

# ENSEMBLE

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CEFIPRA

**ENSURING GENDER PARITY IN  
INDO-FRENCH COLLABORATIVE RESEARCH**

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

## Editor's Note

Dear Readers,

This issue of *Ensemble* comes out at an optimistic time, where India and France are committed to work together as sovereign partners, with a strong willingness to address international challenges in a post-Covid world. COVID-19 vaccines have been rolled out in both India, France and in many countries across the world, prioritising those in care homes and front line workers. India is administering vaccination to 30 million people in the first phase and in the second phase, 300 million people will be vaccinated. Whereas, France is aiming to vaccinate over one million people by the end of January and approximately 14 million people before the summer. Normally, it takes many years to develop a vaccine but in such a short span of time, scientific communities from both the countries have contributed immensely in the fight against COVID-19.

In this issue, we are sharing the successful outcomes of two of CEFIPRA's projects. Project 5903-1 sets the foundation to study macrophages heterogeneity. The study of this diversity of macrophages provides new clues to make them potential therapeutic targets for various metabolic disorders and diseases like cancer. The other success stories resulted in the designing of open-source tools for timed automata verification.

An Indo-French Symposium was held virtually on "Quantum simulations of molecular energy transport" led by Dr Shannon Whitlock, University of Strasbourg & Dr Sebastian Wüster, IISER Bhopal. This kick-off meeting have taken CEFIPRA's collaborative research project forward and brought together local speakers from various organisations as well as from Univ. Trento, Univ. Eindhoven and MPI-PKS Dresden.

CEFIPRA considers women, as well as men, to be actors for sustainable development. In this issue, we are sharing a few testimonials of women scientists, women researchers engaged in CEFIPRA supported projects as PI, Co-PI, students which might give them visibility. Thus, CEFIPRA is making efforts towards equal representation of women in its collaborative research projects; thereby increasing visibility of women researchers. Recently, Prof Rohini Godbole from IISc, Bangalore, and CEFIPRA's previous Scientific Council member has been awarded the "Ordre National du Mérite" the highest distinctions bestowed by France.

Finally, we are also sharing an outcome analysis of publications emanated under the Raman Charpak Fellowship Programme along with media updates from India and France on COVID-19.

We look forward to further strengthening this platform to bring together diverse aspects of the Indo-French collaborative outcomes along with CEFIPRA activities.

In such trying times, I hope all readers are keeping safe and healthy.

**Dr. Purnima Rupal**  
Director, CEFIPRA

<b>Editor's Note</b>	<b>2</b>
<b>Lead Article</b>	
• <i>The heterogeneity of the fruit fly macrophages revealed at last</i>	<b>3</b>
<b>Projects Outcome</b>	
• <i>IoT Software Testing using timed Outcomes Automata</i>	<b>5</b>
<b>Seminar/Report</b>	
• <i>IISER Bhopal and Université de Strasbourg</i>	<b>6</b>
• <i>31<sup>st</sup> STIP lecture</i>	<b>7</b>
• <i>Raman-Charpak Fellowship</i>	<b>10</b>
<b>Testimonials</b>	
• <i>Breaking Barriers</i>	<b>8</b>
• <i>Young Women Researchers</i>	<b>11</b>
<b>News/Updates</b>	
• <i>Covid-19 News from India &amp; France</i>	<b>13</b>

Whats inside...



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# The heterogeneity of the fruit fly macrophages revealed at last



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**M**acrophages are white blood cells that take their name from their function. In ancient Greek, macrophage means big eater, from *makros* (*makros* = large, and *fagein* phagein = to eat). These immune cells are specialized in the detection, engulfing and destruction of bacteria and other harmful organisms, as well as cellular debris and cancer cells. In addition to their role in the defense against pathogens, macrophages are well known for their reaction to inflammation, by secreting signaling molecules called cytokines, and for the initiation of specific defense mechanisms, by recruiting other immune cells called lymphocytes (adaptive immunity). Finally, it has recently become clear that the macrophages play key roles beyond immunity, revealing less understood features of these cells. Because the macrophages are able to move within the organism and send signals, they represent the ideal sensors for our internal state and allow the communication between distant tissues and organs. In this way, the macrophages can affect development and physiology and, even more intriguingly, this cell population may have positive and negative effects in those processes. Such versatility makes the macrophages potent therapeutic targets for human pathologies, from developmental diseases to metabolic disorders and cancer. Unraveling the biology of these cells hence represents one of the major challenges in basic and medical science.

A key question in the field is to understand whether the macrophages are plastic cells that can accomplish different tasks on demand ('macrophages à la carte') or whether they are subdivided in distinct populations, each endowed with specific features and roles ('clonal theory').

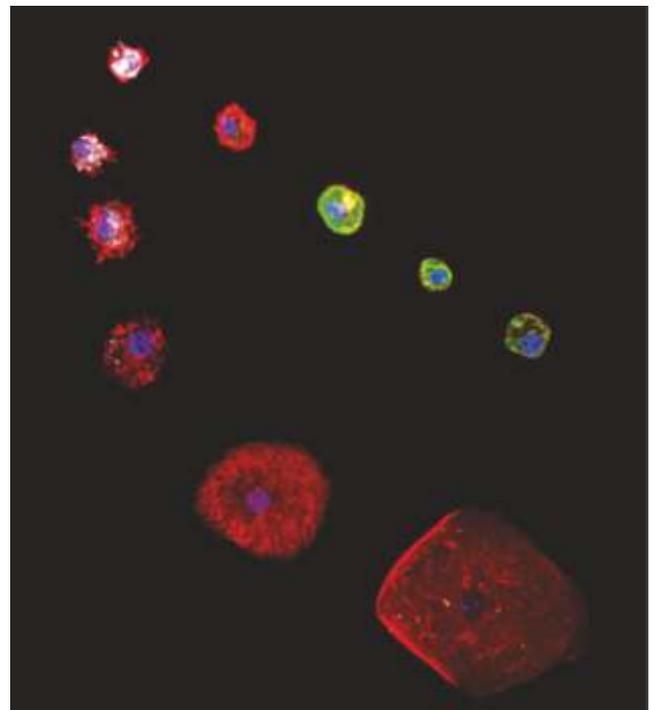
*Drosophila melanogaster* is a proven genetic model, as recognized by the numerous Nobel prizes in Medicine for the discoveries made in development, physiology and immunity. The immune system of this fruit fly is composed of cells called hemocytes. Upon inflammatory or immune challenges, the hemocytes trigger a humoral and cellular response that show similarities to that of vertebrates. Until



**Dr. Tina Mukherjee**  
 Assistant Investigator  
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now, three types of hemocytes had been described: the plasmatocytes constitute the major cell populations (around 95%) and provide the scavenging function typical of our macrophages; the crystal cells are platelet-like cells necessary in the response to wound and melanisation, and the lamellocytes appear only during the inflammatory response and differentiate from the plasmatocytes.

