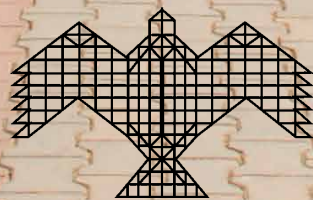


NIAS Newsletter

October 2017

Complex Systems Programme | NIAS Foundation Day |
Regular Updates | Events & Publications | Campus Notes

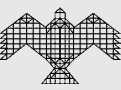


National Institute of Advanced Studies (NIAS)
Indian Institute of Science Campus, Bengaluru

The NIAS Generation Y

The Institute has a bunch of talented PhD scholars and Research Associates, as a part of numerous programmes engaged in cutting edge research. The scholars are also known for their extensive field research all over the country.





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NIAS Newsletter

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Volume 3, Issue 4

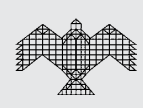
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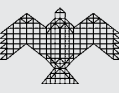
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Note from the Director

Celebrating JRD

The quarter pertaining to the newsletter was marked by celebration of JRD, the visionary founder of the National Institute of Advanced Studies. Besides his birthday, the Institute also had chosen “Celebrating JRD” as a theme for its Foundation Day held on 19 July 2017.

Mr Suresh Krishna, Chairman and Managing Director of the Sundram Fasteners Limited delivered the JRD Tata Memorial Lecture to a packed audience on “The Idea of Excellence in Industrial Harmony”. As a part of its Foundation Day celebrations, the Institute also organized a unique panel discussion titled “The World We Leave Behind: The Impact of Our Present on the Future”.

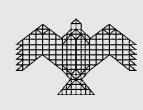
True to the multi-disciplinary nature of the Institute, the panelists of the above discussion came from different backgrounds, carrying rich knowledge in diverse fields, and years of experience. The panelists included the following: Prof PS Goel, Former Secretary, Ministry of Earth Sciences; Amb PS Raghavan, Convener, National Security Advisory Board (NSAB); Ms Bindu Subramaniam, Lyricist, Pianist and Musician; and Prof Balakrishna Pisupati, Vice Chancellor, Trans-Disciplinary University. Can it get any better?

The period also witnessed the Institute hosting India’s Foreign Secretary Dr S. Jaishankar for an evening. Once again, the auditorium was packed, this time to listen to Dr Jaishankar delivering K. Subrahmanyam lecture.

True to mandate and character of NIAS, we hosted a wide range of leaders – from India’s business community to the Secretary of External Affairs Ministry.

As a part of NIAS academic activities, besides our events and publications, which are mentioned in this newsletter, it was a true satisfaction for the Institute to experience senior PhD scholars defending their thesis work, and new scholars present their proposals. The newsletter carries a short note on the above activity. The Institute’s PhD programme is unique and relevant. We continue to enrich and enhance this activity to produce future leaders and citizens of India.

Baldev Raj
Director, NIAS



Featured Programme

Complex Systems Programme

Research, Theoretical Modelling, Predictions

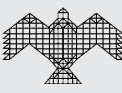
“Nearly all the phenomena we see around us – natural or man-made, arise from nonlinear interactions among constituents of the system, and many times it is possible to mimic their behaviour by constructing simple predictive mathematical models using physical concepts and tools and techniques of dynamical systems theory”

- Janaki Balakrishnan
Head, Complex Systems Programme

NIAS has an integrated approach to the study of the intersections between science and technology, social issues, humanities and leadership. The philosophy underlying NIAS is given shape by its research through the Research Programmes housed by the Schools. In this issue of NIAS Newsletter we feature the Complex Systems Programme.

The Complex Systems Programme was begun in NIAS in July, 2012. Work done in the Programme seeks to model and explain situations and phenomena seen in the real world in various realms employing tools and techniques of dynamical systems theory, aiming in each case to obtain useful results which have practical value. Studies conducted cover a broad spectrum of subjects, making the Programme one which is truly multi and trans-disciplinary. Appropriate physical concepts & mathematical techniques are used to make useful predictions in diverse systems and to determine if and in what way one could achieve some control over their behaviour. Since its inception, the Programme has made contributions to diverse areas like modelling impact of climate change on ecological systems and prediction of insect pest outbreak cycles, dynamics & acoustic cavitation of charged microbubbles, novel nonlinear oscillations in coupled Josephson junction models, neuron dynamics, physics of sensory systems, ecological population dynamics, dynamics of bursting oscillations, complex behaviour in different nonlinear systems, stochastic processes, etc. Many of these contributions have been of a leading and pioneering nature.

The Programme aims to act as a resource & research centre to build up adequate expertise & train bright young minds to fruitfully deal with complex dynamical systems in various fields. Currently, two research projects in progress in the Programme are supported by SERB, DST, Government of India -- (i) “Nonlinear oscillatory phenomena in sensory systems” (under the EMR scheme) and (ii) “Modelling Nonlinear Complex Phenomena : from climate change, environmental effects to interacting species” which forms one of the 3 components of a larger project at NIAS: “Interdisciplinary Forays into Human-Environment Interactions: An Integrative



Research Initiative in Energy, Ecology and Nonlinear Modelling” (under the IRHPA scheme).

Some of our recent research contributions are described below.

Effect of addition of multiple mutually noninteracting species in an ecological system

In another work published by S.V. Iyengar, J. Balakrishnan & Juergen Kurths in the journal *CHAOS*, a mathematical model was constructed to study the effect of the presence of more than

Recent Research Contributions

Modelling Impact of Climate Change on Pest Outbreak Cycles

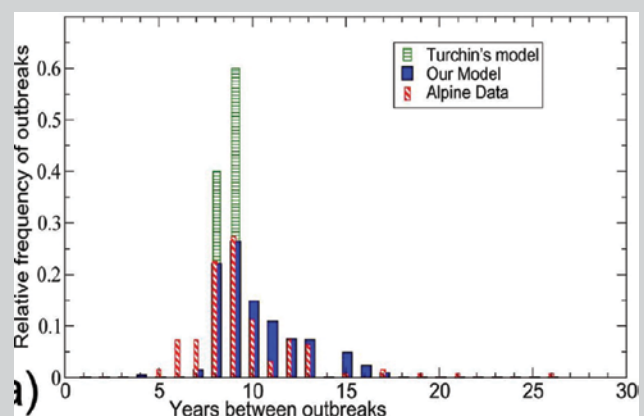
Regular cyclic outbreaks of the budmoth insect pest infestations have caused widespread defoliation of vast areas of larch forests at high altitudes. This has worried environmentalists and ecologists and has also been a cause of concern for the timber and tourism industries. The regular 8-9 year pest outbreak cycles in the Swiss Alps suddenly collapsed after 1981 & the expected cycles have not recurred yet. A significant achievement of the Programme during the past year was the resolution of this puzzle of the occurrence, absence & collapse of pest outbreak cycles by construction of a mathematical model which incorporated climate parameters for the first time. The results of this model were shown to match observational and dendrochronological data recorded over 1200 years.

It accounts for collapse of the cycles after 1981 (due to a climatic tipping point reached in the 1980s), explains absence of cycles in certain places (like the Slovakian Tatra mountains in the Carpathians nearby) & accounts for variations in the 8-9 year periodicity observed elsewhere. This work authored by Sudharsana V. Iyengar, Janaki Balakrishnan & Juergen Kurths, published in *Nature Scientific Reports*, has been very successful as it has been validated in observations & experiments (the dependence of larch budmoth outbreaks on precipitation, on temperature, and on the abundance of the host trees) independently by other authors.



Budmoth larvae (left), and larch forest (right) which these have defoliated lending a brownish colour to the landscape. Image courtesy: E. Ranta et al, Science 298, 973 (2002).

Periodic pest outbreak puzzle resolved. Our model fits best with 1200 years of observed data. Effect of Climatic Tipping Point (1980s).



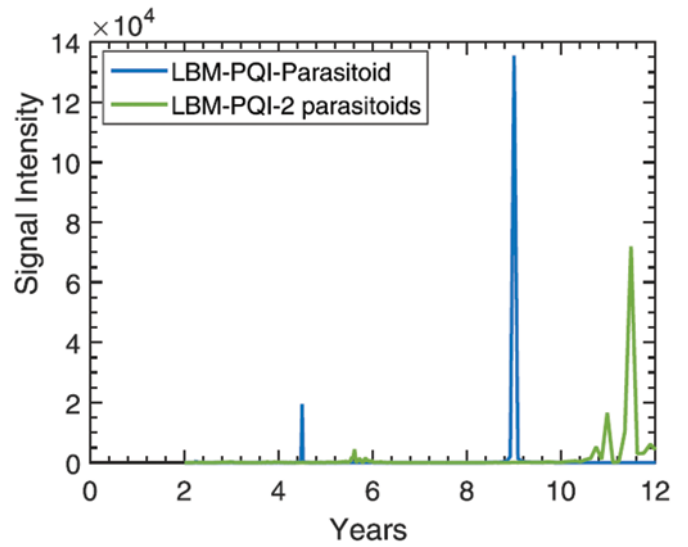
one species of mutually noninteracting parasitoids in a tritrophic ecological system. Observations record the presence of upto 5.4 parasitoid species (on average) a year living off a single budmoth larva which in turn are responsible for extensive defoliation of larch trees at high altitudes. This is the first mathematical model in the literature which studies the effects of multiple species of parasitoids hosted by a single budmoth pest. The model's prediction of longer periodicities of infestation outbreaks due to the presence of additional parasitoid species is in agreement with observations and it also provides an alternative explanation for the observed cessation of cyclic outbreaks of budmoth.

Complex bursting oscillations in nonlinear systems

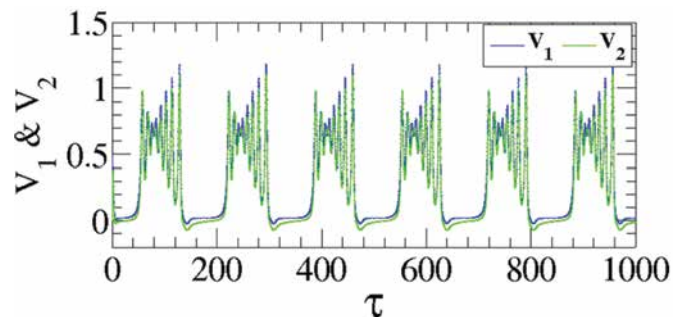
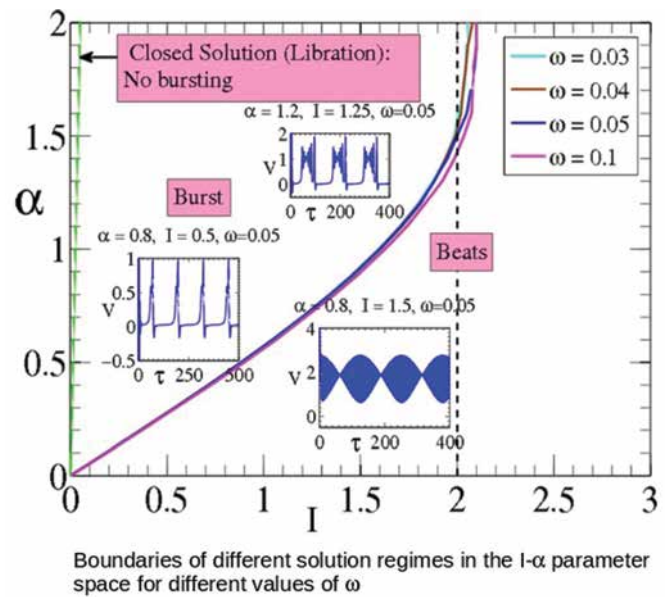
Another achievement of our Programme is the discovery of the bifurcation mechanism governing intriguing periodic bow-tie shaped bursting oscillations in a system of two Josephson junctions, each represented by the resistive capacitive shunted Josephson junction (RCSJ) model, which are diffusively coupled. In this work (published in *CHAOS*, authored by Thotreithem Hongray, Janaki Balakrishnan & S.K. Dana), the physical & mathematical mechanisms underlying the shape of these hitherto unknown bursts were elucidated.

