India and France have a long collaborative relationship in various fields of basic and applied research. Among these, the active areas of joint research are in Mathematics, Material Science, Space Science, and Infectious diseases. Major initiatives have been undertaken periodically to further strengthen the research partnership between the two countries. One important outcome of this partnership is the establishment of IFCPAR/CEFIPRA [Indo-French Centre for Promotion of Advanced Research/Centre Franco-Indien pour la Promotion de la Recherche Avancée] — a bilateral institution, created in 1987, to strengthen the Science, Technology, and Innovation (STI) partnership between the two countries.

The report undertakes a detailed investigation of the role this institution has played in the last 25 years of its existence and based on this assessment gives suggestions for enhancing its engagement for further strengthening the Indo-French STI partnerships. The report draws attention to the value of the knowledge which has been created through the institute’s funding of scientific and industrial research projects, the role this institute has played in strengthening linkages among the individual scientists and institutions of the two countries, enhancing human resource competency in STI of both the countries, and how it has supported translational research that has led to some significant economic and/or social outcomes.

CEFIPRA over the years has broadened its role, keeping in view the changing dynamics of global science and technology, the research demands of both the countries, and the global challenges. How CEFIPRA activities are influencing the overall STI programmes and contemporary engagements between the two countries has also been explored in this study.
editor's note

"To exist is to change, to change is to mature, to mature is to go on creating oneself endlessly" - Henri L. Bergson (1859-1941, French philosopher, 1927 Nobel Prize in Literature)

And that is the story of CEFIPRA, an organization which was created out of the political will to utilize Science and Technology to build up the people-to-people contacts between two traditionally friendly nations. Born at a time when the term “Science Diplomacy” was unheard of, India’s first and France’s only bilateral S&T supporting organization dedicated its efforts to connect the best Franco-Indian scientific minds to strengthen the national scientific competencies and emerged as a model of bilateral cooperation to enrich the human pursuit of knowledge. With the increasing emphasis on knowledge economy, translational research has been encouraged by catalysing academia-industry interaction to improve the competitiveness of the industry. The effectiveness of knowledge-to-product transition to the industry has been stimulated by supporting Research and Development in alignment with Industry’s requirements. In tune to the focus on Innovation by both the Governments, systemic linkages have been established across the knowledge value chain.

During its more than 25 years of evolutionary journey, CEFIPRA has endeared it to the scientific communities of both the nations by providing a vibrant collaborative platform. Testimony of the value of such platform are more than 1700 international joint publications, support to more than 2500 research scholars, graduation of many of them to investigators CEFIPRA-supported projects, and contributions of the selected of them as the members of the Scientific Council. In its pursuit of excellence, the centre has continuously strived to improve efficiency of its service through introduction of technology, reducing transaction costs and time, transparency of processes and fairness in decisions. Relevance of the organization has been kept alive by expanding its reach to new stakeholder communities. Especially the young scientific minds from both the nations have been attracted by introducing dedicated mobility support. In this edition, incidentally which is my last one as editor, we bring the story of this evolution in body and soul of the centre.

It is always been a unique professional experience to be a part of evolving dynamic organization, especially if it probably is the longest existing one for the service of international bilateral scientific cooperation. Leading the evolution process of the centre during the first three years of its journey from its Silver to Golden Jubilee has been an enriching and enthralling experience. I thank both the Co-chairs for providing the opportunity, members of the Scientific Council and Industrial Research committee for their guidance and all the other members of the CEFIPRA family for their cooperation. As a performing organization, I wish all the best to CEFIPRA’s evolution process to fulfil the mounting expectations of the expanding Indian and French stakeholder communities.

Thank you all! Merci Beaucoup!

Au revoir! Good Bye!