The recently established high throughput sequencing protocols made it possible to analyze the transcriptional landscapes at single cell resolution, hence revealing the complexity of the cell populations present in several tissues and organs of the metazoans.

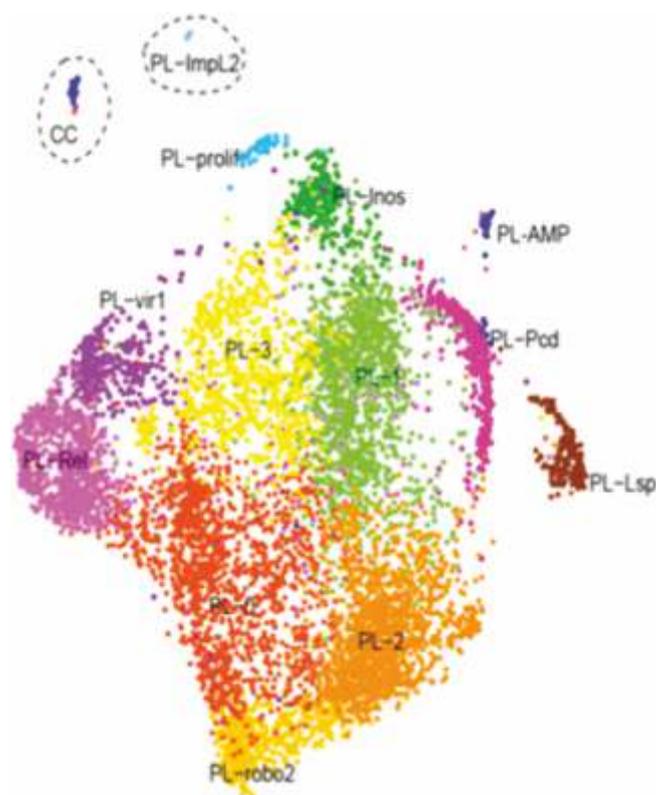


**Figure 1:** Different type of hemocytes found in the hemolymph of the *Drosophila* larva. The images were acquired with a confocal microscope and mounted using Fiji. The plasmatocytes (= macrophages) express the phagocytic receptor *NimC1* (in white). They can differentiate into crystal cells expressing the marker *Lozenge* (in green), or upon wasp infestation, they transdifferentiate into lamellocytes strongly labelled with phalloidin (in red).

The group of Angela Giangrande, Directeur de Recherche CNRS at the Institut de Génétique et de Biologie Moléculaire in Strasbourg (France) analyzed for the first time the *Drosophila* hemocytes by single cell RNA sequencing (Figures 1, 2). An analysis performed in steady state and immune challenged conditions revealed the presence of thirteen subpopulations of plasmatocytes and one of crystal cells in steady state conditions. The molecular signatures identify subpopulations specialized in the production of antimicrobial molecules, in the immune response to bacterial or viral attacks, or in the production of energy stores. Two populations of lamellocytes appear during the inflammatory response.

In collaboration with the team of Tina Mukherjee, Assistant Investigator at the Institute for Stem Cell Science and Regenerative Medicine (InStem, Bangalore), the analysis further showed that the hemocytes undergo a metabolic switch during development, from high production of glucose and fatty acid in the embryo, to high release of energy in the larva. This change in the transcriptional landscape likely reflects the change in the environment. The embryo prepares for tissue and organ growth and is a closed system, protected from the external environment by a rigid membrane, the chorion membrane, so that nothing gets in and nothing goes out. The larva, on the other hand, feeds and is an open system, it constantly responds to immune challenges and lives on fermenting fruits that are rich in microorganisms. This is also the stage at which the animals can be attacked by parasitoid wasp that lay eggs which use the *Drosophila* larva as nourishment. Thus, the novel high throughput technologies allow the analysis of the macrophages at unprecedented resolution and identify new genes, new cell subpopulations, new developmental states.

The Indo-French collaborative work supported by the CEFIPRA grant (Project 5903-1) sets the foundation to study macrophage heterogeneity. In the long term, these data will foster new studies on the role of the environment on macrophage biology, on the intrinsic factors that drive their heterogeneity and on the impact of specific macrophage populations in homeostasis as we all as in pathology.



**Figure 2:** UMAP plot of the single cell transcriptomic analysis of the hemocytes. The analysis reveals 13 subgroups of plasmatocytes (PL) displaying distinctive molecular signatures and one group of crystal cells (CC). The UMAP plot is a graphical representation of the single cell transcriptomic data where each single plot represents one cell, the cells displaying similar molecular signature being grouped together. Each subgroup was label with a different color.



## CEFIPRA welcomes the new French Co-Chair

### MR. MATTHIEU PEYRAUD

We are delighted to welcome Mr. Matthieu Peyraud as Co-Chair of CEFIPRA from France. Currently, Mr. Peyraud is the Director for Culture, Education, Research and Network Cordination at the French Ministry for Europe and Foreign Affairs. He has taken over from Ms. Laurence Auer.

He was awarded with Knight of the French National Order of Merit in 2020 and French National Defence Medal in 1999. He is conversant in English, Spanish and German.

CEFIPRA is confident to further enhance its contribution towards Indo-French S&T collaboration under his able guidance.

# IoT Software Testing using timed Outcomes Automata

The broad goal of the project was to improve the state-of-the-art in the verification of real-time systems, specifically modeled as networks of timed automata. The goals were two-fold: advance on the theoretical foundations as well as implement the results into an open-source tool for timed automata verification. We have been successful on both the fronts during the course of the project.

**Safety verification.** Checking reachability of error states in a model is a fundamental question in formal verification. The basic solution involves enumerating sets of reachable configuration known as zones. We have developed a new algorithm that is able to handle interleavings of different components efficiently and provides gains in several orders of magnitude. This new algorithm has been published in [1]. Efficient algorithms for an extension of classical timed automata containing diagonal constraints and updates have been investigated and the results published in [2] and [4].

**Liveness verification.** This question deals with checking whether a good event can happen infinitely often, and is useful in detecting deadlocks in system models. Fundamental contributions towards the complexity of this problem, and a more efficient algorithm have been published in [3].



**Prof. B. Srivathsan**  
Chennai Mathematical Institute  
Chennai



**Dr. Igor Walukiewicz**  
LaBRI (Bordeaux)  
UMR CNRS 5800

**Tools and examples.** Our algorithms have been implemented and released in the public domain in an open source tool T-Checker [6]. Applications of our methods in an industrial setting are currently being investigated with collaborators from Tata Consultancy Services Innovation Labs Pune [5].

