

ISSN 0531-495X



एवरीमैन्स साइन्स

EVERYMAN'S

SCIENCE

Vol. LIII No.- 2 (JUNE-JULY, 2018)



Dr. G. Madhavan Nair
(2010)



Prof. K.C. Pandey
(2011)



Prof. Geetha Bali
(2012)



Dr. Manmohan Singh
(2013)



Prof. Dr. Ranbir Chander Sobti
(2014)



Dr. Ashok Kumar Saxena
(2016)



भारतीय विज्ञान कांग्रेस संस्था, कोलकाता
THE INDIAN SCIENCE CONGRESS ASSOCIATION, KOLKATA

EVERYMAN'S SCIENCE

Vol. LIII No. 2 (June-July '18)

EDITORIAL ADVISORY BOARD

- Dr. Sujay Rakshit (*Ludhiana*)
Prof. Kuldeep K. Sharma (*Jammu*)
Dr. Soibam Jibonkumar Singh (*Imphal*)
Prof. Jagdamba Singh (*Allahabad*)
Prof. J.P. Shrivastava (*Delhi*)
Prof. Swami Vedajnananda (*Kolkata*)
Dr. Indra Dutt Bhatt (*Almora*)
Dr. Ratnadeep Raghunathrao Deshmukh
(*Aurangabad*)
Prof. K. Byrappa (*Mangalagangothri*)
Prof. Nandadulal Bairagi (*Kolkata*)
Prof. Prakash Chandra Dhara (*Midnapore*)
Dr. Chinmay Kumar Panda (*Kolkata*)
Prof. (Dr.) Vijay Janardhan Fulari
(*Kolhapur*)

COVER PHOTOGRAPHS

Past General Presidents of ISCA

1. Dr. G. Madhavan Nair (2010)
2. Prof. K.C. Pandey (2011)
3. Prof. Geetha Bali (2012)
4. Dr. Manmohan Singh (2013)
5. Prof. Dr. Ranbir Chander Sobti (2014)
6. Dr. Ashok Kumar Saxena (2016)

For permission to reprint or reproduce any portion of the journal, please write to the Editor-in-Chief.

EDITORIAL BOARD

Editor-in-Chief

Dr. Ashok Kumar Saxena

Area Editors

Dr. (Mrs.) Vijay Laxmi Saxena
(*Biological Sciences*)

Prof. Arun Kumar
(*Earth Sciences*)

Dr. Manoj Kumar Chakrabarti
(*Medical Sciences including Physiology*)

Prof. H.P. Tiwari
(*Physical Sciences*)

Dr. Rashmi Sinha
(*Social Sciences*)

General Secretary (Membership Affairs)

Prof. Gangadhar

General Secretary (Scientific Activities)

Prof. Premendu P. Mathur

Editorial Secretary

Dr. Amit Krishna De

Printed and published by Dr. Ashok Kumar Saxena on behalf of Indian Science Congress Association and printed at East India Photo Composing Centre, 69, Sisir Bhaduri Sarani, Kolkata, 700006 and published at Indian Science Congress Association, 14, Dr. Biresh Guha Street, Kolkata-700017, with Dr. Ashok Kumar Saxena as Editor.

Annual Subscription : (6 issues)

Institutional ₹ 500/-; Individual ₹ 300/-

Price : ₹ 20/- per issue

CONTENTS**EDITORIAL :****TAMIFLU (OSELTAMIVIR PHOSPHATE) AN ANTIVIRAL DRUG***Vijay Laxmi Saxena*

67

ARTICLES :**RIVER BANK FILTRATION : AN INNOVATIVE SOLUTION FOR SAFE DRINKING WATER***D. P. Uniyal, S. Khadija Bari, J. S. Aswal, Rajendra Dobhal, A. Pokhriyal and P. K. Kaushik*

70

CRYPTOCURRENCY : CHARACTERISTICS AND FUTURE PERSPECTIVES*Varun Shukla and Atul Chaturvedi*

77

AGERATUM CONIZOIDES—THE TERRESTRIAL INVASIVE OF PUNJAB (INDIA) AND ITS ECOLOGICAL IMPLICATIONS*Kirandeep K Dhami*

81

ARBUSCULAR MYCORRHIZAL FUNGI: NEXT GENERATION BIOAGENTS FOR SUSTAINABLE AGRICULTURE*Kajal S. Rathore, Shivom Singh and Anil K. Sharma*

85

LIFE SKETCHES OF OFFICE BEARERS, SECTIONAL PRESIDENTS AND RECORDERS OF THE INDIAN SCIENCE CONGRESS ASSOCIATION, 2018-2019

89

KNOW THY INSTITUTIONS

120

CONFERENCES/MEETINGS/SYMPOSIA/SEMINARS

123

S & T ACROSS THE WORLD

126

EDITORIAL**TAMIFLU (OSELTAMIVIR PHOSPHATE) AN ANTIVIRAL DRUG**

In 1999, The USA Food and Drug Administration offer authorization to the new occasional influenza as a Neuraminidase Inhibitor, which usually known as Oseltamivir (Tamiflu). In the middle of 2005 to 2009, the risk of pandemic influenza builds step by step; the notice of these emergencies comes straightforwardly from the unmistakable administrative bodies like the World Health Organization (WHO), Centres for Disease Control and Prevention and European Medicines Agency for its utilization in the treatment and prophylaxis of flu. This medication named Tamiflu went through the quantity of controlled preliminaries, precise audits and meta-investigation, which improved the adequacy and the security profile of this medication. Tamiflu (oseltamivir foundational) is a follower of the medication class neuraminidase inhibitors and is utilized to treat avian, Influenza, Influenza Prophylaxis and Swine Flu. This entire procedure of medication testing was financed by the Roche; this same showcased and advanced this medication. Be that as it may, subsequently, a neuropsychiatric occasion happens which completely connected with Tamiflu. A report exhibited at that occasion which brings up an issue over the clinical utility of this medication. As indicated by another ongoing Cochrane survey and articles have scrutinized the hazard advantage proportion of the medication, other than raising questions about the administrative choice of favouring it. After, such a significant number of audits and proposal for amassing of this

medication additionally compels the WHO to put this medication into examination arrange. In this way, a significant number of the commentators named this medication as 'Exorbitant slip-up' and these entire scenes of surveys and suggestions abandon us with some vital exercises.

As of late, a British Medical Journal and Cochrane survey have genuinely revealed about the example of overcoming adversity of oseltamivir. It is one of the most noteworthy income creating drugs for the Roche. Likewise, in different genuine antagonistic occasions detailed about it during the time spent post-showcasing from better places of Japan and UK. Because of the absence of viability and wellbeing from Oseltamivir, and there is no deductively evidence of their power. Along these lines, numerous entrenched and presumed associations like the World Health Organization (WHO), canters for Disease Control and Prevention (CDC), EMA, US FDA does not prescribe this medication for the treatment and prophylaxis of flu, in this way this medication has an unavoidable issue over it. This catastrophe is basically making accessible us with a chance to rational unmistakable classes in order to secure against such logical offenses later on. There is an imperative to consider varieties during the time spent presentation of another medication in the general human services framework and to get more prominent duty and clearness the way we rehearse science.

ABOUT INFLUENZA AND OSELTAMIVIR

The spreadable or transmissible compose viral contamination is normally known as Seasonal influenza, which for the most part takes after a minor course. Rarely, issues, for instance, pneumonia, bronchitis, otitis media, myocarditis, pericarditis, neurologic entanglements (viz disarray, writhing, psychosis, neuritis, transverse myelitis, and encephalomyelitis), and lack of hydration happen and the reason for these conceivable outcomes will be auxiliary bacterial disease or the regular course of viral sickness. Oseltamivir is sialic corrosive simple, which generally taken orally or ingested from GIT, diminishes viral load. The life of it in the human body ought to be 6-10 hours if having great oral bioavailability. In any case, it has some terrible impacts jump at the chance to incorporate sickness, looseness of the bowels, sleep deprivation, stomach agony, and migraine and the purpose for that is the development of carboxylesterase catalyst in the liver.

As indicated by most recent news January 02, 2018, in Japan the antiviral meds for influenza demonstrate some reactions. The patients in Japan who takes these medications has been demonstrated some "unusual conduct" that has guided the administration itself to issue a notice, only to avoid incidental damage or demise of Japanese Citizens. As indicated by the Japanese government, patients secure him in the room and make himself a detainee subsequent to taking this antiviral pharmaceutical.

This season's cold virus is one of the real issues which cause an expansive number of passing in Japan amid influenza season. As per people in general records in the middle of April 2009 to August 2017, a relatively eighth individual of Japan is biting the dust because of

this season's cold virus assault. Also, the one thing basic all things considered separated from influenza assault was that they all were taking against influenza drug and demonstrating some anomalous practices previously their passing. From that point forward, considerably more conceivably related passing has been comparing, and now the general wellbeing authorities have freely talked over the matter of influenza sedate security by and by.

Subsequent to happening this emergency, Japan's wellbeing service passes an announcement which identified with the youthful flu patients. They said that in the wake of taking a hostile to influenza prescription, individuals ought to be secured in the rooms even the leave point, the windows of the room and the route to the overhang isn't available for very nearly two days as they recuperate. This is said to be the primary definite guideline of its liberally made by the service, and it was conveyed to all administrations as the quantity of announced lethal mischances because of irregular conduct kept on rising.

SIGNS OF ABNORMAL BEHAVIOUR

As a security measure The Health Ministry of Japan issue a numerous report and issue a cautions over the strange practices which was the symptoms of this season's cold virus mat which incorporates the sudden drive to leave a room and move towards an overhang in a condition of uneasiness, strolling around a room sobbing, and rambling. These practices appeared by the quantity of various patients who taken this hostile to influenza or regardless of whether the patients hadn't taken any antiviral medicine whatsoever. In the progression of sharpness, The Health Ministry of Japan was given an extraordinary cautioning to the youngsters who age must be between 10 to 19, as they watched

a large number of individuals who demonstrated that unusual conduct was generally had at Young age. A few patients hinted at mental trips and incoherence. All things considered, in the majority of the cases, the irregular conduct goes up to the following perilous level in that individual submits suicide by hopping off the structures.

CHANGES TO ANTIVIRAL CAUTIONING

Subsequent to happening this wellbeing emergency, The U.S. Nourishment and Drug Administration (FDA) distributed the notice out in the open identified with the medication Tamiflu and emphatically offers guideline to the administration medicinal authorities to shutting checking the social changes, particularly in the

kids. Instead of Tamiflu medicate, Japan begins investigating Anti-influenza sedate Relenza as a substitution of Tamiflu. In the interim, the expansion of a notice for wooziness and mind flights is prescribed for Relenza.

Meeting with FDA security analyst Dr Adrienne Rothstein, the effect of the medications on the unusual conduct that data to shocking disasters can't be discounted totally. Despite the fact that the maker of both Tamiflu and Relenza have both remained close to with the security of their items. Meanwhile, it may be best for influenza patients to simply hold relentless and hold up until the point that this season's cold virus season is over to at last discount the likelihood of deadly wounds.

