

## Invited Lecture Series “Research, Innovation & Sustainable Development”

Lecture Series Coordinated by Dr. Sujit Bhattacharya, Chief Scientist

The Invited lecture Series ‘Research, Innovation and Sustainable Development’ invites scholars from academia, industry and civil society to enrich the debate and develop a nuanced understanding of Sustainable Development. The lock-in that happens in research and innovation forecloses many other interesting and useful ways of solving a problem or bring new innovation to the market. The different strands of research that do not speak to each other, disconnect that is observed among academia-industry or the limited interface with society at large particularly during research and early phases of translation towards innovation has larger implications for bringing useful innovation to the market. This also has implications for development of process or products that address the ethical-legal-social implication (ELS) and environment-health-safety issues (EHS) that leads to Responsible Innovation. This underpins the discourse on sustainable development which the invited lecture intends to address.

*This lecture series was inaugurated on 9<sup>th</sup> January, 2020 by **Dr. Shekhar C.Mande**, Director General CSIR & Secretary DSIR. Inaugural lecture was on ‘CSIR & Its History’.*



## Invited Talks

- Invited talk by Professor Vivek Kumar, Centre for Rural Development & Technology, Indian Institute of Technology, Delhi on 23 June, 2020.  
Title of the talk: Ecological Perspective of Growth and Development: A Paradigm Shift
- Invited talk by Dr Diran Soumonni, Wits University, South Africa on 13<sup>th</sup> February, 2020  
Title of the talk: Endogenous System of Innovation in Comparative Perspective: Some reflections on Africa-India Relations
- Invited talk by Professor Pankaj Sekhsaria, Centre for Technology Alternatives for Rural Areas (CTARA), IIT Bombay on 10th Jan, 2020,  
Title of talk: The story of India's earliest indigenous scanning tunneling microscope (STMs) and what lab studies can tell us about S&T policy making in India

### **Invited Lectures as a prelude to this lecture series**

- Invited Talk by Professor Vivek Singh, Professor of Computer Science and Director, Computer Centre at Banaras Hindu University, Varanasi on 11th November, 2019,  
Title of the talk: Measuring and Characterizing Indian Scientific Research: New Dimensions
- Invited Talk by Professor V.V.Krishna, Professorial Fellow, University of New South Wales, Sydney, Australia & Editor in Chief, Science, Technology and Society (Sage) on 14<sup>th</sup> August, 2019  
Title of the talk: Changing Social Contract between Science and Society: Implications for Asian Countries

## Speaker Profile and Abstracts of the Talks

### Ecological Perspective of Growth and Development: A Paradigm Shift

Professor Vivek Kumar, Centre for Rural Development & Technology, Indian Institute of Technology

#### Brief Profile

Professor Vivek Kumar is Professor in CRDT at Indian Institute of Technology, Delhi. Dr. Kumar is Co-Coordinator of one of the major programme of the Govt. of India, Unnat Bharat Abhiyan (UBA) that aims to utilize knowledge institutions of the country to help villages. Dr. Kumar is also coordinating Subject Expert Group activities under UBADr. Kumar is a clean technology and liquid waste management expert. For industrial sector he works in the area of process audit, process integration, implementation cleaner production projects and new greener product development. In the area of rural development he works in the area of planning, and resource management.

Dr. Kumar is actively involved is several projects in the area of pollution control especially in Ganga Basin. He is also actively involved in several projects of pollution prevention and control including Charters in Paper, textile, tannery, and Sugar industries. He is member of several Central Pollution Control Board's committees working for pollution control in textile industries and paper industries, exploring and assessing the techno-economic feasibility of implementation of 'Zero Liquid Discharge' in industries. He was associated with a joint project being executed by the consortium of seven IITs (Indian Institute of Technology) on "National River Ganga Basin Environmental Management Plan". Some of his technical reports work in this area are (i) Rapid assessment of industrial pollution of the River Ganges in Uttarakhand, and (ii) Strategy for improving condition of water bodies in the vicinity of pulp and paper industries in Ganga river basin.

He is currently working on the low foot print domestic sewage treatment systems for cold regions and rural areas. Kumar has guided 08 Ph. D thesis, published around 140 articles in journals, conference proceedings, books (as chapters), and 02 books. He has completed more than 25 R&D and consultancy projects and currently implementing 05 R&D and consultancy projects. He has research collaboration with several international and national institutes and universities. Presently he is collaborating with Queens University & Crainfield University, UK and University of Toronto, Canada. Kumar was also a visiting Research Professor in the Department of Chemical Engineering and Applied Sciences at University of Toronto I the year 2014.