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# IISER Bhopal and Université de Strasbourg

Report on the Indo-French Symposium

“Quantum simulations of molecular energy transport” CEFIPRA collaborative research project online kick-off

CEFIPRA Project No. 62T9-1

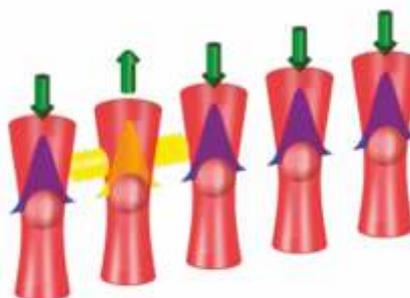
## Organisers:

Shannon Whitlock, University of  
Strasbourg Sebastian Wüster, IISER Bhopal

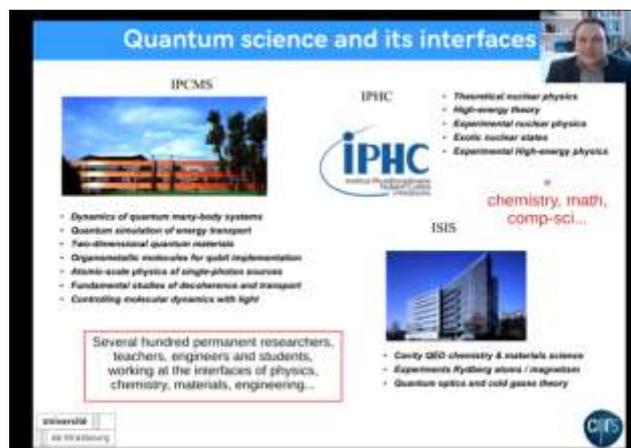
The symposium “Quantum simulations of molecular energy transport” brought together more than 50 researchers, teachers and students for an online event over two days. The event was disseminated by word-of-mouth and through announcements to the broader physics communities in Strasbourg and Bhopal as well as our wider research networks. Participants represented <15 research institutions across 5 countries, with the majority being doctoral students from India and France. Participants presented their research results and discussed topics ranging from: programmable quantum dynamics simulators; quantum simulations of molecular vibrations; controlled decoherence of quantum transport; sensing and spectroscopy.

The programme included an opening session with introductory talks by Dr Rupal (Director CEFIPRA), Prof. Umapathy (Director IISER Bhopal) and Prof. Turek (Deputy Vice President University of Strasbourg) and the organisers. There were then 14 scientific talks distributed over 5 sessions. This included three invited international speakers and 11 talks from the host institutions (5 talks from Uni Strasbourg, 6 from IISER Bhopal) who each brought unique perspectives to the topics of the symposium.

The discussions were lively, often running into the coffee/lunch breaks and the feedback obtained from all symposium participants was very positive. A particular highlight of the program was a vibrant online poster session coordinated by the early career scientists. This consisted of 10x5 minute flash talks and a breakout session in which participants could talk one-on-one with the presenters.



Overall the symposium was a very positive official start to our CEFIPRA collaboration that achieved all our objectives. It successfully brought together a broad range of experts from different specializations across our respective institutions. This will help cement existing collaborations and gave opportunities to initiate new ones. It also successfully showcased the collaboration to international researchers and gave all junior members of both collaborating teams a broad overview of the field. The organisers were especially encouraged by the interest in the research topic by the local scientific communities and the support and encouragement of CEFIPRA and the host institutions to build larger, long-lasting Indo-French collaborations centered around the themes of the symposium.



## 31<sup>st</sup> STIP lecture

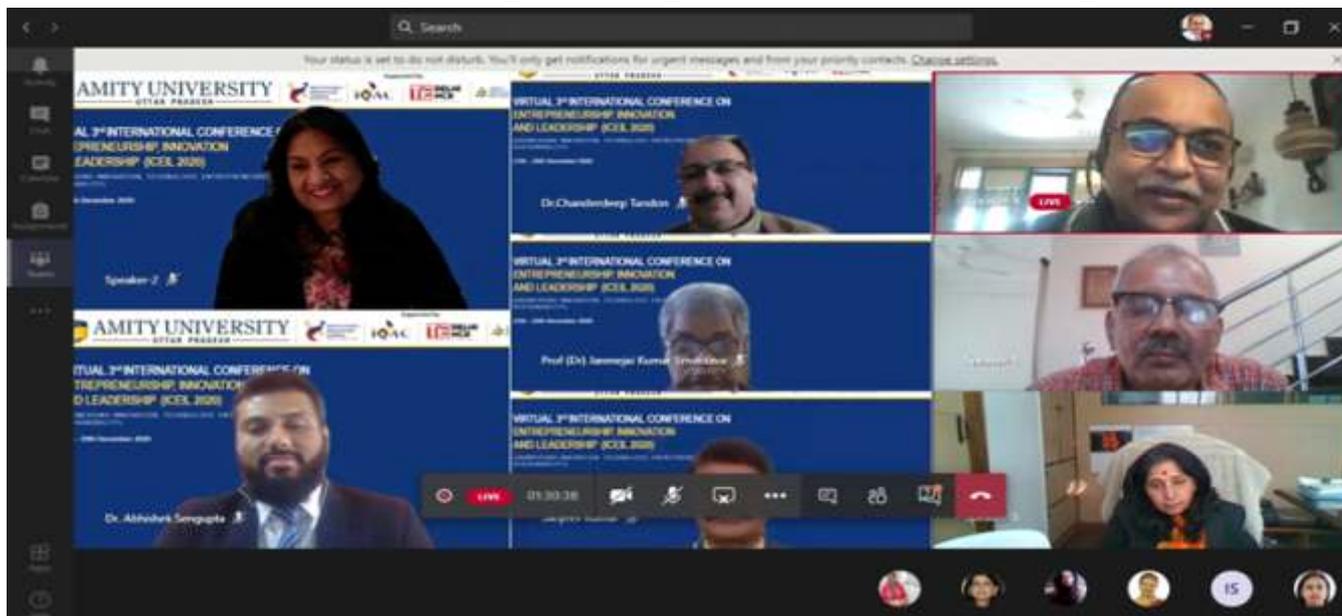
CEFIPRA/the Indo-French Centre for Promotion of Advanced Research has been a partner in organising Science, Technology and Innovation Policy (STIP) forum lectures, along with other scientific institutions housed in the India Habitat Centre, Lodhi Road, New Delhi. Since the last three years, STIP form was able to promote debate on various aspects of Science, Technology and Innovation Policy through public lectures. In continuation of STIP lecture series, Prof. Ashutosh Sharma, Secretary, Department of Science & Technology (DST), Gol was invited by CEFIPRA to deliver this lecture. He spoke, the Art of Science in the Brave New World on 17 December 2020. The

session was Chaired by Amb Dr Bhaskar Balakrishnan, Science Diplomacy Fellow, RIS Other panelist were Mr. Ramanathan Ramanan, Mission Director, Atal Innovation Mission (AIM), Gol, and Dr Purnima Rupal, Director, CEFIPRA. More than 250 participants attended the lecture. Prof Ashutosh Sharma spoke about science, technology, and innovation in the terms of art of science. He suggested new ways of looking at science by linking every compartment of innovation; knowledge of pyramid and framework of pictorial representation of Invention and design.