*Dr. (Mrs.) Vijay Laxmi Saxena
Kanpur*

*Science is not only a disciple of reason but also
one of romance and passion*

— Stephen Hawking

RIVER BANK FILTRATION : AN INNOVATIVE SOLUTION FOR SAFE DRINKING WATER

D. P. Uniyal*, S. Khadija Bari, J. S. Aswal, Rajendra Dobhal,
A. Pokhriyal and P. K. Kaushik

Rivers and lakes are a major source of drinking water supply, but surface water of water bodies may be contaminated due to susceptibility to pollution. The world's freshwater resources are under pressure besides this water quality and quantity also needs to be checked and their conservation is necessary, while maintaining the quality and quantity of water. River bank filtration is an economical and sustainable water treatment method which should be introduced to maintain good drinking water quality. One such method is the Bank Filtration method which comes under the Integrated Water Resource Management Programme (IWRM) which helps in aquifer recharge and improving quality of drinking water supply by removing biological and chemical contaminants of the water through channels of aquifer. Bank filtration (BF) has emerged as an economical and sustainable water pre-treatment technology for drinking water supply. In this article an attempt has been made to highlight the role of BF method in regulating water quality and quantity improvement. Besides this, the mechanism, significance and the development of BF technology in the hilly state of Uttarakhand has been discussed in length. Water quality status of Srinagar and Satpuli river BF sites of Uttarakhand are also described and compared with the Bureau of Indian Standards guidelines for better understanding.¹

INTRODUCTION

India, with more than 1.21 billion people (COI 2011), faces significant challenges in meeting the growing water supply needs of an increasing population. The problem is particularly acute for the urban population that comprises around 31.2% of the total population. Consequently, the substantial discharge of untreated to partially treated industrial and domestic wastewater into surface water leading

to exceptionally high pathogen counts and organic pollution.²

River Bank Filtration (RBF) process has been widely proved as domestic water pre-treatment technology to overcome various water quality problems. The concept of RBF was developed in Germany and has widely been used in Europe for public and industrial water supply along Rhine, Elbe, and Danube rivers over 100 years. It is an efficient and well accepted technique for the treatment of surface water in many European countries such as Switzerland where 80 % of the

Uttarakhand Council for Science and Technology, Vigyan
Dham, Jhajra, Dehradun, Uttarakhand
E-mail: dpuniyal.ucost@gmail.com

drinking water comes from RBF wells, 50 % in France, 48 % in Finland, 40 % in Hungary, 16 % in Germany, and 7 % in the Netherlands. In Germany, around 75 % of the city of Berlin depends on RBF, while in Düsseldorf, it is being used since 1870 as the main drinking water supply. Moreover, other countries like India, China, and South Korea have recently started implementing RBF for drinking water supply. At a number of Indian cities including Delhi, Haridwar, Mathura, Ahmadabad, Medinipur, Kharagpur, Nainital, Patna, RBF sites are operational to produce water of drinking quality.³

RIVER BANK FILTRATION

Riverbank filtration (RBF) or simply bank filtration (BF, a unified term for river and lake bank/bed filtration) is a process in which the subsurface at a river or lake bank serves as a natural filter and biochemically removes potential contaminants present in the surface water (Fig. 1-1). RBF is initiated by the lowering of the groundwater (GW) table below that of an

adjoining surface water (SW) table which induces SW to infiltrate through the permeable river bed and bank (or lake bank) into the aquifer as a result of the hydraulic gradient. The infiltration may be the direct result of an influent river under natural conditions or be induced by GW abstraction wells.

The aquifer serves as a natural filter and also biochemically attenuates potential contaminants present in the SW by overlapping physical, chemical, and biological processes. Physical processes such as hydrodynamics involves advection, dispersion, transport, and dilution, while mechanical processes include filtration i.e. improvement of water quality through the natural filtration of fine sediments by trapping of particles in pore spaces especially for particulate organic matters and pathogens. The success of RBF schemes is dependent on the microbial activity and chemical transformations that are commonly enhanced in the clogging layer within the river bed compared to those that take place in surface

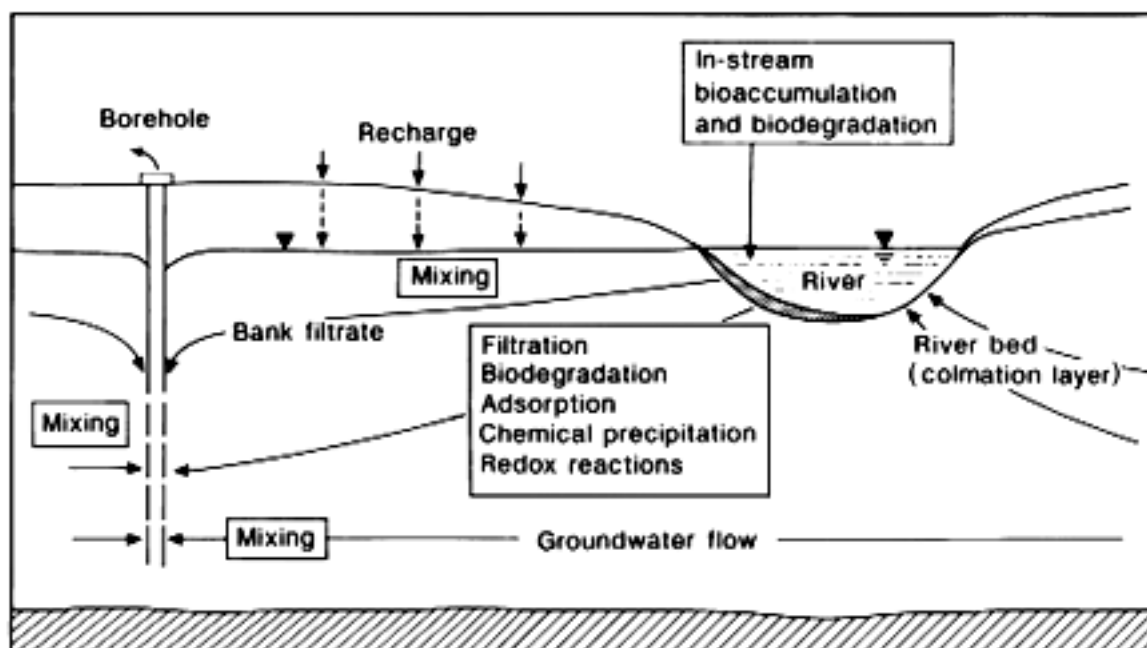


Fig. 1 : Processes of riverbank filtration

or ground waters. The actual biogeochemical interactions that sustain the quality of the pumped bank filtrate depend on numerous factors including riverbed and aquifer structure and mineralogy, SW quality, particle content and composition, oxygen and nitrate concentrations in the SW, types of organic matter in the surface and ground water environments and land use in the local catchment area.⁴

Compared with direct SW abstraction, RBF with its effective natural attenuation processes removes suspended solids, particles, biodegradable compounds, bacteria, viruses and parasites; partly attenuates adsorbable compounds and equilibrates temperature changes and concentrations of dissolved constituents in the bank filtrate. Physico-chemical processes occur involving various processes such as filtration, sorption-desorption, solution-precipitation, redox reaction, complexation, acid-base reaction, hydrolysis, biochemical, microbial biodegradation reactions etc. and by the mixing with groundwater (dilution). These physicochemical processes are subjected to the porosity of the medium, the concentration and the behavior of metals and other inorganic compounds, the water residence time in the aquifer, temperature, pH conditions of water and oxygen concentrations.

FACTORS AFFECTING RIVERBANK FILTRATION

Riverbank filtration has been extensively used for drinking water pre-treatment for various organic pollutants such as pesticides, herbicides, odorous compounds, oil sub-products, and pharmaceuticals. The pumping action creates a pressure between the river and aquifer and induces the water from the river to flow downward through the porous media into the production well. The efficiency of RBF process is dependent on number of factors such as :

- Surface water quality,
- Permeability of the riverbank,
- River level
- Sediment transport variability
- The residence time of the water in the soil
- Temperature

Riverbank filtration has been extensively used for drinking water pre-treatment for various organic pollutants such as pesticides, herbicides, odorous compounds, oil sub-products, and pharmaceuticals. The removal and the behavior of such organic compounds depends on the factors of :

- Hydrophobicity of the compound
- The potential for biochemical degradation
- The amount of organic matter in the aquifer
- Infiltration rate
- Microbial activity
- Biodegradability etc.⁶

However, redox reactions, microbial degradation of organic matter, and dilution are the most common processes to control the transport and fate of inorganic compounds. In redox reactions, manganese and iron oxides are mobilized under reducing conditions and adsorbed, precipitated or co-precipitated under oxidizing conditions. Microbial degradation of organic matter can alter the geochemical conditions and mobilize metals like copper and cadmium, which are usually associated with natural organic matter (NOM). It can also remove the heavy metals like chromium, arsenic etc.

ADVANTAGES OF RBF

- Natural, sustainable and low cost technology.
- Effective elimination of pathogens and organics
- Compensation of shock loads
- Disinfection as a safety measure is sufficient in most cases.⁶

RBF IN UTTARAKHAND

In view of the vast potential of reduction in certain water quality characteristics, RBF has been widely used for transforming river water into drinking water grade by improving water quality. The evaluation of water quality obtained through RBF has been done globally but very few efforts have been made in Uttarakhand so far. The proximity of rivers such as Ganga and Yamuna with various tributaries like Pinder, Mandakini, Alaknanda and Bhagirathi enable the states to select suitable target locations for RBF. Due to seasonal variations, river discharges are minimum in winters and maximum in rainy seasons. As a result of seasonal variations, depletion in water level in main river and its tributaries occur.

The BF production wells have been installed successfully at foothills in Haridwar and Rishikesh near the river Ganga and also in Nainital near Naini lake. Recently a project sponsored by the Department of Science and Technology (DST), New Delhi, four new RBF wells have been installed by Uttarakhand Jal Samsthan (UJS) at Karanprayag, Srinagar, Agastmuni and Satpuli on the banks of Alaknada, Mandakini and East Nayar rivers respectively. In the area of Srinagar during 2013 flashfloods, RBF sites were badly damaged and after that 4 RBF

sites were regenerated in which NIH (Roorkee), IIT Roorkee, University of Dresden, Germany, Uttarakhand Jal Sansthan, and Uttarakhand State Council for Science and Technology participated and it was concluded to re-build the Srinagar sites with the latest technology which is flood proof and fully operational.

