlight fundamental and technological advances in nanotechnology. The academic and practical course cover the functioning and characterisation of nano-objects. This window has been created for Indian doctoral students to help them understand the complexity and challenges of nanotechnology which will be arising in future.

In the last 2 years, a total of 14 Indian doctoral students have been supported by CEFIPRA to participate in ESONN.

ESONN Programme: How To Apply

- Based on specific call for Applications on www.cefipra.org, Indian PhD scholars need to register on ESONN website for the specific call for applications.
- After registration, they need to send their applications to CEFIPRA in specified format.
- Selected candidates are then informed after peer evaluation.

CIFRE Programme

In order to strengthen the supply chain of human resource across the knowledge innovation chain, CEFIPRA has recently entered into an MoU with (ANRT) Association Nationale de la Recherche et de la Technologie to catalyse support to PhD scholars from India and France in PPP mode (Pubic Private Partnership). The programme is currently in advance stages of implementation.

ANRT is in-charge of CIFRE programme which enables Doctoral students to be employed in a French company which cooperates through public laboratory. Scientific exchanges and company's activities are two important elements of the relationship between India and France, so combining them through exchanges of doctoral students who can start their professional carrier by being a new seed for future S&T and Industrial cooperation. This is where CIFRE programme comes into the picture and CEFIPRA along with ANRT intends to develop the future opportunities for doctoral students in the Indo-French context. The details of this programme will be shortly available on CEFIPRA website.

CEFIPRA in its coming years will improve upon the existing student mobility support programmes and incorporate newer ones, keeping in mind the future vision of the organisation. The centre will carry on its support to the young scientific minds of both nations and will expedite its efforts towards building the future scientific competency of India and France.

MOBILITY SUPPORT FOR INDUSTRY BY CEFIPRA
AUGUST-SEPTEMBER 2014

Domain	Name and Organisation affiliation	Institute visited	
Information and Technology	**Sundeep Oberoi** Tata Consultancy Services, Mumbai	Universite de Nice, Nice, France	
Information and Technology	**Debi Prasad Pati** Tata Consultancy Services, Rajarhat, Kolkata	Universite de Nice, Nice, France	
Information and Technology	**Sayan Bhattacharya** Tata Consultancy Services, Rajarhat, Kolkata	Universite de Nice, Nice, France	
Information and Technology	**Abhijit Das** Tata Consultancy Services, Rajarhat, Kolkata	Universite de Nice, Nice, France	

CEFIPRA FOR INDUSTRY

Creating Industry-Academia linkages

Knowledge transfer between academia and industry are required to improve the competitiveness of the industries. CEFIPRA has strived to create seamless linkages between industry and academia.

In the current era of global competitiveness, Industry-Academia linkages have become more significant to generate industrially relevant knowledge and product at affordable cost. The key determinants of global competitiveness are innovation capabilities and development of era-specific business plan. To improve competitiveness, action would be needed on both fronts viz. Academia for research and technology development and Industry for formulation of market driven business plan. However, one alone cannot move faster. Many academics are unable to translate know-how to pilot scale/ marketable product. In the other way, many industries cannot generate innovative product/process line. Even many companies, mainly Micro and Small Enterprises (MSEs), are unable to translate new technologies and ideas into marketable products and services posed by innovation challenges, as they are constrained for want of suitable resources, infrastructures, facilities, environment and financial constrains, inspite of their innovation acumen. The current level of industry–university/academia/R&D institutions linkages has to go a long way to work in tandem.

An industry–academia linkage model that addresses the whole knowledge value chain, right from the prototype to commercial stage, is a need of the hour. Appreciating the need of linking knowledge system with wealth creation (K to B), CEFIPRA in its evolution process initiated the Industrial Research Programme (IRP) in 2002. Launching of IRP has worked as an enabling platform for the organizations in India & France to realize their potentiality in terms of product and process development. It has facilitated innovation, risk taking for Industries and also bringing the private industry, public institutions and the government closer to promote research and innovation between India & France. It has also catalyzed the upper end of the knowledge innovation chain. The projects supported under the programme have resulted in significant in the form of some products & processes, some of which have already came in the market and some will be leading at commercial market in future.