Debapriya Dutta
Director, CEFIPRA
This scheme of collaboration has been the hallmark of Indo-French S&T cooperation facilitated through CEFIPRA, an organization fostering Indo-French S&T collaboration in a manner that is easy to approach and implement. It has attracting a large number of groups of scientists cutting across various disciplines of science towards CEFIPRA. The net result was that in the first five years of its existence CEFIPRA grew exponentially. In the process, it drew into its fold several major players in Indo-French S&T space with established groups from both the sides willing to undertake long-term collaborative pursuits in S&T area. During its more than 25 year long journey CEFIPRA has evolved into a unique organization that connects Indian and French scientific community through its various programmes.

CEFIPRA was established in 1987 as India’s first bilateral centre for the promotion of science and technology based research in various domains. In 2012, the Centre completed its 25 years. During this period, CEFIPRA performed well to contribute towards Indo-French STI system through various mechanisms as linkages between researchers and institutions of the two countries, knowledge outputs and outcomes emerging from supported projects, seminars/workshops, student mobility and other interventions.

CEFIPRA was a political experiment aimed at bringing India and France closer through collaboration in the field of Science & Technology. The testimony of the success of the experiment is the continued existence of CEFIPRA for over 25 years as a benchmark for all Indian bilateral S & T organizations. It has not only resulted in evolution of a vibrant Indo-French Science, Technology and Innovation (STI) ecosystem, it has also become the fulcrum of Indo-French S&T cooperation. CEFIPRA’s important contributions were explicitly appreciated during the state visit of the Honorable President of France, Mr. Francois Hollande in February 2013 and also during the recent visit of the Indian Prime Minister Mr. Narendra Modi to France.

CEFIPRA started primarily as a funding agency with a strong thrust towards promotion of basic and applied research in cutting edge areas of science involving scientists of both nations. Over time CEFIPRA has been able to place itself as a unique platform to accommodate the wide diversity of collaborative efforts of Indo-French scientific community. Emphasis on innovation through Public Private Partnerships is the latest dimension of varied and dedicated efforts of CEFIPRA for achieving its objectives. The new logo of the CEFIPRA aptly and adequately represents the new philosophy and the goals that underlie CEFIPRA’s existence.

Establishing scientist-to-scientist linkages, output management by emphasising on knowledge forward chaining, development of systemic linkages through network programmes and facilitating usage of large scale research facilities by the bilateral S&T research community are various mechanisms that CEFIPRA has deployed to strengthen its core scientific programmes.

The respective scientific research and development policies of India and France have strongly emphasized on innovation through public private partnership for generating societal and economic benefits. In appreciation of this line of thinking, CEFIPRA has introduced several new innovation programmes in partnership with reputed industrial organisations to support the basic and applied research that dovetails well with needs of industrial stakeholders. With participants like Saint Gobain, The Airbus Group and BIRAC, CEFIPRA provides a platform to industrial organisations of both countries to leverage the experience of CEFIPRA in promoting collaborative
A rejuvenated Intellectual Property Management Plan facilitates equitable intellectual property sharing between various stakeholders.

CEFIPRA has also brought value to the national S & T systems of India and France through initiation of targeted programmes in the areas of infectious diseases, engineering sciences, big data, cyber-physical systems and high-performance computing.

The supply chain of scientific human resources required to maintain the tempo of S&T collaboration between the two nations has been strengthened by launching dedicated mobility support programmes for doctoral students. In this context, the Raman Charpak fellowship has emerged as a flagship Indo-French student mobility programme. Till date 28 Indian and 9 French scholars have already been supported to build up their research competencies through value adding exposure to the STI ecosystems of the partnering country.

The role of CEFIPRA as a systemic facilitator strongly manifests itself in catalysing cluster level interactions between the two countries namely ICT Pole de Competitivité in France, and, Science & Technology Parks in India. In order to harness the synergy between specific pairs of regions of India and France in various knowledge and business domains, a pilot scale region-to-region cooperation programme has been launched between Aquitaine region of France and the state of Karnataka in India.