The water quality monitoring data of analyzed river water samples (through surface abstraction) and RBF well water samples (obtained after RBF pre-treatment method) show the usefulness and efficiency of RBF technique in improving the water quality. pH values in the analyzed river samples and RBF well water samples fluctuated in a limited range from 7.9 to 8.2 and from 7.4 to 8.1, respectively. All these pH values were well within the prescribed limit of 6.5 to 8.5 as per BIS. The turbidity in all river water samples were found higher than the permissible limit (10 NTU) of BIS and varied from 13 to 240 NTU, where Srinagar sampling site has maximum turbidity as 240 NTU. While in RBF well water, its values ranged from 0.6 to 0.8 NTU. All values in RBF well water were below than the desirable limit of BIS, which showed the effective removal of turbidity from water making it suitable for drinking. The TDS values varied from 68 to 110 mg/l in river water and 104 to 650 mg/l in RBF well water. All sites have TDS content lower

Table 1 : Details of water sampling sites with RBF facility in Uttarakhands.⁶

Description of RBF site	Srinagar	Agastmuni	Satpuli	Karnprayag
Name of river	Alaknanda	Mandakini	East Nayar	Pinder
Name of district	Pauri	Rudraprayag	Pauri	Chamoli
Type of source tapped	river	stream	stream	stream
Classification of population	urban	rural	rural	urban
Longitude	78.76650E	79.02131E	78.71162E	79.25206E
Latitude	30.21986N	30.39072N	29.91903N	30.28780N



Fig. 2 : Major rivers of Uttarakhand

than the desirable limit of 500 mg/l except in RBF well water of Srinagar as 650 mg/l but lower than the permissible limit of 2000 mg/l. The hardness values ranged from 39 to 82 mg/l in river water samples and from 75 to 270 mg/l in RBF well samples. No sample of the study area exceeds the desirable limit prescribed for hardness in both types of water samples. The bacteriological analysis shows the presence of coliform contamination in river water samples, which varied from 141 to 900 colonies/100 ml. No coliform contamination was observed in any water sample of RBF wells and this reflects the

high efficiency of the RBF technique over bacterial reduction.⁷

RBF POPULARISATION EFFORTS

Uttarakhand State Council for Science and Technology, NIH (Roorkee), IIT Roorkee, University of Dresden, Germany and Uttarakhand Jal Sansthan, Dehradun jointly worked under the project “Development of Riverbank Filtration as a Sustainable Solution for Drinking Water Quality and Quantity Problems in Uttarakhand (Phase I & II)” funded by WTI (DST, GoI) to popularise and train the human resource about RBF technology.

A total of 9 workshops were conducted in the tenure of the project like Indo-German International workshop, Dehradun in the years 2009 and 2011; Indo-German International workshop, NIH Roorkee in year 2015; RBF awareness workshop, Dehradun, 2012; RBF awareness workshop, Nainital and workshops conducted in Shillong as well as in Goa. In these workshops water engineers from Public Health Department, civil society, S&T institutes and members from Universities were trained and a curriculum was designed in which minute details about RBF was covered. These training motivated many State Government to take up this technology and now moving ahead to implement this project in their respective states. Earlier also Indo-German Workshops were organized in FRI, Dehradun in which members from University of Dresden, Germany and Uttarakhand State Council for Science and Technology etc. actively participated and many brainstorming sessions

were conducted in which RBF technique was discussed and action plan was prepared. Now the above mentioned institutions propose to organize an Indo-German Workshop in the month of November, 2018 to discuss the progress of the projects, new technology and to prepare a further action plan to implement the same in different states of India.

CONCLUSION

To sum up, the water quality at the studied sites has improved significantly. Removal of microbial pathogens and turbidity in RBF takes place by biodegradation, sorption, natural ultrafiltration, and dilution of ground water. In India, the removal of microbial pathogens in drinking water from surface water through RBF proves to be a crucial factor. Thus it could serve as an alternative to direct river water abstraction for many urban and rural settlements provided suitable hydro-geological conditions exist. At a

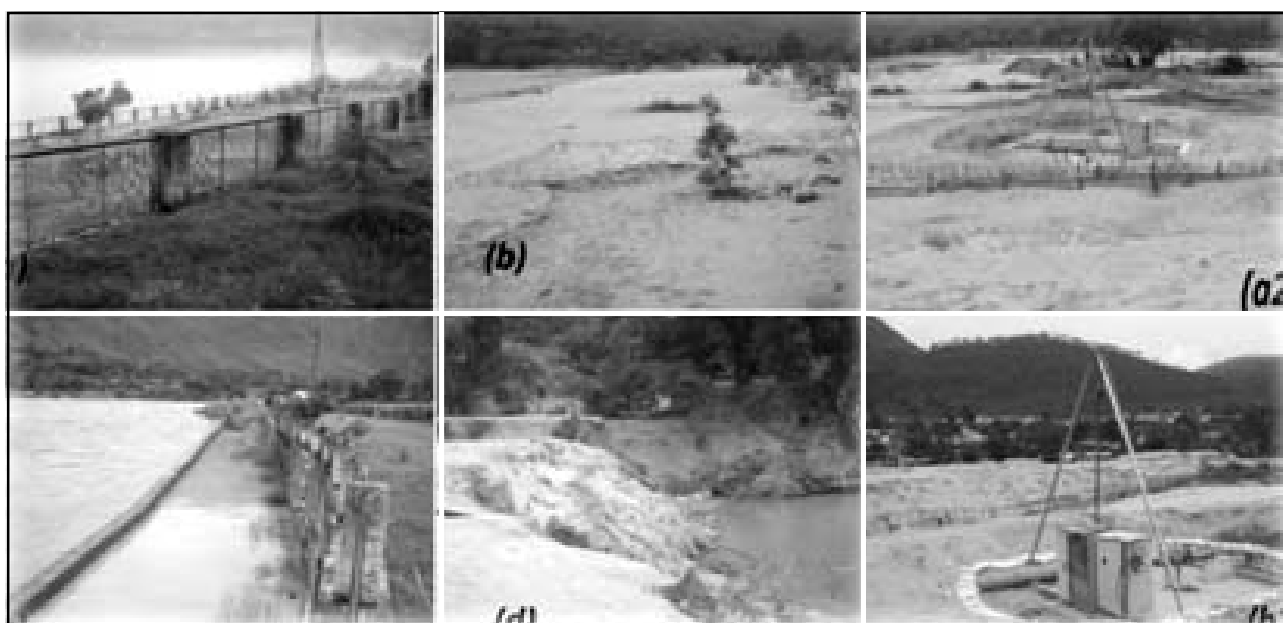


Fig. 3 : Photos of Srinagar RBF site before and after flash flood.

minimum bank filtration acts as a pre treatment set up in drinking water production. It also serves as an asset to water suppliers by way of capital cost reduction through lower maintenance, improved reliability as source-water and enhanced community supply by lowering the total dissolved solids concentration. There is an immense potential of RBF at suitable sites along the rivers in India. The observed removal of bacteriological indicators in bank filtrate (even in monsoon) abstracted from the production wells makes RBF an effective treatment process before the disinfection stage. As mentioned earlier that multi institutional efforts were made to popularize the cost effective RBF technique in India and looking forward to implement this unique technology across the country so that masses may get safe drinking water which may help in ensuring better health conditions.

REFERENCES

1. B. Sharma *et al.*, *Current Sciences*, 1118-1122, 2014.
2. N. C. Ghosh *et al.*, *Current Sciences*, 301-302, 2015.
3. S. Tyagi *et al.*, "Studies of River Water Quality using RBF in Uttarakhand, India", *Water Qual Expo Health Springer*, 140, September 2013.
4. T. Grischek *et al.*, *Treatment and Distribution*, 1-5, 2011.
5. K. M. Hiscock, T. Grischek, *Journal of Hydrology* **266**, 139-144, 2002.
6. S. Tyagi *et al.*, "Springer", 141, September 2013.
7. H. P. Uniyal, "Riverbank Filtration in India: Existing Efforts and Future Prospects", *Drinking Water: Source, Treatment and Distribution*, 2011, 11-13, A. Gahlot, Shiva offset press, Dehradun.

CRYPTOCURRENCY : CHARACTERISTICS AND FUTURE PERSPECTIVES

Varun Shukla* and Atul Chaturvedi**

Now a days we listen many things about cryptocurrency i.e. Bitcoin (we take Bitcoin as an example of cryptocurrency). It is recently developed cryptocurrency or we can name it as a worldwide payment system. We know that readers have different perception regarding cryptocurrency as we all have fear of unknown. Cryptocurrency is a digital currency and it is not centralized which is a very interesting feature. The important point is that cryptocurrency forms a peer-to-peer network with direct transactions. Cryptocurrency and various related aspects are discussed so that readers are benefitted.

INTRODUCTION

It is not possible to discuss cryptocurrency without discussing cryptography. There is a strong reason behind it. The peer-to-peer transactions between users are nothing but communication between participating entities and all the communication is secured by cryptography. All the records are kept safe in a public domain called as blockchain.

Blockchain is a kind of ledger system as we use in our day to day banking system. So at this point of time, it is essential to know the basics of cryptography¹⁻³. Cryptography is all about keeping the data secure. Cryptanalysis is about breaking the code. Cryptography and cryptanalysis together are called cryptology. Cryptography provides data communication security and there are four cryptographic goals.

*Dept. of EC, PSIT, Kanpur, Uttar Pradesh.

**Dept. of Mathematics, PSIT, Kanpur, Uttar Pradesh.

- **Secrecy (Privacy)** : It is a service which is essential to keep the data secure. There are many ways to provide privacy like encryption algorithms or by additional hardware.
- **Data Integrity** : It makes sure that any unauthorized access of data cannot be done. Unauthorized access of data includes insertion, deletion and substitution.
- **Authentication** : It is very important specifically when we communicate over insecure channels. Participating entities must recognize each other in a legitimate manner. Authentication can be classified into message authentication and entity authentication.
- **Non-repudiation** : It takes care that no participating entity can deny previously done communication. It is a very important goal for financial transactions and legal communications like online bidding etc.

Cryptographic goals
1. Secrecy: Symmetric/public key
2. Data integrity: Hash functions & MACs
3. Authentication: Entity/message authentication
4. Non-repudiation: Digital signatures

Fig. 1 : Showing cryptographic goals mandatory for secure data communication.

Bitcoins were originally developed by Sataoshi Nakamoto⁴ in 2009 as an electronic cash system.

BLOCKCHAIN

It consists of records in the form of blocks⁵. All blocks are linked with each other. Cryptography provides essential security to all the blocks. Block includes hash value of the preceding block with a timestamp in it. Block also contains transaction data. This is a chain network that's why it is called as open distributed ledger. Needless to say that it holds the record of financial transactions between two nodes and it forms a peer-to-peer network. Since it includes hash, the data of a block can't be modified. The only chance of modification is possible when all the nodes agree to do the same which is not possible.

Blockchain can further be divided into categories like public blockchain and private blockchain etc.

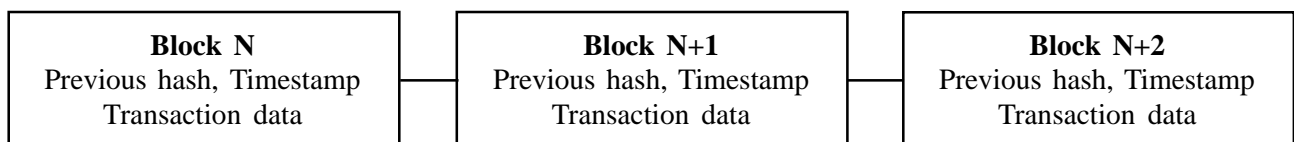


Fig. 2 : Showing blocks of cryptocurrency

HASH FUNCTIONS

Hash functions play very important role in modern data security. Hash functions required input of variable length and produces output of fixed length⁶.

Hash functions are the key ingredients for data integrity. In most of the cases (as in cryptocurrency) the hash value of the message is used for all the representation. One category of hash functions are MACs (Message Authentication Codes). The way hash functions are suitable for cryptocurrency can be understood by following explanation. Suppose we have message m and we calculate its hash at time instant t_1 and we save the output. At time t_2 , one wants to determine that whether the message m is altered or not. We pick m' and to find out that whether $m' = m$, we calculate the hash value of m' . If $h(m) = h(m')$ then we conclude that the message m is not altered (A hash function holds many properties like collision resistance, preimage resistance etc.). So the problem is reduced to keep only the small size hash value of the message.

