EDITORIAL

We are excited to usher in the second half of 2017 with the July issue of our Newsletter which includes fascinating research stories by our Fellows, event updates, and new workshop announcements.

At the outset, we would like to extend our heartfelt congratulations to India Alliance Strategic Advisory Committee chair, Prof Rafi Ahmed (Emory University and Emory Vaccine Center, Atlanta, USA) for being awarded the Robert Koch Prize in Biomedical Research for 2017 (a scientist of Indian origin to win this prize!). Felicitation to IA Fellows, Dr Arun Shukla (IIT Kanpur) for being invited to join the editorial boards of Cellular Signalling (Elsevier) and Chemical Biology & Drug Design (Wiley) and to Dr Suceena Alexander (Christian Medical College, Vellore) for getting elected as a Fellow of the American Society of Nephrology.

Following India Alliance’s 7th Annual Fellows’ meeting in Hyderabad in May, report of which is included in this issue, some of our Fellows were invited to attend Researcher’s Meeting on Genetics and Physiology in Health and Disease organised by the Wellcome Trust in Cambridge, UK on 14-15 June. Nine of our Fellows also attended the Developing Excellence in Leadership, Training and Science (DELTAS) Africa Annual Grantsee Meeting in Accra, Ghana from 3-5 July, organised by the Alliance for Accelerating Excellence in Science in Africa (AESAf). These are part of India Alliance’s efforts to encourage IA Fellows to forge national as well as international collaborations.

On the Fellowships front, result of the Senior and Intermediate Fellowship 2017. Early Career Fellowship 2016 in Basic Biomedical research and Research Training Fellowship 2017 for Clinicians and Public Health researchers are now out. We are presently accepting preliminary applications for our Early Career Fellowship 2017 in Basic Biomedical research which are currently under process. We feature new Fellows who joined the India Alliance family in the last few months. Read about their research in this issue.

Research Highlights section includes diverse research stories by our Fellows, Prof. Raghu Padinjat and his team provides another piece to the puzzle of how membrane traffic in the cells is regulated using a Fruit Fly model system. On the topic of cellular logistics, Dr. Ravi Manijithaya with colleagues from JNISCAR and NIMHANS Bangalore, recently showed how toxic waste inside cells in Parkinson’s disease is cleared up by a molecule called 6-Bio, paving way for new therapeutics for neurodegeneration. Senior Fellow, Dr. Amit Singh and his group at IISc Bangalore continue to unravel the complexities of antimicrobial resistance. His recently published work in *eLife* elucidates how *Mycobacterium tuberculosis* develops resistance towards a commonly used antibiotic, Augmentin. Intermediate Fellow Dr. Farah Ishaq, also based at IISc Bangalore, is studying circulation of parasites in Himalayan birds and reports fascinating and important insights in *Journal of Ornithology* and *Parasites and Vectors*. In light of growing inflammatory bowel disease cases in India and world-wide due to changing lifestyles, Intermediate Fellow, Dr. C. V. Srikanth’s latest research aims to inform the development of novel therapeutics for IBD. Finally, Senior Fellow Dr Shantanu Chowdhury and his group’s recent work provides novel insights into cancer metastasis (spreading of cancer cells to other parts of the body). These published works were also covered in the media, links of which are included in the Research Highlights section.

This newsletter also includes interviews of Dr Bhavana Muralidharan, IA Early Career Fellow at TIFR Mumbai, Prof Senthil Kumar Nachimuthu, Mizoram University and Dr Madhavan Chalat, Grants Adviser, India Alliance.

The scientific meeting Autophagy: Cellular mechanisms and significance in health and disease (11-13 December 2017, Bhubaneswar) were recipients of the first “India I EMBO Symposium” funding. More details on this meeting is available on our website and also in this issue. Applications submitted for the second round of India I EMBO Symposium are currently under review. Information on this funding opportunity can be accessed on the India I EMBO Symposium website.

We are excited to launch a new workshop series “Developing Indian Physician Scientists” which aims to ignite scientific curiosity in young doctors, while promoting an understanding of the frontiers of medicine and related sciences. Find out more about this workshop and how to apply in this issue.

The India Alliance continues to support and organise various Science Communication training activities. Last month, India Alliance organised one-day SciComm101 workshops at Mizoram University (6 June), Institute of Advanced Study in Science and Technology, Guwahati (8 June) and North Eastern Hill University, Shillong (9 June). A short report on these workshops is included in this issue. The next one-day Workshop will be held in IIT Gandhinagar on 19 August 2017 and our biannual two-day Science Communication workshop will be held at INSA, New Delhi on 7-8 September 2017.

On the Public Engagement front, if you are an artist or a collective (or know one who might be interested) please send in your applications for Art + Science programme 2017-18. Instituted by Khoj International Artists Association and supported by the India Alliance, Art + Science programme is designed to advance projects that explore artistic applications of emerging thoughts and technologies with the help of partners from the scientific industry and academia. More information on this can be found in this issue.

Don’t forget to check out more announcements at the end of this issue for Workshop on Science Administration and Management for Women at I.I.S.E.R. Pune, Newton Bhabha PhD Placements Programme and Newton Bhabha STEM Teacher Training Workshops.

Last but not the least, India Alliance CEO, Dr Shahid Jameel will be talking about career and funding opportunities in India to do biomedical research, at UCLA, UCSF and UCSD campuses next month, so please do attend if you are in those places.

As always, we would like to extend our heartfelt gratitude to those who have contributed to this newsletter. Special thanks to our Intermediate Fellow, Dr. C. V. Srikanth for the cover image, which shows a tissue section of inflamed mice intestinal cell lining induced by dextran sodium sulfate (DSS) and the brown staining is for a protein implicated in IBS.

We look forward to receiving your valuable comments and suggestions so that we can make this newsletter a more useful and enjoyable read for you.

Happy Monsoon!

Sarah Iqbal, PhD
Public Engagement Officer
Wellcome Trust/DBT India Alliance
July 2017
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UPCOMING DEADLINES
INDIA ALLIANCE FELLOWSHIPS

Early Career Fellowships in Biomedical Research
Launch date: 13 July 2017; Preliminary applications deadline: 10 August 2017

This is a mentored Fellowship programme that provides a unique opportunity for postdoctoral researchers to carry out research in India towards building an independent research career.

Eligibility:
- Applicant must be in the final year of PhD or have no more than four years of post-PhD research experience from the date of PhD viva to the full application submission deadline (August 2016 for the current round of competition); due consideration will be given to justified career breaks.
- Applicant can have a PhD in any discipline of science.
- There are no restrictions based on age or nationality.
- Applicant need not be resident in India while applying, but should be aspiring to launch an independent research career in India.
- Applicant must choose a not-for-profit host institution in India that will administer the Fellowship for the full duration (5 years) of the award. The applicant and the host institution will have to abide by the India Alliance policies on time commitment.
- Applicant may or may not have a faculty position.

Remit:
Full spectrum of biomedical science from fundamental molecular and cellular studies through Clinical and Public Health research. Interdisciplinary projects are welcome.

Provisions:
- The upper limit for an award is INR 1.7 Crores. The 5-year Fellowship typically provides:
  - Competitive personal support
  - Generous research funds
  - Funding to work overseas for up to 2 years and develop international collaborations

Essentials on the application:
- A research proposal that seeks to answer an original biomedical research question.
- A Fellowship Supervisor who would supervise the applicant in the proposed research and a letter of support to this end.
- An additional letter of recommendation.

Application form is available on the India Alliance online application System (IASys) at https://fellowships.wellcomedbt.org/Login.aspx
Please visit http://wellcomedbt.org/fellowships/early-career-fellowships for further information on eligibility, remit, provisions, and the application process. Queries may be addressed to info@wellcomedbt.org

**We encourage Clinicians and Public Health researchers to apply in the separate Clinical and Public Health competition which would be announced in January 2018. Please check for updates at http://wellcomedbt.org/fellowshiptype/clinical-and-public-health-research-fellowships

Senior and Intermediate Fellowships in Biomedical Research
Launch date: 15 June 2017; Preliminary application deadline: 16 July 2017
Applications submitted are currently under process.