The stakeholder community of CEFIPRA has also been significantly expanded through various focused outreach activities. In order to motivate the next generation of scientists through interactions with the best scientific minds from both the nations, CEFIPRA Annual Lecture Series has been launched and has evoked a robust response. ENSEMBLE, the bimonthly newsletter of CEFIPRA, launched about two years ago, has helped significantly to spread wider awareness about CEFIPRA’s programs and activities amongst new stakeholders in both countries.

Last but not the least, the performance of an organization, to a very large extent, depends upon its internal efficiency. In this context, introduction of a digital proposal submission and project management systems at CEFIPRA have resulted in a significant increase in number of proposals received during the recent call for proposals. Other tools like video conferencing, electronic fund transfer systems, financial management information systems (MIS) have substantially reduced transaction time and costs. The working environment of the Centre has also been enhanced with the well planned renovation of its office premises at New Delhi and, upgradation of communication infrastructure to match international standards.
The first aspect of the project was to study the production of particles in these collisions from first principles, using recent developments in the perturbative Quantum Chromodynamics (QCD), the theory that describes the action of the strong force (QCD) was constructed in analogy to quantum electrodynamics (QED), the quantum field theory of the electromagnetic force). The ultimate goal of this part of the project was to develop a computer programme that samples the distribution of possible initial conditions.

The second aspect was to study specific signatures of QGP using QCD at finite temperature, namely the production of charmonium, and of particles with high transverse momenta. Nucleus-nucleus collisions produce thousands of particles which strongly interact. If interactions are strong enough, the system reaches a state of local thermal equilibrium. QCD predicts that this state is a QGP at temperatures larger than 160 MeV. Several observables can be used as signatures of the QGP, and there are several methods to compute these observables, within the general framework of quantum field theory at finite temperature.

The third aspect of the project was to investigate the expansion of the QGP and its decay into particles using relativistic hydrodynamics. The idea was to make predictions for soft observables (transverse momentum spectra of identified particles, azimuthal anisotropies, Hanbury-Brown and Twiss correlations between identical particles) at LHC on the basis of hydrodynamical models, and their relations to properties of the QGP such as the equation of state and viscosity.

The broad objective of our project was to make predictions for heavy-ion collisions (mostly, Lead on Lead) at LHC, and contribute to the interpretation of the forthcoming experiments. A dedicated experiment, ALICE, has been built to specifically analyze these collisions, and the other experiments at LHC (CMS and ATLAS) also participate in the heavy-ion programme (see Box 1, 2, 3). The project consisted of fundamental theoretical studies, and also phenomenological studies in direct relation with observables.

Here are some highlights

- We proposed a number of new multi-particle correlation observables, ratios of which are less sensitive to the hydrodynamic response of the Extreme QCD in the LHC Era

The Large Hadron Collider (LHC) is the world’s largest and most powerful particle accelerator. It first started up on 10 September 2008, and remains the latest addition to CERN’s accelerator complex. The LHC consists of a 27-kilometre ring of superconducting magnets with a number of accelerating structures to boost the energy of the particles along the way.

The project was devoted to theoretical studies in close relation with the experimental programme of the LHC at CERN that included acceleration and collisions of beams of Lead nuclei, at energies about 15 times larger than those at the Relativistic Heavy-Ion Collider (RHIC) at Brookhaven. These collisions produce a phase of matter named the Quark-Gluon Plasma (QGP).
medium, and thus more directly characterize the initial-state fluctuations of the event shape. This allows for a more precise determination of the medium properties than is currently possible.

- We proposed a model where initial fluctuations stem from independent flux tubes randomly distributed in the transverse plane. We calculated analytically the moments of the initial anisotropies (dipole asymmetry, eccentricity, triangularity), which are the sources of anisotropic flows. Results are in good agreement with those from commonly used Monte-Carlo codes, providing a simple understanding of the fluctuations contained in these models.

- We presented a new procedure to analyze unambiguously correlators between event planes of different harmonics measured by the ATLAS experiment.
collaboration at LHC. Our procedure is less demanding in terms of detector acceptance than the one used by ATLAS. Results based on realistic simulations within the transport model AMPT were in excellent agreement with the ATLAS data.