In a different but related work, identically-shaped bursts were also found in a very different system – a simple mechanical pendulum with damping and an external driving fed through a dynamical feedback mechanism (published in *CHAOS*, authored by Thotreithem Hongray & Janaki Balakrishnan). The mechanism underlying the oscillations in this forced system were found to be a little different from that in the coupled Josephson junction system.

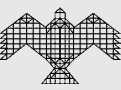
Bursting oscillations such as these are observed in firing from certain neurons in the hippocampal region of the brain. It is therefore hoped that these studies made of these bursting oscillations would help in understanding the mechanism of similar oscillations seen in the brain also.



Addition of a second parasitoid in the system increases the time period of budmoth outbreaks. Model results agree with direct observations.



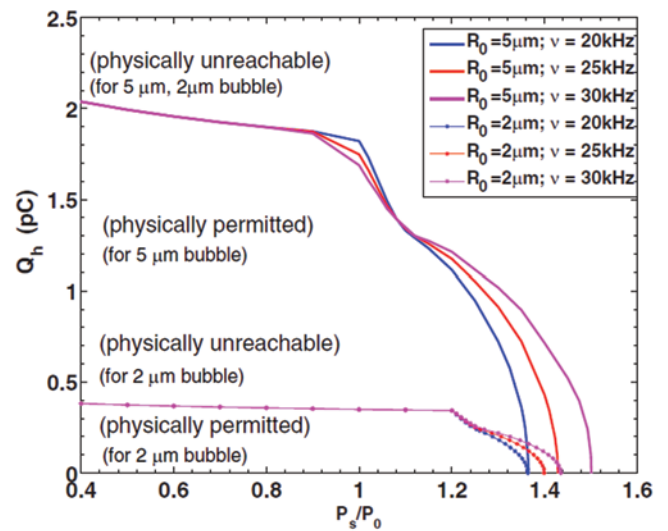
Bursting oscillations of the normalised voltages V_1 & V_2 of the coupled Josephson junction model system in the high damping regime. The bursts show near-complete synchronization at strong couplings.



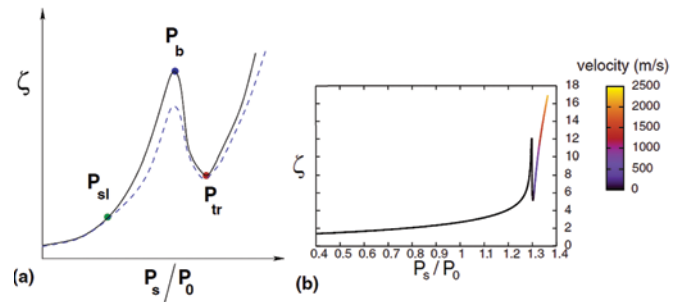
Dynamics of charged microbubbles in liquids under ultrasonic forcing

The Programme has made significant contributions to the theoretical investigations of the dynamics of an electrically charged gas bubble undergoing forced oscillations in a liquid due to the incidence of ultrasound. Micron and nano-sized bubbles in fluids under ultrasonic forcing are forced to oscillate violently because of extremely rapid pressure variations and tend to implode. Bubble implosion is a highly energetic process and can cause enormous damage to nearby surfaces.

Detailed results were obtained giving pressure and charge thresholds for the implosion and collapse of micron & nano-sized gas bubbles bearing constant surface electric charge, in fluids when subjected to ultrasound at different driving frequencies and bubble radii (published in *Nonlinearity* (2014) and in *Pramana* (2015), authors: T. Hongray, B. Ashok and J. Balakrishnan). These are the first calculations of charge & pressure thresholds of electrically charged bubbles. This is of use in damage control of tissues in ultrasound medical diagnostics and of wear of vibrating machinery in fluids like turbines in industry and enables one to operate in a “safer” regime. We found that the presence of charge influences the regime in which the bubble’s radial oscillations fall. The system was shown to exhibit period doubling route to chaos, with the presence of charge having the effect of advancing these bifurcations.



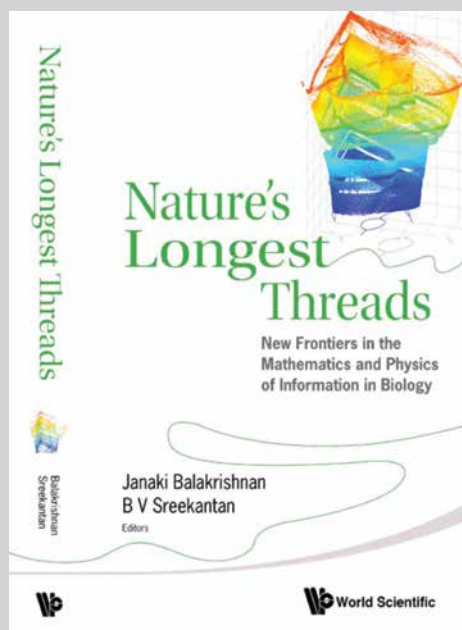
Maximal charge Q_h a bubble can carry for a given frequency, as a function of driving pressure amplitude P_s , for bubbles of equilibrium radius $R_0 = 2 \text{ \& } 5 \mu\text{m}$.



The points on the graph where frequency & charge-independence sets in (P_{sl}), the Blake threshold ($P_b = P_{Blake}$) and the upper transient threshold pressure (P_{tr}) are shown in the schematic figure

Complex Research Programme

Recent Publications



Book

Nature's longest threads: New Frontiers in the Mathematics & Physics of Information in Biology

J. Balakrishnan and B.V. Sreekantan (eds)
World Scientific Publishing Company Pte.Ltd., Singapore (2014)
(ISBN-13 no.: 978- 9814612463)

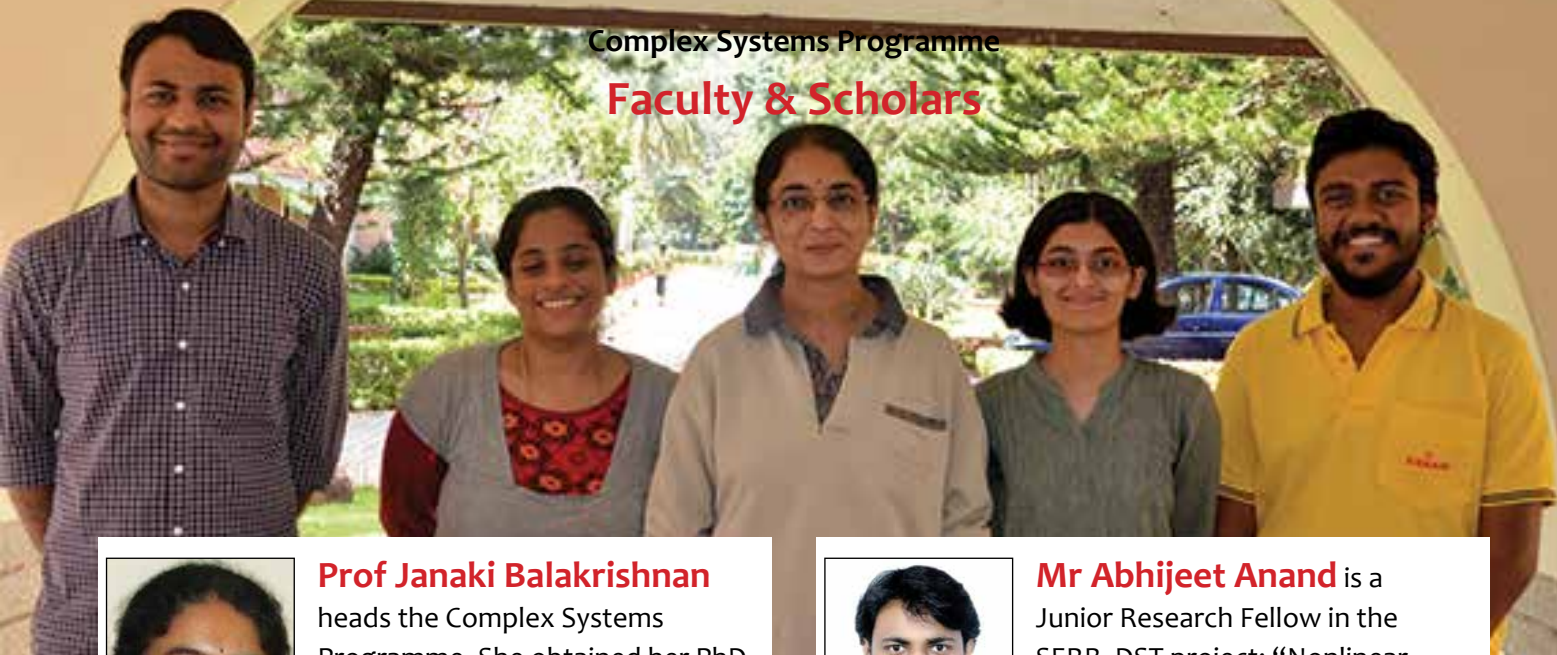
This volume reports inter-disciplinary research and views on information and its transfer at different levels of organization by reputed scientists working on the frontier areas of science. It is a frontier where physics, mathematics and biology merge seamlessly, binding together specialized streams such as quantum mechanics, dynamical systems theory, and mathematics. The topics would interest a broad cross-section of researchers.