PEER-TO-PEER NETWORKS

A peer-to-peer or P2P network is formed when two or more PC's (or entities/nodes) are connected in order to share data⁷. A P2P network can be an ad hoc connection (without

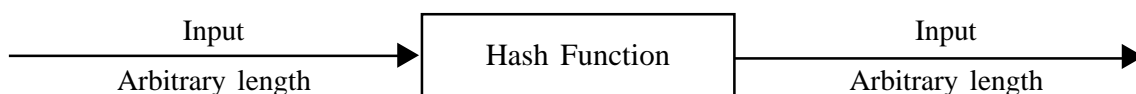


Fig. 3 : Showing the concept of hashing.

infrastructure) or a permanent infrastructure connection.

institutions. But the market of cryptocurrency is increasing in India. The blockchain foundation

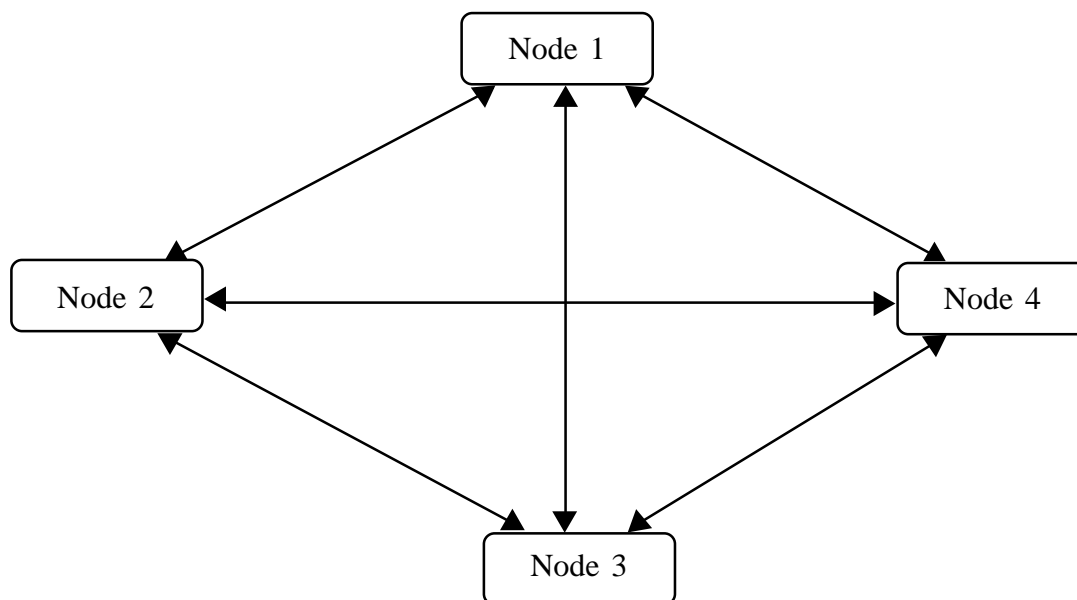


Fig. 4 : Showing a simple P2P ad hoc network with four nodes.

FUTURE OF CRYPTOCURRENCY

Very famous and inspiring entrepreneur, Tim Draper, in his article⁸, predicted that the bitcoin market will hit \$ 2,50,000 by the year 2022. Now the importance and largeness of cryptocurrency can be imagined. The other cryptocurrencies (other than bitcoin) like Litecoin, Ripple and Mintchip are also getting popular. Government and local bodies have started to have an eye on cryptocurrency values. One can see that many shopping sites and payment systems now asking for payment in bitcoin and some of them providing discounts if you pay in bitcoins. The reason behind that they know that the value may raise tomorrow and they will be benefitted. In India, RBI has declared that bitcoin and its variants are illegal because it is a digital currency equipped with encryption and work independently beyond the domain of country's financial

of India is an organization dealing with bitcoin promotion in India⁹. There are many startups like Coinsecure, Zebpay and Unocoin etc. which are making easy to buy bitcoins¹⁰. One can transfer cryptocurrencies to abroad and convert it to other currencies as well.

CONCLUSION

Cryptocurrency is a decentralized digital currency having a P2P network for direct transactions. The transactions are kept secured with the help of cryptography. A layman may have fear in investing in it but once the concept behind is known it can be used as the future currency.

REFERENCES

1. A. J. Menezes, P. C. V. Oorschot, S.A. Vanstone, *Handbook of applied cryptography*, fifth edition, CRC press Inc., USA, 2001.

2. W. Stallings, *Cryptography and network security, principles and practices*, fourth edition, Prentice hall, 2005.
3. B. Schneier, *Applied cryptography, protocols, algorithms and source code in C*, second edition, John wiley & sons, 1996.
4. S. Nakamoto, Bitcoin: A peer-to-peer electronic cash system, available at <https://bitcoin.org/bitcoin.pdf>
5. M. Turkanovic, M. Holbl, K. Kopic, M. Hericko, A. Kamisalic, *IEEE access*, **6**, 5112-5127, 2018.
6. B-M. Goi, M. U. Siddiqi, H-T. Chuah, *IEEE transactions on consumer electronics*, **49**, 4, 1249-1255, 2003.
7. S. D. Segura, C. P. Sola, J. H. Joancomarti, G. N. Arribas, J. Borell, *Mobile information system, Hindawi*, 1-16, 2018.
8. T. Draper, On the future of cryptocurrency, available at <https://www.forbes.com/sites/rachelwolfson/2018/05/02/tim-draper-on-the-future-of-cryptocurrency-his-new-book-and-why-bitcoin-will-hit-250000-by-2022/#18dde4d92d71>
9. <https://www.blockchainindia.com/>
10. <http://www.indiabitcoin.com/indian-bitcoin-startups-get-to-know-the-disruptors-techstory/>

AGERATUM CONIZOIDES—THE TERRESTRIAL INVASIVE OF PUNJAB (INDIA) AND ITS ECOLOGICAL IMPLICATIONS

Kirandeep K Dhani

Punjab, a northwestern state of India, is one of the main agricultural states of the country that is a major producer of several crops like wheat, rice, sugarcane and corn. The State is also renowned for its biological diversity. However, invasive/non-indigenous species are posing a threat to the ecology, agriculture and economy of the state. There is a need to spread awareness regarding the same in general public.

INTRODUCTION

Invasives or non-indigenous species are those species that spread rapidly and aggressively when introduced outside its native range into any new region irrespective of the variation in environmental factors. This rapid spread outside the native habitat can be owed to a unique set of characteristics any invasive carries. This includes its adaptability, extra ordinarily high seed production, ability to successfully compete with natives for resources and inhibit the native growth by release of some toxic chemicals. Since the invasives lack any natural pests in their new habitats, there is no check on their growth and population increase in the region. All these characteristics in invasives make them spread rapidly in their new region by curbing the growth of indigenous species. Either intentionally or accidentally introduced, invasives can outcompete the native species. displace indigenous species,

disrupt normal ecosystem processes and bring economic damage. Hence, invasives are a huge threat to the biological diversity and normal functioning of the ecosystem.

Punjab one of the premiere agricultural state in northwest India, has approximately 84% of its area (Total area 50,362 sq. km) under agriculture. The state is rich in biological diversity (1897 Angiosperms, 48 Pteridophytes, 34 Bryophytes, 948 Fungi and 397 Algae) that faces threat from several established invasive alien species¹. Punjab Biodiversity Board, Botanical Survey of India, Zoological Survey of India and Forest Department have identified *Lantana camara*, *Parthenium hysterophorus*, *Ageratum conyzoides*, *Ricinus communis*, *Eupatorium odoratum*, *Artemisia scoparia*, *Datura stramonium*, *Chenopodium ambrosioides*, *Cassia occidentalis* and *Bidens pilosa* as the major invasives in India². Among these *A. conyzoides* (terrestrial), *P. hysterophorus* (terrestrial), *L. camara* (terrestrial) and *Eichhornia crassipes* (aquatic) have been

Department of Botanical & Environmental Sciences, Guru Nanak Dev University, Amritsar (Punjab)-143005
Email : kirandeepdhani@gmail.com

identified as the most problematic invasives of terrestrial and aquatic ecosystems in Punjab. These terrestrial invasives particularly *A.conyzoides* has not only established itself in the plains but also in hilly areas of Punjab and bear major ecological implications in the region. The strong invasive ability of *Ageratum* (almost 1000 plants per meter square) is challenging the dynamics of natural ecosystem processes of the region by lowering the biodiversity and creating a homogenous mono specific stand.

Table 1. Classification and common names of *Ageratum conyzoides*.

Classification	<i>Ageratum conyzoides</i>
Kingdom	Plantae
Phylum	Magnoliophyta
Class	Magnoliopsida
Order	Asterales
Family	Asteraceae

***Ageratum conyzoides* - Morphology & Ecology**

A. conyzoides is an erect herbaceous annual that is a native to South America, but the herb

has expanded its boundaries to several different countries of the world including India (Biogeographical distribution, Figure 1). The plant bears great morphological variation with its height variable between 30 cms to 2 metres and flower color pink, white or violet (Figure 2). *Ageratum* can grow well in moist mineral soils of tropical or subtropical environment (from sea level to 2400 m in altitude) and generally, it is found in grasslands, forests and agricultural fields.

The shade tolerant *Ageratum* is a highly adaptable and productive herb that makes it a difficult to control weed in the Himalayas and Shiwalik ranges of Punjab and Himachal Pradesh. The annual plant appears to have several features that makes it spread rapidly in the any new region. One, it reproduces generously. Each *Ageratum* plant can produce huge numbers of seeds every year that can be almost 94,000 seeds. Two, the plant not only sheds huge number of seeds but also it can happen for an extended period of time that can be about 5 to 8 month in a year. Three, its seeds can survive any adverse environmental conditions in

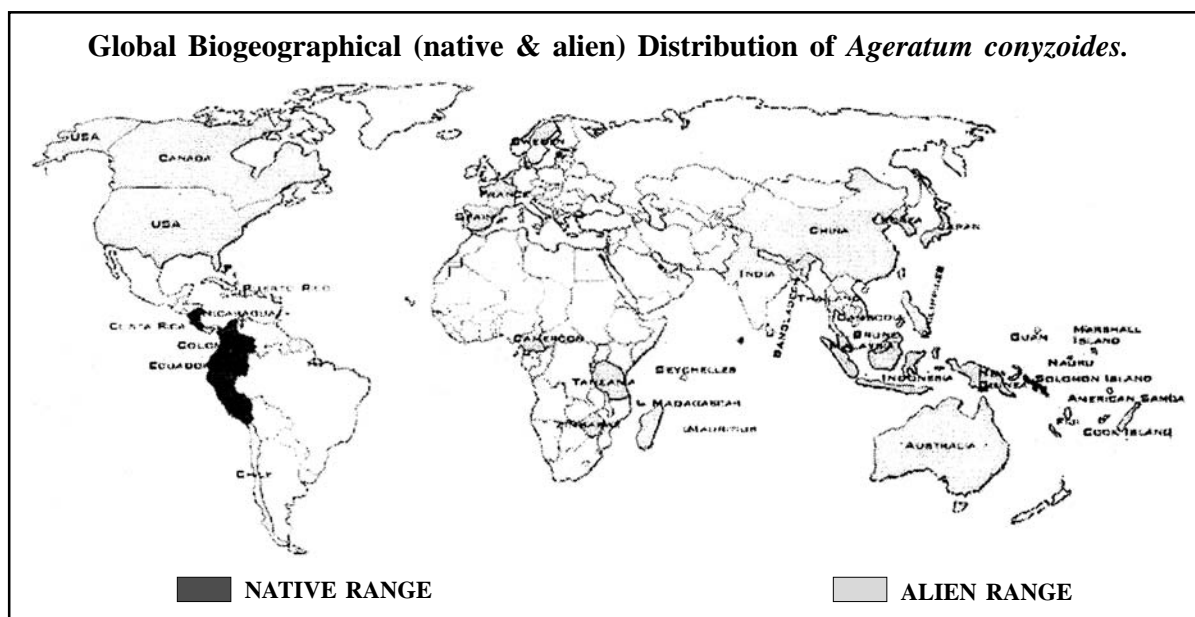


Fig. 1. Native and Alien range of *Ageratum conizoides* across the globe.