- We presented a complete set of multiparticle correlation observables. These include moments of the distribution of the anisotropic flow in a single harmonic, and also mixed moments, which contain the information on correlations between event planes of different harmonics. We explain how all these moments can be measured using just two symmetric subevents separated by a rapidity gap. This presents a multi-pronged probe of the physics of flow fluctuations.

- We showed that previously unknown subleading modes in both rapidity and transverse momentum for the elliptic and triangular flows are revealed when the Principal Component Analysis method is applied to the two-particle correlation matrix. This method brings out all the information contained in two-particle correlations in a physically transparent way, unlike existing methods.

**Takeaways/Path Forward**

Quark-Gluon Plasma has been discovered and the experiments provide a strong support to hydrodynamics as the appropriate effective theory for relativistic heavy-ion collisions. We are now in the midst of trying to determine thermodynamic and transport properties of QGP accurately. Uncertainties associated with the initial conditions present a main hurdle in this endeavour. One of the unanswered questions is at what kinematic scale quarks lose their quasiparticle nature and become fluid-like. QCD phase diagram still remains largely unknown. RHIC remains operational. LHC will soon start producing results at even higher energies. Newer (low-energy) facilities are coming up in Germany and Russia. So this exciting field is going to remain very active for the next decade at least.
First of all, I would like to express my gratitude towards CEFIPRA for choosing me as a Raman-Charpak Fellow in the Physical Sciences section. As a Raman-Charpak fellow, I joined Unité de Dynamique et Structure des Matériaux Moléculaires, Université du Littoral Côte d’Opale at Dunkerque, France to pursue advanced research on the impact of quantum dots on the optical, electronic and display properties of ferroelectric liquid crystals. During the stay in France, I worked on quantum dots-liquid crystal composites and investigated “pico-ampere current sensitivity in diode characteristics” which is a new observation for the scientific community. We investigated graphene oxide liquid crystal composite whose polarizing optical image was selected as “Liquid Crystal Beauty” by the Journal of International Liquid Crystal Society for its July-2015 issue. They published my bibliography as “Artist of the month”.

I consider Raman Charpak Program as an exciting and innovative mechanism that enables young researchers to work with French scientists and to exchange ideas that can lead to development of new technologies that add to the welfare of the larger society.

Apart from professional pursuits, I explored French culture, customs and cuisine. I also got an opportunity to visit Prague, Czech Republic as a scientific visitor to join an international conference (FLC-2015) organized by the Czech Physical Society. In hindsight, while I really my participation in the exchange programme. I think the duration of fellowships should be increased. I also must place on record my appreciation for the cooperation I received from CEFIPRA and CAMPUS FRANCE members which went a long way to make the experience memorable.

Detail of POM image: The POM (polarizing optical micrograph) represents the change in optical texture of a LC material in chiral nematic phase after the dispersion of graphene oxide (GO). After the dispersion of GO, we observed few cobweb structure in the POM. The POM was taken at 115.5°C. The picture width is 10 micrometers.

Jury comment: Dispersions of graphene oxide in LC phases are increasingly important in colloidal liquid crystal science. This is one of many images of GO in LC phases that we will see more frequently in the literature from now on.
ENSEMBLE : Looking back at the years that you invested at CEFIPRA, what is/are the most important takeaways as you move on to your next responsibility?

Dr. Debapriya Dutta (DD) : I joined CEFIPRA in 2012 which was quite an interesting juncture in CEFIPRA history as it had just completed 25 years of its existence. Challenge for me was to harness the wisdom/legacy accumulated over a quarter of a century and chart a path that enabled CEFIPRA to continue to address the expectations of its stakeholders in a changed world.

Around that time the Governing Body of CEFIPRA also decided to expand the mandate of the center. As a result CEFIPRA was set on a path to evolve from being a funding agency, to be a catalyst organisation focused on strengthening the bilateral R&D ecosystem.