A success story for translating innovative ideas into working prototypes is development of prototype ceramic crucibles. International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI), Hyderabad, India along with two industrial partners, M/s Porcelaine Pierre Arquie Ceramique Technique (PACT), Limoges, France and M/s Ceradecor India Limited, Greater Noida, UP, India have jointly developed prototype ceramic crucibles through some innovative process with the support of CEFIPRA. In this collaboration for benchmarking the sample crucibles provided by M/s Ceradecor, ARCI thoroughly studied the

crucible for all properties and carefully designed the thermal shock resistant formulations which can give the same properties after development of innovative product. Further, ARCI was able to cast a lab scale crucible with dimensions, ⌀ 90mm & H 66mm and fix the sintering schedule to obtain a crack free crucible. To prove the thermal shock resistance of crucible, the field trials were conducted both by M/s Ceradecor and ARCI and the crucible withstood for 7 cycles over the temperature range RT-1200^{oC}. Further, ARCI independently worked for fabrication of actual size crucibles and sintering the same. Ultimately, they were successful in reproducibly making the thermal shock resistant containers of approximate dimensions ⌀ 210 x H170 x th15 mm.

Further, success of IRP is not only restricted to development of the prototype but also pilot scaling. The restriction enzyme, BamH1 is available in the market by international players like NEB (New England Biologicals) at higher cost. Bangalore Genie, an SME was trying to make import substitution of restriction enzyme, BamH1. But they were facing difficulties in getting pure and stable BamH1, employing conventional methods of chromatography. At the same time, Universite de Technologie (UTC), France was developing some cutting edge ultra-high performance chromatographic systems based on pseudo-bio affinity recognition for purification of structurally intact protein molecules ensuring functional properties. CEFIPRA brought both Industry (Bangalore Genie) & Academia (UTC) together to work out an efficient method to recover and purify the restriction enzyme BamH1 from the bacterial culture media producing this enzyme. After collaborative effort, necessary innovation was carried out using novel ultra-high throughput chromatographic systems and using Convective Interaction Media (CIM) technology combined with pseudo-affinity ligand to recover & purify stable restriction enzyme, BamH1. Collaborators were able to get successfully 20,000 units of BamH1 using UTC's innovative system with a rum time of only 40 seconds. This fast and efficient purification strategy was successfully integrated into the existing restriction enzyme production system of Bangalore Genie. In addition, Technical experts from Bangalore Genie were also trained at UTC for a period of six months in different cutting edge chromatographic approaches such as Immobilized Metal Affinity Chromatography (IMAC), Histidine and Affinity Chromatography (HLAC) etc. which could be used beyond this specific problem.

Another success story is to develop inexpensive, affordable healthcare product. The '**Misoprostol**' is an orally active synthetic prostaglandin E_1 (PGE_1) analog used to prevent gastric ulcers, evacuation of the uterus in case of incomplete abortion, induce labour and abortion. "Misoprostol" is a unique breakthrough in human (women's) health arena. Misoprostol was invented and marketed by G.D. Searle & Company (now Pfizer) under the trade name Cytotec, but other trade names and generic formulations are also available. World Health Organization (WHO) declared it as an essential medicine. It was too expensive and was not affordable for the common people. Indian Institute of Chemical Technology (IICT), Hyderabad along with Ecole Nationale Supérieure de Rennes intervened in the process know-how of this essential medicine 'Misoprostol' and developed the innovative technology with the support of CEFIPRA, which has successfully reduced the cost of

INDUSTRIAL RESEARCH PROGRAMME

HOW TO APPLY

The proposals must involve at least one industrial partner either in France or in India and a research institute from the other country. Proposals involving more than one industrial partners or research institutes are also welcome.

HOW TO APPLY

- A two-page write up (pre-proposal) is sought from the collaborators for screening the ideas.
- A detailed proposal is invited from selected Collaborators.