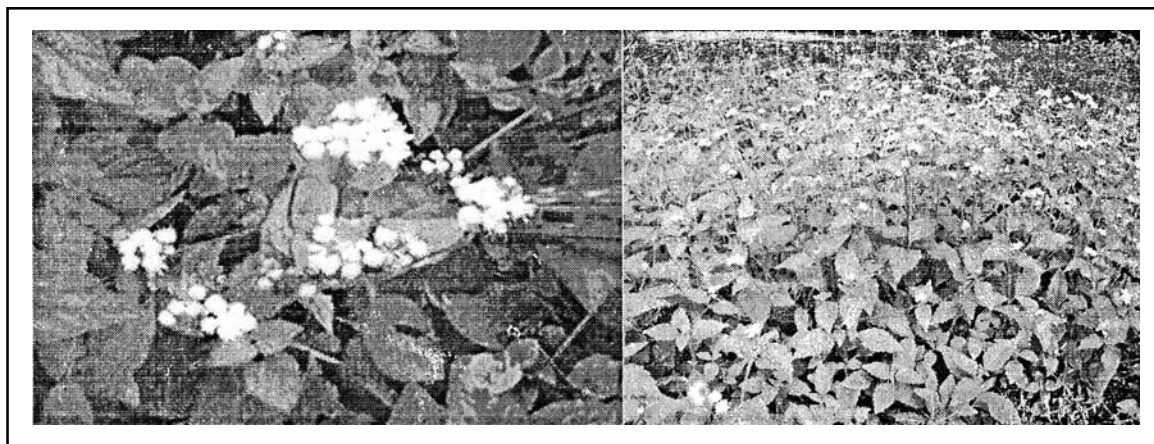


Fig. 2. Morphological identification of *Ageratum*

(commonly known with several names; Neela Phulnu, goat weed, billy goat weed, winter weed, tropical whiteweed, budbuda).

dormancy stage in the soil. Four, *Ageratum* seeds have extraordinary physiological plasticity and longer viability i.e the seeds can persist in arable fields for long periods (almost a year) and germinate in the temperature range from 20 to 25°C or under. The Shivalik mountain range that forms part of the North Indian Himalayas is known for rich floral diversity and *Ageratum* is replacing the native grasses of the region, altering the structure of natural plant grassland and forest communities in the adjoining states of Punjab and Himachal Pradesh³. Since Punjab is chiefly an agricultural state, the presence of *Ageratum* poses a threat to normal crop production in the state.

Ecological Implications of the Herb

Though widely known for its medicinal, biocidal and herbicidal properties, *Ageratum* has been known to interfere with the growth and production of several crops. *A. conyzoides* is an inhibitor of seed germination in wheat (*Triticum aestivum*) and rice (*Oryza saliva*). The invasive releases water soluble phenolics into the soil and exert a phytotoxic effect on the crops thereby reducing the crop yield. It can reduce the rice grain production by 25-47%^{4,5}. Similarly, *A.*

conyzoides inhibits seedling growth in peanut, redroot amaranth, cucumber and ryegrass. In chickpea (*Cicer arietinum*), *A. conyzoides* causes reduction in growth, and nodulation whereas it strongly inhibits germination in radish (*Raphanus sativus*)^{6,7}. The plant is a major weed of sugarcane and maize as well where it has been observed to grow in high densities (250-1000 plants/m²). For Punjab being the food basket of India and one of the largest producer of wheat, rice, maize and sugarcane, the presence of weed like *Ageratum* is an ecological and economic threat to the farmers. Moreover, its ability to act as a host of many crop diseases can significantly change the vegetation community structure, and modify the soil regime. Any economic loss that the state of Punjab faces due to invasive *Ageratum* has, not been estimated yet.

Considering the ecological and economic impact, it is important to keep a check on the weed in the state. Two strategies can be applied to control the weed in the region. One, application of any of these chemicals; simazine, atrazine, diuron, oxadiazon, oxyfluorfen, methazole or metribuzin provides excellent control to the weed.

Two *Parthenium* plant extracts of (Parthenin) and Eucalyptus (volatile essential oils) offer an environmental friendly strategy in controlling *A. conyzoides*. Monoterpenes like cineole and citronellol, can affect the germination, seedling growth, chlorophyll content and respiratory activity of *A. conyzoides*⁸.

It is advisable that comprehensive information on the invasive plant species be compiled and awareness programs be initiated in the region. It is required that modes of entry into the state be determined and the economic impacts be estimated. A more complete information on the biological and ecological attributes be disseminated in general public so as to keep a check on the spread of the *Ageratum* in the region. Several physiological and ecological features of the species has helped in successful invasion into the state and its growing range need serious efforts on the part of public to manage the weed effectively.

REFERENCES

1. TERI. 2015. Biodiversity and Green Growth in Punjab. New Delhi : The Energy and Resources Institute.
2. K.S. Dogra, R.K. Kohli, S.K. Sood and P.K. Dobhal, *Int. J. Biodivers. Conserv.* **1**, 135-145, 2009.
3. R.K. Kohli, K.S. Dogra, D.R. Batish and H.P. Singh, *Weed Tech*, **18**, 1296-1300, 2004.
4. D.R. Batish, S. Kaur, H.P. Singh and R.K. Kohli, *Flora*, **204**, 388-395, 2009.
5. H.P. Singh, D.R. Batish, S. Kaur and R.K. Kohli, *J Agron Crop Sci*, **189**, 341-346, 2003.
6. D.R. Batish, H.P. Singh, S. Kaur, V. Arora and R.K. Kohli, *J. Plant Dis. and Protect.* **XIX**, 293-299, 2006.
7. C. Kong, F. Hu and X. Xu, *J. Chem. Ecology*, **28**, 1573-1581, 2002.
8. H.P. Singh, D.R. Batish and R.K. Kohli, *Crop Protection*, **21**, 347-350, 2002.

ARBUSCULAR MYCORRHIZAL FUNGI: NEXT GENERATION BIOAGENTS FOR SUSTAINABLE AGRICULTURE

Kajal S. Rathore¹, Shivom Singh^{*2} and Anil K. Sharma³

India is bestowed with a variety of crops because of its immense agro-climatic diversity. The diverse agro-climatic conditions of the country give it a unique advantage as well as a competitive edge over other countries. Because of health hazards created by excessive use of chemicals in farming, there is lot of emphasis on the production of food using integrated crop management practices where the chemicals are used judiciously in combination with biofertilizers/biopesticides. On advances in research on arbuscular mycorrhiza fungi (AMF) physiology and ecology over the past 40 years have led to a greater understanding of the significance of AMF in the ecosystem. This knowledge is applicable to human activities of ecosystem management, ecosystem restoration and agriculture. AMF have a strong influence on plant interactions by aiding plants in resource acquisition, disease suppression, and tolerance to soil pollution and play a decisive role in plant development. It also enhance the supply of water and nutrients (phosphate and nitrogen), to the host plant. In return, up to 20% of plant-fixed carbon is transferred to the fungus; hence the nutritional exchange is bidirectional. Needless to say, AMF have involved a huge deal of interest from the agricultural world over the years and is therefore being able to substitute for reduced fertiliser and biocide inputs in agricultural practices.

INTRODUCTION

Global environmental change caused by human activities is one of the biggest challenges facing our society. The expansion in the organic sector, increasing public resistance to the use of pesticides and greater emphases on food quality put forward that there will be an increasing market for foods produced in the systems. To achieve this, agriculturists are

following alternate technology, where beneficial microbes are the key players especially for protecting and regaining the soil health. In addition, they are indigenous to soil and plant rhizosphere and potential tools for sustainable agriculture. They augment the growth of a root system and even of an entire plant and often control certain plant pathogens.¹ Amongst, the key players, arbuscular mycorrhizal fungi (AMF) are one of the important organisms for improving and sustaining soil qualities and hence are considered as essential input for healthy plant growth and agricultural development.

¹Department of Biotechnology, Govt. K.R.G.P.G. College, Gwalior, MP

^{2*}Department of Environmental Sciences, ITM University, Gwalior, MP

³G. B. Pant University of Agriculture and Technology, Pantnagar, UK

E-mail: shivomsingh101@gmail.com

Agriculture is the most important sector for ensuring food security, alleviating poverty and conserving the vital natural resources that the world's present and future generation will be entirely dependent upon for their survival and well being. Due to haphazard use of chemical herbicides, pesticides and intensification of agricultural production during the past few decades has led to other harmful effects like nitrate in the ground water, contamination of fooding materials, eutrophication, stratospheric changes etc. To escape from these harmful effects, AM fungi can act as support system in promotion of plant health, soil fertility, and soil aggregates stability in the developing economies. AMF also perk up plant growth, assist in contaminant removal, reduce the need for fertilizer application in commercial plant production, and advance the soil structure and health. AM fungi are essentially characterized by arbuscules which are formed by fine, bifurcate branching hyphae in cortical cells. Hyphae of AM fungi extend outwards from the root surface, expanding the accessibility of the root system for nutrient uptake. AM fungi can therefore serve as a biofertilizer by facilitating access to nutrients.² They are one of the important organisms for improving and sustaining soil qualities. The studies conducted with these effective fungi have shown 10 to 40 percent increase in yield/biomass³ and are fundamentally involved in the wide range of resources in both natural and managed ecosystems, nowadays called ecosystem services.⁴

RELATION OF AMF AND CROP PRODUCTION

AMF can be found in many different plant species; they can provide their favourable services to almost all terrestrial ecosystems, from grasslands to forests, deserts and agro

ecosystems. They form symbiotic relationships with the majority of land plants, including many crops. All AMF are obligate plant symbionts, and generally provide nutrients, especially phosphorus, to plants in exchange for plant carbohydrates, protection against pathogens and drought.^{5,6} They have been shown to enhance the sustainability of ecosystems by improving the soil structure and by reducing nutrient losses after rain-induced leaching events.⁷

The current requirement in agriculture for high yields as quickly as possible may be an ongoing necessity for the future food production. The increasing consumer demands for organic or sustainably produced food, however, will require changes to incorporate cultural practices which increase AMF diversity.⁸ Sustainable production of food crops in the tropics is often severely constrained by the fragility of soils, being prone to several forms of degradation. Making better use of the biological resources in these soils can contribute to enhanced sustainability. Mycorrhizal fungi constitute an important biological resource in this respect.