From earlier emphasis on individual to individual linkages between scientists the focus is now on systemic linkages by developing networks and programmes nested in those networks. We have started a programme that facilitates usage of large research facilities by our scientists. All of this has strengthened the core Scientific Research Programme (SRP) of CEFIPRA enhancing its impact in basic and applied research.

ENSEMBLE : What is the most exciting task that stays unfinished as you hand over the baton and how would you like it to pan out under the new leadership of CEFIPRA?

DD : Under our flagship Scientific Research Programme we have successfully networked as many as 2500 scientists from India and France through robust collaborative linkages. Now is the time to convert and encash these linkages and networks into generating value for society in terms of economic and societal benefits.

I believe that Scientific Research Programme should continue to function as nuclei of CEFIPRA’s activities. The challenge will be to make them sustainable by bringing other funding partners and enhance diversity of knowledge partners.

Agriculture is going through a transitional phase with a huge need to enhance farm productivity that has plateaued off late. We initiated a dialogue between INRA and ICAR to devise a mechanism to harness the synergy between two countries.

Another important point of satisfaction was starting new dedicated mobility programmes to allow researchers of two
countries to directly interact and work together. We started a programme in collaboration with ANRT, a French organisation that supports doctorals to pursue short stints with the industry. Lastly, the Region to Region programme was started on the premise that S&T collaboration needs to be driven by complimentarities between niche regions of the two countries. The pilot programme was between the Indian state of Karnataka & Aquittaine region of France focussing on business as well as technical side of Aerospace & Biotechnology sectors. Due to a variety of factors the programme has been a little slow on the rise. This will be a good candidate for effort by the team at CEFIPRA in the years to come to give more broader base to Indo-French S&T Collaboration.

**ENSEMBLE**: What is your take on the differences, and similarities, between S&T ecosystems of India and France? How do they impact the realisation of Indo-French S&T cooperation?

**DD**: If we look at the policy frameworks of the two countries, France has its National Research and Innovation Strategy 2009 and Science Diplomacy for France, 2013 while India has its Science, Technology and Innovation Policy 2013.

Both countries lay emphasis on innovation and use of S&T to enhance social and economic wellbeing of their people.

The difference lies in the way their respective innovation ecosystem and the S&T institutional landscape is structured. In India the emphasis of its government led innovation ecosystem is on frugal and inclusive innovation given the heterogeneous and diverse country that India is. Indian S&T landscape is mostly centered around government ministries and departments with not much alignment between industry, academia and research organisations.

French innovation ecosystem is based on a systemic approach. S&T landscape in France is structured to find and tap synergy between its S&T institutions and industry. Nationally funded R&D funded bodies are located within academic institutions in order to not only promote synergy but also to benefit from constant supply of talented human resources. French Pole de competitive (PDC) are clusters where large and small industries, research and academic institutions are collected focussing on specific themes. CEFIPRA can play a very useful role by being a conduit to bring into India the French expertise in creating mechanisms that harness synergy between institutions dotting the S&T landscape of India.

**ENSEMBLE**: Which are the main areas that in your view hold maximum potential for Indo French S&T collaboration in the years to come?

**DD**: There are several areas which are already established and there are ones that are likely to emerge based on convergence between interests of India and France.

I will put the aerospace and aeronautical engineering at the top. France has huge interest in this area and Indian aviation is the fastest expanding in the world. We need to encourage development of a lot of SMEs in this area that can link up with French companies on business terms. Other areas could be Biotechnology (red and green Biotechnology), energy, sustainable city development and transport planning and Material Science and Nanotechnology.

**ENSEMBLE**: Scientific Research Programme and Industrial Research Programme are flagship programmes of CEFIPRA to foster collaboration between scientists of the two countries. What has been their impact and how do you think these can be made more effective and aligned to emerging priorities in the times to come?