Other Recent Publications

- T. Hongray & J. Balakrishnan. "Dynamics of bow-tie shaped bursting: forced pendulum with dynamic feedback", *Chaos* **26**, 123107(1)-123107(6) (2016).
- Sudharsana V. Iyengar, J. Balakrishnan & Juergen Kurths. "Impact of climate change on larch budmoth cyclic outbreaks", *Scientific Reports* (Nature Publishing Group) **6**, 27845 (2016).
- Sudharsana V. Iyengar, J. Balakrishnan & Juergen Kurths. "Co-existence of periodic bursts and death of cycles in a population dynamics system", *Chaos* **26**, 093111(1)-093111(15) (2016).
- T. Hongray, J. Balakrishnan & S.K. Dana. "Bursting behaviour in coupled Josephson junctions", *Chaos* **25**, 123104(1) - 123104(9) (2015).
- Sudharsana V. Iyengar & J. Balakrishnan. "q-Deformations and the Dynamics of the Larch Bud-moth Population Cycles" in *Nature's longest threads: New Frontiers in the Mathematics & Physics of Information in Biology*, eds. J. Balakrishnan and B.V. Sreekantan, pgs. 65-80, World Scientific Publishing, Singapore (2014).
- T. Hongray, B. Ashok & J. Balakrishnan. "Oscillatory dynamics of a charged microbubble under ultrasound", *Pramana: Journal of Physics* **84**, 517 (2015).
- T. Hongray, B. Ashok & J. Balakrishnan. "Effect of charge on the dynamics of an acoustically forced bubble", *Nonlinearity* **27**, 1157 (2014).
- J. Balakrishnan, "Instabilities in sensory processes" in : *Nature's longest threads: New Frontiers in the Mathematics & Physics of Information in Biology*, eds. J. Balakrishnan and B.V. Sreekantan, pg.37-46, World Scientific, Singapore (2014).

Complex Systems Programme

Faculty & Scholars



Prof Janaki Balakrishnan

heads the Complex Systems Programme. She obtained her PhD in theoretical high energy physics and has subsequently worked in diverse areas of physics. Since

the past several years her work has been directed towards understanding the dynamics of a variety of nonlinear systems. She was an Associate Professor of Physics at the Central University of Hyderabad for several years before moving to Bengaluru. Earlier she has held Visiting and other positions at various places including the Institute of Mathematical Sciences, Chennai, Centre for Artificial Intelligence and Robotics (CAIR), CMMACS, JNCASR, Indian Institute of Science, Raman Research Institute, Bengaluru, The University of Newcastle-upon-Tyne, U.K., Max-Planck Institute for Mathematics in the Sciences, Leipzig, the Max-Planck Institute for the Physics of Complex Systems, Dresden, etc. She is also a Guest Faculty at the Indian Institute of Science, Bengaluru where she teaches the course: "Introduction to Dynamical Systems Theory".



Dr Sudharsana V Iyengar

is a post-doctoral re-search associate in the SERB, DST project: "Modelling Nonlinear Complex Phenomena: from climate change, environmental effects to interacting

species". She obtained her PhD from the School of Physics, University of Hyderabad in 2016. Her areas of research interest include theoretical physics, nonlinear dynamics, modelling and simulation of complex systems.



Mr Abhijeet Anand

is a Junior Research Fellow in the SERB, DST project: "Nonlinear oscillatory phenomena in sensory systems". He obtained his M.Sc degree in Physics through the

B.Sc. (Research) -MSc (Undergraduate) Programme from the Indian Institute of Science, Bengaluru in 2017 and has been awarded the CSIR - UGC JRF/NET fellowship.



Mr Sriram Chandramouli

is a Project Associate in the SERB, DST project: "Modelling Nonlinear Complex Phenomena: from climate change, environmental effects to interacting species". He obtained

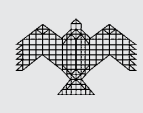
his M.Sc degree in Mathematics through the B.Sc. (Research) - MSc. (Undergraduate) Programme from the Indian Institute of Science, Bengaluru in 2016. He was a recipient of the KVPY scholarship (SX Fellow) during 2011-2016.



Ms Sampada Kolhatkar

is a Project Assistant in the SERB, DST project: "Modelling Nonlinear Complex Phenomena: from climate change, environmental effects to interacting species". She obtained

her B.Sc. (Research) degree in Mathematics from the Indian Institute of Science, Bengaluru in 2016. She was a recipient of the KVPY scholarship (SA Fellow) during 2011-2016 and NTSE scholarship during 2009-2011.



July 29, 2017

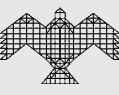
NIAS Foundation Day

The NIAS Foundation Day and also the Birthday of JRD Tata, the founder of NIAS was celebrated on July 29, 2017.

The JRD Tata Memorial Lecture was delivered by Mr Suresh Krishna, Chairman and Managing Director, Sundram Fasteners Limited on “The Idea of Excellence in Industrial Harmony”.

In the afternoon, as a part of the celebrations, the Institute organised a panel discussion on “The World We Leave Behind: The Impact of Our Present on the Future”. The panelists were Prof PS Goel, Former Secretary, Ministry of Earth Sciences, Amb PS Raghavan, Convener, National Security Advisory Board (NSAB), Ms Bindu Subramaniam, Lyricist, Pianist and Musician, and Prof Balakrishna Pisupati, Vice Chancellor, Trans-Disciplinary University.

In the morning an entertaining cultural event was organised after a short in-house interaction on “Yesterday, Today and Tomorrow: JRD Tata’s Vision and Repositioning Ourselves”.



Special Focus

Walking through NIAS

An interaction with Prof Anitha Kurup

As a continuation of the initiative, 'Walking through NIAS', brings forth yet another interaction from the campus. It aims to interact with an in-house faculty or a visiting scholar with an objective to look at the institute through their eyes. With a personal touch, this section blends their reminiscence as a scholar, mentor and teacher.

Prof Anitha Kurup is Dean and Professor of School of Social Sciences and Anchor of the Education Programme. She is also leading the National Gifted Education Program in India anchored at NIAS. She has contributed to developing a framework beyond societal and personal reasons responsible for the small numbers of women in STEM disciplines. Her research interests span the broad disciplines of education and gender studies.

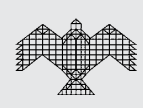
Prof Anitha Kurup's expertise in the area of gender covers a wide spectrum, from examining conceptual and methodological strands of gender relations to political participation and decentralised governance. Prof Kurup was a member, governing board of ISEC, Bangalore and member, academic council at Christ University. She has been awarded the Fulbright Nehru Senior Research Fellowship for the year 2011-2012 and was hosted at the University of California, Davis.

A small team of NIAS scholars and faculty members (Prof Sindhu Radhakrishna, Prof D Suba Chandran, Ms Anupama Mahajan, Ms Aparupa Bhattacharjee and Ms Sourina Bej) interacted with Prof Kurup.

Following are the excerpts:

Prof Anitha, as a part of your work at the Institute, you have been managing a huge canvas—Gifted Children, Women in STEM, Gender etc. How do you manage such a large spectrum?

The Education Programme at NIAS is a consolidation of work in various projects and academic activities conducted at the institute for nearly two decades. Attempting to address multiple challenges the programme engaged with questions like - how to provide equal and quality education to all? What models and practices of education are suitable for a diverse population? How can local and national priorities be matched with the pressures of global regimes? What linkages must education institutions have with the social, political and economic worlds of the people? Attempting to address these challenges and drawing on the institutional mandate of inter/multi-disciplinary research, the Education Programme focuses on connecting research with teaching, advocacy and policy. The formalisation of the Education Programme at NIAS



had two components. The chamrajanagar project focusing on the education of the adivasis led by Prof Vasavi and the women in the STEM The Education Programme at NIAS is a consolidation of work in various projects and academic activities conducted at the institute for nearly two decades. Attempting to address multiple challenges the programme engaged with questions like - how to provide equal and quality education to all? What models and practices of education are suitable for a diverse population? How can local and national priorities be matched with the pressures of global regimes? What linkages must education institutions have with the social, political and economic worlds of the people? Attempting to address these challenges and drawing on the institutional mandate of inter/multi-disciplinary research, the Education Programme focuses on connecting research with teaching, advocacy and policy. The formalisation of the Education Programme at NIAS had two components. The chamrajanagar project focusing on the education of the adivasis led by Prof. Vasavi and the women in the STEM disciplines was led by me. With my training in education I entered NIAS as part of the Women's Policy and Advocacy Unit. I had limited understanding of gender theoretically but personally I always had an intuitive understanding of the rights of women and have asserted for it during my early life.

I had a great team and an excellent leader allowing me to learn a lot in the process. NIAS was actually bliss for me as a young scholar aspiring for autonomy and enjoying the challenge of engaging with difficult research questions; plus it was my first job. It was indeed a great experience to be interviewed by Prof. MN Srinivas and Prof. R.L Kapur and clinch the first job. Having lunch with Dr Raja Ramanna was a big thing for me. Having conversations with M N

Srinivas and Prof RL Kapur about whom you have just read and won't have thought that you will share conversation leave alone sharing a lunch table with them on a daily basis was a huge thing for me. The ambience of this place was really something that caught my imagination. When I joined, NIAS gave me a great deal of autonomy to work despite being part of a project. The entire project was built on a largely participative mode which gave me opportunity to meet stalwarts in the field of gender. After the completion of the project, it was with a great deal of thought that I decided to get back to the field of my academic training- education and use gender as a tool and rather than look at gender studies as a broad area. Even as PhD scholar, I always embarked on asking important and challenging questions. What are the parametres that will allow me to understand the variation of school quality in rural India? This was one such question.

I brought gender and education together at the time when I thought I should look at women in the stem discipline. Most of the work done in that discipline was by either scholars in the field of women studies or by women scientists who had a limited understanding and training in gender. I found that very limiting. I was a science graduate and I thought it will be interesting to bring these two perspectives together.

My work blends the academic relevance and policy dimensions. Hence this gave me the space to work with large data and provide evidences to address difficult questions. The absence of gender disaggregated data in higher education in the country bothered me. With a small grant from TCS, I used the library database and worked with Ms Hamsa Kalyani the librarian at NIAS and INFLIBNET and put together data of more than 40,000 PhDs in the decade 1998-2007. Using this data the regional analysis, gender based analysis drew national international attention. Today





“The study on STEM was a huge learning and it was possible only because I was at NIAS. The question that why after PhD women were unwilling to practise research was a tough question to negotiate with scientists who call the shots, engage with them, keep the dialogue going and create the data in a form that they understand”

the effort of AISHE data we have data in higher education available and accessible to scholars in higher education. Today I can say very clearly that the universities in Karnataka (looking at the regional dimensions) are concentrated in and around Bangalore. In around Delhi has the maximum number of universities in the country making Delhi the PhD capital of India. Very clearly the data in the study shows the skewed distribution of universities across the country along with a skewed distribution of PhDs across disciplines.

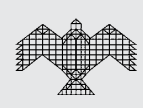
The National study on women in the STEM disciplines carried out in collaboration with the Indian Academy of Sciences focussing on women who completed their PhD is the largest national study that impacted policy of retaining women in science. This was possible only because I was at NIAS. Focusing on the question that why after a PhD in science, women were unwilling to practise research was a difficult

research question. The experience of working with women scientists as part of the core team, understanding and respecting their view points, engaging with them, keeping the dialogue going and creating data in a form that they understood and respected provided me a great learning.

The idea of a study on Gifted Children is unique. How did you conceive? And how are you pursuing this?