Tentative launch date for next competition: January 2018

Clinical and Public Health Research Fellowships
(except Research Training Fellowships)
Applications under process; Tentative launch date for next competition: January 2018
India Alliance is pleased to announce Fellowship Awardees for Basic Biomedical Research Fellowships and Clinical and Public Health Research Fellowships. Interviews for these Fellowships took place in May 2017. Please note, these Fellowship Awards have been recommended by the India Alliance Fellowship Committee. Recommended Awardees, who accept the India Alliance Fellowship, are listed on our Fellows page.

* indicates newly awarded Host Institution.

**Basic Biomedical Research Fellowships 2017**

**Early Career Fellowships**

- Dr. Masum Saini, Regional Centre for Biotechnology, Faridabad
- Dr. Chandramouli Reddy Puli, Indian Institute of Science Education and Research Pune, Pune
- Dr. Pritha Paul, Tata Medical Centre, Kolkata
- Dr. Sriiram Varahan, Institute for Stem Cell Biology and Regenerative Medicine, Bangalore
- Dr. Mariam Sood, National Brain Research Centre, Manesar
- Dr. Shankar Manoharan, *Vellore Institute of Technology, Vellore*
- Dr. Jyoti Singh, National Centre for Cell Science, Pune
- Dr. Tuhin Subhra Santra, Indian Institute of Technology Madras, Chennai
- Dr. Sushmita Chakraborty, All India Institute for Medical Sciences New Delhi, New Delhi
- Dr. Kush Anand, Indian Institute of Science, Bangalore
- Dr. Parveen Goyal, Institute for Stem Cell Biology and Regenerative Medicine, Bangalore

**Intermediate Fellowships**

**May 2017 round**

- Dr. Tamal Das, TIFR Centre for Interdisciplinary Sciences, Hyderabad
- Dr. Sivakumar Vallabhapurapu, Indian Institute of Science Education and Research, Tirupati
- Dr. Deepa Agashe, National Centre for Biological Sciences, Bangalore
- Dr. Sreedhar Chinnaswamy, National Institute of Biomedical Genomics, Kalyani
- Dr. Geetanjali Chawla, *Amity University, Gurgaon*

**Senior Fellowships**

**May 2017 round**

- Dr. Lolitika Mandal, Indian Institute of Science Education and Research, Mohali
- Dr. S P Arun, Indian Institute of Science, Bangalore
- Dr. Dhiraj Kumar, International Centre for Genetic Engineering and Biotechnology, New Delhi

**Clinical and Public Health Research Fellowships 2016 & 2017**

**Research Training Fellowships 2017**

- Mr. Sourav Datta, L V Prasad Eye Institute, Hyderabad
- Dr. Dorcas B C Gandhi, Christian Medical College, Ludhiana
- Dr. Vinnyfred Vincent, All India Institute of Medical Sciences, New Delhi
- Dr. Arun K, Sree Chitra Tirunal Institute For Medical Science & Technology, Trivandrum
- Dr. Sowmya Selvaraj, National Institute of Mental Health and Neurosciences, Bangalore

**Early Career Fellowships 2016**

- Dr. Gagandeep Kaur Walia, Public Health Foundation of India, Delhi
Establishment of a Medical Research Hub in the Centre for Biosystems Science and Engineering

The Medical Research Hub will gather together scientists and clinicians focusing on a specific subject or disease, thereby integrating various scientific and medical disciplines to allow interventions directly into clinical practice. In the first instance, activities will relate to gut function focusing on receptor guanylyl cyclase C and its role in childhood and familial diarrheas. An extension of these studies will involve studying the role of this receptor and other components of the signaling pathway in insulin secretion from the pancreas, and incidences of pancreatitis associated with Type II diabetes. Working towards a closer interaction with Clinicians, we will establish Chairs for Medical Professionals to spend time in the Research Hub interacting with Engineers and other researchers in the multidisciplinary environment of the Indian Institute of Science. We will support medical students and MDs to associate themselves with research laboratories in the Institute. We will also embed our students in the clinical environment provided by the associated hospital, with a view of being able to appreciate and thereby identify problems that could benefit from research in the Centre for Biosystems Science and Engineering.

Innovative multi-model approach to identify novel candidate genes and small chemical molecules for cardiomyopathies

Cardiomyopathies (CM) are a group of life-threatening heart muscle diseases that represent a large proportion of pediatric heart failure and are one of the leading causes of heart transplantation in children. Every year about 1,000-5,000 new cases are diagnosed with pediatric cardiomyopathy. The cause of a significant percentage of childhood cardiomyopathies (~50%) remains unknown with no curative therapy available for these affected children. The long-term goal of this project is to identify genetic causes and curative drugs for childhood onset cardiomyopathies.

The aim of my India Alliance-funded project is to study the copper uptake and export mechanism in human cells. The studies will determine the key factors that maintain the copper homeostasis in human body, dysfunction of which leads to diseases of copper accumulation (Wilson disease) or deficiency (Menkes disease). My laboratory is interested specifically two copper transporters, ATP-dependent copper exporter ATP7B and ATP-independent copper importer CTR1. We incorporate sequence change in these proteins (mutate) and record the effect on their cellular location, and copper pumping activity. Also, we are trying to understand the role of other proteins (regulators) that help ATP7B and CTR1 reach their respective locations in the cell where they can carry out their respective functions of copper pumping. We believe that this study will contribute towards better understanding of the diseases of copper metabolism and identifying drug targets for their treatment.

Objective: The primary goal of my project is to study the copper transporters in human cells and understand their role in the copper homeostasis of the cell.

Methods: We will use a multi-model approach to study the copper transporters. We will mutate the proteins in vitro and study their cellular localization and copper pumping activity. We will also study the role of other proteins that interact with the copper transporters to understand their functions.

The project will help in identifying drug targets for the treatment of copper-related diseases.
Acute encephalitis is a life-threatening inflammation of the brain. Outbreaks of acute encephalitis result in many thousands of deaths in India every year, and leave many more permanently disabled, notably affecting children. The exact cause of this brain inflammation remains unknown in about 70% of the cases. I am working with teams of virologists and clinical microbiologists to identify viruses associated with this condition.

In particular, I study a family of viruses called Flaviviruses – notorious members of this family include Japanese encephalitis virus, dengue viruses and Zika virus. My interest lies both in expanding the spectrum of agents known to cause encephalitis and in developing an understanding how these viruses cross the fortress-like barrier between the blood and the brain to infect the brain.

Scrub typhus is a life-threatening acute febrile illness endemic in Asia which accounts for a million cases resulting in 150,000 deaths annually. The optimal treatment for severe scrub typhus remains unclear and has never been evaluated in a randomized clinical trial. The current mainstay of therapy for scrub typhus is doxycycline, but the optimal therapy for severe disease remains unclear as there is a complete absence of evidence. Intravenous doxycycline is unavailable in many countries, and intravenous azithromycin is used as an alternative but its use is not supported by robust evidence. Doxycycline resistant scrub typhus infections were reported in Northern Thailand in the 1990s, but further studies have not been carried out to confirm this or to assess whether this is present elsewhere. In this study, we aim to provide conclusive evidence for the optimal treatment of severe scrub typhus by demonstrating a reduction in mortality and improved outcomes in a multicentre randomized controlled trial. At the core of the project will be a multicentre, prospective, three arm RCT comparing i) 7 days IV azithromycin, ii) 7 days IV doxycycline, and iii) 7 days of combination of IV doxycycline and IV azithromycin. The study is designed to demonstrate differences in mortality and improved outcomes in this multicentre RCT. We will evaluate clinical and surrogate markers associated with severe disease, perform pharmacological investigations and characterize the isolates/strains involved.

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stimulation (TMS), electromyography (EMG), electroencephalography (EEG), magnetoencephalography (MEG) and local field potentials (LFP). I will specifically explore changes in motor neuroplasticity and functional connectivity in the motor network, and their clinical/behavioral relevance in patients with movement disorders.