Visit CEIFPRA Website: www.cefipra.org for proposal format and detailed guidelines. Apart from this, special calls for proposals in select thematic areas are also put out from time to time invited.

production. Optimization of the whole process chain took more than a year through synthetic route for one gram of compound. The technology was later transferred to AVRA Laboratories. AVRA stepped in at this stage and scaled up the production process in pilot batches after optimizing critical control points at every stage improving purity profile. The main challenge faced during optimization at pilot scale was maximization of pure final product to freeze the process as stable. Those pilot trials were carried out to produce 10 kg batches. It was followed by rigorous stability (accelerated and standard) studies. The stability studies and yield of pure grade pilot product was very sensitive process innovation of the whole technology. On completion of the stability studies and after necessary regulatory clearance, the product was launched in Indian market in September 2011. AVRA is now manufacturing 100 kg of drug per month and offers it to several national and international pharma companies. The company is under development of GMP facility at Vizag, Andhra Pradesh to double the production capacity, which may involve an investment of more than Rs. 5 crore. Around 42 million women undergo abortion either with Misoprostol alone or in combination with Mifepristone every year. Due to this breakthrough innovation and subsequent development of economic products, "Misoprostol" is now inexpensive, affordable healthcare product in this country and widely available in the developing world. Since the market potential of this drug is very attractive and over Rs. 350 crore per annum in the Indian market, the pharma company has successfully commercialized the drug.

In recent years emphasis of India and France has been to translate knowledge towards creation of global common goods. In this context, CEFIPRA has collaborated with Biotechnology Industry Research Assistance Council (BIRAC), a not for profit company of the Department of Biotechnology, Government of India for improving the comptitiveness of Indian SMEs through collaboration with French SMEs in the area of red and green biotechnology. Science and Technology Department of the French Embassy in India, Ministry of Foreign Affairs, Government of France along with BIRAC and CEFIPRA have recently launched an Indo-French Challenge Oriented Programme in the area of Red Biotechnology for the academia and industries of both the nations upto the commercialization stage. The first call for proposal under the programme was in the area of molecular diagnostics for prediction of disorders like cardiac, alzheimers disease (and/or dementia), cerebral palsy etc. and generation of new assistive technologies for mobility of physically challenged.

Appreciating the interest of private sectors to contribute to the Indo-French scientific collaboration, CEFIPRA expanded its programme portfolio and has developed its Innovation Programme. Private companies could leverage this platform for continuing their R& D activities in a collaborative mode, across the knowledge-innovation chain. Groups of industries/industrial consortia from the two countries can approach CEFIPRA for such agreements for each programme of their interest. Currently Saint-Gobain Research India and CEFIPRA have partnered for a programme on "Sustainable Habitat for Hot and/or Humid Climates".

As a whole, industry-academia model of joint collaborative venture and CEFIPRA's catalytic action for this venture made unique troubleshooting of industrial problems and development of economic & efficient products for India and France. ●

NATF and INAE Seminar on Technology & Health Care

15-16 October 2014

To deal with the new challenges facing the society in terms of ensuing demographics, the National Academy of Technology France (NATF) and the Indian National Academy of Engineering (INAE) came together to collaborate in the following areas in healthcare:

i. **Genomics and Computational Biology:** Diagnostics, markers, bioinformatics-based modelling, gene and cell therapy.

ii. **Medical Devices:** Chips, ICT and Electronics for advanced medical devices, Mobile devices, personalized treatment.

The seminar between INAE and NATF on "Technology and Health-Care" was successfully organized at Évry-Génopôle, France on October 15-16, 2014. The seminar yielded following recommendations:

- Need to move from ideas to actions
- Need to now define precise actions for a long term collaboration
- Topics for long term collaboration: Affordable healthcare, Bioinformatics
- Delegates from France and India showed great interest and enthusiasm in identifying joint areas for a long term collaboration
- Need to sustain the interest

Director, CEFIPRA attended the seminar as a part of the Indian delegation.