He said, "Quality, relevance, and appropriate direction of knowledge will lead the world. Coupled with it, a cultural aspect such as self-confidence and self-respect makes up the art of science." Emphasizing on the importance of collaboration, Prof Sharma concluded, "Covid 19 spontaneously spurred the spirit of partnership with a clear and shared purpose. Researchers should have a scientific temper which entails rational analysis of situation, positivity, optimism, and cooperation. The scientific community should critically challenge views, be inquisitive, and be able to engage people in purposeful conversation.

## International Conference on Entrepreneurship, Innovation and Leadership (ICEIL'2020)



Dr. Purnima Rupal, Director, CEFIPRA participated as a Panelist in the technical session entitled "Biotechnology Frontiers: Research and Funding Opportunities – The Way Ahead" on the theme "Harnessing Innovation, Technology, Entrepreneurship and Sustainability" during the 3rd International Conference on Entrepreneurship, Innovation and Leadership (ICEIL'2020) organised by Amity Institute of Biotechnology, Amity University, Noida, U.P on 18 Dec. 2020. The Session was Chaired by Dr. Shirshendu Mukherjee, Mission Director, Biotechnology Industry Research Assistance Council (BIRAC). The other Panelists were Dr. Purnima Sharma, Managing Director, Biotech Consortium India Ltd. (BCIL), Deptt. of Biotechnology (DBT), Mr. Narayanan Suresh, Chief Operating Officer, Association of Biotech Ltd. Enterprises (ABLE).

## Breaking Barriers: Women in CEFIPRA Collaborative Projects



**Dr Françoise Combes**  
Professor at Collège de France  
Astronomer at Paris Observatory  
LERMA, Paris

“ In September 2018, I participated in the Women in Science seminar of CEFIPRA in Paris. It was the occasion to share experiences of the women status in India and France. We made the same observations that girls at school have a better success, a better rating, and obtain more diploma at the end of their studies. However, they select then less rewarding careers, with less responsibilities, and less power. There is also a glass ceiling for women’s careers, and although there are 30% of women researchers in science, only 3% of Nobel prizes are attributed to women. In French academy of science, less than 10% of members are women. Interesting discussions happened about the relevant actions to favor the work of women in science, and sometimes the intuitively good actions were not practically the right ones. For instance, providing a budget to help women to stop several months for maternity leave and care of their young children, had the consequence that women were losing their competitiveness, and their leadership in their research domain, especially when working in fast-moving topics. The exchange of ideas was very productive, and we also exchanged about the science promoted by the CEFIPRA collaboration. I am myself currently working with my team in collaboration with the group of Kanak Saha in Pune (IUCAA). We are working together on several projects, related to the galaxy evolution, in particular due to their bars and spirals, and also the evolution of galaxies at high redshift: early in the universe, the first galaxies irradiated the intergalactic medium, composed of atomic hydrogen essentially, and began to ionize it. This epoch of reionisation is not well known and is thought to last one billion years. Our observation with Astrosat, the ultraviolet Indian satellite, has discovered a galaxy where the ionizing radiation is leaking out, allowing to estimate the escape fraction of these photons that will reionise the universe. The CEFIPRA organization allowed students and postdocs to travel between our two countries, and fostered considerably our collaboration.



**Dr Ranjani Narayan**  
PI of REDEFINE Project  
(IARDP)  
Morphing Machines, Bangaluru

“ I obtained my PhD degree in Computer Science and Engineering from the Indian Institute of Science in 1989. My interest in Dataflow Multiprocessors was further nurtured through my association and collaboration with researchers in MIT, USA, and Delft University, The Netherlands. During 1994 - 2005, when I worked for leading multinationals, I realized that I need to satisfy my research interests, and engineer the same. It was for this, in 2005, I joined a startup, Morphing Machines, launched from the Indian Institute of Science. Primary objective of this venture was to realize a massively parallel, many-core, runtime reconfigurable processor. A few years of dedication resulted in REDEFINETM. While I have engaged with a number of highly talented professionals (from industry and academia) in the past few years, it has been fulfilling to get involved in a CEFIPRA project, involving SAFRAN, INRIA, Indian Institute of Science, and Morphing Machines. In this project the primary objective was to support reactive applications on REDEFINE. I have thoroughly enjoyed my interactions with fellow scientists/engineers between France and India, over the past 2 years. This has given me an opportunity to contribute to areas of mutual interest, and strengthen Indo-French relationship to further Science and Technology.



**Dr Vijay Laxmi with Dr Akka Zemmari**  
(University of Bordeaux), and two research scholars  
(Shweta Bhandari and Vineeta Jain) Dr. Vijay Laxmi  
Professor (Computer Science and Engineering)  
Malaviya National Institute of Technology

“ As a scientist, CEFIPRA allowed me to expand our research on Android App Analysis. This collaboration has also allowed five research scholars (all women) to visit France and develop their research work. We all were mainly benefitted in the area of formal methods that resulted in development of a model for checking information leakage across multiple apps. During this visit, we also learned about research work in allied areas especially distributed algorithms and fault localization in distributed networks. Students benefitted most from research culture at France and developed a confidence that their research outcomes matched international standards. This project helped us establish tie with University of Bordeaux and this collaboration has resulted in joint publications and joint thesis supervision. Periodic reviews from CEFIPRA helped in meeting project objectives and deadlines and completing project successfully. Suggestion from expert were good and some of these suggestions were incorporated and some have become pointer for future research work. In all, working with CEFIPRA was a wonderful experience as CEFIPRA team helped us promptly with any query and all visits were approved as well as necessary documents for visa provided without any delay. Though annual review meetings were held and useful suggestions provided, a presentation in person would have been a better alternative.