While I was doing the women in the stem research, Prof Ramamurthy was the director at NIAS. He came and asked about our work at the education programme? That time even I was contemplating as to what should an education programme located at NIAS be doing? I came to the conclusion that the education programme should create it's own DNA by conducting critical research on important questions in education which the other universities hesitate to address either because they do not fall within the traditional boundaries of the discipline or the absence of data NIAS or large data holes to be able to understand the problem. The multi-disciplinary nature of NIAS equips one to think of these difficult questions and draw on perspectives, tools or methods of other disciplines to address the unique research problems.

Alongside, we were convinced that the research should made contributions to the knowledge base as well as influence policy. Notwithstanding these efforts, there was a need to get our research into the curriculum to influence the way disciplines are



taught in universities. When I was talking to Prof. Ramamurthy, he said, “The country is not looking at the gifted and talented children.” I had replied, “Like normal people, gifted and talented people are quite capable of taking care of themselves.” So, he sent three-four papers and asked me read and get back to him for a discussion. Then he called me and said, “Anitha what do you think?” I said, “No, my mandate on women in the STEM disciplines is broad enough, having several questions to be addressed that I am not sure if I should venture into another new area”. Then he sent out another three papers to me. Each time I read it I was convinced it is an important question but will it be a difficult battle for me. Personally, I had to convince myself that the programme on gifted and talented education will not be in conflict with the principle of promoting equality but on the other hand will strengthen the cause of equality. Once I resolved this, I agreed to participate in the Indo-US roundtable. NIAS had already prepared me to critically review the research and develop a research agenda for India in this new field. The over emphasis on using western based tools for identification convinced me that we should at first focus on an Indian based identification tool for the gifted children in India which was the focus of my paper in the round table. After that there was no looking back and I engaged in large field based research, engaging in discussions with my team members to create a core team who are equally convinced of the research agenda as we embark in conducting research and developing model programme in gifted education in India. It is a dream that India will have a vibrant gifted education programme with strong components of research, training, services and policy advocacy for gifted children in India. At all policy platforms, we have been advocating that a National programme on Gifted Education will benefit the poor and under privileged rather than the elite. India is already late entrant into the gifted education network worldwide.

What will you consider as a major landmark in the Gifted Children study?

Currently, we have created a multiple protocol based on intensive field research that will help us identify the gifted and talented from diverse populations in India. The multiple protocols allows

for local specificities and have quantitative and qualitative dimensions. We have been able to reach out to a large number of teachers and schools. We have been able to argue out at the policy level that the gifted and talented children are children with special needs as much as differently abled children. Their needs are different and needs special attention. And currently what we have done is we are trying to provide them continuous mentoring support.

What role does the teacher play? Shouldn't there be gifted teachers first to identify gifted children?

I think any real teacher can identify a gifted child. For example, if I train you, I can get you to identify a gifted and talented child since she/he exhibits exceptional ability which makes them distinct when compared to their age peers. The teachers nomination behavioural rating scale(TNBRs) has been developed through 730 hours of detailed classroom observations of different types of schools represented in India. The TNBRs has been standardised and has been effective in identifying the gifted and talented children. The effectiveness of the nomination is based on training of teachers. The teacher training was finalised after several forms of teacher training was conducted over one year with teachers drawn from urban and rural schools.

Now that you have moved from gender to education, do you think education carry that same tint of “not been academic enough”?

I don't think so. Education as a discipline is a much more established as departments. Education department is much larger and dated when you compare it with women studies. However in retrospective, I think that in India, individuals fail to recognise that these two fields are as specialised as any other field be it Astrophysics, Economics or law.





“NIAS has always given me the flexibility of trying to move across domains and be able to bring it back to your understanding. As long as you are able to convince the NIAS fraternity of your understanding and generate funding, it is this conviction that drives you to define your research boundaries”

Do you think if you were in another kind of institute you would have been able to make the switch in the fields?

I think traditional Indian universities are structured in ways that gives you very little room to move beyond your specialisation. NIAS on the other hand recognise the fact that real world problems compel you to move beyond the comforts of your own disciplines to seek answers to these problems. As long you as you are able to convince the NIAS fraternity of the importance of your area of work, your passion, conviction and ability to raise grants drives your research agenda.

What do you think is your major contribution programme? What is the legacy that you and the programme will be leaving behind at the NIAS?

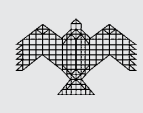
I don't see it as a legacy that I am leaving behind. But I would definitely want the education

programme to continue to be an integral part of NIAS. I am hoping to build a team with complementary strengths who will be able to dialogue, respect differences and appreciate strengths and willing to work together to build the programme. There is a need to periodically revisit and evolve a research agenda that is relevant in the contemporary period. The team will aim to make critical contributions at the national and international levels.

The education programme has been fortunate to raise large research grants, and I hope this will continue during the years to come. We are currently working out a mechanism that will allow us to rotate our responsibilities of raising grants and contribute to academic writing and we are hopeful to arrive at this arrangement sooner than later. We would want the programme to give opportunities for all PhD scholars, research associates and faculty and be able to draw their strengths to build a robust education programme.

Developing second line of leadership is critical to the programme and we have been working hard on this aspect. We look forward to developing scholarship and making critical contribution to academic writing, policy research and developing national models. Networking with scholars at the state, national and international level is equally important

Excerpted by Aparupa Bhattacharjee and Sourina Bej



NIAS

Research Programme Updates

International Strategic and Security Studies Programme (ISSSP)



Prof Rajaram Nagappa

NIAS was one of the cosponsors of the India-Republic of Korea Strategic Consultation Forum 2017. The theme of discussion in the Forum was Making a Strategic Partnership Special: Defence Production and Aerospace in India-Korea Relations. From India HAL, DRDO and IDSA were the other sponsors.

The Forum meeting was held on September 1, 2017 and International Strategic and Security Studies Programme took the main lead in organising the seminar topics, identifying the speakers and the conduct of the sessions as well as arranging the visit of the ROK team to DRDO labs.

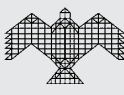
Some members of the ROK team including the Director of the East Asia Foundation took part in a discussion meeting with ISSSP members on September 2, 2017.

PhD Programme



Prof Sundar Sarukkai

A total of ten students spread across the four Schools joined the NIAS PhD Programme on August 1, 2017. The current batch is the fourteenth since the beginning of the doctoral programme, and includes Mr Snehashish Mitra, Mr Nitesh SA, Ms Jahnavi Sharma, Mr Sarvajeet K Sinha, Mr S Vignesh, Ms Ashni K Dhawale, Ms Chandana R Bindu, Mr Shilajit Sengupta, Mr Ajit Kumar Babu and Ms Cheshta Arora. The Orientation Programme for the batch was held on August 2, 2017 with the Director's welcome address



followed by briefings by the Academic Head, Deans of the four Schools, and other faculty members.

NIAS faculty members are currently offering a wide range of interdisciplinary courses to the new batch, students from the earlier batches, and interested others outside NIAS. There are three mandatory courses for the first year students: Foundation Course, Research Methodology and a Thesis Proposal Course.

NIAS had a major rethink on the **Foundation Course (FC)**. The aim is to transmit an idea of interdisciplinarity not through disciplinary concerns alone but through the world of ideas in different disciplines. The aim of the one credit modules is to exhibit the ways of thinking in these different disciplines, as well as showing how new and original ideas arise. The FC modules are informative, have a high degree of learnability and rigorous.

The **Research Methodology Course (RM)** is designed so as to give foundational training in research methods in the different disciplines. This is a focused, coherent course that covers basic training in research methodologies in different disciplines. The RM course also has short workshops which will deal with Project Management (billing and other administrative details), Project Writing, Research and library access etc.

The **Proposal Course** is a course where the output is a well crafted research proposal with literature survey and other required elements of the proposal. This course is offered by the guide(s) with added inputs by other faculty and Student Advisory Committee. This course helps the student to write the proposal in line with the research theme and includes course content of the required literature. The student will present the proposal as the final assignment of this course and this presentation will also be the presentation of the proposal to the NIAS audience. There will also be periodic assignments and other requirements as followed by other courses.

The courses taught in the current semester are: Understanding Conflict: Theoretical Constructs, An Introduction to Mind, its Functions and Purpose, Ancient Astronomy in the Indian Subcontinent,

Indian Temple Architecture – Origins and Evolution, Topics in Information, Coding Theory and Chaos with applications to Consciousness Studies, Philosophy for (academic) Survival, Measuring Development, Energy, Environment, and Natural Resources – Policies and Practices in the Indian Context, Human Animal Studies, Primate Behavioural Ecology, Capital and Labour in the New Millennium, Inequality, Reading the Economy, Feminism and Techno-Science, Migration and Development, Dimensions of Entrepreneurship, Effective Research Writing, and Contemporary India: Ethnographic Perspectives.

All these courses began in the first week of August and will end by November 2017.

Students from 2015 batch have completed two years (S Siddharth, Sashi Kiran C, Shyam Hari P, Meera Sudhakar, Sreedhar V, and Vijay CS) and promoted from Junior Research Fellow to Senior Research Fellow.

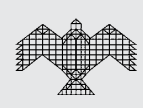
Students from 2013 batch completed four years at NIAS and gave a colloquium for their fifth year fellowship extension. (Venkatesh KN, Nishant Srinivasaiah, Shaurabh Anand, Ankita Rathi and Anamika Ajay).

Ms Soundarya Iyer, doctoral candidate working under the supervision of Prof Narendar Pani from the School of Social Sciences, defended her thesis on 'Dynamics of Rural Transformation in Karnataka: A View from three Villages' and was awarded PhD on September 13, 2017 by the Manipal University.

Ms Aditi Kathpalia, doctoral candidate working under the supervision of Dr Nithin Nagaraj defended her proposal on 'Theoretical and Experimental Investigations into Causality, its Measures and Applications' and registered with Manipal University.

Ms Kuili Suganya, doctoral candidate working under the supervision of Dr MB Rajani defended her proposal on 'Geospatial Analysis of Water Features in the Archaeological Landscape of Malaprabha River Valley' at NIAS.

Ms Ekta Gupta, doctoral candidate working under the supervision of Dr MB Rajani defended her proposal on 'Advancing Archaeological and



Geomorphological Understanding of the Indian Coast Using Old Cartographic and Visual Records' at NIAS.

Ms Sherin Ajin, doctoral candidate working under the supervision of Dr M Mayilvaganan defended her proposal on 'Spatializing Nation-state through the Discourses of Development and Security at the Borderland: A Case Study of Tawang' at NIAS.

Mr Surya Sankar Sen, doctoral candidate working under the supervision of Dr Anshuman Behera defended his proposal on 'Implications of Local Conflicts on Bilateral Relations: Cases of Land Boundary and Enclave Conflicts on India-Bangladesh Relations' at NIAS.