AMF AND ORGANIC AGRICULTURE

Organic farming is a method of cultivation which preserves and respects the environment's balance, enhances natural resources and produces healthier and tastier products. The developed nations of the world are concerned about the spreading contamination of poisonous chemicals in food, feed, fodder and fibre.⁹ Naturally, organic farming system is looked upon as one of the means to remedy these maladies there. However the major problem in India is the poor productivity of our soils because of the low content of the organic matter.¹⁰ It is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. The efficiency of the organic inputs in the

promotion of productivity depends on the organic contents of the soil. There were a lot of resemblances of organic farming principles in the traditional agriculture of India. Mycorrhizal fungi are widespread in agricultural systems and are especially relevant for organic agriculture because they can act as natural fertilisers, enhancing plant yield. Moreover, mycorrhizal fungi can directly and indirectly contribute to plant productivity in organic farming systems. Mycorrhizal effects include enhanced nutrient uptake, enhanced seedling establishment and stimulation of soil structure. Low-input organic farming systems have increasingly garnered interest due to their focus on natural resource conservation and reduction of environmental degradation. The general principals of organic farming include: (1) exclusion of synthetic biocides; (2) addition of organic fertilizers to the soil, including farmyard manure, compost and crop residue, and slow release mineral fertilizers such as rock phosphate; and (3) use of crop rotation. Organic farming relies heavily on active soil microbial communities, and AM fungi play a vital role in agro ecosystem function. It has been reported that organic farming increases AM colonization, propagule numbers, and species diversity compared to conventional systems.¹¹

Intensive agricultural systems that use large quantities of inorganic fertilizers and pesticides were developed long ago as a method to alleviate food shortages. The degenerative effects of intensive farming practices on soil fertility and ecological balance are surfacing which needs immediate attention for sustaining the productivity rate.¹¹ These disadvantages have led to increased demands to make agricultural systems more sustainable by reforming agricultural practices. As a result, interest in organic farming as an alternative agricultural strategy has increased. It is a production system,

which favours maximum use of organic materials and AMF is one of them, which, improve soil health and increased the yield and also played important role for minimizing the harmful effect of pesticides and herbicides.

ROLE OF AMF IN SOIL IMPROVEMENT

Plant health is intimately linked to soil health, managing the soil in ways that conserve and enhance the soil biota can improve crop yields and quality. Agricultural management also has profound effects on soil communities.¹ A diverse soil community will not only help prevent losses due to soil-borne pests and diseases but also speed up decomposition of organic matter and toxic compounds, and improve nutrient cycling and soil structure. The most abundant members of the vast community of soil organisms that develops mutually beneficial relationships with plants roots and contributes majorly to plant growth are called mycorrhizal fungi. They are multipurpose organisms with complex ecological ramifications in the soil system that has been difficult to study and understand.¹² The phytocentric concept of AMF that has prevailed since the naming of these organisms is being replaced by a holistic vision recognizing that AMF are a key element of soil functioning and health rather than a plant root component.¹ AMF have been suggested to improve biodegradation of persistent organic pollutants because of the immense size and very high surface interface with soil. AM fungi are of importance as they play a vital role in metal tolerance and accumulation.^{11,12} AMF associations have a direct effect on soil structure, which is especially important in mixed culture systems, where cultivations and low levels of soil organic matter tend to result in damaged soil structure. The crucial ecological role played by AMF is their capacity to directly influence the diversity and composition of the aboveground plant

community confirmed that plant species richness can be altered not only by climatic and edaphic factors, but also by soil microbial assemblages.¹² In addition, they improve plant growth, help in contaminant removal, reduce the need for fertilizer application in commercial plant production, and improve the soil structure and health.

CONCLUSION

Organic farming is a form of agriculture in which we have minimal or no dependence on chemical fertilisers and pesticides to enhance crop yield. It envisages the use of organic manure, to replenish the soil of its lost nutrients. It is well established that AMF can do crop improvement largely through nutrition; other positive effects are in the biological control of root pathogen, biological nitrogen fixation, hormone production and greater ability to withstand water stress. Because of their exceptional ability to increase the uptake of phosphorus by plant, mycorrhizal fungi can be utilized as practical substitute for phosphoric fertilizer. This approach also augments yield and monetary returns to the farmers, particularly to the small landholders, for which the incremental input cost is low. The combination of these organisms in natural, undisturbed ecosystems would seem to add to the flourishing growth and health of plants. In sustainable and organic agricultural systems, the role of AMF in maintaining soil fertility and bio-control of plant pathogens may be more important than in conventional agriculture where their significance has been marginalized by high inputs of agrochemicals. AMF have great potential of improving the productivity of most of the agricultural crops.

Further research is imperative for field appraisal of these fungi. Therefore, the management and planned applications of AMF

to improve growth of beneficial and important crops particularly in India with an understanding of exploiting AMF payback towards sustainable agricultural development is very important. We believe that farming with AMF will be helpful in developing eco-friendly and cost effective plant disease management practices, will open and establish new avenues for era of next-generation biopesticide cum biofertilizer from nature.

REFERENCES

1. M. Zadehbagheri, A. Azarpanah, S. Javanmardi, *J. Agric. Environ. Sci.*, **14** 4, 379-386, 2014.
2. S. Singh, K. Srivastava, S. Sharma and A. K. Sharma. Springer-Verlag Berlin Heidelberg, pp. 67-79, 2014.
3. M. A. Abiala, O. O. Popoola, O. J. Olawuyi, J. O. Oyelude, A. O. Akanmu and A. S. Killani, *Int. J. Pure Appl. Sci. Technol.* **14**, 61-79, 2013.
4. S. Gianinazzi, A. Gollotte, M. N. Binet, D. van Tuinen, D. Redecker and D. Wipf, *Mycorrhiza*. **20**, 519-530, 2010.
5. R. M. Auge, *Mycorrhiza*. **11**, 3-42, 2001.
6. B. A. Sikes, K. Cottenie and J. N. Klironomos, *J. Ecol.* **97**, 1274-1280, 2009.
7. M. G. A. van der Heijden, *Ecology*. **91**, 1163-117, 2010.
8. S. E. Smith and D. J. Read, *Mycorrhizal Symbiosis*. Second edition, Academic Press, London, UK, 453-69, 1997.
9. D. Lotter, *J. Sustain. Agric.* **21**, 1-63, 2003.
10. R. K. Dubey and N. Shukla, *Int. J. Inno. Res. Sci. Eng. Tech.* **3** 3, 10726-10734, 2014.
11. E. Facelli, S. E. Smith, J. M. Facelli, H. M. Christophersen and F. A. Smith, *New Phytologist*. **185**, 1050-1061, 2010.
12. A. Jamal, N. Ayub, M. Usman and A. G. Khan, *Int. J. Phytoremed.* 205-221, 2002.

**LIFE SKETCHES OF OFFICE BEARERS, SECTIONAL PRESIDENTS
AND RECORDERS OF THE INDIAN SCIENCE CONGRESS
ASSOCIATION, 2018-2019**



Dr. Manoj Kumar Chakrabarti
General President

Dr. Manoj Kumar Chakrabarti, currently an ICMR Emeritus Medical Scientist is highly reputed for his work. He served as Scientist G and Director (I/C), National Institute of Cholera & Enteric Diseases (NICED), one of the leading national biomedical research Institutes especially in enteric diseases in India where he provided dynamic leadership to 15 research groups conducting translational research programs to discover and understand the molecular mechanism involved in enteric diseases including diarrhoea. In his 34 years with ICMR as Scientist in various capacities. Dr. Chakrabarti made several pivotal contributions. One of his work lead to the development of a cheap and efficacious candidate vaccine against shigellosis whose potential has been acknowledged globally. For his deep expertise in this area he was invited to write an article on vaccine development in *Methods in Molecular*

Biology, 2016 (Springer publication, New York, USA). His research on further development of ORS has made an impact in the field. Dr. Chakrabarti's work on potassium channel is of therapeutic value. Moreover his work has a great potential on the possibility of development of a non-hemolytic variant of TDH and a protease as novel agent in the therapy of human colorectal cancer in future. Beside being an outstanding researcher Dr. Chakrabarti is deeply involved in human resource development. He has supervised several students for their Ph.D thesis. Dr. Chakrabarti did post doctoral research at the university of Kansas USA and also worked at Nagasaki university Japan as visiting Scientist. He is associated with different universities as guest faculty, member UG and PG board of studies, Ph.D committee etc. Dr. Chakrabarti's outstanding contribution to science in general and diarrhoeal diseases in particular has been recognized by his being elected to the Fellowship of the National Academy of Science (FNASc.), India, and West Bengal Academy of Science and Technology (FAScT). He has received awards from different societies including platinum jubilee lecture of ISCA. He was the General Secretary of Indian Science Congress Association, 2010-13. He served as a member of several selection committees, advisory bodies, and research grant review panel and continues to be called upon by many govt. and private foundations to evaluate the work of

others. Because of his contribution in the area of enteric diseases he was elected as the President, Section of Physiology of the Indian Science Congress Association 2001-2002 and has been invited to serve as a reviewer of different National and international journals. Dr. Chakrabarti is Area Editor of Medical Science Section of Everyman's Science. He published more than 90 original papers in the area of his research as well as book chapters and review articles. He has two national and one international patent. In short Dr. Chakrabarti is believed by his peers to be a pioneer and national leader in the study of intestinal cell and molecular biology and its relevance for diarrhoea and enteric diseases.



Prof. Gangadhar
General Secretary
(Membership Affairs)

Prof. Gangadhar, an alumni of University of Mysore started his career as Lecturer, Reader & Professor of Zoology at Visvevarapura College of Science, Bangalore. Later he was promoted as the Professor and Head, Dept. of Biotechnology, Dean of Science and Principal at BTL Group of Institutions affiliated to Bangalore University. He has been given the "Best Teacher Award" in the international conference held at Bangalore. He has 37 years of teaching, research and

administrative experience. He has received "B. S. Chauhans Gold Medal" from Zoological Society of India.

He has served as Chairman, Board of Examiners in Zoology, Genetics & Biotechnology of Bangalore University. He has also served as the member of Board of Studies in Zoology and Genetics of Bangalore and Various other universities in Karnataka. He has done research in the field of fish toxicology and published research papers and articles in the journals of national and international repute. He has received funds for research projects from UGC, Bangalore University and other funding agencies.

He is a fellow of Zoological Society of India, Society of Environmental Sciences and member of various other academies. He was elected to the academic council of Bangalore University twice from the teacher's constituency. He has organized number of national, international & regional conferences/seminars, workshops & refresher courses under the aegis of Bangalore University Zoology Teacher's Forum.

He has visited number of countries including USA, UK, France, Italy, Ethiopia, Sri Lanka and Singapore for academic and scientific assignment and collaborations. As a member of European Comparative Endocrinologist Association, he has attended conferences held at Bonn University, Germany, Manchester University, UK and Genoa University, Italy.