Indo-French Seminar on Organic Photovoltaics for Solar Conversion

15-17 October 2014

National Chemical Laboratory (NCL), Pune in association with University of Bordeaux had organized a workshop on "Organic Photovoltaics (OPV) for Solar Energy Conversion" at NCL, Pune during October 15 and 17, 2014 with support from CEFIPRA. Twenty Six eminent invited delegates from France and India made presentations on various aspects of OPV. A poster presentation by students and a round-table discussion by all the speakers were also held on October 16, 2014.

The main objective of the workshop was to discuss on the emerging developments in the OPV area, including OPV devices, bulk heterojunctions, organic-inorganic hybrid systems and organic architectures (polymers and small molecules). Round table discussion was very helpful to understand the expertise available as well as needed for each participating group. Most of the Indian (French) participants could identify a partner with complementary expertises from France (India) and held a very healthy discussion on the possibilities of joint proposals, to be submitted to CEFIPRA or the French National Agency for Research ("ANR") in the near future. It is also to be underscored here that the informal discussion held among the speakers for about 2 hrs on October 15th morning, before the inauguration ceremony, paved a concrete road to friendly scientific discussion on all aspects of OPV workshop on all three days. Friendly scientific atmosphere prevailed throughout the workshop, and speakers and students enjoyed interacting. Mr V.V Rao, CEFIPRA insisted on moving towards low power applications with

OPV devices, such as Samsonite's project on luminous name strip on suit case or hand bag, and it was well received. Sustainability of the OPV device is an impending issue, which is discussed at length. It is also worth mentioning here that very few number of industries are working in the OPV area in France, and no OPV industry exists at present in India, underlining the amount of work to be addressed by the scientific community. To go further in bilateral collaboration, Prof. Thierry Toupance has proposed to use "Invited professorship position" offered by most of the French universities to invite the Indian colleagues.

All participants felt that OPV workshop, involving renowned researchers, students/young scientists can go a long way to future collaborations between India and France. Indeed, in the concluding session, Prof. Thierry Toupance proposed to hold the second Indo-French workshop on OPV in France, after two years, and it is fully appreciated by all. ●

HIGH IMPACT SCIENTIFIC RESEARCH NETWORK PROGRAMME

Call for pre-proposal for high impact Scientific Research Network Programme

Indo-French Centre for the Promotion of Advanced Research (CEFIPRA) has been traditionally associated with bridging of individual scientist of India & France in a collaborative mode. After the journey of 27 years, a rich plethora of scientists and scientific group are well networked. Over the years, support from national funding agencies from both the countries has also been increased in Science and Technology. Recognising this, CEFIPRA announces 'High Impact Scientific Research Network Programme' for developing scientific network between excellent research groups from two countries in a collaborative mode. The objectives of the programme are as follows:

- To develop mechanism for knowledge linkages & Knowledge forward chain by facilitating exchange of domain expertise, innovative ideas and technological knowhow between selected groups
- To foster Interdisciplinary/ Intra disciplinary collaborative research & networking activities.

Call for pre-proposal has been announced to create a world class collaborative research network by establishing linkages between nationally supported groups for solving specific problems.

All areas of interest in Science & Technology between India and France with special emphasis on the following areas

- Optics
- Nano sciences
- Cold atoms
- Synchrotron Science
- Computer Science & Bio-informatics
- Energy storage devices
- Metabolic disorder
- Infectious diseases

Eligibility

Permanent position in an Indian or French University / R & D Institute
Successful nationally funded scientific groups from India & France
There could be minimum three partners from each side
Proposal must be submitted jointly

For further information please contact:
Director
Indo-French Centre for the Promotion of Advanced Research(Centre Franco-Indien pour la Promotion de la RechercheAvancée) 5B, Ground Floor, India Habitat Centre Lodhi Road, New Delhi 110 003 (India)
Email: director@cefipra.org • Website: www.cefipra.org | Tel. : +91-11 2460 2432 Fax: +91-11 2464 8632