Mr Subroto Dey, doctoral candidate working under the supervision of Dr Shivali Tukdeo defended his proposal on 'Dreams and Discontents: Understanding Career and Life-Path of High School Students in Mandla, Madhya Pradesh' at NIAS.

Ms Vijayshree CS, doctoral candidate working under the supervision of Prof Carol Upadhyia defended her proposal on 'Understanding Ritual Objects: An Ethnography of *Bhuta* Visual Culture' at NIAS.

Ms Hema Thakur, doctoral candidate working under the supervision of Prof Sharada Srinivasan from the School of Humanities presented her final colloquium on 'Pre-thesis colloquium by Ms Hema Thakur on 'Emergence of urban settlements in North Karnataka – c.300 BC-c.300 CE with particular reference to Sannati' on September 20, 2017.

NIAS has a Research Ethics Policy working under a set of committee of NIAS faculty members. Prof Carol Updhyia is the Chairperson for this Ethics Committee.

All research proposals that include work with animal and/or human subjects must include an ethics statement, based on the above guidelines and standard ethical principles in the researcher's discipline or area of research. The ethics protocol should refer to the methodology section of the proposal and address all the relevant points outlined above, e.g. how informed consent will be obtained,

how confidentiality will be assured and data protected, how the well-being of animals will be ensured, and so on.

A research ethics statement or protocol is an essential part of every proposal for research involving human and/or animal subjects, and must be submitted to the NIAS Ethics Committee for review and approval.

Activities of the Students

Ms Nimisha Agarwal was invited as a panelist for LGBT and Feminism at St. Joseph's College held on August 11, 2017 and also Church and LGBT issues in contemporary India at United Theological College held on August 30, 2017.

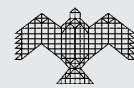
Mr Sreedhar Vijayakrishnan attended the Student Conference on Conservation Science held at the Indian Institute of Science between September 21 and 24, 2017, Attended and co-organised a workshop on Animal Behaviour at the Student Conference on Conservation Science held at the Indian Institute of Science on September 21, 2017 (Other organisers: Nishant M Srinivasaiah and Samira Agnihotri, both NIAS). He gave a talk on Demography and distribution of elephants in the Annamalai landscape (based on PhD work) at the Annual Academic Meet of the Nature Conservation Foundation held at Mysore in August 2017 and another talk on conservation conundrums in today's context, to high school students from various schools of Chennai, attending a nature camp at the Annamalai Tiger Reserve.

The NIAS-NCBS Collaborative Programme



Prof Anindya Sinha

A collaborative research and teaching programme was officially initiated between NIAS and the National Centre for Biological Sciences (NCBS) of



Bangalore, when Prof Baldev Raj and Prof Satyajit Mayor, the two Directors, signed an overarching Memorandum of Understanding (MoU) between the two institutions on 5 September 2017. Although there has always been a close link, both in terms of individual research collaborations and jointly taught teaching programmes, between the two institutions from early times, this MoU marks a new beginning to this valuable relationship.

Under the aegis of this Programme, IAS and NCBS would consider jointly fostering and developing ideas leading to research, teaching, training or outreach that fall within the common interests of both institutions. Particular emphasis has been laid on joint-interest collaborative research and teaching programmes related, but not restricted, to the history and philosophy of biology, interrelationship between biology and the social sciences, biology–society interactions, animal studies and human-nonhuman relationships, and the environmental sciences.

Moreover, it was agreed that the two institutions would provide academic supervision and even joint doctoral research guidance, if appropriate, for students involved in joint research programmes in areas that have already been identified by the two institutions as also expand such collaborations to other areas in which the two institutions have significant and complementary strengths.

Importantly, IAS and NCBS would provide doctoral, post-graduate and graduate students from both institutions opportunities to register for courses across the two institutions and receive credit for the same, as and when appropriate. In fact, we agreed that we would explore the possibility of initiating new courses at the different academic levels mentioned above in areas of mutual interest, potentially offered jointly by faculty drawn from both institutions, especially in areas spanning biology and the social sciences, history and philosophy of science, and in science studies.

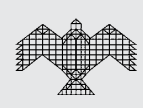
Moreover, IAS and NCBS would consider organising inter-institution dialogues as well as discussion meetings, conferences and workshops in areas of

mutual academic interest, with the participation of faculty, students and staff of both institutions.

More specifically, a collaborative IAS–NCBS Biology and Society Programme, to be coordinated by Anindya Sinha and Sundar Sarukkai, has been established between the two institutions, with an aim to explore the interactions between the biological sciences and society at large. In this collaboration, the focus would be to broadly draw on the respective strengths of these institutions in the fields of biological sciences as well as science and technology studies. The following items are some of the specific modes of collaboration envisaged, with a general aim to leverage the respective strengths of these two institutions in order to create a more powerful collective platform. The strengths of IAS, in this particular connection, include the behavioural sciences (with a focus on animal studies and human-nonhuman relationships), history and philosophy of science and technology, and science education while that of NCBS lie in the understanding of living systems, drawing upon a variety of disciplines and perspectives, including, but not limited to the natural sciences, mathematics and computer science. We aim to draw on these strengths in the future and forge new ways ahead to examine the close relationship between the biological and the social, interconnections that have remained largely unexplored in our country.

We propose to organise, in collaboration with NCBS, the First National Conference on the History and Philosophy of Biology in July or August 2018. This conference would bring together students, teachers, researchers and others interested in this field and would have two days of paper presentations and round-table discussions. We also propose to organise a tutorial workshop over three days leading to the conference, where students and others interested in the history and philosophy of biology could be trained in methodologies and brought up to date with the latest advancements in this field.

The coordinator of the overall IAS-NCBS Collaborative Programme would be Anindya Sinha.



Bridge Programme for Children Admitted under RTE Provision through Child Centered Play



Prof Malavika Kapur

Under the Right To Education (RTE) Bill with an intention to provide Free & Compulsory Education to all Children, the private schools are required to admit 25% of the children from disadvantaged backgrounds. It is to be expected that these first-graders from regional medium schools and mostly low literate backgrounds will experience difficulties in adjusting to the new Social and Learning circumstances effectively. The aim was to provide free intervention programme to make the transition smooth especially in their early days of the school.

It also aimed at enhancing psychosocial development, reading, writing and mathematical skills and promoting creativity. The programme used play, art, craft, games, number and language games, singing, dancing, music, drama, and so on. The programme relies entirely on play-way method.

These programmes were conducted in two private schools in Bangalore between April and June 2017.

In school 1, 14 children admitted under the RTE were provided 10 session of intervention of child centred play approach. On Pre and post assessment improvement in IQ, self esteem, reading and maths

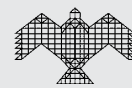
skills. In school 2, 38 children in 2 batches were provided the intervention over 10sessions.

On pre post assessment improvements in attention, intelligence and self esteem were found.

Most of the children made smooth and easy transition to the 1st standard in the two schools much to the surprise of teachers.

These programmes that provide the proof that ten sessions during summer vacation in the private schools employing play centred inputs will enhance the academic and psycho social skills of disadvantaged children admitted under the RTE to make a smooth transition in to class 1, as well demonstrates, in the ensuing years teachers of class 1 children themselves can provide intervention during summer vacation. This would enable the schools to upscale the model.





Campus Notes

Dynamics of Rural Transformation in Karnataka: A View From Three Villages

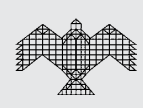
Ms Soundarya Iyer successfully defended her PhD thesis titled “Dynamics of Rural Transformation in Karnataka: A View From Three Villages”. Prof Abdul Aziz, external examiner, appreciating her work has suggested that the thesis be published as a book.

About the Thesis

The transition from a rural to an urban economy in India is implicitly taken to be inevitable and uniform across diverse regions of the country. An exploration of this transition however suggests significant regional diversity. This diversity can be seen not just in the transition from the rural to the urban but also in the change within the rural. This thesis makes use of the fact that Karnataka provides diversity across multiple axes, with the extremes being found in poorer northeastern Karnataka, the rapidly changing coastal Karnataka, and the ever-resilient old Mysore region in the south. It chooses three villages to represent this diversity: Mahagaon in the northeastern region of the state, Naravi in the coastal region, and Iggaluru in the south. The Census of India had studied these villages in detail in the Village Survey Monographs, 1961.

While most studies on Karnataka have focused on episodes such as land reforms, green revolution and decentralization, the primary objective of this thesis has been to trace processes of rural transformation that connect these episodes in these villages of Karnataka over half a century using quantitative and qualitative research methods. While several socio-historical, ecological and economic factors play a role in determining the path of transformation, there are common underlying processes, such as the subdivision of land, mobility of capital and labour, and decentralization, that interact with the specific regional contexts resulting in diversity.

The thesis conceptualizes diversity in transformation in the three villages as follows: Localized urbanization in Mahagaon where productivity constraints placed by the environment as well as the agrarian system leave labour with few opportunities, leading to repeated cycles of circular migration that result in urbanization in the village; Localized modernity in Naravi in the coastal Karnataka region, where land reforms not only drastically transform land relations but also change the nature of the family, leading to a rise in individualism and identity politics in the village alongside technological developments and progress in education; and Agrarian resilience in Iggaluru, where majority of the population continues to stay in agriculture due to state investment in irrigation, even as other



fundamental changes occur in cropping patterns, labour relations as well as in education.

Major Findings of the Study

- Urbanization occurs not just at the destination of migration as understood in development studies, but also at the source village, especially in the case of repeated cycles of circular migration as seen in Northern Karnataka.
- Agrarian resilience is seen in Southern Karnataka in the occupational profile of the peasantry and the relationship to land despite changes in irrigation, crop shifts and education.
- Dalits in Iggaluru in Southern Karnataka are more educated today than the Dominant Caste members of the village.
- Land reform envisioned as the transfer of land from large land owner to tenant (who was either landless or owned very little land) was relevant only in Naravi village in coastal Karnataka.
- Land reforms in Naravi not only transferred land to the tenant but also led to the nuclearization of the family.
- Although land reforms alter the relationship to land and bring about a minor reduction in land inequality, the cultural capital of the erstwhile land-owning castes of Naravi continues to remain. They are more educated today than the castes that gained land in land reforms.
- Depending on the educational endowments of the region as well as capital investment by the state as well as land owners, labour substitution may



PhD Supervisor Prof Narendar Pani and External Examiner Prof Abdul Aziz

occur in agriculture (as in Iggaluru), in services in the village (as on Mahagaon Cross) or outside the village (as in Naravi).

- Land subdivision is an ongoing process in all regions of Karnataka.
- The process approach shifts the focus from success or failure of episodes to understanding interconnections between the episodes of land reform, Green revolution and decentralization.

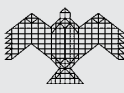
A Note from the Supervisor

Prof Narendar Pani, Soundarya's PhD supervisor, says her work provides fresh insights not only into the transitions taking place in rural Karnataka, but also into the larger and more difficult question of how do we theorize the diversity that marks rural India.