The current project funded by Wellcome Trust/DBT India Alliance is aimed at determining the role of nicotinic neuromodulation in the pathophysiology of levodopa-induced dyskinesias. Levodopa is the gold-standard drug available to treat Parkinson’s disease. However, over time, most patients develop abnormal involuntary movements called levodopa-induced dyskinesias (LID) as a complication. Animal experiments have proposed nicotine to be a potential drug for LID but its mechanism of action is unclear. Integrating non-invasive brain stimulation and recording methods, I will determine if nicotine can reverse certain abnormalities of brain function that are specific to Parkinsonian patients with LID. The results of this project will help in understanding the role of nicotine in the disease process and in evaluating nicotine as a promising treatment for LID.

Dietary diversity and nutritive value of indigenous foods in addressing food security and nutritional status of vulnerable tribal communities of India

Indigenous tribal people retain knowledge of their land and indigenous food systems rooted in historical continuity within their region. Indigenous foods are usually not purchased but obtained locally from the natural environment and utilized based on traditional wisdom and knowledge. We will explore indigenous food environment of vulnerable tribal communities of Jharkhand, India and study nutritive value, availability, access and utilization of indigenous foods in these communities. Contribution of indigenous foods to current nutrient intake and nutritional status of communities will be estimated, reasons for gap in consumption will be identified and strategies for promoting these foods will be developed.

The chief impact of the project would be an increased knowledge of nutritive values and possible strategies to improve usage of indigenous foods by the communities.

Effectiveness of the ‘Care for Stroke’ intervention in India

Our IA-funded study will provide reliable evidence as to whether a smartphone-enabled carer-supported educational intervention can reduce disability and dependency in activities of daily living among stroke patients.

This study will be a multi-centre, pragmatic, randomized, outcome assessor-blind, controlled trial. A total of 320 adult stroke patients who fulfil the eligibility criteria will be randomized to receive either ‘Care for Stroke’ intervention or standard treatment. The primary outcome measure is the effect of treatment allocation on dependency measured by the modified Rankin Scale (MRS) (score of 0-2) at 3 and 6 months after randomization. All the trial outcomes will be measured by a blinded outcome assessor at baseline, 3 months and at 6 months after recruitment. An increase in the prevalence of stroke in India and in other countries will increase the demand for stroke rehabilitation services. The present barriers to accessibility and, the lack of awareness about the problem among those affected widen the gap that has to be bridged. This context warrants the development of innovative rehabilitation interventions that can bridge the gap. ‘Care for Stroke’ is one such strategy for addressing the unmet needs for stroke rehabilitation and for bridging the gap in access to stroke services worldwide.
What are you working on and what impact do you hope it will have?

The cerebral cortex is the most complex brain structure involved in higher functions such as perception, decision-making, thinking, language, learning and memory. For the circuitry in the brain to be wired, two types of nerve cells (neurons) and glia (support cells) must be generated in a sequential manner, neurons first, glia later. Any failure to do so leads to a range of neurological diseases and disability.

We have identified a transcription factor, Lhx2, which controls whether a neuron or glial cell is produced from a dividing progenitor cell. I am working on understanding the mechanism by which Lhx2 executes this complex job. Understanding this would provide a framework for understanding normal brain development and, in the context of which the underlying mechanisms of disorders such as autism, epilepsy, and schizophrenia may be understood.

What inspired you to become a scientist?

From my high school days I was attracted to the field of biology. My high school biology teacher Mrs Vasumathy taught biology in such a simple and lucid manner that I fell in love with the subject. During my graduate days I had amazing teachers who opened up our minds to exploring the biological sciences. In particular Prof. Kannan pushed us to read current research articles in Nature, Science and Cell which generated a lot of motivation and excitement in wanting to do research myself. The field urged me to look at the natural world with awe and admire its immense complexities. From then onwards it was a continuous quest for knowledge. What fascinates me the most about being a scientist is the idea of being able to explore and understand things at a fundamental level.

What challenges do you see (or have already experienced) for young scientists like yourself in India and how did you/your plan to overcome them?

One of the main constraints is funding; though it is a challenge in other parts of the world as well, I think it is more so in India. However, I must say that it has improved in the last few years.

As a graduate student I didn’t worry too much about the research expenses like reagent costs or access charges etc. Postdoc salaries being low also didn’t concern me at the beginning, but I now realize it is an important factor, when one is raising a child etc., that the compensation be adequate. The India Alliance fellowship addresses this need very thoughtfully by providing a generous personal support along with ample funds for doing research. I would hope more organisations come forward with funding like the India Alliance.

The other constraint in being in India is we are lagging behind the international competition in terms of infrastructure to do cutting edge science. We circumvent this problem by trying to work on niche, novel ideas so that we can somewhat overcome the limitations by performing novel exciting research.

What role do you think scientists can play in the society today?

Since the taxpayer pays for our research it is our responsibility to keep the citizens informed of the scientific advancements and tell them how it is improving or affecting our lives. We sometimes get caught up in our jargon and journals. We need to do our bit by engaging with the public often and telling them about our science in simple words.

We should also engage with children and make science more interesting to them by highlighting the science behind everyday activities. It makes learning fun for the children, but also, importantly it keeps the fire of curiosity alive in them. I am actively involved in public outreach activities where I give talks to the general public, school or college students to share with them exciting and current advances in neuroscience.

How has Wellcome Trust/DBT India Alliance funding helped you and your research?

The Wellcome Trust/DBT India Alliance funding has been a major factor in shaping my postdoctoral research career in India. One can have all the ideas in the world but one needs resources to execute those ideas, therefore funding becomes extremely critical for science to flourish.

Having my own grant as a postdoc gave me a sense of independence and also responsibility. The duration of the fellowship was a real asset too. My mentor encouraged me to work with complete freedom and was willing to wait out the long stretches when things didn’t work.

The funding enabled me to travel to a foreign collaborator’s lab and perform key experiments, which have impacted my publications in a very positive way.

Being an Early Career Fellow has been a good platform for a young scientist like me and now I can aspire to become an independent scientist in the country.

I would take this opportunity to thank the India Alliance for all the support that they have provided to me. The flexibility which comes with this funding is unparalleled, at least in India at the moment. I would also like to thank the India Alliance staff who were always ready to discuss issues specific and unique to my situation and provided ample support during my maternity break.

What keeps you going everyday?

The very idea of finding something new is fascinating. Though it is a lot of hard work and it’s not everyday that you find something new, it’s a process and you know you’re getting there. Sometimes, just the challenge of solving a problem, explaining a mechanism or troubleshooting an experiment is a joy in itself.

Unlike some other fields of science, mine involves a lot of experiments, imaging and analysing the data. A typical work week involves a lot of reading up on journals and keeping up with what’s happening around the world. One needs to have that determination and conviction to keep going.

Most importantly, you get to learn something everyday. Being surrounded by smart people is also very helpful. Having a great mentor like Prof Shubha Tole and working in her lab is an icing on the cake. Rigorous scientific discussions regularly and periodic journal clubs and lab meets keep your mental juices flowing and keeps the scientific curiosity intact.
A novel regulator of membrane logistics

Prof. Raghu Padinjat, Senior Fellow 2014

National Centre for Biological Sciences, Bangalore

Research story by Anusha Krishnan

A novel regulator for membrane traffic in cells has been discovered by a team of scientists from the National Centre for Biological Sciences (NCBS), Tata Institute for Fundamental Research (TIFR) and the Babraham Institute. The molecule, Phosphatidylinositol 5-phosphate 4-kinase or PIP4K is a molecular overseer of membrane dynamics that functions as a negative regulator of endocytosis.

What do the Mumbai dabbawalas and the international e-tailer Amazon have in common with a living cell? The answer lies in their detailed organisation and ability to carry out complex operations – Logistics.

Within cells, the flow of information and goods between cellular compartments is tightly regulated by a logistics network that is incredibly intricate. And like all such networks, cellular logistics also require overseers – a set of molecular supervisors that direct the flow of materials between various locations in the cell for the smooth functioning of life.

Now, a team of researchers from the National Centre for Biological Sciences (NCBS), Bangalore, Tata Institute for Fundamental Research (TIFR), Mumbai and the Babraham Institute, UK, have identified a novel molecular overseer that regulates membrane traffic in cells. Using the fruit fly Drosophila as a model system, Raghu Padinjat from NCBS and his group have shown that the protein Phosphatidylinositol 5-phosphate 4-kinase or PIP4K, is essential in controlling membrane dynamics in cells.