**Prof Uttama Lahiri**  
IIT Gandhinagar

“ I would like to thank CEFIPRA for funding my research titled "Post-stroke tele-neurorehabilitation using an operant conditioning paradigm under Volitionally driven Transcutaneous Neuromuscular Electrical Stimulation" that I carried out with University at Montpellier, France with the French side being funded by INRIA. I could complete the project satisfactorily with an Excellent grade. Working with CEFIPRA was really nice since the flow of funding was smooth and the way they conducted the committee presentations was laudable. Each time, the committee offered constructive suggestions that helped me to give a very good shape to my project. In fact, I could achieve a patent application to be filed while working on this project. Also, I could get a number of journal and conference publications at well-known venues. I wrote this project within two years post my arrival to India after working at the USA for many years. This funding helped me to compete with my other colleagues, both male and female. I could give my PhD students (both male and female) exposure of the life and work at well-known research labs in France with the help of this funding support.



**Ms Aarti Kumari**  
Scientist  
CSIR-National Metallurgical  
Laboratory Jamshedpur

“ Under CEFIPRA program, I am working on the project based on extraction and separation of rare earth metals from waste electrical and electronic equipments (WEEEs). The rare earth metals are one of the most essential ingredients of modern technological applications. The domestic demand of rare earth metals is continuously growing in both India and France. Due to scarcity of primary resources of rare earths and its processing limitations, it is challenging to fulfil the demand of rare earths. In this situation, the present project under CEFIPRA is very much relevant and provides an excellent opportunity to work together to find a solution.

The collaboration given a chance to interact with the scientists and researchers of the collaborating institutes, having their own area of expertise. It helped to expand my knowledge and given a chance to understand the problem in different perspectives. The project is also helpful in enhancing the leadership quality in me and skill to communicate with overseas researchers.

Under this collaborative project, I got the opportunity to visit Marcoule Institute of Separation Chemistry (ICSM), France in September, 2019. The visit has given a great exposure and learning opportunity. It was a great experience to visit hydrometallurgical laboratory with new facilities and to interact with international scientists and researcher. It also builds our international network for future collaboration. As a growing researcher, it was a learning opportunity for me to work for a project under CEFIPRA program.



**Ms Shally Gupta**  
Researcher  
Tata Consultancy Services  
Tata Research Development  
& Design Centre Pune

“ I, Shally Gupta currently working as a researcher at Tata Research Development and Design Center, Pune. My research work is focused on rare earth metal extraction and separation from electronic waste equipments under the CEFIPRA Industry-Academia Research and Development Programme (IARDP). CEFIPRA-IARDP project provided me the opportunity to visit Marcoule Institute in Separation Chemistry (ICSM) Bagnols-sur-Cèze, and Terra Nova Development (TND), Quesnoy-sur-Deûle, France. During my stay in Avignon (France), I visited ICSM laboratories and interacted with many Professors and Ph.D students. It was a great experience to work at ICSM lab. I also got a chance to visit TND (Terra Nova Development) where they have a pilot plant for recycling of electronic waste. Additionally, I got opportunity to visit nuclear fuel recycling facility at French Alternative Energies and Atomic Energy Commission (CEA). I developed novel research insights about process intensification. This visit helped me in building scientific collaborations. I could learn both theoretical and practical aspects of our project. I believe that this Industry-Academia collaboration program provides us a platform to exchange our scientific views and technical knowledge so that both industry and academia can work in parallel to bring out new solutions. I also became familiar with French culture and language. I would like to convey my sincere thanks to CEFIPRA team for providing me this opportunity and making my travel smooth and easy.

## Raman-Charpak Fellowship

The Raman-Charpak Fellowship programme was launched in honour of two Nobel Laureates in Physics, Prof C.V. Raman, Indian Nobel Laureate (1930) and Prof. Georges Charpak, French Nobel Laureate (1992) during the State visit of the President of France to India during February, 2013.

The aim is to facilitate the exchange of doctoral students between the two countries, in order to broaden the scope and depth of future engagements in Science, Technology and Innovation.

The Raman-Charpak Fellowship is the only Indo-French bilateral Fellowship programme jointly funded by the Department of Science and Technology (DST), Government of India and the French Institute in India (IFI), French Embassy in India, Ministry for Europe and Foreign Affairs, Government of France.

This programme implemented by CEFIPRA aims at improving the doctoral skills of Indian and French students by providing them an opportunity to carry out part of their research work in a University / Research & Development Institute based in France or India respectively.

The programme was initially approved for 3 years from year 2013-2015. Based on the success of the programme, the Governing Body (GB) of CEFIPRA in its 29<sup>th</sup> meeting held on 4 March, 2016 renewed the Programme for another 3 years (2016-2018) with enhanced slots. Since year 2013 to 2019, 173 Raman-Charpak Fellows have been supported/awarded under this programme including the French Masters' students (4), for whom the call was launched first time in year 2016. The students selected for the year 2019 are undertaking their visits.

Further, the Governing Body of CEFIPRA in its 32<sup>nd</sup> meeting held on 8 March, 2019 have renewed the Programme for 3 more years (2019 to 2021) and have also suggested to analyse the Programme based on the publications emanated from the students. Accordingly, CEFIPRA contacted fellows of batch 2013-2016 and requested the desired information on which this report is prepared for the funding agencies. The Summary and Publication Analysis for RCF is given as follows:

### Summary and Publication Analysis for RCF

	Batch 2013	Batch 2014	Batch 2015	Batch 2016
No. of Students	15 Indian 5 French	17 Indian 4 French	5 Indian 5 French	25 Indian 5 French
No. of Male and Female students	11 Males & 4 Females	16 Males & 5 Females	12 Males & 8 Females	19 Males & 11 Females
No. of Publications	16	29	12	27
Thrust area of Maximum Publication	Life and Health Sciences (7)	Physical Sciences (8)	Materials Science (5)	Life and Health Sciences (7)
Average Impact Factor	2.82	2.40	1.95	3.004
% of students made self contacts with Host supervisor	69%	50%	64%	44%
Did Post- Doc in France after completing RCF	3	7	2	6
Rating of RCF	Excellent (85%) & Very Good (15 %)	Excellent (81%), Very Good (13%) & Good (6%)	Excellent (100%)	Excellent (88%) & Very Good (8 %)

## Young Women Researchers



**Ms Hema Bhardwaj**  
Raman-Charpak Fellow - 2017  
NPL, New Delhi

As a Indian women research scholar, CEFIPRA provided me an excellent opportunity through Raman-Charpak Fellowship to undertake a collaborative research for six months in premier institution of ICBMS, University Lyon 1, France. My aim was to facilitate joint research which was related to my doctoral thesis work on the topic of mycotoxin detection by biosensor technologies.

CEFIPRA gave me this opportunity for conducting the research work, acquiring disciplinary competences including handling various analytical techniques and working on advance instruments in the host laboratory (University Lyon 1, France) to detect the mycotoxins. I am thankful to CEFIPRA for providing me this financial assistance and helping me in making new professional networks and also to incorporate the international research work in my doctoral thesis.