His Excellency, the Governor of Karnataka was kind enough to nominate him as the syndicate member for Bangalore University (one of the biggest universities in Asia). He had the opportunity to serve as the Chairman and Member of various academic administrative scientific and technical committees.

He is serving as the President of Bangalore University 'Zoology' Teacher's Forum, Secretary Society for Advancement of Biological Sciences, Treasurer, Indian Biotech Association and member of various academic bodies. Prof. Gangadhar had the opportunity of serving Indian Science Congress Association as Executive Committee member for six years and council member for nine years and at present he is serving as the General Secretary (Membership Affairs) of Indian Science Congress Association since 2016.



Prof. Premendu P. Mathur
General Secretary
(Scientific Activities)

Prof. Premendu P. Mathur, Ph.D. is Professor & Head of the Department of Biochemistry & Molecular Biology at Pondicherry University. He served as the Vice-Chancellor, KIIT University, Bhubaneswar (August 2012- August 2017). He is a Fellow of National Academy of Medical Sciences (India). He is Vice-President, Asian Association of Andrology (China) and on the Membership Committee of the Society for the Study of Reproduction, U.S.A. He is nominated as a member of Court of the Central University of Karnataka. He has earlier served as member of Court, Executive Council and Academic Council of Pondicherry University.

Prof. Mathur has served as Dean, School of Life

Sciences and Founder Head, Center of Excellence in Bioinformatics at Pondicherry University. He received B.Sc., M.Sc. and Ph.D. degrees from Banaras Hindu University. He has guided several Ph.D., M. Phil. and M.Sc. dissertations. He has over 42 years of teaching and research experience. He has published around 180 scientific papers/reviews in various high impact journals and books and participated in more than 100 national and international scientific conferences. His publications has h index of 31 (Scopus) and 38 (Google Scholar) and i10-index of 96. He is on the Editorial Boards of many national and international journals. He is Reviewer for more than 100 reputed journals. He is recipient of many prestigious awards such as Asutosh Mookerjee Memorial Award (ISCA), Young Scientists' Award (ISCA), Lifetime Achievement Award (ISSRF), Rockefeller Foundation Special Postdoctoral Fellowship Award, Rockefeller Foundation Biotechnology Career Award, INSA-German Academy (DFG) Exchange Programme, Dr. P.N. Shah Memorial US Vitamin (India) Oration Award, ICMR International Fellowship Award for Senior Indian Biomedical Scientist, Subhash Mukherjee Memorial Infar India Oration Award, Dr. K.K. Iya Memorial Oration (NDRI), Vidyasagar Award (Indian Institute of Oriental Heritage, Kolkata), Re:think India Visionary Eduleader of India Award and Foundation Day Lecture, ICAR-Central Rice Research Institute, Cuttack. He has travelled widely within India and abroad.

Prof. Mathur has been Visiting Professor/Scientist at The Population Council, Rockefeller University, New York, Cleveland Clinic, USA, Westfalische-Wilhelms Universitat, Muenster, Germany and Hamad Medical Centre, Qatar. He has been Chairman/Member/Member-coordinator of NAAC peer teams to around 60 institutions and has been Chairman/Member of many

national/International academic and scientific committees. He was member of Executive Committee of Indian Science Congress Association (ISCA), (2008-09 & 2009-10) and Founder Convener of Pondicherry Chapter of ISCA. He was President, Section of Animal, Veterinary and Fishery Sciences, Indian Science Congress (2013-14). He served on National Task Force on Bioinformatics and Infrastructure Facilities of the Department of Biotechnology (DBT) and Department of Information Technology, Government of India. He is on the National Task Force on Fertility Regulation & Expanding Contraceptive Choices of Indian Council of Medical Research. He was the Vice-Chairman of Scientific Committee of Third Asia-Pacific Forum on Andrology, China. He has made many innovations in teaching and research including launching of Study in India Programme at Pondicherry University. He received huge funding support from various national and international funding agencies. He developed a Bioinformatics Centre at Pondicherry University, which was recognized as a Centre for Excellence for teaching and research by the Dept. of Information Technology (Govt. of India). He was coordinator of National Biodiversity Strategy and Action Plan for Pondicherry.



Prof. Ranjit Kumar Verma
Treasurer

Professor Ranjit Kumar Verma is the Vice

Chancellor of Munger University-a state university of Bihar (u/s 22 of UGC Act) and, is on lien from the University Department of Chemistry, Magadh University, Bodh Gaya where he had been serving as Professor of Inorganic and Analytical Chemistry since 1993. Earlier he served as the Pro Vice Chancellor of Patna University (7th oldest university of India) for a three year term. Prof Verma's earlier work places include H.D. Jain College, Ara where he served as Lecturer (1977-1983) after which he joined the University Department of Chemistry (which later became *DST-FIST Sponsored and UGC-BSR Supported*), Magadh University, Bodh Gaya. He had become Reader in 1986 and Professor in 1993 and has also served as the CCDC of Magadh University (2007-2010).

An internationally acclaimed Thermal Scientist, Verma's name figures in the prestigious list of 350 world's leading thermal scientists published in the 2nd edition of 'Who is Who in Thermal Analysis' by Springer Science from Europe (<http://www.springer.com/chemistry/analytical+chemistry/book/978-3-319-09485-4>) on account of his outstanding publication activity in thermal analysis, professional activity, awards, etc. his. Presently, he is member of the Advisory Committee of the International Confederation for Thermal Analysis and Calorimetry (ICTAC) - the UN-affiliate (ICSU-IUPAC) professional body of scientists working in this area (www.ictac.org). He is also the Vice Chairman of its Scientific Commission and Chairman of its Education Committee. Earlier, he served as the Secretary of this organization (2012-16) and as a Member on the panel of Scientific Award Commission (2008) for ICTAC. Besides, he is also the present Vice President of the Indian affiliate of ICTAC, the Indian Thermal Analysis Society

(www.itasindia.org). His areas of interest include solid state thermal decomposition, kinetics, calorimetry and nanotisation and his fields include inorganic, materials, nano, complex, food (edible oils) and the methods include TG, DSC, kinetics, specific heat & calorimetry. He has published dozens of trend-setting research articles and, has supervised a dozen Ph.D. students. He is an F.I.C. [Elected Fellow of Institution of Chemists (India)].

Besides publishing in the domain of 'Thermal Analysis', 'Nanotisation' and 'Chemical Education', he has been serving as Editorial Board Member (since 2013), as Regional Editor, (2010) as well as the Guest Editor for SATAC-2010, SATAC-2011 and SATAC-2014 Special issues of the *Journal of Thermal Analysis and Calorimetry* (Springer Science) (www.springer.com/10973). He was the Honorary Editor (Inorganic and Analytical) of the *Journal of Indian Chemical Society* (www.indianchemicalsociety.in) during 2007-2010. He has keenly been involved in developing govt sponsored standard textual materials for Chemistry students at all levels (secondary, tertiary and Post graduate levels-from Senior Secondary to M.Sc.). He was the National Coordinator, Chemistry (M.Sc., Organometallic Chemistry) in the UGC's e-PG Pathshala Project. Chemistry videos were recognized as the best at the National Workshop on MOOCs (massive open online courses) for SWAYAM (Govt. of India) - by HRD Minister Sri Prakash Javadekar at Vigyan Bhawan, New Delhi on 2 March 2017. The project was supported fully by the Ministry of Human Resource Development of the Govt. of India under their National Mission on Education through ICT (NME-ICT) project

(http://epgp.inflibnet.ac.in/view_f.php?category=666). Earlier, he participated in the e-Text Book project on 'Inorganic Chemistry' which was published by the Council of Scientific and Industrial Research (CSIR, Delhi) under the nsdl-project (National Science Digital Library-www.nsdl.niscair.res.in) of Govt. of India. He has also actively been associated with the textual material development projects of NCERT (National Council of Educational Research and Training, Govt. of India, Delhi) for senior secondary students and, is one of the authors of the present Class XII text book. He is also a coauthor of a Chapter on Thermal Analysis: Coupled Techniques in the Encyclopedia on 'Analytical Sciences' (3rd Ed, Elsevier)

Prof Verma had earlier been in the Executive Committee and Council of the Indian Science Congress Association and was the Founder Convener of the Bodh Gaya Chapter of the Association. He is Vice President of Indian Council of Chemists (www.chemicc.com) and, has served on different panels of UGC, AICTE, and MHRD and has also been associated with NAAC. He has delivered several dozens of invited lectures at conferences, seminars and symposia in India and abroad (besides lectures in Refresher Courses in Universities in Bihar, Jharkhand, UP, MP, Rajasthan, Maharashtra etc.).

Verma has widely travelled in India and abroad (including USA, Italy, France, Finland, Hungary, Japan, Brazil, Chile, Peru, Hong Kong etc.). He is a motivational speaker and socially, he is associated with Rotary International (he is a Paul Harris Fellow, Asst Dist Governor and two times Club President, 1990-91, 2012-13) and Bharat Vikas Parishad (Zonal Secretary).



Dr. Sujay Rakshit
President
Section of Agriculture and Forestry
Sciences

Dr. Sujay Rakshit did his B.Sc. (Ag.) Hons. from Viswa-Bharati, Santiniketan in 1991. After completing M.Sc in Genetics & Plant Breeding (1991-93) from Banaras Hindu University and Ph.D in Genetics (1993-98) from Indian Agricultural Research Institute. He started his scientific career at Indian Institute of Pulses Research, Kanpur in 1996. In September 2000 he joined the erstwhile Directorate of Maize Research, New Delhi as well as faculty member in the Division of Genetics, IARI. He did his post-doctoral research at Iwate Biotechnology Research Center, Japan under JSPS post-doctoral fellowship on rice genomics from 2003 – 2005. From November 2008 till March 2017 he worked as Principal Scientist (Plant Breeding) in the erstwhile Directorate of Sorghum Research. He has worked on genomics and molecular breeding of maize, sorghum, minor millets, rice and pulses. Since March 24, 2017 he is working as Director of ICAR-Indian Institute of Maize Research, Ludhiana.

He has made 128 publications in journal of national and international repute. He has edited

three books. He has one QPM hybrid, 20 genetic stocks and over 700 DNA sequences registered to his credit.

He is recipient of the following recognitions: Indian Society of Genetics & Plant Breeding (ISGPB) Fellow, NE Borlaug Fellow (USDA), JSPS Post-doctoral Fellowship for Foreign Researchers, BOYSCAST Fellowship, CSIR Scientist Travel Fellowship, Indian Science Congress Association Young Scientist Award, ICAR Jawaharlal Nehru Award, UNESCO Fellowship in Biotechnology, Best Ph.D. Student of IARI Medal, IARI Merit Medal, Jawaharlal Nehru Memorial Award, Binani Gold Medal, BHU Gold Medal among others. He has visited Australia, Germany, Netherlands, Singapore, Japan, Bangladesh, Malaysia and the USA.



Prof. Kuldeep K. Sharma
President
Section of Animal, Veterinary and
Fishery Sciences

Prof. Kuldeep Sharma completed his post graduation from the University of Jammu, Deptt of Zoology. Subsequently he finished his Ph.D. in 1985 from the same university in the field of larval ecology of freshwater fishes. Prof. Sharma

worked as a Research Scientist and joined Jammu University as Asst. Professor in 1987. He was also awarded as a "Young Scientist" by DST, Govt. of India to participate in aquatic ecosystem winter school at Tirupati. He was also selected for Indo – Russian cultural exchange program by UGC.