The membranes of a cell are ever changing and never constant – being incessantly altered through endocytosis and exocytosis. Endocytosis occurs when parts of the cell's surface membrane are internalized into structures called endosomes, while exocytosis is a process by which membranes from within the cell are sent to the surface.

These processes are important in all cells including the retinal membranes of the eye, where the light-sensing molecule rhodopsin is anchored on photoreceptor cells. Rhodopsin, a membrane protein, is the receptor that absorbs light. Once triggered, rhodopsin must be engulfed into the cell through endocytosis, reset, then recycled back to the surface to maintain vision. However, when PIP4K is absent in photoreceptor cells, the rhodopsin that should be on surface membranes ends up inside the cell in endosomes.

While investigating this phenomenon, Padinjat’s team found that membrane traffic in cells without PIP4K seemed to be normal in all aspects, except one – endocytosis. When PIP4K is absent in photoreceptor cells, the process of endocytosis goes into overdrive and rhodopsin accumulates in expanded endocytic compartments inside the cell.

As Padinjat explains, “In real life logistics, if the flow of goods into a sorting centre does not match distribution from it, then parcels will build up at the sorting centre. This is what happens when PIP4K is missing; cell surface receptors enter and accumulate in the early endosomal compartment.” Furthermore, the role of PIP4K as a membrane traffic regulator is not restricted to photoreceptors alone, it also plays the same role in other cell types in Drosophila. “PIP4K seems to be a fine-tuning signals coming from the plasma membrane by modulating trafficking events – in this case endocytosis in cells. But what is really interesting, is that PIP4K seems to turn down the process of endocytosis,” says Kumari.

In mammals, PIP4K is implicated in the development of cancer and autoimmune disease. “However, the challenge now is to connect complex phenomena such as cancer and autoimmunity to the defective cell and molecular processes that are part of the disease process,” says Padinjat. Though his team has established that PIP4K affects membrane traffic in many cell types in Drosophila, Padinjat now wants to determine if PIP4K in human cells also functions in a similar manner. “We also need to study the molecular mechanisms involved, and once we establish this, our medium-term goal will be to relate the function of the human protein in the context of human disease,” he says.

Hitchhiking Parasites: A Cautionary Tale

Dr. Farah Ishtiaq, Intermediate Fellow
Indian Institute of Science, Bangalore

Many birds undertake long journeys to warmer locations in winters. The Blyth’s Reed Warbler, a tiny brown bird that could easily fit into the palm of your hand, makes a surprising migratory journey even beyond the size of its species. It is one of the few warblers that winter in India from the Palaearctic ecoregion, a huge geographical area that expands from northern Africa, to Europe and to the Himalayan foothills.

During this long migration journey, the Blyth’s Reed Warbler stops for a few weeks in northern India, as a ‘passage migrant’ and then flies on towards southern India for the winter. It seems to be utterly innocuous. However, it isn’t.

Hitchhiking in the warbler’s blood are tiny parasites, mostly protozoa – the same type of organisms that cause malaria. In fact, one of them causes avian malaria: Plasmodium. The other is an organism particularly virulent to pigeons called Haemoproteus but have a broad host range. If you thought Plasmodium sounded familiar, you are right – parasites of the same genus cause malaria in humans, too.

Birds of all species can suffer from ‘avian’ malaria but thankfully; it is not caused by the same species that affects humans. While this is indeed good news for people, it’s rather detrimental for birds. Both Plasmodium and Haemoproteus parasites need specific ‘vectors’ for their transmission between birds, which are usually mosquitoes for Plasmodium and biting midges for Haemoproteus transmission. When the flies bite an infected bird, the parasites get sucked up with the blood and when the flies bite another bird, they transmit the parasite, causing disease through their saliva. Disease transmission can occur be both ways – migrant to local species, or the other way around.

Traditionally, malaria parasites have been examined through blood smear for the presence of infected red blood cells. In recent times, molecular techniques have revolutionised the field of disease ecology. A ‘molecular based’ study typically involves examining samples at the molecular level. This was the first molecular based study in the Indian subcontinent on the migrant warblers that explores the extent of blood parasite sharing between migrants and those resident in India.

In a novel study on avian disease ecology funded by Wellcome Trust/DBT India Alliance and led by Dr. Farah Ishtiaq of the Indian Institute of Science, Bangalore, blood samples from 156-warblers were screened using traditional microscopy as well as molecular techniques. 64 of these samples were positive for either parasite. Using both methods makes the analysis more robust, and also allows researchers to gauge if the parasites are in the active infection stage or not. However, none of the samples showed an infective stage under the microscope, despite testing positive in the molecular analysis. This helped confirm that there is no active transmission of parasites between migrants and resident birds, or vice versa.

A further complication is that these parasites are not the same as the local parasites to which our native birds have spent centuries getting adapted to, making infections acquired from the warblers and other migrants more devastating than can be usually expected. “Understanding how parasites disperse between hosts populations is important to predict risk of emerging infectious diseases”, states Dr Ishtiaq. “However, we lack information on the transmission or exchange in parasites through migrant avian hosts in India”, she adds. This study revealed that although the parasites were found in the Blyth’s Reed Warblers’ blood, they were not in their infective stage and submicroscopic stage which can easily be detected via PCR but morphologically absent. This means that the parasite, while present, is not capable of attacking other birds because it is still immature or ‘spill over’ infections from migrant birds. Vector-borne parasites offer a complex system where presence of competent host and an appropriate vector is important and optimal temperature conditions are important for successful parasite transmission.

While this may seem like an anti-climax, it is an example of what should be done in the current scenario of global disease – ‘global’ as parasites are expanding their range in the face of climate change. While birds have been flying all over the world since long before the Wright brothers were born, it exactly mirrors what humans are doing nowadays.

In another study conducted by Dr Ishtiaq and a team from Sweden, this time in 394 birds of several species in both India and Sweden, screening for Plasmodium and Haemoproteus along with another parasite: Leucocytozoon which is also a vector-borne parasite and infects a wide range of bird species. This study, unlike the previous one, used 3 different molecular tools to diagnose and detect the parasites in bird samples of known parasite intensity. All the tools were variants of PCR (Polymerase Chain Reaction) technique, in which genetic material is amplified and decoded. It was found that a quantitative PCR was the best of the 3 variants of this famous tool, and this study stressed the necessity of sensitive diagnostic tests to avoid under estimation of parasite prevalence which is a crucial parameter to understand disease ecology and epidemiology.

The ‘quantitative’ PCR technique allows researchers to analyse both presence and quantity of the gene in question; the usual method only allows researchers to amplify DNA without giving information about the quantity being amplified. Using a combination of diagnostic techniques, these studies highlights the importance of accounting for methodological issues to better estimate infection in parasitological studies understanding the spread of disease from migrant to resident birds as well as confirmed that not all migrant species are involved in host and geographical shifts in transmission of vector-mediated parasites which require a definite host (e.g. insect vector) for successful transmission.

The principles of spread of diseases to new populations mentioned in this study are true for human diseases as well. This has led to popularisation of the term ‘emerging infectious disease’, a term which has also been applied to diseases like bird flu and Ebola. With new diseases being constantly discovered and old foes making comeback in new locations, it is prudent to think of the Blyth’s Reed Warbler. The ease with which they could have spread disease to new fresh hosts is a cautionary tale, well worth remembering.

Exploring host and geographical shifts in transmission of haemosporidians in a Palaearctic passerine wintering in India. Farah Ishtiaq, Journal of Ornithology, March 2017

**RESEARCH HIGHLIGHTS**

**Molecule, 6-Bio, clears up toxic waste inside cells in Parkinson's disease**

By Dr. Ravi Manjithaya, Intermediate Fellow 2010

Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore

Autophagy is cell’s own mechanism to clean up unwanted junk. This is usually in the form of protein clumps in case of neurodegenerative disease like Parkinson's, Alzheimer's, Huntington's and Amyotrophic Lateral Sclerosis. Not clearing these toxic cellular clumps eventually leads to death of the brain cells. As these cells are irreplaceable, the decline in numbers over time results in manifestation of the above diseases. To compound the problem, autophagy is dysfunctional in such cases. Our studies identified a drug-like small molecule that can boost autophagy and thus help cells clear the toxic protein clumps and save cells from certain death. While studying how this molecule, 6-Bio, enhances autophagy, we identified a possible braking mechanism that exists in normal cells to prevent perhaps rapid autophagy flux. 6-Bio relieves the cell of these brakes thus accelerating the autophagy process. All the way from yeast cells to a mouse model for Parkinson’s, 6-Bio’s autophagy boosting ability helped cells clear protein clumps and survive. This understanding of a basic mechanism could possibly be an exciting target for identifying and developing therapeutic solutions for neurodegenerative disorders via autophagy induction.