The Raman-Charpak Fellowship gave me a much needed exposure to a different scientific research experience which has not only widened my intellectual horizon but has also lead to deeper engagement in science and technology. It has also provided me a chance to work in a multicultural environment amongst colleagues belonging to different countries. It was a highly rewarding experience for improving my academic and professional skills, deepen my knowledge base, pursue my passion of research and give useful contributions to the scientific community. As a women PhD scholar from a simple conservative family background, the fellowship provided me necessary confidence to step out into the international research community and I sincerely want to thank CEFIPRA for making my overseas stay safe and successful my taking care of the logistics part of the fellowship with smooth operation.

Based on the success of the proposed work, we have published a joint research article in international journal of repute, which is on food toxin detection biosensor. The food toxicity is a significant issue in today's world and hence our research is aimed towards making a portable toxicity detecting food biosensor device for usage by common man.



**Ms Mandira Majumder**  
Raman-Charpak Fellow  
IIT (ISM), Dhanbad

Getting awarded with the prestigious Raman-Charpak Fellowship has changed my life, indeed! It is not just a fellowship but an identity. This fellowship provides excellent opportunity to get to know the rich French culture in research and the as well as its society. A visiting fellowship programme like Raman-Charpak fellowship enable researchers to get exposed to a foreign work culture which is necessary to flourish as a researcher globally. I have learnt many things during my stay in France, which has changed my perspective not only towards research but also towards life, as a whole. My stay taught me how to be open towards people belonging to different cultures. The research group I worked with in the University of Lille, France, consisted of researchers from across the globe and that gave an ambience of truly global research environment. Knowledge about other culture makes us identify the advancements and drawbacks that we have as women researcher in India. Stay of six months in France has really made me independent in many ways, helped me identify my strengths, and has inculcated confidence in me. What I enjoyed the most was a true feel of women empowerment and freedom from stereotypes. The motto of the French Republic is "Liberty, Equality, Fraternity" (Liberté, Égalité, Fraternité). I got to see and experience what it means to be in equality and enjoy the liberty being a woman, that improved my self-esteem to a great extent. I am grateful to CEFIPRA for having provided me with such a wonderful opportunity thorough the aegis of Raman-Charpak Fellowship. I can say that this was life changing opportunity that cast me into much more confident woman researcher.

Based on the success of the proposed work, we have published a joint research article in international journal of repute, which is on food toxin detection biosensor. The food toxicity is a significant issue in today's world and hence our research is aimed towards making a portable toxicity detecting food biosensor device for usage by common man.



**Dr Ashwani Ravi**  
Raman-Charpak Fellow  
VCU, Bangaluru

At the start of my Ph.D. in 2017, I had no fellowship and went through difficult times during which managing my daily expenses was a night mare. In spite of the difficulties, I was determined to pursue my research work. When I was in the lookout for various funding opportunities for doctoral students, the RCF call from CEFIPRA came as a boon. With the consent of a host supervisor in France, I managed to submit my application for the RCF. I held my nerves and kept my fingers crossed until I saw my name in the list of RCF 2018 awardees. This opportunity opened up a new avenue for me to get exposed to an international environment and enhance my technical skills.

Although I was excited to travel to France for a period of 6 months, I was equally anxious as it was my first travel abroad. However, realizing the potential of RCF, I was curiously waiting to start my journey. My visit to France helped me in boosting my confidence level with an exposure to new work cultures and traditions. This helped me overcome some of the common challenges encountered by

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women in an unknown environment. I was able to extend my research activities from fundamental science to applied research with better organization capabilities and planning. The interactions with the French. Professors, foreign students also pushed me to explore new collaborations and scientific approaches. The flexible duration of 2-6 months for RCF fellows was really advantageous, especially to women. The RCF program helped me realize my potential and to be independent with my personal and professional activities. On the whole, it was a life time and an unforgettable experience as well. Such platforms ensure that budding researchers do not lose hope and pursue science as their career. It also aids in minimizing the scientific gaps between highly advanced EU nations and India.

Finally, I would like to thank CEFIPRA for offering me this wonderful opportunity through the prestigious Raman-Charpak Fellowship. I would also like to take this opportunity to thank my supervisor/mentor Dr. M S Santosh for all his valuable guidance and motivation and also my dear parents for their support.



**Dr Jincy Joy**  
Raman-Charpak Fellow  
IIT, Delhi

Being a Raman Charpak Fellow (2015) offered me a great opportunity of collaboration with one of the renowned labs in biomaterial engineering. The collaboration improved the quality of my doctoral thesis tremendously which in turn built my foundation as a researcher. This CEFIPRA programme provided an early platform during my PhD tenure to explore a French state-of-the-art lab which changed my perspective and provided a better research orientation in my career. Raman Charpak fellowship also gave me an exposure to a new culture and meet new people advancing my personal skills. CEFIPRA ensured my safety and progress as a women researcher throughout the programme. With all these experiences, I can safely say that RCF had a pivotal role in my present position as a postdoctoral fellow at the Max-Planck Institute for Medical Research, Germany. Women in science in India need such platforms like CEFIPRA programmes to step out into the world of opportunities and make our country proud at the International research scenario. Being a fellow, I urge every women to step forward and seize the opportunity to spread their potential as a researcher to fly towards greater heights in life, like I did through RCF. There is a great need for women to stand on the shoulders of giants and mark their presence to bring in a new form of independence for women in science in India. I am proud of CEFIPRA in providing this impetus and shield to women of our country to advance in science without any fear. I also appreciate CEFIPRA's efforts in acknowledging Women in Science through this dedicated special edition. RCF improved my professional and personal life as a head start of where I am today. I am hopeful and awaiting of the change CEFIPRA would bring about in the lives of many women in science in the future, like it did for me.



**Ms Ines Leleu**  
Raman-Charpak Fellow  
Institute Pasteur De Lille

Being a Researcher is not just a job we do every day in a routine way. Working as a scientist necessitate to be completely driven by passion to contribute extensively to the knowledge in order to understand and allow the world evolve positively. Nevertheless, children have always been taught that only great men that do great discoveries. Making a small contribution to understand mechanisms by which devastating diseases like the malaria and how to combat them has always been an intense desire in my life. That is why I chosen to work on the immunobiology of parasitic diseases such as cerebral malaria. I very quickly became passionate and committed my body and soul to my research work. Sadly, being a student in a team led by a woman, I quickly had to face injustices, jealousies which confronted me, very early, to the difficult reality and the bad face of the extreme competition in the research world. Thanks to the unconditional support of my P.I., I decided to apply to the Raman-Charpak scholarship. I success in, and it open the way to live an experience for which I didn't realize how it will change my life and spirit. In fact, this RCF CEFIPRA program was a real chance to work in one of the best research center in India, the IISER Pune in order to enrich my technical skills and both scientific and cultural knowledges. This was an essential step to complete my scientific formation and to give me a chance to create a network with other scientists in a foreign country. This was a unique experience and today I continue the collaboration. The results of the work done should allow a publication soon which should contribute to open door for my future in the scientific research world.