DEAD LINE FOR SUBMISSION OF PRE-PROPOSALS : 15th FEBRUARY, 2015

Strengthening Capacity for Inventory of Fauna in Biodiversity Hotspots in India and it's Neighboring Countries

14-17 October 2014

The pace of climate change and the ongoing human alterations in the tropical forests give a new dimension of urgency to document the species in our biodiversity hotspots. However, there has been a steep decline in taxonomists and the concern over the declining capacity in taxonomy is not new. It is known as"taxonomic impediment", which is the incomplete knowledge of diversity life on earth and the dearth of taxonomists world wide. This impediment is most acute in tropical, developing nations, which contain most of the world's biodiversity, yet produce far fewer taxonomists than developed countries.

India has four globally recognized biodiversity hotspots within its territory and therefore, the impact of this impediment is expected to be significant.

Dr. Karthikeyan from Laboratory for Conservation of Endangered Species (LaCONES), Centre for Cellular Molecular Biology, Hyderabad (CCMB), India and Dr. Annemarie Ohler from Museum of Natural History, Pairs France, conducted a four day workshop on strengthening capacity for inventory of fauna in biodiversity hotspots in India with the support of Indo-French Centre for Promotion of Advanced Research (CEFIPRA). This workshop attempted to create linkages between taxonomists working in the Indian region, and researchers who share the same interests in France. Thereby, strengthening taxonomic work and creating a platform for taxonomists to exchange ideas on how the impediment could be overcome.

The workshop was held in LaCONES campus of CCMB, Hyderabad. It was attended by 40 experts in different fields of faunal taxonomy from around the India and France. Participants represented the taxonomic expertise that exists in the biodiversity hotspots. The Inaugural address was made by Dr. Ch. Mohan Rao, Director CCMB and it was followed by talks by Prof. Alain Dubois, Museum of Natural History, Pairs, Dr. Ajith Kumar, Wildlife Conservation Society and Dr. K. Venkataraman, Director, Zoological Survey of India.

During the four day workshop 14 posters and 27 talks were presented. A hand-on session on biodiversity data sharing was also conducted. On the final day of the workshop participants came up with recommendations on strengthening capacity for inventory of fauna in biodiversity hotspots in India.



Interactive Sessions for the Raman Charpak Fellows of 2013

16 September & 17 October 2014

CEFIPRA hosted a debriefing cum Interactive session for the Raman Charpak Fellows of 2013 in New Delhi and Paris to share their experience of work in their host institutions and provide their feedback for improving upon the programme. Eight Indian and three French Raman Charpak Fellows attended the sessions in CEFIPRA, New Delhi and Embassy of India, Paris respectively. Keeping in mind the valuable suggestions which emanated out of the session, CEFIPRA will take further initiatives for evolving the Raman Charpak Fellowship into a leading international student exchange program in India and France.




MOBILITY OF SCIENTISTS SUPPORTED UNDER CEFIPRA PROJECTS
AUGUST-SEPTEMBER 2014

Project Title	Name and institution affiliation	Institute visited	
Hypergeometric functions: harmonic analysis and representation theory	**E. K Narayanan** Indian Institute of Science, Bangalore, India	Laboratoire de Mathematiques et Applications de Metz, Université de Lorraine-Metz,Institut Elie Carton, Vandeuvre Nancy, France	
Deep structure of the Indian continent	**Ravi Kumar** National Geophysical Research Institute, Hyderabad, India	Institut de Physique du Globe 1 rue Jussieu, Paris France	
Deep structure of the Indian continent	**R K Chadha** National Geophysical Research Institute, Hyderabad, India	Institut de Physique du Globe 1 rue Jussieu, 75238 Paris cedex 05 France	
Deep structure of the Indian continent	**Srinagesh** National Geophysical Research Institute, Hyderabad, India	Institut de Physique du Globe 1 rue Jussieu, Paris, France	
Correlated studies of response properties of Open-shell molecules in the relativistic Framework	**Trond Saue** Laboratoire de Chimie et Physique Quantiques- Université de Toulouse, Toulouse, France	Raman Centre for Atomic Molecular and Optical Science, Kolkata, India	
Deep structure of the Indian continent	**Eleonore Stutzmann** Institut de Physique du Globe Paris, France	National Geophysical Research Institute, Hyderabad, India	
Extreme QCD in the LHC Era	**Konstantin Petrov** HPC - SED - INRIA - Saclay - Ile-de-France Bâtiment Alan Turing, Palaiseau, France	Tata Institute of Fundamental Research, , Mumbai, India	
Control of melanosome biogenesis by small GT Pases	**Cedric Delevoye** Structure et Compartiments Membranaires Institut Curie, Paris, France	Indian Institute of Science (IISC), Bangalore, India	
Nutrient sensing in plants	**Narendra Tuteja** International Centre for Genetic Engineering and Biotechnology, New Delhi, India	Biochimie et Physiologie Moléculaire des Plantes CNRS/INRA/SupAgro/ UMII,Batiment 7, Montpellier, France	