Media coverage: Molecule discovery offers hope for Parkinson’s cure. (Times of India)
‘Pac-Man or a vacuum cleaner’. (Fountain Ink)

**New mechanism demonstrates how Mycobacterium tuberculosis (Mtb) develops resistance towards beta-lactam class of antibiotics**

By Dr. Amit Singh, Senior Fellow 2016

Indian Institute of Science (IISc), Bangalore

In our recent study published in eLife, we discovered how Augmentin - a commonly prescribed antibiotic to fight many different types of bacterial infection, can be made useful to target drug-resistant Mtb. We combined a computational analysis with experimental approaches to study the effect of Augmentin on Mtb.

Our study revealed that Mtb cells can develop resistance to Augmentin by increasing the production of an enzyme that breaks down the antibiotic and by neutralizing reactive oxygen species, a type of chemical produced as a result of cellular stress, with help of an antioxidant (mycothiol). Further, Augmentin treatment decreased the production of a protein called WhiB4 in the Mtb. This protein is involved in detecting when cells are stressed and regulates the levels of both mycothiol and the enzyme that breaks down the antibiotic. Increasing the production of this protein made the bacterial cells more susceptible to Augmentin treatment by decreasing the levels of active mycothiol and reducing the production of the enzyme that breaks down the antibiotic drug.

These findings suggest that Augmentin could be made more effective against drug-resistant tuberculosis and other bacterial infections if it is combined with a drug that can alter the levels of reactive oxygen species inside bacterial cells.

Efficacy of β-Lactam/β-lactamase inhibitor combination is linked to WhiB4-mediated changes in redox physiology of Mycobacterium tuberculosis. Saurabh Mishra, Prashant Shukla, Ashima Bhaskar, Kushi Anand, Priyanka Baloni, Rajiv Kumar Jha, Abhilash Mohan, Raju S Rajmani, Valakunja Nagaraja, Nagasuma Chandra, Amit Singh. eLife; May 2017

Popular media coverage: IISc researchers’ quest to make a common antibiotic more effective against TB
New cellular pathway in inflammatory bowel disease (IBD) that provides a novel lead for therapeutic intervention for IBD

By Dr. C.V. Srikanth, Intermediate Fellow 2011

Regional Center for Biotechnology, Faridabad

Modern ways of living have led to a sudden rise in abnormal immune function which results in various auto-immune diseases. Inflammatory bowel disease (IBD) is one such disorder of gastrointestinal (GI) tract involving chronic abnormal immune activation. Symptoms include recurrent diarrhea, abdominal cramps, weight loss, fatigue and fever and a terribly compromised ‘quality of life’ in patients.

Several molecular pathways in cells have been tested for therapeutic pathways but none have been found to be fully effective. In our recently published study in Open Biology we have investigated possible role for SUMOylation in IBD. SUMOylation is an inherent post-translational modification pathway involving various enzymes that alter the structure of proteins which consequently regulates their location inside the cell. Defects in the SUMOylation pathway have been shown to contribute to various cancers, protein aggregating disorders, such as Huntington’s, Alzheimer’s, Parkinson’s diseases and, some developmental disorders.

In our published study that employed mice model and human patient samples, we demonstrate existence of an aberrant SUMOylation pathway which caused a global molecular signaling alteration including a SUMOylation-dependent malfunctioning of master signaling regulator Akt1, a key protein in inflammatory pathways. These findings, the first of its kind in IBD, connect two very important cellular mechanisms (SUMOylation and Akt1) to intestinal inflammation and highlight them as potential targets for therapeutic interventions.

Mechanistic insights into cancer metastasis

By Dr. Shantanu Chowdhury, Senior Fellow 2010

CSIR-Institute of Genomics and Integrative Biology, New Delhi

In the world of proteins, Telomerase achieved stardom in 2009 when discovery of functions of telomerase and telomeres in protecting human chromosomes received the Nobel Prize. Telomeres protect chromosome ends somewhat like the plastic clips at the end of shoelaces that prevent fraying of the ends, and telomerase makes telomeres. This is where telomerase is being good. However, less understood is how telomerase works like a ‘criminal at night’ - helping cancer cells to spread to other organs aggressively. In many cancers telomerase, somewhat mysteriously, becomes hyperactive. Whereas, in normal cells this is kept in check.

We focused on the reasons behind why and how the check on telomerase production is lost. Mainly because we are trying to figure out how another protein called non-metastatic 2 (NME2) prevents cancer spread, also called metastasis.

Both, NME2 and telomerase find common ground in recent discoveries from our group. Presence of NME2, our results show, sharply reduces production of telomerase RNA (molecules that eventually give telomerase protein). Much like a security control check point, occupancy of NME2 at the telomerase promoter - a stretch of DNA sequence that takes critical decisions about when and how much telomerase RNA should be made - prevents production of telomerase RNA. On the other hand, low NME2 removes this check leading to high telomerase production. Perhaps more interestingly, we find that NME2 engages a DNA structural form (instead of a stretch of DNA sequence, which is typically the case) at the telomerase promoter. We know this because we attempted to disrupt the structure and lost effects of NME2. But why is this important? Involvement of a DNA structural architecture allowed us to use molecules that recognize the specific structure - which in turn were able to function like NME2 by checking production of telomerase. Though several steps remain, this suggests something of importance in a clinical setting. In a large number or cancer patients hyperactive or reactivated telomerase was noted to result partly from mutations in the telomerase promoter. Importantly, these mutations occur in regions that are well placed for disrupting the security control check point(s) that hold telomerase production in check. Our recent work published in the Journal of Biological Chemistry suggests that small molecule agents may be useful in recovering the lost check points and bring telomerase production in control once again.


Media coverage: CSIR researchers rein in cancer cells. The Hindu
The 7th annual Wellcome Trust/DBT India Alliance (IA) fellows’ meeting was held in Hyderabad from 18-20 May. An annual event, this meeting is a great opportunity for IA fellows to interact. The meeting was centred around scientific talks, poster sessions and panel discussions. The fellows presented their latest research in diverse fields like cancer biology, neuroscience, intracellular signalling, ecology, public health and genomics; giving an insight into the high-quality scientific output that the fellowship enables. The meeting also provided an opportunity for newly funded fellows to talk about their research plans.

The Wellcome Trust/DBT India Alliance research fellowships were launched in 2008 and have continued to provide stable funding to researchers in India, since then. The Welcome Trust, UK and the Department of Biotechnology, Government of India are equal partners in these fellowships, which are highly coveted by both, young and established researchers in India. The fellowship supports scientists at various stages of their career; early, intermediate & senior and in three broad areas; basic biomedical research, clinical and public health research and for building new research programs in research institutes in India. Apart from providing funds, the fellowship also facilitates capacity building by helping the fellows network, train and explore new areas.

One of the highlights of this year’s meeting was the presence of delegates from African Alliance for Accelerating Excellence in Science in Africa (AESA). The Welcome Trust plans to bring close cooperation between Wellcome Trust/DBT India Alliance and their counterparts in Africa. Alphonus Neba, program coordinator of DELTAS spoke about the goals of his organisation and the challenges in promoting biomedical research in Africa. Simon Kay, head of International operations and partnerships of Wellcome Trust also spoke about his organisation’s continuing commitment to enabling the biomedical research community in India and shared his plans for funding research in priority areas like infectious diseases.

K VijayRaghavan, secretary of the Department of Biotechnology addressed the meeting over Skype and reiterated the need for scientists to work with the political systems to improve infrastructure and output. He also mentioned the need to look beyond the metrics in science to produce high-quality and high-impact science in India.