Today, I'm happy in my professional life. I have regained self-confidence and I'm fulfilled in the team and, I still work with my P.I who represents for me a model of excellence in Science. This amazing experience with CEFIPRA permitted me to enhance my view in Research and Science, and to develop and to enrich my professional experience. It was one of the best opportunity to discover the international world of research and particularly in India where the number of French students are still few. It gave me the opportunity to prove my motivation to continue in research but not only in France. I also prove my strength to adapt myself in a new environment, to open my mind and discover new culture, way of life, philosophy and work habits. I'm convinced that woman have their legitimate place in Sciences and CEFIPRA help me to assume myself, to show my values and my ability to progress and consider myself as an courageous woman engaged in sciences. "



**Ms Navya Reghu**  
Raman-Charpak Fellow  
Puducherry University

“ I have currently completed my PhD that I started in 2014 at the Laboratory of Palynology and Paleocology, French Institute of Pondicherry, under the guidance of Dr. K. Anupama. My doctoral research entitled “Pollen based estimates of Holocene vegetation in southern India: An LRA (Landcover Reconstruction Algorithm) approach.” is a new model-based approach in India (first such work in India) that has already been carried out in European countries. This method includes a particular computerised model comprising several softwares developed for the purpose of quantitative land cover reconstruction using pollen as the tool. Obtaining quantitative estimates of the past landcover using these models is the core part of my doctoral studies.

Raman Charpak Fellowship programme provided a wonderful opportunity to learn all the theories and models (REVEALS - Regional Estimates of VEgetation Abundance from Large Sites, 2007a, for the quantitative past landcover reconstruction and ERV- Extended R-value model, 1994, for the estimation of Relative Pollen Productivity) in a systematic way. Through the Raman-Charpak fellowship programme, I got an opportunity to meet and work with Dr. Florence Mazier, CNRS

Research Scientist at Université de Toulouse Jean Jaurès, Toulouse, France who is one of the key persons in the Landcover Reconstruction Group (Landcover6k). She had worked and published papers based on the same theme. I acquired essential knowledge, on preparing and systematizing the data before running the program, to run the program and have learnt to interpret the output of the program. This knowledge was very crucial for the completion of my thesis and will allow me to publish the outcomes in peer-reviewed journals.

After the completion of the Raman-Charpak Fellowship programme, I expertise to handle the pollen-vegetation relationship and quantitative reconstruction programs such as ERV model (Extended R-Value modelling), REVEALS model (Regional Estimates of VEgetation Abundance from Large Sites) and had successfully completed and submitted my PhD thesis in Pondicherry University.

As a woman, I am proud to say that “Today, I am the only person from India who has the expertise in the pollen-vegetation relationship softwares and was the ‘ Resource Person’, during the international workshops (INQUA HaBCom Training Workshop, 2018 & PAGES LandCover6K workshop, 2019) attended by PhD students and scientists from different countries including India, conducted by Laboratory of Palynology & Paleocology of French Institute of Pondicherry, Pondicherry. I would like to express my heartiest gratitude to CEFIPRA at this moment. Thanks a TON! CEFIPRA for giving me such a wonderful opportunity!

## News/Updates

# Covid-19 News from India & France

**Bharat Biotech begins phase-3 trials of COVID 19 vaccine Covaxin in India**



(COVAXIN | Photo Courtesy: [www.boomlive.in](http://www.boomlive.in))

The pharmaceutical company has begun the phase 3 trials of its COVID 19 vaccine candidate, Covaxin, in India. The phase-3 clinical trials will involve 26,000 participants across 22 sites in the country. The trial will be conducted in partnership with the Indian Council of Medical Research (ICMR). It is the largest clinical trial conducted for a COVID 19 vaccine in India.

(Source: [www.livemint.com](http://www.livemint.com))

**French institute aims to start human trials of ‘promising’ COVID 19 drug this winter**



Vivre mieux,  
plus longtemps

(Image Courtesy: [www.nutevent.com](http://www.nutevent.com))

The Pasteur Institute in the northern French city of Lille has confirmed the discovery of a “very promising” drug in the fight against the coronavirus pandemic, without

naming it. The unnamed drug has already undergone a number of laboratory studies, which found that it demonstrated “considerable power against the virus”, according to Dr. Benoît Deprez, scientific director of the Pasteur Institute in Lille.

(Source: [www.france24.com](http://www.france24.com))

### Bengaluru startup developing heat-tolerant COVID 19 vaccine

Mynvax, a startup incubated in the Indian Institute of Science (IISc), Bengaluru, is developing a COVID 19 vaccine that can be stored at 37 degrees Celsius, a development that could be a game-changer for India which lacks sufficient cold chain facilities.

(Source: [www.deccanherald.com](http://www.deccanherald.com))

### Sanofi reports positive animal test results for potential COVID 19 vaccine



(Flublok | Photograph Courtesy: [www.bioworld.com](http://www.bioworld.com))

Clinical trials of an experimental vaccine against COVID 19 which is being developed by France's Sanofi and U.S. biotech firm Translate Bio are on track to begin before the end of the year after positive results in tests on animals. Sanofi and Translate Bio said in a statement on Thursday that the results from pre-clinical trials showed two doses of the MRT5500 vaccine induced a “favourable” immune response in mice and monkeys.

(Source: [www.reuters.com](http://www.reuters.com))

### ICMR, Biological E develop horse antiserum for COVID 19 treatment

The Indian Council of Medical Research announced that it has, along with Hyderabad-based Biological E, developed blood serum of horses that contain antibodies against COVID 19. The bio-medical research agency said that it

could be a potential treatment and prevention of COVID 19 and an alternative to convalescent plasma therapy, which is blood serum of humans who have recovered from the respiratory disease.

(Source: [www.livemint.com](http://www.livemint.com))

### Biological E begins clinical trials of COVID 19 vaccine

Biological E. Ltd (BE), a Hyderabad-based vaccines and pharmaceutical company, announced that it has initiated clinical trial of its COVID 19 subunit vaccine candidate in the country following approval from the Drugs Controller General of India (DGCI). BE is making the vaccine in collaboration with Dynavax Technologies Corporation (Dynavax), a US-based vaccine focused biopharmaceutical company, and Baylor College of Medicine, a health sciences university in Houston. The vaccine candidate includes an antigen in-licensed from BCM Ventures, Baylor College of Medicine's integrated commercialisation team, along with Dynavax's advanced adjuvant CpG 1018.