# **Endogenous Systems of Innovation in Comparative Perspective: Some reflections on Africa-India Relation**

**Diran Soumonni**

Senior Lecturer, Wits University, South Africa

## **Brief Profile**

**Dr Diran Soumonni** is a Senior Lecturer in Innovation Policy and Management, and Programme Director of the Master of Management in Innovation Studies at the Wits Business School, South Africa. He obtained his PhD in Public Policy from the Georgia Institute of Technology in Atlanta, Georgia, USA, where he focused on both innovation studies and energy policy. He is an active member of the Global Network for the Economics of Learning, Innovation and Competence Building Systems (GLOBELICS) and of the Society for the Social Studies of Science (4S). He serves on the scientific board of the African Network for the Economics of Learning, Innovation and Competence Building Systems (AFRICALICS), and is also a Steering Committee Member of the International Network on Appropriate Technology (INAT).

## **Abstract**

The dominant modern discourse on globalization masks the fact that the history of humanity itself is one of migration, exchange, and interpenetration in all facets of life. Furthermore, the prevailing apparatus designed to foster “development” in most of the world is economic in its orientation, and tends to downplay the plurality of values that provide people with a higher sense of meaning and purpose. Thus, the task of formerly-colonized nations in Africa, Asia, and elsewhere, must be to not only problematize these discourses, but to offer alternative pathways for a more just global order. As a contribution to such an exercise, this paper first highlights the underpinnings of endogenous knowledge, cursorily understood to signify that “knowledge of self” is the properly-suited basis for a reciprocal valorization of diverse knowledge systems. In contradistinction to the framing of Africa that was inherited from its arbitrary partition, however, the premise that serves as the basis for this paper is that which was defined by the preeminent Beninese linguist and cultural theorist, Ambassador Olabiyi Yai, as “the sum total of African cultures as sedimented for millennia in philosophies, wisdoms, ways of being and doing things, as well as ways of relating to otherness”. Secondly, some salient examples of political leaders in India and Africa, who attempted to base the development of their emerging states on a critical appropriation of modern science, will be underscored. Thirdly, some notable contemporary models of endogenous knowledge-based, innovative initiatives in both territories will be highlighted. Finally, these building blocks, namely, endogenous knowledge generation, innovative organizational development, and nation-building, provide the basis for a three-tiered, but mutually-reinforcing model for South-South cooperation in general, and for Africa-India cooperation, in particular.

There is a growing body of social science research on the role of innovation in socio-economic development in the Global South. In this regard, the Systems of Innovation (SI) framework, which has been embraced by numerous Indian and African scholars alike, offers insights that predominantly provide strategies for acquiring technological capabilities from outside sources and subsequently upgrading them for the purpose of economic development. Another orientation within the same systemic perspective emphasizes low cost, grassroots, and socially-inclusive innovation. The latter are roughly analogous to the early themes in the Appropriate Technology movement, which were largely inspired by the Indian economist, J.C. Kumarappa and the Sri Lankan scholar of Indian culture, Ananda Coomaraswamy, among others. However, despite the significant potential of applying scientifically-novel or “emerging technologies” such as advanced Information and Communication Technologies (ICTs), biotechnology or nanotechnology to developmental challenges, the synthesis between the two main approaches largely remains elusive. Furthermore, only a few related studies in either perspective attempt to ground their work in the historical experience of African and Indian peoples, their intellectual heritage, or the viable innovative solutions that continue to emerge from their knowledge bases, both indigenous and contemporary. This paper, therefore, combines the concept of “Endogenous Development”, as developed by the late, renowned Burkinabé historian, Joseph Ki-Zerbo, in his 1992 book, “La natte des autres”, with selected analytical tools from the SI approach to propose an Endogenous Systems of Innovation (ESI) framework. Of specific interest, with respect to Africa-India knowledge exchanges, are the concepts of “alternative science” articulated by Shiv Visvanathan, as part of his critical reflections on the Swadesi movement in Bengal, and “alternative sciences” as propounded by Ashish Nandy. Far from being essentialist or nativist, these perspectives provide an enlarged set of insights for integrating diverse knowledge forms, while remaining true to “endogeneity” as a referential, though self-critical and evolving matrix. From the vantage points of gender inclusivity, social equity and ecological consciousness, the scholar-activists, Sunita Narain and the Late Wangari Maathai, provide cutting-edge Global South critiques and alternatives to contemporary environmental discourses and practices.

Following the conceptual groundwork presented, some more experiential and programmatic models are offered that could provide blueprints for how reciprocal, knowledge-based exchanges might be strengthened. In the first set of examples, some of the core convictions of the Late Tanzanian president, Mwalimu Julius Nyerere, and the Late Indian Prime Minister, Pandit Jawaharlal Nehru, with respect to both harmonious science-based development and South-South solidarity, are presented. The second set of illustrative cases relates to non-governmental organizations that offer much-needed developmental services in an “endogenous” manner. These include the Benin-based, innovation award-winning Songhai Center, which promotes “authentic technology” based on sustainable agroecology, and the collaboration between the Mauritius-based Global Rainbow Foundation and the Indian not-for-profit organization, Jaipur Foot, in the manufacturing and fitting of artificial limbs. Lastly, some recommendations that emerge from the three-tiered endogenous development exchange model are offered for concrete, future engagement.