The last day of the meeting kickstarted with Sarah Iqbal, Public Engagement Officer, IA, highlighting their efforts to communicate science to the general public.

One of the unique features of this meeting were the sessions on practical non-scientific issues that the young scientists face in conducting their research in India. A discussion on lab management, by a panel of experts including Amit Singh of IISER, Bangalore, Bushra Ateeq of IIT Kanpur, Roop Malik of IITD, Hyderabad and Vaibhav Saha of TMC, Kolkata was well received by the fellows. Another discussion on the need for a research development office in academic institutions was conducted by Anur Shukla IIT Kanpur, Naresh Sharma of IISER Pune, Shantanu Chowdhury of CSIR-IGIB, New Delhi and Savita Ayyar of NCBS, Bangalore. They discussed the merits of a dedicated office for international affairs and grants management, which being a nascent culture in India was welcomed by the fellows.

The final panel discussion was on communicating science to the public which was moderated by Abi T Vanak of ATREE, Bangalore. In this interactive session R Prasad from The Hindu, Sandhya Sekhar from IISc Media Centre and Dinesh Sharma from India Science Wire discussed issues pertaining to both scientists and journalists, while communicating with each other and to the general public.

Finally, the meeting ended with the CEO of Wellcome Trust/DBT India Alliance, Shahid Jameel addressing the fellows. He announced new plans to invite graduate students and post-doctoral scholars in the fellows’ lab which led to a big applause and drew the curtains to this fruitful and innovative meeting.
The Wellcome Trust/DBT India Alliance and EMBO are pleased to announce the first award for the India I EMBO Symposia 2017-18. Find out more about this Symposium here or click on the poster below.

Autophagy: Cellular mechanisms and significance in health and disease
11 – 13 December 2017 | Bhubaneswar, India

ORGANIZER
Santosh Chauhan
Institute of Life Sciences, IN

CO-ORGANIZERS
Gulam H Syed
Institute of Life Sciences, IN
Ravi Manjithaya
Jawaharlal Nehru Centre for Advanced Scientific Research, IN
Manjula Kalia
Translational Health Science and Tech. Institute, IN
Sovan Sarkar
University of Birmingham, UK

SPEAKERS
Ravi Amaravadi
University of Pennsylvania, US
K N Balaji
Indian Institute of Sciences, IN
Patricia Boya
Centre de Investigaciones Biológicas, CBIC, ES
Patrice Codogno
Institut Necker-Enfants Malades, FR
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Cambridge Institute for Medical Research, UK

REGISTRATION
Application deadline
17 August 2017
Abstract submission deadline
31 August 2017
Students / Postdocs.............35 EUR
Academics............................70 EUR
Industry..............................100 EUR

Applications submitted for the second round of India I EMBO Symposia are currently under review. For detailed information on the application process, key dates, format of the meeting and required documentation, please consult the application guidelines or visit India | EMBO Symposia website. For any enquiries, please write to workshops@wellcomedbt.org
INDIA ALLIANCE WORKSHOPS

Click on the poster below to find out more about this workshop

Wellcome Trust/DBT India Alliance Workshop
DEVELOPING INDIAN PHYSICIAN SCIENTISTS (DIPS)
DELHI NCR; NOVEMBER 23-26, 2017 | HYDERABAD; MARCH 2-5, 2018

Rapid developments in biomedicine and information technology is ushering in a new age of medicine. Artificial intelligence, genome editing, tissue engineering, are just a few of the frontier fields that are changing the practice of medicine.

The Developing Indian Physician Scientists (DIPS) workshops aim to ignite scientific curiosity in young doctors, while promoting an understanding of the frontiers of medicine and related sciences. The workshops will provide training in quantitative methods and research methodology, and an opportunity to young clinicians to discuss the relevance of biomedical research and career options. Eminent physician-scientists will make up the workshop faculty. Each workshop will be restricted to 40 participants.

ELIGIBILITY: To apply for participation in the workshop, applicant must be
- an MBBS (final professional) or an MD student training in an Indian medical college. Equivalent students/trainees in allied fields such as dentistry, optometry, etc. are also eligible.
- prepared to pay a refundable advance of INR 2500 (MBBS) or INR 5000 (MD) will be refunded on the end of the last day of the workshop to those who have attended the complete workshop.
- prepared to make their own travel arrangements. Accommodation (double occupancy) and meals will be provided by the organizers at no charge.

APPLICATION DEADLINE
FOR DELHI NCR WORKSHOP September 23, 2017
(Call currently active)

FOR HYDERABAD WORKSHOP January 2, 2018
(Call for application in late September 2017)

ORGANIZERS
Prof. Rakesh Aggarwal, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow
Dr. Anurag Agrawal, CSIR-Institute of Genomics and Integrative Biology, New Delhi

SUPPORTED AND FACILITATED BY
Wellcome Trust/DBT India Alliance is an initiative funded equally by the Wellcome Trust, UK and Department of Biotechnology, India, aimed at promoting basic biomedical, clinical and public health research in India through funding and engagement.

FOR MORE INFORMATION ON THESE WORKSHOPS please visit our website www.welcomedit.org or write to us at workshops@welcomedit.org
The India Alliance organised one-day Science Communication Workshops at Mizoram University (6 June), Institute of Advanced study in Science and Technology (IASST) Guwahati (8 June) and North Eastern Hill University (NEHU) Shillong (9 June). These were coordinated by the Department of Biotechnology’s North Eastern Region-Biotechnology Programme Management Cell (NER-BPMC).

These one-day Workshops covered topics such as research ethics, grants and manuscript writing, presentations skills, writing CV, cover letter and preparing for interviews. The Workshop mentors also stimulated discussions on the importance of communicating science to the public.

Around 80 PhD students participated at the Workshop at Mizoram University (MZU) who came from various departments such as Botany, Biotechnology, Chemistry, Veterinary Science, Zoology, Forestry. In his opening remarks, Vice-Chancellor of MZU, Prof. Lianzela, set the tone for the workshop by underscoring the need for scientists to become effective communicators in order to enhance the impact of their research.

At IASST, an institute established in 1979 by the Assam Science Society and inaugurated by Nobel Laureate Dr Dorothy Hodgkin, the 94 participants were a mix of PhD students, Postdocs and research technicians from the Life Sciences division. At the start of the workshop, Prof N C Talukdar, Director, IASST (now a DST institution), showcased the diverse research being carried out at the institute which is aimed at solving local as well as nationally relevant technological, health and socio-economic problems and urged the participants to engage with research truthfully and responsibly.

The final workshop at NEHU was attended by 30 PhD students and young postdocs from the Biotechnology, Bioinformatics, Biochemistry and Botany departments. In addition to the workshop modules by IA workshop facilitators, Dr. Meenakshi Munshi from DBT spoke about the diverse funding opportunities offered by DBT and other government agencies and Dr. Pawan Sharma, Senior Consultant - Healthcare at NER-BPMC, presented an overview of the activities of the Department in the North East.

Participants discussed various topics with the workshop mentors which ranged from how to prepare a grant proposal in the absence of preliminary data, when can one write a review paper, strategies to engage with local communities about their research, preparing for an academic and industry job interview, research opportunities in India and so on. It was evident from the active participation that such training workshops are need of the hour and many participants opined that these should be formally introduced as part of research training in order to make young research scholars both nationally and internationally competitive.

**UPCOMING WORKSHOPS**

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<tr>
<td>19 August 2017</td>
<td>SciComm101 at IIT Gandhinagar</td>
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<td>7-8 September 2017</td>
<td>16th Science Communication Workshop, New Delhi (not accepting applications for this Workshop; selected applicants have been intimated)</td>
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Prof Senthil Kumar has been the Head of the Department of Biotechnology and Academic council member at Mizoram University, Aizawl, Mizoram. He has been instrumental in establishing the DBT State Biotech Hub, Bioinformatics Infrastructural Facility and Digital e-library consortium (DeLCON) at the Department and is currently the coordinator of these facilities. Prof Senthil Kumar has a background in human genomics, disease biology, molecular diagnosis, with specific training and expertise in demographic survey research and secondary data analysis associated with cancer and other diseases. Prof. Senthil coordinated the recent India Alliance one-day Science Communication Workshop at the University.

What are your research interests?