MOBILITY OF SCIENTISTS SUPPORTED UNDER CEFIPRA PROJECTS
AUGUST-SEPTEMBER 2014

Project Title	Name and institution affiliation	Institute visited	
Probing dense matter and strong gravity	**Hema Ramachandran** Raman Research Institute Sadashiv Nagar, Bangalore	Centre d'Etude Spatiale des Rayonnements,CNRS Toulouse, France	
Global transcriptomics of sex specific splicing	**Arun Kumar** Centre for DNA Fingerprinting and Diagnostics, Hyderabad	Centre de Neurosciences de Paris Sud Université Paris-Sud, Orsay, France	
Analysis of protein flexibility in biological recognition	**Pinak Chakrabarti** Bose Institute, Kolkata	CNRS - UPR 9080 Laboratoire de Biochimie Théorique Institut de Biologie Physico Chimique Paris, France	
Deep structure of the Indian continent	**N Purnachandra Rao** National Geophysical Research Institute, Hyderabad	Institut de Physique du Globe Paris, France	
Financial Inclusion based upon rural mobiquitous services technological platform	**Veni Madhavan** Indian Institute of Science\ Bangalore	Universite de Nice, Nice France	
Design and synthesis of new C1- symmetric biaryl-based ligands and catalysts and their evaluation in asymmetric catalytic reactions	**Pradeep Kumar** National Chemical Laboratory Pune	University of Strasbourg,UMR 7509/ CNRS/ECPM – Chimie Moléculaire ECPM25 Rue Becquerel Strasbourg Cedex 0267087 Strasbourg Alsace	
Thermo-hydrodynamics of phase-change induced oscillating Taylor bubble flows	**Sameer Khandekar** Indian Institute of Technology, Kanpur	Institut National des Sciences Appliquées de Lyon (INSA Lyon) Centre de Thermique de Lyon Villeurbanne, France	

MOBILITY OF STUDENTS SUPPORTED UNDER CEFIPRA PROJECTS
AUGUST-SEPTEMBER 2014

Domain	Name and institute	Institute visited	
Pure and applied physics	**Shaon Sahoo** Indian Institute of Science Bangalore	INAC/SPSMS/GT, CEA Grenoble, Grenoble, France	
Pure and applied physics	**Suhail Usmani** University of Delhi Delhi	Laboratoire de Physique et Chimie des Nano-Objets, Institut National des Sciences Appliquees Toulouse, Toulouse, France	
Pure and Applied Chemistry	**Balaji Sundarraman** Bharathidasan University Tiruchirapalli	Université de Strasbourg Institut de Chimie de Strasbourg, Alsace	
Material Sciences	**Abhijeet Lale** Indian Institute of Technology Chennai	Institut Européen des Membranes, UMR 5635-CNRS/ENSCM/UM2 Université Montpellier 2 Montpellier, France	
Pure and Applied Chemistry	**Vibha Saxena** Bhabha Atomic Research Centre Mumbai	Universite Paris Diderot- Paris	
Information and Technology	**Manjunatha S V** Indian Institute of Science Bangalore	Universite de Nice, Nice, France	
Pure and Applied Chemistry	**Apurba Ranjan Sahoo** National Institute of Science, Education and Research, Bhubaneshwar	Institut des Sciences Chimiques de Rennes – Organométalliques : Matériaux et Catalyse, Rennes, France	