(Source: [www.businessinsider.in](http://www.businessinsider.in))

### No swab, no problem: France trials new rapid COVID 19 test



(EASY COV | Photo Courtesy: [www.news.cnrs.fr](http://www.news.cnrs.fr))

French researchers say that they have encouraging initial results from trials of a COVID 19 testing system that can deliver results in 40 minutes with no swab and no need to send off samples to a lab. The French system showed 87.5% accuracy for detecting positive results when tested on a sample of 220 people, the researchers said, and they are now seeking approval from the French regulator for the system to go into commercial use. The system, called EasyCOV, is one of a number of options being developed around the world to try to fix a bottleneck with COVID 19 testing.

(Source: [www.dailysabah.com](http://www.dailysabah.com))

## BCG vaccine can help elderly fight against COVID 19: ICMR study



(BCG Vaccine | Photo Courtesy: [www.pharmaceutical-technology.com](http://www.pharmaceutical-technology.com))

The Bacille Calmette-Guerin or BCG vaccine, originally made against tuberculosis, may help in the management of COVID 19, especially in the elderly, says a study by the Indian Council of Medical Research (ICMR). The BCG vaccination is known to induce innate immune memory, which confers protection against several infections, the study uploaded as preprint at medRxiv, reported.

(Source: [www.businessinsider.in](http://www.businessinsider.in))

## Smell, taste changes provide early indication of COVID 19 community spread

According to an international team of researchers, self-reports of smell and taste changes can be earlier markers of the spread of the novel coronavirus than indicators based on hospital emergency room (ER) consultations. The team's study, published in the journal Nature Communications, noted a decline in self-reports of smell and taste changes as early as five days after lockdown enforcement, with faster declines reported in countries that adopted the most stringent lockdown measures.

(Source: [www.timesofindia.indiatimes.com](http://www.timesofindia.indiatimes.com))

## Pan-India COVID 19 genome studies suggest virus genetically stable, no major mutation: Centre

As the work continues to develop an effective vaccine for COVID 19, two pan-India studies on the Genome of SARS-CoV-2 (COVID 19 virus) in India conducted by ICMR and the Department of Biotechnology (DBT) suggest that the virus is genetically stable and there is no major mutation in the virus. There had been concerns in some quarters that any major mutation detected in the novel coronavirus could hinder the development of an effective vaccine.

(Source: [www.newindianexpress.com](http://www.newindianexpress.com))

## Even mild cases of Covid infection can make people sick for months, French study says

French researchers found that COVID-19 patients who experience even the mildest illness risk suffering

symptoms for months. Two-thirds of patients who had a mild-to-moderate case of Covid-19 reported symptoms 60 days after falling ill, when more than a third still felt sick or in a worse condition than when their coronavirus infection began. Prolonged symptoms were more likely among patients aged 40 to 60 years and those who required hospitalization, according to staff at Tours University Hospital.

(Source: [www.theprint.in](http://www.theprint.in))

## Protein-based COVID 19 vaccine candidates more suitable for India, say scientists

As the world moves into the next stage of COVID 19 management and several vaccine candidates approach end-stage trials, scientists say a critical consideration for India is storage temperature and a protein-based preventive might therefore work best for the country.

(Source: [www.deccanherald.com](http://www.deccanherald.com))

## COVID 19: Five-stage vaccination plan for France

A five phase COVID 19 vaccination plan with nursing home residents the first priority has been announced by top health advisory body HAS. The Haute Autorité de Santé (HAS) recommended to the government that vaccination must be phased in, taking account of people's vulnerability to falling seriously ill with the disease, as supplies of vaccine will arrive in batches.

(Source: [www.connexionfrance.com](http://www.connexionfrance.com))

## '70% of COVID 19 patients don't transmit virus,' reveals study conducted in AP, TN

A latest study has revealed that not all individuals infected with COVID 19 transmit the virus, stating children as active transmitters. This study, titled 'Epidemiology and transmission dynamics of COVID 19 in two Indian states', was published in the September 30 edition of 'Science' magazine.

(Source: [www.hindustantimes.com](http://www.hindustantimes.com))

## France launches flu vaccine campaign amid COVID 19 crisis

France launched a flu vaccine campaign in an effort to avoid facing another epidemic peak as the coronavirus is spreading rapidly in the country. French health authorities have issued official recommendations to prevent potential shortages of flu vaccine, which they fear might happen amid increased demand because of the COVID 19 pandemic.

(Source: [www.newindianexpress.com](http://www.newindianexpress.com))

# CALL FOR PROPOSALS

## *under CSRP - thematic research*

(Deadline for submission of Proposals 15 Jan, 2021)

CEFIPRA supports research groups through high quality collaborative research projects in advanced areas of basic and applied science to nurture scientific competency in India and France. For upcoming cycle the call is launched for the thematic research specifically addressing important societal challenges.

### Eligibility to apply

Principal Collaborators and Joint Collaborators (Indian & French) should have permanent position in an Indian or French University/R&D Institution. They should meet national level eligibility criteria with respect to the operation of grants and age of retirement.

### Funding support for the proposals

- Manpower (PhD/Post-doctoral/Master students positions for French Partners; JRF/SRF/RA/Master students for Indian Partners)
- Purchase of consumables
- Travel (International & domestic)
- Equipment (only to Indian Partners : Minor equipment and accessories which are essential for the project with a limit of max. of 10% of total approved budget of the project (max. 20.000Euros))



## Thematic areas:

### Host-Microbe interactions in Health, Water & Agriculture

- There should be significant novelty in the Host-Microbe interactions aspect of the proposal.

### Habitability of the Earth & Planets

The topic includes, but is not limited to, the investigation of

- the past and present environmental conditions on planetary bodies,
- the effects of global warming on the environments, geochemical cycles and biosphere,
- the geological record to assess the fate, diversity and evolution of the biosphere over geological times, and relations between major extinctions, diversifications and environmental changes
- the composition, structure and dynamics of the inner and outer envelopes of the Earth and planets over geological time, with emphasis on modelling initiatives
- the intrication between geology, geodynamics, geochemical cycles, hazards and natural resources.

### Marine Biology and Ecology

- Marine Biology and Ecology

### Chemical & Synthetic Biology

- Synthetic organic chemistry and biotechnology to create tools for studying and manipulating biological processes.
- It encompasses molecular pharmacology, single-molecule biophysics, synthetic biology for engineering of molecular tools (with the exclusion of system biology).



CEFIPRA

For further information, please contact:

**Director**

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