We all know that ecosystem is one and biological concepts are uniform across species. I work on all model organisms from bacteria to humans to understand the evolutionary forces that shape the ecosystems. Predominantly, I do bioinformatics coupled with ecological/ demographic information. I do believe that understanding our biodiversity and genetic principles will eventually lead to better environment as well as human health. We use molecular phylogenetics concepts to understand the evolution of species and the rich diversity of flora and fauna in this region.

I am working with the fields involving molecular biology dealing with cancer, diabetes, microbiology and bioinformatics. I also envisage to work more progressively on human diseases that will help in the socio-economic development and livelihood of the state. The people of Mizoram have a high incidence of cancer. Hopefully working on cancer can help us find out the genetic epidemiology with the aim of developing personalized medicine.

What motivated you to become a scientist?

Curiosity and eagerness to understand life and to appreciate life forms. Science is very important for uplifting the under developed regions of the country. But to put it simply, I just love Science. It satisfies my curiosity and furthermore it allows me to engage with people from different walks of life – starting from students, researchers, administrators, foresters, ecologists, clinicians, government officials and the general public. My greatest pleasure in doing science is to learn about things that I didn’t know of before.

Please share your experience of setting up your lab in Mizoram University. What were some of the challenges and how did you overcome them?

It was a great learning experience and provided immense satisfaction. Doing research in Molecular Biology or setting up research labs in itself was a new endeavour in the state of Mizoram. But we received lot of support and encouragement from the University Administration and local public. There were logistical problems in transporting the equipment, installation and proper maintenance, costs involved in bringing service engineers, coupled with stable water and electricity supply. Due to the geographical location, lot of lab necessities cannot turn up within required time. But, these were pleasant challenges and it is all along a memorable story. We have managed to pull through with the help of all the colleagues and research scholars, students and staff. The team work brought in success.

Proper time and resource management were key in overcoming these problems. I always remember a proverb – Think globally, act locally. We need to solve local problems while looking at the big picture.

The support from DBT, New Delhi for setting up the Bioinformatics infrastructure facility under the BTISNet programme as well as the State Biotech Hub under NER-BPMC to set up the laboratory and infrastructural facilities was immensely helpful. Project support from DST, UGC, ICAR and CSIR was helpful for the faculty to establish the department. Other programmes of DBT, New Delhi such as the Twinning projects, Unit of Excellence and Visiting Research Professorship also paved ways for establishing research and teaching facilities.

Can you provide a snapshot of the kind of research that is happening in your department?

Faculty in our Department are working on diverse areas such as inventorization and characterization of plant genetic resources for genetic improvement of crops and conservation of important crops, exploration of wild mushroom biodiversity of Mizoram for their commercial application in health and agriculture, Cancer genomics in the context of Mizoram and the North East, stress biology of cyanobacteria, antibiotic resistance in microbes and so on.

You have been involved in various student training activities at the University and also supervise many research students. How do you keep your students motivated?

Most of the motivation is provided by “Science” itself. The research areas are so interesting and applicable in our daily lives that it keeps generating interest in these young minds. I also feel it is important that I show my enthusiasm for research and use appropriate, concrete and easy-to-understand examples to help...
students grasp the scientific concepts. We create a list of jobs for the students for the week and celebrate their achievements. We learn and respect the feelings of students and first try to gauge their potential, which we try to build on during their training. Interdisciplinary approaches and multi-tasking are instilled in them early on in training. I think that, encouragement from us is key in keeping them motivated. Students in NER are highly disciplined and energetic. There is enormous human resource at this level that can be tapped for scientific growth and development of the country.

Do you see the research landscape changing in the North East? If so, how?

Yes, there has been a drastic change in the research perspective in the northeast over the past two decades. I can see sustainable growth and development in Science and Technology in NER. Funding agencies under the Government of India such as DBT, UGC, DST etc. are doing a wonderful job in promoting human resource development, infrastructure building and extension activities. Many educational institutions and State government agencies are also now involved in research and extension activities apart from their own mandate. The research output from NER has grown tremendously and many students and teachers have contributed enormously to the knowledge database, publications as well as the impact a research lab can offer to future students. A lot of research here addresses local problems. There is growing amount of public participation as there is more and more awareness of the importance and contribution of science which is resulting in an overall positive change in the research landscape.

What are some research areas that you think require more attention or a boost in the NER?

Few important research areas would be: Human disease diagnosis and prognosis; genomics and proteomics of diseases; disease vectors and their management; biodiversity and environmental Assessment. NER is rich in natural resources which are largely untapped. So in that context I think research in the following areas should be encouraged - Bio-prospecting of medicinal plants and other useful microbial genetic resources, biosynthetic potential of endophytic microorganism associated with traditional medicinal plants and exploring them as an alternative source for drug discovery, biofuel production by utilizing the available biomass.

What keeps you going every day?

Nothing in this world is permanent, except knowledge and the amount of knowledge we have gained so far is very meager. When we have a dream, we never tend to sleep unless we achieve it and hard work is the only way to get to it. Respectfully quoting our former President, Dr. A P J Abdul Kalam ‘Dream is not the one that we get in our sleep, but it is the one that makes us not to sleep’. I believe that there is more to do in research, which can be achieved and should be directed to the welfare of the people of Mizoram state and the country at large. The need to improve daily and constantly and flow along with the developments around the globe and the results and data which we generate in our research keeps me inspired and happy everyday.

Do you have advice for those who wish to work/study at Mizoram University (MZU)?

Lot of generosity and honesty is found in Mizoram University. People are focused and passionate about their work. Students get full access to equipment and resources and have freedom to innovate. Creativity in work is highly encouraged and supported at Mizoram University.

I must also add here that Mizoram is a pleasant and beautiful place to stay. People here in general are very kind, friendly, hardworking and helpful. Established around the motto “Greater deeds Remain” Mizoram University welcomes anyone and everyone who wishes to work or study towards the development of the state, NER and the country on the whole.

Lastly, please share your views on the importance of developing effective Science Communication skills for researchers in the context of the recently held SciComm101 workshop.

SciComm is a very essential course for modern day researchers and will definitely pave way for enhancing the quality of research output in India.

The SciComm workshop recently conducted by the Wellcome Trust/DBT India Alliance at Mizoram University was very useful for researchers and students to understand the ethics of doing research as well as for manuscript and grant writing. The workshop also covered presentation skills which was valuable component. Overall, the teachers and research scholars who attended the Workshop from different institutions found it very useful and interesting. We received very good feedback for the quality of the resource persons and content of the workshop.
Khoj International Artists Association invites proposals for its Art + Science programme. Instituted by Khoj and supported by Wellcome Trust/DBT India Alliance, Art + Science is designed to advance projects that explore artistic applications of emerging thoughts and technologies with the help of partners from the scientific industry and academia.

We seek project proposals that have the potential to allow the public to learn alongside artists, scientists and technologists doing thought-provoking work. Projects, including prototypes, documentation, and work-in-progress, will be presented to the public at an Open Studio at Khoj Studios in late March 2017. We are greatly interested in project proposals that include some aspect of public demonstration and engagement with the public.

The Art + Science grant program is open to individual artists and artist collectives.

The scientists for this edition work across and are interested in Biological Sciences, Genomics, Regenerative medicine, Internet and Science, Myth and Science, Health and Disease, Infections, Genetic Engineering, Neuroscience, Biotechnology, Perception and alternate or augmented reality and Human/machine, Mars, Terra-forming and Astronomy, interface, robotics; sensorial and extrasensory interfaces etc.

Particular areas of interest include the following:

The Internet
Science-Fiction
Health, Medicine and disease
Issues of perception and alternate, augmented or virtual reality.
Human/machine interface; robotics; sensory and extrasensory modes of perception.
Space, exploration and new frontiers.
The Politics of Science and Technology.
Science and Myth.

Applicants wanting to co-develop projects with Scientists/Academics may write to applications@khojworkshop.org and they will be connected to the scientists working in the relevant area. Alternately if applicants want to work on topics outside the stated, please write to us and we will try our best to connect you with suitable researchers/scientists/scholars.

Deadline to submit proposals 30 September 2017

Read more here: http://khojworkshop.org/opp_/call-for-proposals-art-science/

Looking for ideas on how to engage with the public/communities with your research or would like to share your public engagement strategies? Check out Mesh.