CALL FOR PROPOSALS

DST ANR Targeted Programme on Neuro & Engineering Sciences

Department of Science and Technology (DST), Government of India and AgenceNationale de la Recherche (ANR) launch a joint call for proposal to foster Indo-French collaboration by supporting joint research projects conducted by the scientists from both the countries. In India, on behalf of the Department of Science & Technology, Indo-French Centre for Promotion of Advanced Research (Centre Franco-Indien pour la Promotion de la RechercheAvancée, CEFIPRA) invites proposal from the Indian scientists / researchers .

The Proposal will be supported in the following scientific areas:

- Neuro Science
- Engineering (including: material science, chemistry, smart transport, energy, mechanics & Manufacturing)

Eligibility : On the Indian side:Permanent position as a scientist/faculty member in universities/deemed universities, academic institutes and national research and development laboratories/institutes.

For details regarding the application process, format, supporting documents and funding pattern please visit www.cefipra.org or contact:

The Director

Indo-French Centre for the Promotion of Advanced Research(Centre Franco-Indien pour la Promotion de la RechercheAvancée) 5B, Ground Floor, India Habitat Centre Lodhi Road, New Delhi 110 003 (India)

Email: director@cefipra.org • Website: www.cefipra.org | Tel. : +91-11 2460 2432 Fax: +91-11 2464 8632

DEADLINE FOR SUBMISSION OF PROPOSALS: 30 MARCH, 2015

CALL FOR PROPOSALS

CEFIPRA-SOLEIL Synchotron

India and France would like to utilise large scale scientific facilities available within these two countries. In this context, Indo-French Centre for Promotion of Advanced Research (Centre Franco-Indien pour la Promotion de la Recherche Avancée, CEFIPRA) and Société Civile Synchrotron SOLEIL have signed an MoU to facilitate the use of the Soleil Synchrotron facility in France by Indian Scientists. A call for proposals to initiate this programme is being launched by CEFIPRA. While SOLEIL has agreed to make beam-time available at its synchrotron facility in Saclay based on its usual evaluation/review process, CEFIPRA would consider providing the financial support to the selected successful scientists/researchers to carry out experiments during the beam time assigned by SOLEIL.

Eligibility:

The Indian Principal applicants should hold a permanent position as a scientist/faculty member in universities/deemed universities/academic institutes/ national research and development laboratories.

Application Procedure:

The Scientists have to first apply to PRC (Programme Review Committee) for allocation of beam time at SOLEIL. For this purpose, application should be sent to the Programme Coordinator, SOLEIL (Please visit the website: http://www.synchrotron-soleil.fr/Recherche/SUN). They have to apply simultaneously to CEFIPRA to the designated E-mail ID. The project budget submitted to CEFIPRA must clearly delineate the various components and the justification for the same.

The Director

Indo-French Centre for the Promotion of Advanced Research (Centre Franco-Indien pour la Promotion de la RechercheAvancée)
5B, Ground Floor, India Habitat Centre Lodhi Road, New Delhi 110 003
Tel: +91-11 2460 2432 Fax: +91-11 2464 8632

LAST DATE FOR SUBMISSION OF APPLICATIONS : 20th DECEMBER, 2014

Indo-French Centre for the Promotion of Advanced Research (CEFIPRA) 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.

CEFIPRA

For further information please contact:
Pour touta information complémentaire, veuillez contacter:

Director

Indo-French Centre for the Promotion of Advanced Research

5B, Ground Floor, India Habitat Centre, Lodhi Road, New Delhi-110 003 INDIA
Tel: 011 2468 2251, 2468 2252, 2463 3567, 4352 6261
Fax: +91 -11-24648632
E-mail: director@cefipra.org | Web: www.cefipra.org