At NIAS, Prof Pani heads the following Programmes: NIAS-UNDP Initiative on Inequality and Human Development; Conflict Resolution Programme; and RBI Programme on Interdisciplinary Approaches to Economic Issues.

Ms Soundarya Iyer with fellow PhD scholars and faculty, after defending her thesis





Campus Notes

PhD Thesis Presentations

Theoretical and Experimental Investigations into Causality, its Measures and Applications



Aditi Kathpalia
School of Humanities

Causality Testing, which determines the cause and effect relationship between given systems based on time-series measurements is widely used in various disciplines of science. Several model-based to model-free causality measures exist based on different mathematical explanations. Also, they suffer from several limitations as we shall demonstrate.

This thesis focusses on proposing a unifying mathematical-framework for the working of these measures. New measures naturally arise out of this framework which will be compared to existing measures by testing on simulated and real-world time-series (from neuroscience, climatology, complex-ecosystems) to establish their advantages/disadvantages. The last part of the thesis would involve mathematical-modelling and testing of retrocausal processes with possible implications to explain phenomena such as dreams during sleep, existence of free-will and the logic of the mind.

Advancing Archaeological and Geomorphological Understanding of the Indian Coast using old Cartographic and Visual Records



Ekta Gupta
School of Humanities

Exploration and later colonisation of Indian coastal regions by the Portuguese, French,

Dutch, and British from 14–18 Century CE led to the extensive and meticulous mapping of Indian coast to enable maritime travellers/merchants to navigate across the seas. These maps/charts are valuable as they mark contemporary buildings (forts and religious structures) that were visible on the coast from the sea at that time; also, they record coastal geomorphic features such as depth, beaches, shoals, spit bar, lagoons, etc., of a time when there is no direct information from other sources.

The proposed study aims to - explore these maps and charts, textual records called Pilots or Pilotages that accompanied the sea charts and paintings of the Indian coast which are archived in various collections; develop methods to extract archaeological and geomorphological information from these records and integrate them with remote sensing images and topographical models on geospatial platform; and analyse the changes the landscape has undergone since the time these charts were made.

Spatializing Nation-state through the Discourses of Development and Security at the Borderland: A Case Study of Tawang



Sherin Ajin
School of Conflict and Security Studies

In the Westphalian schema, the geodesy of border proves to be the popular trope of fixating the legitimate, sovereign space of the state that needs to be diligently guarded. The appellation of nation-state largely dwells in the realm of ideation. However, owing to the strategic significance, the space of border becomes a perpetual theatre of seeding the idea of nation into the script of state. Development and security becoming the oft twin co-opted discourses for operationalising the same.

Substantively, borders are not hermetically sealed entities nor its inhabitants' mere cogs in the strategic calculus. Borders are essentially dynamic, dialectical space(s) of everyday living. The agenda of this proposed research would be to understand the interface between the statist perception of borderland vis-à-vis the native population's perception of borderland, which also happens to be their home. For this, the proposed research would employ the case study of the Sino-Indian borderland of Tawang.

Geospatial Analysis of Ancient Water Features in the Archaeological Landscape of Malaprabha River Valley



Kuili Suganya
School of Humanities

This thesis aims to focus on identifying, documenting and analysing water features (extant / non-extant) in the context of built environment and to understand the role of topography in defining their locations at the archaeological landscape of Malaprabha river valley in Karnataka using geospatial analysis.

Working definition for archaeological landscape is an area which comprises of natural elements which provide a physiographic boundaries, water sources and built environment in a temporal setting (Branton, 2009), (Hardesty, 2009), (Varanashi, 2002), (INTACH, 2004), (Unesco, 2014), (Shukla, 1998). Geospatial analysis would be carried out to identify accessibility to basic resources, visual and physical linkages and proximity or nearness that exist within the archaeological landscape through co-relating remote sensing data with ground truthing, field survey, historical accounts and measure documentation.



Understanding the Implications of Local Conflicts on Bilateral Relations: Cases of the Land Boundary and Enclave Conflicts on India-Bangladesh Relations

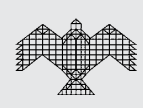


Surya Sankar Sen
School of Conflict and Security Studies

The research focuses is on the unsettled issues surrounding the Land Boundary Agreement between India and Bangladesh. The study will attempt to understand the nature and scope of 'local' level conflicts which persist even after the official 'settlement' of the land boundary

issue, and the manner in which they have affected India-Bangladesh relations. In the course of the study, the narratives of the inhabitants of these erstwhile enclave spaces will be engaged with, in an attempt to comprehend their perceptions regarding nationality, citizenship and territoriality as well as their understanding of these conflicts.

Gathering an understanding of these 'local' issues and the position of the same within the greater discourse of the nation state will enable us to better understand their implications on bilateral relations. Thereby, my research will attempt to situate these differences in perception between the narratives at the 'national' and 'local' levels, and understand the connection between conflicts manifesting at the 'local' level and its effect on bilateral relations, through the selected cases.



Exploring Career and Life-paths of High School Students in a Backward District



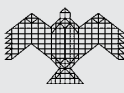
Subroto Dey
School of Social Sciences

With its overall expansion over the last seven decades, formal education has become a part of the experience of 'growing up' for many. In recent years, education has also received attention by highly diverse domains highlighting its role in bringing

change, enabling individuals and communities, and opening up opportunities. Paying attention to the structural factors as well as experience and aspirations, a number of scholars have pointed out the contestations that are central to education.

The proposed study, in this context, looks at adolescent/young-adult students from marginalised communities and aims to explore their experience and imagination of schooling while deciding how they navigate 'What next?' after completing their high school. Within this frame, the study focuses to understand the sub-culture of youth on the verge of completing their high school in an Adivasi majority backward district of Madhya Pradesh, India





Campus Notes

The Story of a Sultan and His Rockets: A Play Reading in NIAS



Savitha Suresh Babu

PhD Scholar, NIAS

How do you stage a personality who towers in popular memory as both hero and villain, as despot and citizen, as sectarian and secular? And how do you present him in ways that do not further divide or polarise? And just maybe, even heal some wounds of the past that continue to fester today? Can we remember the glory of Tipu Sultan's rockets, without immediately finding ourselves at the far ends of sharply divided political battle lines?

Historians have long debated how stories of the past can be best told. Meanwhile, a group of artists have found some ways - ways that speak to our collective memories; ways to move beyond the many erasures that mark the stories we tell. In a reading of the play "Vanguard: The Story of the Mysore Rockets" on October 23, 2017 in NIAS, we heard a compelling story.

A work of historical fiction set in the events leading up to and after the Battle of Pollilur in 1780, the play is about Mysore rockets and Tipu Sultan. Or maybe not. It is about the stories of many people at a time when Tipu Sultan commissioned rockets, wars were fought and better worlds imagined. It was, as today, a time when people struggled to find the best ways to act and wondered how they would be remembered.

The action moves between scenes of an artist's studio where perfect rockets are crafted, along with visions of a liberated world, to the office of the East India Company, where sincere officers hope to prevail against injustices.

The play is based on meticulous research. Along with archival records, historians, art collectors, scientists, military experts and political scientists have been consulted in fleshing out the content of the play, said Ram Ganesh Kamatham, the playwright. Where the play moves beyond the factual is in imagining its many diverse characters. Here too, there are attempts to draw from the realms of plausibility. From different religions, and many nationalities, these are people struggling to do good - within the limits of their possibilities.

Tipu Sultan is central to the play, and not. No single actor plays him. Through an artistic device, different characters become Tipu at different points in the play.



Not having a single actor reinforces the idea of his complexity - the understanding that there isn't a need to box him into pre-defined adjectives or personas.

It was interesting to see key women characters in a period play. As Mallika Prasad, the director said in an interaction after the play reading, the women

characters were fleshed out in places where there were possibilities of their existence- and crucially, they were key to moving the plot forward.

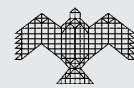
Prior to the reading Prof Roddam Narasimha spoke about Tipu and the scientific temper of the time depicted by the play; he also chaired the discussions after the reading.



Actors Ensemble India Forum (AEIF) is working towards making the play a full-fledged production. Given that this production will incur heavy costs on costumes and stage-set up, and the actual firing of rockets, substantial funds need to be raised, said Ram Ganesh. Here is hoping Tipu Sultan and his rockets soon come alive on a stage - to give us a story of our past with all its complexities intact.

Photos Credit: Virginia Rodrigues





Campus Notes

Such is the Beauty of NIAS



Rajesh K

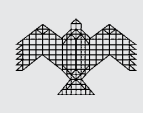
Library Assistant, NIAS

We live on the most beautiful planet i.e. *Earth* which is endowed with attractive nature filled with enriched flora and fauna. Nature is human's best friend which provides us all the resources to live here. We should fully enjoy the nature without causing any disruption to its ecological balance. Nature is a most precious gift given by the God to us to enjoy, we have to conserve, protect and enhance it in whatever capacities possible. One should take proper care of our nature, keep it clean and adhere to measures that help in conserving its natural entity.

Butterflies are small flying insects. NIAS garden is beautified with a variety of flowering plants, it naturally attracts these beautiful and colorful butterflies – a Pleasing sight indeed to watch them. Butterflies of different kinds and types get attracted towards the colorful flowers in the NIAS campus and engage actively into the business of collecting nectar from flowers. Most importantly this act of butterflies plays an important ecological role as pollinators.

Every day as I took some time to go for my post lunch walks, I used to get engrossed into the activity of watching these (butterflies) little colors of nature's creation flickering under the bright sunlight and harvesting pollen from every potential flower. That's when a thought provoked my mind and I decided to make a collection of pictures of these butterflies that often visited the NIAS garden.

As a result of this thought, I am able to present the following album which contains 12 different species of butterflies with their scientific names. I would like to acknowledge Ms Akhila Machaiah for helping me in providing the scientific names of these butterflies.