**DD**: Scientific Research Programme and the Industrial Research Programme are two programmes that form the core of CEFIPRA which account for about 70% of CEFIPRA's budgeted resources. It gives me great satisfaction to note that in the past 28 years CEFIPRA has supported 478 collaborative R&D projects which have led to more than 1700 publications in reputed and

From earlier emphasis on individual to individual linkages between scientists the focus is now on systemic linkages by developing networks and programmes nested in those networks.
peer reviewed international journals with more than 30,000 citations till date. In addition to publications CEFIPRA has supported travel/related expenses of more than 3700 scientists and students enabling them to go across to interact and work with scientists in the partner country. As many as 2500 science students have earned doctoral/post doctoral qualifications while working on projects supported by CEFIPRA through SRP/IRC.

Publications coming out CEFIPRA’s projects finding place in peer reviewed journals are a clear indicator of their impact and contribution to the knowledge pool. CEFIPRA supported project has already led to development of Misoprostol which has been commercialized and has reached markets in India and other countries. Another impact of CEFIPRA’s efforts has been robust relationships between Indian and French S&T ecosystems at individual as well as institutional levels which serves as a foundation for overall bilateral relations. This enables other stakeholders to build upon this leading to enhanced Indo-French contributions to global common goods opening vistas for knowledge generated under CEFIPRA to be deployed for wider applications.

ENSEMBLE : Maximising Interaction between young scientists of the two countries are critical for laying long term effective collaborations for scientific R&D. CEFIPRA has contributed to this cause through its various mobility programmes for young students. How, in your view, this can be enhanced in the future even with the resource constraints that do and will exist?

DD : CEFIPRA has gone beyond just supporting mobility of staff working on projects supported by CEFIPRA and has started dedicated mobility programs. Raman Charpak Fellowship Programme is a dedicated mobility support programme which has already supported 70 Indian/French doctoral students since it was launched 3 years ago. Support under Raman Charpak programme enables Indian and French doctoral students to pursue R&D stints in labs of India and France to get a rigorous exposure to S&T ecosystems of the two countries. Support for Indian students to ESONN is another example in this context.

Now the question is how to take this further. My view is that CEFIPRA should in times to come also dovetail its efforts in the mobility area with other funding windows. For example a few fellowships under the Prime Minister’s Fellowship could be secured for sending Indian students to French institutions. Several national agencies in France support students to take stints in other countries which must be tapped by CEFIPRA through collaborative mechanisms. More than 800 french companies have operations in India and similarly Indian companies are operating in France. These industries can be very useful.

ENSEMBLE : What can be done to attract more private sector participation in funding and execution of bilateral S&T cooperation between India and France?

DD : Private sector is an integral part of S&T ecosystem given its needs to generate/access new knowledge in order to develop new products/services. CEFIPRA support can reduce the risks a private entity is exposed to while developing new products/services.

Contd. on pg. xii
## MOBILITY OF SCIENTISTS SUPPORTED UNDER CEFIPRA PROJECTS

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Domain</th>
<th>Project Title</th>
<th>Name</th>
<th>Institutional Affiliation</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Pure and Applied Physics</td>
<td>Studies of spin ladder and heavy fermion systems in extreme conditions of hydrostatic or uniaxial pressure and low temperature</td>
<td>Arumugam Sonachalam</td>
<td>Bharathidasan University</td>
<td>Institut Nanosciences et Cryogénie</td>
</tr>
<tr>
<td>2</td>
<td>Pure and Applied Mathematics</td>
<td>Hypergeometric functions: harmonic analysis and representation theory</td>
<td>Angela Pasquale</td>
<td>Université de Lorraine - Metz</td>
<td>Indian Institute of Science</td>
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<td>4</td>
<td>Pure and Applied Chemistry</td>
<td>Correlated studies of response properties of Open-shell molecules in the relativistic Framework</td>
<td>Debashis Mukherjee</td>
<td>Indian Association for the Cultivation of Sciences</td>
<td>Université de Toulouse 3</td>
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<td>5</td>
<td>Life and Health Sciences</td>
<td>Control of melanosome biogenesis by small GTPases</td>
<td>Gangi Setty</td>
<td>Indian Institute of Science</td>
<td>Institut Curie CNRS UMR 144</td>
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<td>6</td>
<td>Earth and Planetary Sciences</td>
<td>Tropical cyclones in the Bay of Bengal: Oceanic response and air-sea interactions</td>
<td>Matthieu Lengaigne</td>
<td>National Institute of Oceanography</td>
<td>Université Pierre et Marie Curie</td>
</tr>
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</table>

*Contd. from pg. xi*

**ENSEMBLE**: What is your message to the team at CEFIPRA as you prepare to pass on the baton of leadership and move on to newer challenges?