# **The Story of India's earliest Indigenous Scanning Tunneling Microscopes (STMs) and what Lab Studies can tell us about S&T Policy Making in India**

**Pankaj Sekhsaria**

Associate Professor, Centre for Technology Alternatives for Rural Areas (CTARA), IIT  
Bombay

## **Brief Profile**

**Professor Pankaj Sekhsaria** is Associate Professor, Centre for Technology Alternatives for Rural Areas (CTARA) & Associate Faculty, Centre for Policy Studies (CPS), IIT-Bombay. His research interests lie at the intersection of technology, society, science and the environment. He writes extensively on these issues for the Indian media and is also author of a number of books including most recently *Instrumental Lives* - an intimate biography of an Indian laboratory (Routledge, 2019), *Islands in Flux - the Andaman and Nicobar Story* (Harper Litmus India 2017, 2019) and his debut novel *The Last Wave* (HarperCollins India, 2014)  
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## **Abstract:**

The presentation is based on Sekhsaria's doctoral research at Maastricht University, the Netherlands where he studied 'Cultures of Innovation in nanotechnology research for development in India'. The research spanning nearly five years was carried out in five nanoscience and nanotech labs across three cities of India and highlights how societal and cultural contexts deeply influence science, technology and innovation. It will draw on two case studies that make up his doctoral thesis and in particular on his new book *Instrumental Lives - an intimate biography of an Indian laboratory* (Routledge, xxii+126, (HB), Rs 695, ISBN: 9780367856298), which is an account of instrument making at the cutting edge of contemporary science and technology in a modern Indian scientific laboratory.

The presentation will locate scientific research and innovation within the social, political and cultural context of a laboratory's physical location and ask important questions of the dominant narratives of innovation that remain fixated on quantitative metrics of publishing, patenting and generating commerce. It will story simultaenously be the story of the labs as it will be a story of his own journey of engaging and understanding the lab and its constituents and eventually telling that story. It will also delve into related issues of the history of S&T in India and of the contemporary S&T policy landscape of the country.

# Changing Social Contract between Science and Society: Implications for Asian Countries

V.V.Krishna

Professorial Fellow, University of New South Wales, Sydney, Australia & Editor in Chief, *Science, Technology and Society* (Sage)

## Brief Profile

**Professor Venni V. Krishna** is currently Professorial Fellow, School of Humanities and Languages at the University of New South Wales & Honorary Prof, School of History and Philosophy of Science, Sydney University, Sydney, Australia. He has a PhD from the University of Wollongong, Australia and has more than 30 years of research, teaching and consultancy experience in STI studies, history and sociology of science and technology, innovation studies and science, technology and developing world in leading academic and research institutions. He was Professor in Science Policy and Chair, Centre for Studies in Science Policy, School of Social Sciences, Jawaharlal Nehru University, New Delhi and Senior Scientist at CSIR-NISTADS.

## Abstract

Globalisation (and economic liberalization) is not something, which is just confined to economic, political and financial institutional spheres of society and economy. Its influence and impact already penetrated into the practice of science and technology system and the functioning of science as a social institution (as we know it from the last 200 years or so) including universities and higher educational institutions. Some basic fundamental values of open, academic science, advancing knowledge frontiers and science as public good (existing social contract) is being over taken by secrecy in science, creation of wealth from knowledge and science as market good (new social contract). John Ziman characterised this change as 'science as undergoing cultural revolution'; and the current transformation of universities is drawing our attention to what has come to be known Triple Helix and entrepreneurial universities which in a large measure come to threaten academic science ethos. Overall, coping and adapting to the new social contract or the emerging science and society relations is not going to be all that smooth. Large and complex technological systems, increasing degrees of risk, regulation of new science based technologies and democratization of science are likely to pose different set of new challenges. For instance, advances in biomedical science and technology in the last few years has thrown up a big challenge in environmental, ethical and risk related factors. The last decade also witnessed a big shift towards 'commodification' of knowledge and encroaching the 'public space of science' by intellectual property rights (IPRs) threatening 'scientific commons'. What are the implications for science and society relationships? Should we allow the market forces to take over the governance of scientific enterprise? How can we create a level playing field between 'public good' and 'market good' in science institutions and universities? Are IPRs and secrecy going to benefit advancement of

knowledge or retard its progress? What are the implications for Asian countries? These are some of the issues addressed in this presentation.

## **Measuring and Characterizing Indian Scientific Research: New Dimensions**

**Vivek Singh**

Professor of Computer Science and Director, Computer Centre at Banaras Hindu University, Varanasi

### **Abstract**

The talk will attempt to address quantitative pursuits in Indian Science, addressing several traditional issues like India's research output, global share and rank, disciplinary distribution of research output and international collaboration patterns. The main emphasis will be on quantitative methods and how they can be used to draw inferences useful for science policy. The talk will include discussion on issues of gender and research publishing as well as open access levels and patterns in Indian research. The University-Industry-Government collaboration in research would also be looked into. The talk will also discuss on a very important and emerging issue of social media attention of Indian research output, including characterizing the type of research output that gets significant attention in different social media and news platforms.