Common Jezebel



Common Leopard



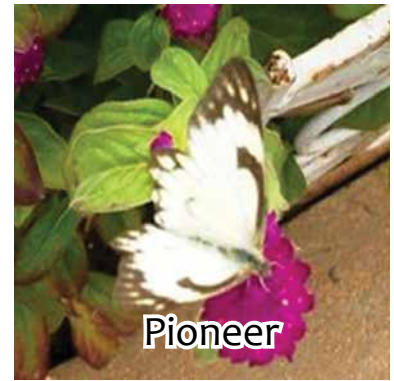
Lemmon Pansy



Blue Tiger



Blue Tiger



Pioneer



Oriental Mottled Emigrant



Yellow Pansy



Pioneer



Common Crow



Plain Tiger



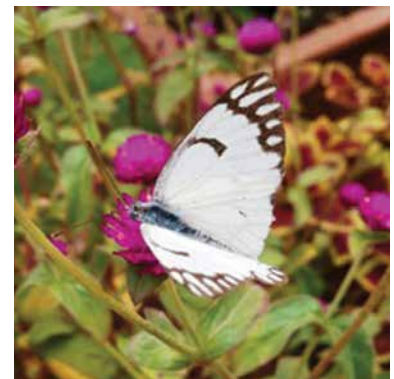
Common Leopard

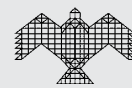


Grass Yellow



Danaid Egg Fly





NIAS Events

Experimental Traditional Iron and Steel Making Workshop under the NIAS-TCS Metal Crafts Heritage Initiative, and in collaboration with Prof Mark Kenoyer, University of Wisconsin Madison

(August 17 to 19 and 21, 2017)

NIAS-TCS Heritage Initiative organised an exciting workshop on Experimental Iron and Steel Smelting, co-organised by Prof Sharada Srinivasan, Dean, School of Humanities with Prof Mark Kenoyer, University of Wisconsin-Madison. The workshop aimed to re-construct traditional iron smelting and the lost knowledge of high grade wootz steel making with insights from Buchanan's 19th century accounts of wootz making. An innovative aspect of the experimental workshop was that faculty and students worked hands-on with blacksmiths and potters to source traditional materials and to gain practical experience from them. In a two way synergy, the research team also imparted scientific insights to the blacksmiths. Three experimental trial smelts were fired, resulting in spectacular scenes in the atmospheric monsoon weather.

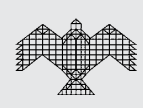


Connecting Cultures: Ramayana Re-tellings in South India and Southeast Asia

(September 14 and 15, 2017)



A major international conference on "Connecting Cultures: Ramayana Re-tellings in South India and



Southeast Asia” was co-organised by Prof S Settar under the aegis of the DN Achyuta Rao Foundation held at Reva University which had leading scholars in attendance from Thailand, Malaysia, Vietnam, US and France.

Meeting of the NIAS Council of Management and the Annual General Body Meeting of NIAS Society

(September 22, 2017)



FIFTH K SUBRAHMANYAM MEMORIAL LECTURE



Dr S Jaishankar

Secretary, Ministry of External Affairs, Government of India

Navigating an Uncertain World

August 4, 2017

PUBLIC PROGRAMMES



Dr R Gopichandran

Director, Vigyan Prasar, Department of Science and Technology, Government of India

Emerging Dynamics of Science Communication

September 27, 2017

Ms Jessica Lynn

International Speaker and Outspoken Advocate

My Transgender Journey - An Interactive Talk

(In collaboration with Queer Straight Alliance, Indian Institute of Science, Bengaluru)

September 13, 2017

Dr V Bhujanga Rao

ISRO Chair Professor, NIAS

Bionic Ear and Bionic Eye: Progress against Hearing Disabilities and Visual Impairment

September 7, 2017

Dr K Gopinath

Department of Computer Science and Automation, Indian Institute of Science, Bengaluru

Eighth FIRST (Forum for Interdisciplinary Research and Studies) Lecture on Indic S&T and the Computational Thinking Metaphor

August 30, 2017

Ms Meera S

PhD Scholar, NIAS

Agnisakshi (Malayalam Novel) written by Ms Lalithambika Antharjanam – Book Reading and Discussion Meeting by STILL (Social Transformation in Indian Languages and Literature)

August 24, 2017

Prof Mark Kenoyer

University of Wisconsin-Madison

The Indus Civilization: New Insights on Trade, Technology, Ideology and Writing

August 18, 2017

Prof Vasudha Narayan

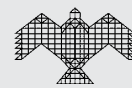
University of Florida

Vishnu Iconography and Art and Temple Architecture in the Angkorian Period

August 11, 2017

Dr Marieke van Vugt, PhD

University of Groningen, The Netherlands



Classical Ballet: An Introduction with Excerpts from Swan Lake, Sleeping Beauty, La Bayadere
July 31, 2017

Mr Suresh Krishna

Chairman and Managing Director, Sundram Fasteners Limited
JRD Tata Memorial Lecture: The Idea of Excellence in Industrial Harmony
July 29, 2017

Dr PS Goel

Former Secretary, Ministry of Earth Sciences
(Science, Technology, Innovation and Society)

Amb PS Raghavan

Convenor, National Security Advisory Board (NSAB)
(Geo-Political Realities)

Ms Uma Mahadevan

Principal Secretary to Government of Karnataka,
Women and Child Development and Empowerment
(Gender and Child)

Ms Bindu Subramaniam

Lyricist, Pianist and Musician, Bengaluru
(Fine Arts and Society)

Prof Balakrishna Pisupati

Vice Chancellor, Trans-Disciplinary University (Education)
*Panel Discussion on The World We Leave Behind:
The Impact of Our Present on the Future*
July 29, 2017

Dr Marieke van Vugt

University of Groningen, The Netherlands
*Studying Tibetan Monastic Debate in India: Psychology
Outside The Box*
July 28, 2017

Prof Narendar Pani

Professor, NIAS
*First Book Reading and Discussion Meeting by STILL (Social
Transformation in Indian Languages and Literature)*
July 13, 2017

Mr TCA Srinivasa Raghavan

Senior Journalist, Author and Economist
Dialogue of the Deaf: The Government and the RBI
July 6, 2017

Dr Badri Narayanan G

Economist, School of Environmental and Forestry
Sciences, University of Washington-Seattle
*Potential Global Economic Impact of OPEC's Oil
Production Freeze*
July 3, 2017

WEDNESDAY DISCUSSION MEETINGS

Mr PM Soundar Rajan

Visiting Professor, NIAS
Avionics as the Force Multiplier of Air Power
September 20, 2017

Dr Namitha A Kumar

Research Director, Centre for Health Ecologies and
Technology, Bengaluru
Reconfiguring the Humanities PhD in the Digital Age
September 13, 2017

Mr Nishant Srinivasaiah

PhD Scholar, NIAS
*Lights, Camera, Action! Behind the Scenes of a Study of
Asian Elephants in a Human-Dominated Landscape*
September 6, 2017

Dr MB Rajani

Assistant Professor, NIAS
The Untold Tales of Srirangapatna's Myriad Monuments
August 30, 2017

Mr Chetan Singai

Assistant Professor, National Law School of India
University, Bengaluru
*Policy Recommendations and Policy Change:
Connections, Gaps and Contradictions*
August 23, 2017

Prof PS Goel

Raja Ramanna Chair Visiting Professor, NIAS
Space Exploration: Do We Need Man in Space
August 16, 2017

**Prof Sangeetha Menon, Dr Nithin Nagaraj and
Dr Shankar Rajaraman**

NIAS Consciousness Studies Programme, NIAS
*A Dialogue and Interactive Session on Beyond the
Binary: Exploring Causality and Consciousness*
July 26, 2017

Dr Anshuman Behera

Assistant Professor, NIAS

Political Inequality and Political Violence: Indian State and the Maoist Conflict

July 19, 2017

Prof Sharada Srinivasan

Professor and Dean, School of Humanities, NIAS

Some Ethnoarchaeological Aspects of Nilgiris

July 12, 2017

Dr M Mayilvaganan

Associate Professor, NIAS

High Frontiers and Emerging Strategic Challenges: The Case of Tawang

July 5, 2017

OBITUARY



Prof Timothy Poston, Sir Ashutosh Mukherjee Visiting Professor at NIAS during August 2004 to July 2007 died on August 22, 2017.

Prof Tim Poston was a Visiting Professor at NIAS for three years, but he continued to interact with NIAS faculty and students

for some time thereafter. He was an unforgettable individual for many reasons: his wide-ranging research interests (detailed in his obituary in the Guardian), his unique demeanour coupled with his unusual interests, and his ability to converse so knowledgeably on so many topics. He was also completely uninhibited, often punctuating the tea-time hubbub by singing a melody or reciting a poem.

If someone introduced him as a mathematician, he would immediately clarify: “I’m more a geometeer” – a fact confirmed by no less an authority than Google, if you care to try. Entering his office room was like stepping into a sci-fi movie. One was immediately confronted by complex Mobius rings and other contorted wooden or metal artefacts – all carved by his hand – some of which he wore as pendants. His other personal touches included a large beard and a shepherd’s crook (also self-crafted), which doubled as a pointing device during talks at NIAS whenever the laser pointer failed.

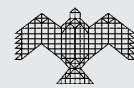
These accoutrements made him appear much older than he was. In 2004, while discussing the 60th anniversary of D-Day of WWII, I asked him where he was at the time. With a smile, he replied “A twinkle in my father’s eye!” He turned 60 following year, yet he walked 5 km each way to NIAS from his home in the interiors of Kodigehalli. Along the way, he would interact with children, shopkeepers or anyone else he encountered, documenting these encounters with photographs on his website. He once asked me for help in selecting a good camera for this purpose, with just one constraint:

“It must have as large a display screen as possible. The children that I meet are so gracious in posing for my pictures, and the only way I can reciprocate is by showing these to them as soon as they are taken!” While trying to reach his home for the first time, I lost my way. I found that I merely had to gesture to anyone that I was seeking a tall bearded man with a stick, and they would immediately point me to the right way.

Prof Poston was once invited to preside as the chief guest of the kindergarten graduation ceremony at a local school. He arrived wearing the maroon robe and hat he wore for his PhD graduation at Warwick University. Needless to say, the children and teachers were thrilled, and he was bombarded with requests to pose with them for pictures. He shared some of these with us, with the caption: “I knew my PhD would be of use some time!”

At NIAS, Prof Poston gave a lecture in the History of Ideas series (2004) on the “Idea of seeing”. He had thought deeply about how we perceive shapes, and how they can be conveyed into a CAD system to enable further processing. He was trying to devise an optical computer mouse with two sensors so that the user could rotate the mouse to design and draw complex shapes. He was an ardent participator in PhD student colloquia and would pose challenging questions (much to the trepidation of the presenters). After several years without contact, his wife Rebecca and he turned up quite unexpectedly on the day of my PhD defence. I was pleasantly surprised, and assuming that his visit was serendipitous, I invited him to attend. “That’s what we are here for!” he chuckled. “We have been tracking you.” As ever, his participation made the discussion very memorable. There was something timeless about him, and I cannot say he looked any different from the time I first met him to last year when I saw him for the last time. We shall miss being surprised by him.

by MB Rajani



NIAS Publications

Anshuman Behera, “Development as a Source of Conflict: The Sahukars, Displaced People and the Maoists in Koraput,” *The Round Table: The Commonwealth Journal of International Affairs* (2017).

D Suba Chandran, “NA-120: One Result, Many Questions,” *Rising Kashmir*, 26 September 2017
 D Suba Chandran, “The rise of troubled Asia,” *Daily Times*, 25 September 2017.

Prakash Panneerselvam, “Will Modi’s “Make in India” Programme Benefit from Japanese Defence Industry”, *WIONews*, 19 September 2017.

D Suba Chandran, “The Rohingya Politics,” *Rising Kashmir*, 19 September 2017.

Harshini Vakkalanka, “History through a Different Lens,” interview with Prof Sharada Srinivasan, *The Hindu*, 18 September 2017.