**DD**: I was fortunate to get a team at CEFIPRA that comprised of young, bright and very hard working professionals. As dedicated professionals they have provided me full support to push forward the agenda of CEFIPRA right from the day I joined. And I have often pushed them to their limits. I am sure they will provide the same support to my successor. I wish the very best not only to my successor but also to each and every member of the team at CEFIPRA. And I see a great future for CEFIPRA in the times ahead.●
CEFIPRA in collaboration with Joseph Fourier University, Grenoble supported the participation of 8 Indian doctoral students in ESONN from August 23rd 2015 - September 12th 2015.

<table>
<thead>
<tr>
<th>Name</th>
<th>Institutional</th>
<th>ESONN SESSION FOCUS</th>
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</thead>
<tbody>
<tr>
<td>Somesh Kumar</td>
<td>Indian Institute of Technology Ropar</td>
<td>Quantum Physics and NanoElectronics</td>
</tr>
<tr>
<td>Shailendra Saxena</td>
<td>Indian Institute of Technology Indore</td>
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<tr>
<td>Sweta Chander</td>
<td>National Institute of Technology Slichar</td>
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<td>Supratim Maity</td>
<td>Jadavpur University</td>
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<tr>
<td>Mayank Patel</td>
<td>Institute of Chemical Technology Mumbai</td>
<td>Interface between Biology and Chemistry.</td>
</tr>
<tr>
<td>Swarup Roy</td>
<td>University of Kalyani</td>
<td>Interface between Biology and Chemistry.</td>
</tr>
<tr>
<td>Nirmal Das</td>
<td>Indian Institute of Science Education and Research Bhopal</td>
<td>Interface between Biology and Chemistry.</td>
</tr>
<tr>
<td>Anuja Das</td>
<td>Indian Institute of Technology, Kharagpur</td>
<td>Interface between Biology and Chemistry.</td>
</tr>
</tbody>
</table>

Ensemble | July - August 2015
CEFIPRA has supported around 500 projects till date in different areas of basic and applied research. However, only 2% of those projects are from north-eastern states of India. Thus, during the Outreach Programme at Kolkata in 2014, it was decided to organise an outreach programme in the north-eastern regions of India. Accordingly, an outreach session was organized on 24th July, 2015 at Institute of Advanced Study in Science & Technology, Guwahati, Assam with an objective to reach out to the scientific communities in this region.

Approximately 100 scientists, technologist, students participated from different parts of the North East Region. Prof. Arup Ratan Pal, Associate Professor, IASST gave some information about the foreign collaboration at North Eastern Region. He also informed some probable research topics shared by the Scientist for this region. Mr. R.S. Joshi, Chairman, Federation of Industry & Commerce of North Eastern Region (FINER) shared his experience about the promotion of Industries at North Eastern Region. Mr. Amitava Das, Education Advisor, Campus France Kolkata informed the audience about the opportunities available for higher studies at France. Mr. Tarun Kewsani, Raman-Charpak Fellow 2014 shared his experiences emphasizing the unique benefits of this fellowship and its impact in his career.