Mesh is a collaborative open-access web space for people involved in community engagement with health research in low and middle income countries (LMICs). It provides an online meeting place where community engagement practitioners, researchers, health workers and others can network, share resources and discuss good practice. https://mesh.tghn.org/

Read about Public Engagement projects funded by the India Alliance on Mesh,
Project Report: PRIDE: engaging young people with mental health in India
Project Report: Using Traditional Arts to Engage School Students on Environmental Health Issues in Delhi, India

If you have any ideas or questions about public engagement, write to us public.engagement@wellcomedbt.org
What is your background?

My family originally hailed from Kerala but I grew up in a coastal city in Andhra Pradesh, Visakhapatnam or Vizag, for short. I studied there till masters. I did my PhD in Anna University, Chennai. My PhD was on biophysical characterization of transmembrane channels formed by a family of proteins called Connexins using Raman spectroscopy and electrophysiology. Following PhD, I did postdoctoral work at Weill Cornell Medical College in New York and at University of British Columbia in Vancouver where I worked on ATP-independent and ATP-dependent phospholipid flippases (cell membrane lipid transporter proteins), respectively. For the last year or so, I am in Hyderabad. Though I have moved to many different places for work and study, Vizag is the only place I would call home.

What led you to a career in research/grants management?

Research work, while primarily being an activity to discover the secrets of nature, is also a journey to discover one’s self. Somewhere along the way I realized that I was not totally happy with what I was doing. While I had the opportunity to work with great people and learn some wonderful things, I was not entirely satisfied with where things stood. I wanted to switch streams and seek a different kind of challenge in my career. Going through the process of research work inculcates in you ancillary skills that can become primary skills in certain non-academic settings. Research management and grants administration is one such.

How has your India Alliance journey been so far?

In any assignment, the most exciting thing for me is the opportunity to learn new things. From that perspective, my experience at India Alliance so far has been extremely enjoyable. We have just completed interviews where the first set of applications that I handled completely were awarded fellowships. And the feeling is that I am part of something important, even path-breaking. We are not only facilitating the identification of some of the most exciting researchers in the country and supporting their work, we are also setting a benchmark for other grants agencies. And all this is eventually going to be beneficial for our country.

When not busy on the job, what do you enjoy doing?

I have a deep interest in public communication and science reporting. I maintain a blog called Information factory where I write about research that I find interesting and other things going around in the country. A good amount of my non-working time is consumed by the blog. I hope to eventually develop it into a comprehensive platform with different types of content. I also like reading non-fiction, mostly of the political type. I try to complete at least a book every month.

What was the last piece of research that excited you?

I recently wrote in my blog about an interesting research published in the journal Science by Jeffrey Cohen and co-workers. The researchers here used the photosynthetic ability of cyanobacteria to restore oxygen supply to heart tissue as a means to counter heart attack. The researchers showed that after injecting cyanobacteria into the heart tissue of mice and shining light, there was an increase in oxygen supply and improvement in heart function. Eventually there was also an alleviation of damage to heart tissue. These finding are still very preliminary and many technical challenges have to be overcome before this idea can be anywhere close to real life application, if at all. But the thinking behind the idea itself, that an ever replenishing source of oxygen can be embedded into the tissue itself to treat conditions arising out of oxygen depletion, was something that I found very interesting and exciting.

Who inspires you (living or dead)?

Richard Feynman. Surely you’re joking Mr Feynman! was probably the first non-fiction that I read. I finished the book in one straight sitting, that’s how interesting the man’s life was. One life lesson I learnt from Feynman was to always master the basics. If the basics are clear, you can understand and solve how much ever complex a topic might be, from a transistor radio to quantum mechanics.
WEST COAST OUTREACH 2017
CAREER AND FUNDING OPPORTUNITIES
FOR BIOMEDICAL RESEARCH IN INDIA

The Wellcome Trust/DBT India Alliance, a £160 million partnership between The Wellcome Trust, UK and the Department of Biotechnology, Government of India (DBT), supports the best and brightest of biomedical scientists to work at Indian institutions.

This outreach event will inform on funding and career opportunities in India’s Life Sciences sector, and is designed for PhD students, postdocs, junior and mid-career scientists aspiring for a career in India.

There will be a 30 min talk on India Alliance by Dr. Shahid Jameel, CEO, and a panel discussion on opportunities in India.

DATE. August 7
TIME. 3:00pm-5:00 pm
VENUE. Room MH-1401/1402, University of California at San Francisco

DATE. August 9
TIME. 11:00 am - 1:00 pm
VENUE. Room B5RB154, University of California at Los Angeles

DATE. August 11
TIME. 3:00 pm - 5:00 pm
VENUE. Leichtag Building Lecture Room 107, University of California at San Diego.
PERMISSION:

for	[104x1431]OTHER ANNOUNCEMENTS

Workshop on Science Administration and Management for Women

**Overview**
The workshop aims to open up new avenues to retain trained women in science by targeting those who are making a transition from education to scientific careers. The programme is planned to generate a trained workforce to take on emerging roles in the growing scientific enterprise and to raise awareness about alternative career options in STEM.

**Orientation Session (Open to All)**
On September 18, 2017, one day prior to the workshop, there will be an Orientation Session on Careers in Science Administration and Management with speakers from India working in related areas. This session will be free and open to everyone. Details will be posted closer to the date.

**Date:** September 18, 2017
**Venue:** Sir C.V. Raman Auditorium, IISER Pune

**Eligibility for the Orientation Session:** Open to All

**Workshop**
The workshop will be in two levels. The first level of the workshop will be for selected participants and will involve in-depth discussions and assignments. Some of these participants will have the opportunity to attend a second, advanced level of the workshop.

**Trainers and Organisers**
This workshop would be conducted by a team of experienced faculty from Coventry University, UK. The workshop is sponsored by the British Council, through the Newton Bhabha Fund and organized by MHRD’s Centre of Excellence in Science and Mathematics Education with support from the Science Management and Communications Team of IISER Pune.

[Click here to register online](#) (Last date for Application: **August 11, 2017**)

**Dates:**
Level 1: September 19-21, 2017
Level 2: January 8-9, 2018
**Venue:** IISER Pune

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Newton Bhabha - STEM Teacher Training Workshops

**About the Programme**
British Council in collaboration with Indian Institute of Science Education and Research (IISER), Pune organises STEM Teacher Training workshops to develop Research-Based Pedagogical Tools. These workshops are funded under Newton Bhabha Fund aiming to train faculty of undergraduate colleges of India to develop new project based learning tools to be used in their day to day teaching. The workshops have already trained 450 faculties from 253 undergraduate colleges and universities.

The workshops are delivered by Sheffield Hallam University, UK and Indian experts. It’s a hands-on workshops with participants preparing their own teaching tools and reviewing those of others. This platform provides an opportunity to teachers to interact with counterparts from various colleges and education experts from India and abroad.

**Applications Open – Apply now to attend 2017-18 workshops.**

**Deadline for accepting applications:** 27 August 2017

More details on this programme are available [here](#)

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Newton Bhabha PhD Placements Programme

**About the programme**
On behalf of the Department for Business Energy & Industrial Strategy, UK and the Ministry of Science and Technology, India, British Council- India, the Department of Science and Technology (DST) and the Department of Biotechnology (DBT) India are pleased to invite applications for funding to support short-term PhD placements between UK and Indian institutions.

It is the fourth consecutive year Newton Fund India in partnership with DST and DBT is offering opportunity for the UK and Indian PhD scholars to spend a period of their study (2 to 4 months) in Indian and UK higher education institutions taking place between March to December 2018.

**Deadline for receipt of applications:** Thursday, 21 August 2017 by 16.00 hrs (UK time)

**Selection results announced by mid November 2017**

**Placements to take place between March to December 2018**

The application should be submitted by PhD scholar with endorsement from both the sending and receiving Head of Department and supervisors with the latter’s confirmation that they will host the PhD scholars; duration of the stay and level of bench fees if they charge (bench fees is applicable only for UK host Universities)

UK applicants apply [here](#)

Indian applicants apply [here](#)

More details can be found [here](#)