Shreya Upadhyay, “Green is the Colour of Indo-US Ties,” *Mainstream*, 16 September 2017, Vol LV No 39.

D Suba Chandran, “The Rohingya Violence,” *Rising Kashmir*, 12 September 2017.

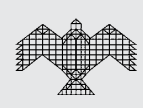
Sangeetha Menon, “Exploring Philosophical Foundations of Peace”, *The Deccan Chronicle*, 11 September 2017.

D Suba Chandran, “The Pak-US Déjà Vu,” *Rising Kashmir*, 6 September 2017.

Anitha Kurup and Chetan B Singai, “Redefining University Education in India: Pedagogy and Student Voices,” in *Transforming Teaching and Learning in Higher Education: Towards a Socially Just Pedagogy in a Global Context*, Springer, Palgrave Critical University Studies, pp.175-190 (2017).

Sanderien Verstappen, “Mobility and the Region: Pathways of Travel within and beyond Central Gujarat,” *Journal of South Asian Development*, Volume 12, Issue 2, pp.112-135 (2017).

Leah Koskimaki, “Youth Futures and a Masculine Development Ethos in the Regional Story of



Uttarakhand,” Journal of South Asian Development, Volume 12, Issue 2, pp.136-154 (2017).

Carol Upadhy, “Amaravati and the New Andhra: Reterritorialization of a Region” Journal of South Asian Development, Volume 12, Issue 2, pp.177-202 (2017).

D Suba Chandran, “Trump’s Afghan Surge”, Rising Kashmir, 29 August 2017.

D Suba Chandran, “Return of the Car Bombs” Rising Kashmir, 22 August 2017.

D Suba Chandran, “Indo-Pak 70/70”, Daily Times, 20 August 2017.

D Suba Chandran, “Hizbul Mujahideen ban goes global, but will it reach the Valley,” The Indian Express, 17 August 2017.

D Suba Chandran, “Jirga and gender violence,” Rising Kashmir, 15 August 2017.

D Suba Chandran, “Doklam, Demochok and DBO,” Rising Kashmir, 8 August 2017.

Sundar Sarukkai, “The March from Yesterday”, The Hindu, 10 August 2017.

D Suba Chandran, “The Sharif Verdict”, Rising Kashmir, 1 August 2017.

Sumithra Sunder, “Fighting for a Public Space,” Seminar, Volume 694, pp.65-69 (2017).

M Rashmi, “The ‘Digital Others’,” Seminar, Volume 694, pp.40-43 (2017).

Neesha Dutt, “Being Green?” Seminar, Volume 694, pp.50-54 (2017).

Michael Goldman, Vinay Gidwani and Carol Upadhy, “Bangalore’s ‘Great Transformation’ - The Problem,” Seminar, Volume 694, pp.12-16 (2017).

S Sutha, R T Rajendra Kumar, Baldev Raj and R Ravi, “Ultrasonic-assisted fabrication of superhydrophobic ZnO nanowall films,” Bulletin of Materials Science, Volume 40, Issue 3, pp.505-511 (2017).

Samyadeb Bhattacharya and Sisir Roy, “Quantum Thermodynamics and Coherence in Ion Channels,” Applied Physics, System Science and Computers, Ntalianis, Klimis, Croitoru, Anca (Eds.), Springer, pp. 3-11 (2017).

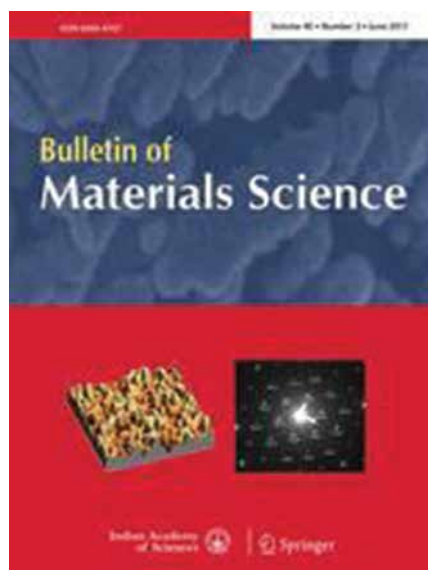
Sundar Sarukkai, “Privacy in the Public Domain”, The Hindu, 27 July 2017.

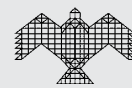
Sourina Bej, “What Trump’s Afghanistan Policy Means for India”, The Diplomat, 15 July 2017.

D Suba Chandran, “Social Codes under Stress”, Rising Kashmir, 18 July 2017.

D Suba Chandran, “Pakistan’s Parachinar Problem”, Rising Kashmir, 10 July 2017.

D Suba Chandran, “Towards a PML minus Sharif?”, Rising Kashmir, 04 July 2017.





Column

Birds and Blooms



MB Rajani

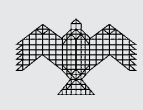
Assistant Professor, NIAS

Jackfruit

One often relishes jackfruits served during lunch at NIAS. The fruit with the golden-yellow sweet flesh, served on large plates, disappears fast. All the jackfruit served at NIAS comes from trees on our campus. They not only appease human denizens but many non-human inhabitants like squirrels, mice, birds, etc.

The jackfruit (*Artocarpus heterophyllus*), also known as jack tree, fenne, jakfruit, jack or jak, is a species of tree in the fig, mulberry, and breadfruit family (*Moraceae*) native to South India, and is the national fruit of Bangladesh. The word “jackfruit” comes from Portuguese jaca, which in turn is derived from the Malayalam language term chakka (Malayalam chakka pazham). The tree grows best in tropical lowlands, and its fruit is the largest tree-borne fruit. It has a poky exterior, reaching as much as 35 kg (80 lb) in weight, 90 cm (35 in) in length, and 50 cm (20 in) in diameter. A mature jackfruit tree can produce about 100 to 200 fruits in a year. The jackfruit is a multiple fruit, composed of hundreds to thousands of individual flowers, and it is the fleshy petals that are eaten. The jackfruit tree is a widely cultivated and popular food item throughout the tropical regions of the world. Apart from eating the flesh as a fruit, the seed is dried and cooked and used as ingredient for sambar and curries, so even the unripe fruit is a special delicacy in cuisines from the southwest coast of India. The wood is used for furnitures and decorative carving.





Column

Whirls of Words



Samhita K

Research Associate, NIAS

Truth Gazers

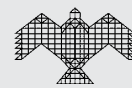
A bottle of wine she downed
A seductive smile she adorned.
She quaffed pint after pint of ale,
And slurped some coffee later
In reminiscence of the waiter.

Seated beneath a birch tree,
She contemplated Nature.
An hour or two later,
She woke up from her siesta
Eager to go to a fiesta.

On a wintery morning,
She saw a lad so charming
In the blistering cold,
Amidst the snowfall
And he was so ‘tall’.

On a summery evening,
Into the woods they sauntered
Where a crystal gazer they encountered.
“Aleph”, she whispered,
Was the key to the realm of the unheard.

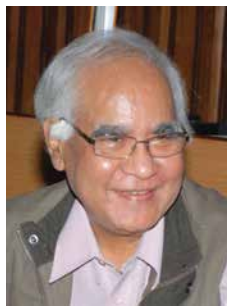
The twain of them saw eye to eye,
To see to see the ‘aleph’ and
To see to see the inward truth.
Pristine truth they beheld in awe
They said nothing but merely, “Oh!”
A bottle of wine they downed
Seductive smiles they adorned.
They quaffed pint after pint of ale,
And slurped some coffee later
In reminiscence of the crystal gazer.



NIAS News

Awards and Honours

Awards & Honours



Prof Baldev Raj, Director, NIAS

Member, Advisory Committee, Tṛtīyam Viśva-Veda-Vijñāna-Sammelanam (VVVS), Pune.

Member, VIBHA-DST Science Indian Portal, September 21, 2017.

Academia Member, Working group on Development Agenda for S&T Sector-2022, NITI Aayog, Government of India, New Delhi, September 20, 2017.

Chairman, CSIR-NISTADS Wild Ideas in Technology Science (WITS) Prize Committee, September 5, 2017.

Co-Chairman, Advisory Board of Centre for Spatial Analytics and Advanced GIS (C-SAG), NIAS, August 28, 2017.

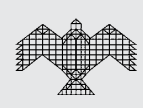
Chairman, National Panel for the formulation of the Technology – led Innovation Policy, Policy Research and Planning and Coordination and Performance Management, DST, Ministry of S&T, New Delhi, August 25, 2017.

Co-Chairman, Search-cum-Selection Expert Committee (SSEC) for the Abdul Kalam Technology Innovation National Fellowship, Science and Engineering Research Board, New Delhi, August 21, 2017.

Honorary Fellow, Australian Institute of High Energetic Materials, Australia, August 8, 2017.

Member, External Peer Review Committee of IISER Mohali nominated by Hon'ble HRD Minister, August 4, 2017.

Member, Scientific Advisory Committee, 105th Indian Science Congress, Osmania University, July 21, 2017.



Review Committee Member, TWAS-COMSTECH Research Grants Committee for Engineering Sciences, Italy, July 14, 2017.

Academic Chair, Quality Sub Committee, CII National Committee on Higher Education, CII, New Delhi, July 10, 2017.

Member, ActionAid CSR Advisory Board under Leadership Mr Sandeep Chachra Country Director and Ms Dipali Sharma, Director, OE and CSR, July 7, 2017.

Chairman, Research Council of CSIR-Central Glass and Ceramic Research Institute (CSIR-CGCRI), Kolkata, July 3, 2017 (for three years).

Member, High Level Committee on CSIR Diamond Jubilee Technology Award (CDJTA), July 2017.



Prof Anindya Sinha was International Advisor, Twenty-Eighth International Biology Olympiad, Coventry, UK, July 18 to 30, 2017.



Prof Malavika Kapur was appointed the Advisory Board member of Indian Psychology, Department of Clinical Psychology, NIMHANS, Bengaluru and attended the first meeting on September 5, 2017. Commissioned by Oxford University Press, New Delhi to write a text book on Child Development and Pedagogy for teacher trainees in September 2017.

New Faces



Prof Sheela K Ramasesha (formerly Visiting Scientist, Divecha Centre for Climate Change, Indian Institute of Science, Bengaluru) joined NIAS as **Principal Scientist** in the Energy and Environment Research Programme on September 28, 2017.



Dr Muralidhar Lakkanna joined NIAS as **Postdoctoral Associate** to work in the area of Advanced Manufacturing on September 15, 2017.

Congratulations



Dr Prakash Panneerselvam was appointed as **Assistant Professor** in the International Strategic and Security Studies Programme on September 11, 2017.

Our Men in Blue

The Institute's Support Staff makes a silent contribution to our progress. Always with a smile on their face, and ready to address each and every concerns of the faculty and our visitors, our men in blue bring sunshine into the Institute.



Behind every success of NIAS...

...is the strong admin team. Silently working behind the scenes, the administrative team of the Institute is one of its greatest strengths. Sincere, hard working and effective, they form a strong pillar of NIAS.