Two panel discussions were organised. The first panel was on enabling mechanism of CEFIPRA’s Industry Academia Research & Development Programme and its utility for the North-Eastern states of India. The Industrial Research Committee Members and other Scientists participated as panellists for this session. Dr. Pradip, Industrial Research Committee member, CEFIPRA made a presentation highlighting about the scheme and mechanism of support for Industry Academia Research & Development Programme. Prof. Jayant Modak, Industrial Research Committee member, CEFIPRA gave overview about the mechanism for promotion of start-up. Other panellists invited from this region also gave their views about the innovation ecosystem and their expectation from CEFIPRA. There is a strong desire to have a bilateral seminar. After long discussion it was decided that a preparatory committee involving two faculties from IASST and Mr. Rajeev Aggarwal, Director, Federation of Industry and Commerce of North Eastern Region will be formed under the chairmanship of Prof. N.C. Talukdar, Director, IASST to identify the topic for the seminar and also to prepare some concept proposals under Industry Academia Research & Development Programme.

The Second panel was on enabling mechanism of CEFIPRA’s Scientific Collaborative Research programme and its utility for the North-Eastern states of India highlighting about the scheme and mechanism of Support for promotion of Research. The Scientific council member, panellists from the North Eastern Region and audience participated in panel discussion and gave their views. There is a strong desire to have a bilateral seminar and topic will be finalised by forming a committee under the chairmanship of Director, IASST. Third session was on opportunities for students under Indo-French collaboration and its utility for the North-Eastern states of India. At the onset, Health Science, mathematical Science, biodiversity and ecosystem in traditional knowledge, herbal medicine, sericulture (Muga silk), fragrant material were identified for collaboration for North Eastern Region.
The first French-Indo Symposium on correlated oxide materials (FISCOM) was held from 15-17 July 2015 in Montpellier, France. FISCOM was jointly organized by Université de Montpellier, France, Indian Institute of Technology (IIT) Madras, India, CNRS and CEFIPRA. The symposium brought together experts of materials science (in theory and experimental techniques) from both the countries to a single platform to address the current challenges at the frontiers of strongly-correlated oxide materials, particularly magnetic and structural properties and aimed at being the first step towards exploring potential collaborations in the areas of mutual interests.

The programme of the symposium started with opening remarks by Prof. Werner Paulus and Prof. M.S.R. Rao. This was followed by an invited talk by eminent scientist and Emeritus Professor Michel Pouchard of ICMCB, Académie des Sciences, Bordeaux, France on the topic, “Fifty years of research in the solid state chemistry and materials science oxide domain”. The symposium included 30 oral presentations from various experts from different universities/laboratories/institutes of France and India. Eight distinct groups from France were represented by sixteen French scientists while eight Indian groups were represented by fourteen Indian scientists. Two contributions came from Japan and Switzerland.

At the end of symposium, there was a visit to various labs and facilities in the Université de Montpellier. The symposium covered a wide range of topics in material science. Research talks dealt mainly with topics like, magnetism and magnetocaloric effect in manganites, Berezinski-Kosterlitz-Thouless transition in ultrathin superconducting films, magnetic transition metal oxides: impact of the spins on the thermoelectric properties etc. Experimental and theoretical investigations were equally represented in the abovementioned talks.

FISCOM is also the fruit of long-standing scientific collaborations between the University of Montpellier and IIT Madras, permanently nourished by student and academic exchange, including common teaching activities on both sides. These relations will soon culminate into a common French-Indo Master Course in Materials Science, naturally allowing to organize the future symposia on correlated oxides as heavily demanded by all participants.

The 2nd FISCOM edition is expected to be held in India in 2016 with the support from CEFIPRA.
The Industrial Research Programme (IRP) of Indo-French Centre for the Promotion of Advanced Research (CEFIPRA) was launched in 2002 to support collaborative research programme involving Industry & Academia of both the countries. Launching of IRP has worked as an enabling platform for the organizations in India & France to realize their potential 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 under one roof to promote the research and innovation between India & France. Recently CEFIPRA has changed the name of the Programme to Industry Academia Research and Development Programme. Apart from regular call for pre-proposal in all the areas of technology of interest to the Indian & French Industries, CEFIPRA invites special call for pre-proposal in the following areas:

- Additive manufacturing
- Robotics
- Affordable Medical Devices

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

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