He served University of Jammu in various capacities as Dean, Faculty of Life Sciences, HOD – Deptt. of Zoology, Incharge – Central Library , Director – Internal Quality Assurance Cell, Member – Secretary J&K SET Examination, Chairman, Campus cultural committee (2 Terms), Member Syndicate, Vice – President JUTA (Teacher's Association), Member – Academic Council, Convener & Member Board of Studies in Zoology, Sericulture, Human Genetics and Fisheries, Convener – Central Purchase committee of Scientific Equipment's, Member Selection Committee's for faculty recruitment.

Prof. Sharma has also served as Member, Academic Council as well as board of studies in the following universities : University of Kashmir, Central University of Himachal Pradesh, Central University of Kashmir, Central University of Jammu, Baba Saheb Central University, Lucknow, Central University NEHU Shillong, Himachal State University Shimla, Agra University, Awadh University, Faizabad Hemvati Nandan Bahuguna University, Srinagar – Garhwal, Gurukul Kangri University Haridwar and some other elite institutions.

Prof. Sharma has to his credit 150 Research publications in various reputed Journals of national and international importance with high impact factor. He has supervised 30 PhD Students, 25 MPhil and 30 MSc Fisheries students. He has also published two books and one monograph in the field of aquatic sciences.

Prof. Sharma has also visited several institutions abroad and interacted with various faculty in the field of Aquatic sciences. He has been awarded life memberships of many scientific associations and academies. He is also a fellow of Inland Fisheries society of India, Environmental Society of India, Zoological Society of India and NESAI. He has been recognized for his work multiple times over the last three decades.



Dr. Soibam Jibonkumar Singh
President
Section of Anthropological and
Behavioural Sciences
(including Archaeology, Psychology,
Education and Military Sciences)

Prof. Soibam Jibonkumar Singh, (born on 1st February, 1964), Professor of Physical Anthropology and Director Centre for South East Asian Studies in Manipur University, completed his schooling from Sainik School Imphal, Manipur. He completed his B.Sc and M.Sc. (Physical Anthropology) with 1st Class 1st, received Ph.D Degree in Anthropology from Manipur University in the year 1992. He was awarded Manipur University Gold Medal for securing first class first on M.Sc. Examination. He was also recipient of Dwijamani Dev Trustee

Fellowship, Young Scientist Award, awarded by DSTE Govt. of Manipur for best presentation in the 2nd Manipur Science Congress, 1990. After completing his University education, he started his professional career as a lecturer of Anthropology at Presidency College, Motbung, Manipur in the year 1987. Subsequently he joined Manipur University as an Assistant Professor in the year 1995 and has been actively engaged in teaching, research, administrative and consultancy for the last 30 years or so.

Prof. Singh is the Life Member of a number of professional and academic bodies and Secretary of Anthropological Society of Manipur, Imphal. He was also the member of Board of Cultural Committee, Association of Indian Universities (2009-10), Delhi and member of Sectional Committee for Indian Science Congress 2015-16 for Anthropological and Behavioural Science Section.

Over these years, he has been teaching, researching and supervising in many areas of Physical Anthropology. He has produced 9 Ph.D. Degrees and presently guiding 8 research scholars. He has completed 4 major research projects funded by different central and state funding agencies and 3 projects are still on going.

He has done many professional extension activities. He acted as resource person in many training programs, workshops, and orientation courses etc. He worked as a moderator and panelist in workshop programs. He is the Director Nodal Organization of Childline Imphal, a Project of Ministry of Women and Child Development. He was the Member of Selection Committee for appointment of Chairperson, Members of Child Welfare Committee and Social Worker, Member of Juvenile Justice Board (JJB) of Government of Manipur (2014-15); member of State Child

Protection Society, Manipur (2015-16); and Member of State Level Committee to combat Child and Human Trafficking Committee (2015-16). At the same time within the University administration he has been rendering service to the university in different capacities such as member of the Departmental and School Board of Studies, Member of the Anti Ragging Committee, Member of the Academic Council, Member of the Executive Council as well as Governing Body Member of the different Government aided and private colleges of Manipur.

He attended and presented scientific papers, gave key note address and delivered invited talk in more than 60 national and international seminars/conferences. He chaired many sessions in many national and international seminars. At the same time he has also organized few National and International Seminars, Conferences, Training, Workshop, Symposium, Refresher and Orientation programmes over the last few years. It is to his credit that Department of Anthropology, Manipur University got DST FIST programme during his Headship (2013-2016). He has also delivered many invited talks in many institutions. He has published more than 50 research articles in national and international journals and published research papers in books. He was the coordinator of the E-Content Module on Anthropology for Consortium for Educational Communication, UGC and produced 20 Video Lectures (2014-2015) and presented One Lecture programme for E- Pathashala (2015), UGC. He is the referee for Journal of Human Ecology-An International Journal, Journal of Indian Anthropological Society and Anthropologist. He was also member of the editorial board of Indian Journal of Research in Anthropology.



Prof. Jagdamba Singh
President

Section of Chemical Sciences

Dr. Jagdamba Singh is a Professor in the Department of Chemistry at the University of Allahabad, Allahabad, India. He obtained his B.Sc. and M.Sc. degrees from the University of Allahabad and was then awarded the CSIR-Junior Research Fellowship in 1973 to carry out doctoral research under the supervision of the renowned chemist, the late Prof. R.D. Tiwari, in the Department of Chemistry at University of Allahabad, on the topic "Isolation and Characterization of Some Polyphenols". He awarded a D.Phil degree in Chemistry in 1976. Subsequently he received a CSIR-Research Associate fellowship to carry out postdoctoral research at the same University. In 1979 he was appointed as a Lecturer in the Department of Chemistry at the University of Allahabad. He was promoted as a Reader in 1990 and then as a Professor in 2000. At present he has more than 39 years of teaching and research experience in the areas of organic and natural product chemistry.

His research interests were initially centered on the phytochemical investigation of medicinally important plants and the synthesis of natural products and their analogues. From the year 2005 onwards he has also worked in the areas

of synthetic organic chemistry and green chemistry, focusing particularly on the development of new green methodologies for the synthesis of biologically important heterocyclic scaffolds.

Dr. Singh has published more than 120 research papers and review articles in leading international and national journals. He has also authored more than 20 inspiring books and book chapters on Organic Chemistry. So far 45 students have obtained D.Phil degree under his guidance. A number of postdoctoral researchers have also worked under his mentorship. He is the recipient of several national and international awards and fellowships. He was awarded the Senior Commonwealth Academic Staff Fellowship in 1985, for carrying out research at the Department of Chemistry, University of Glasgow, United Kingdom and the Indo-Hungarian Cultural Exchange Fellowship in 1988. Dr. Singh has participated and delivered lectures at various national and international conferences and symposia. He has received several research grants from national and state funding bodies like UGC, CSIR and CST-UP etc. Dr. Singh is a member of various professional and academic bodies and a reviewer for many leading international journals.

Dr. Singh has also held several key administrative posts in the University of Allahabad. He has served as the Dean Student Welfare from 2002 to 2007 and again in 2014 and 2015, as Coordinator of the postgraduate admission test from 2007 to 2009, as Coordinator of both the undergraduate and postgraduate admission test in 2014 and 2015 and as the Head of the Department of Chemistry from 2014 to 2016. He is currently the Director of the College Development Council of the University. In addition he is also a member of

the Academic Council of the University and of various Departmental Committees.



Prof. J.P. Shrivastava
President

Section of Earth System Sciences

Dr. J. P. Shrivastava, M. Tech., Ph. D. is a Senior Professor of Geology in the University of Delhi for the last several years. For the last four decades, he is consistently working in the field of geochemical lava flow stratigraphy, age and duration of the Deccan volcanism, and its paleo-environmental implications during Cretaceous/Tertiary boundary transition. He has supervised more than sixteen Ph. D. and seven M. Phil. dissertations, contributed more than 138 research papers to high impact journals of national and international repute.

Dr. Shrivastava has recognized 37 physically distinct lava flows in the eastern Deccan volcanic province and grouped them into six chemical types. He determined chemical and Nd-Sr-Pb isotopic composition of these lavas and correlated them with the Upper Formations of the Deccan stratigraphy. His systematic ^{40}Ar - ^{39}Ar determinations assigned 63-65 Ma ages for these lava flows, thus, inferred post Cretaceous/Tertiary boundary, youngest, terminal Deccan volcanic activity in this area. As a member of IGCP 507, his chemico-mineralogical studies on clays associated with the Late Maastrichtian Lameta sediments revealed derivation of Fe-

smectites from the Deccan basalt, thus, Lameta post-dated Deccan volcanism. Structural and compositional maturity of 21 intra-volcanic bole beds translated production time of ~ 7 Ma for their formation and further stressed that Deccan volcanism started much earlier in the Late Maastrichtian, continued even after 63 Ma, thus, suggested prolong duration. His organo-molecular studies on marine Um-Sohryngkew River section and its comparison to brackish, fresh-water intertrappeans and terrestrial intra-volcanic bole beds of the Deccan, suggested volcanism induced environmental stress causative for collapse of ecosystem, biotic transformations and Cretaceous/Tertiary boundary mass extinction in the Indian sub-continent.

In the field of Applied Geochemistry, his thermodynamic modelling and experimental validation studies on CO_2 mineral sequestration in basalt revealed that carbonation reactions and secondary mineral formation is mainly controlled by the time, where, calcite is the first mineral to form with the faster rate, but, for a shorter period. Further, cell parametric studies revealed increased bond length with weakened covalent bond between C and O atoms causal to calcite degeneration. In Environmental Geochemistry, Dr. Shrivastava studied nuclear waste and natural glasses for long-term performance assessment in geological repository, ascertained low ionic release with new mineral formation from natural volcanic glass associated with the differentiating centers of the Deccan basalt, thus, suggested its suitability as a natural analogue for high level nuclear waste disposal in the geological repository.

He possesses vast teaching experience in the field of petrology, geochemistry, economic geology and taught Post-Graduate Geology/Applied Geology students in various Indian Universities, delivered several lectures, key note addresses and chaired

technical sessions in various seminars, symposia, conferences and workshops held in India and abroad. In his research carrier, he has completed twenty one research projects funded by agencies such as DST, MoES, DAE-BRNS, CSIR, UGC and IUAC. For his academic excellence, he was honoured with the National Mineral Award 2003 by Government of India, New Delhi and W.D. West Memorial Award, 2017 by Indian Science Congress Association, Kolkata.



Prof. (Dr.) Swami Vedajnananda
President
Section of Engineering Sciences

An ordained monk of Ramakrishna ideal, with 30 Years of experience in teaching Chemical Engineering, Engineering Research, philanthropic activities including Societal development, services for impaired and downtrodden, Swami Vedajnananda, is presently Professor in the Department of Chemical Engineering, Heritage Institute of Technology, Kolkata. He was one of the toppers from his Alma Mater, St Paul's Cathedral Mission School, Kolkata. He joined Chemical Engineering Department, Jadavpur University in 1976. He was the recipient of prestigious Institution of Engineers India Scholarship. After obtaining First Class in B ChE examination, he admitted to PG course on Operations Research and Statistical Quality Control in Indian Statistical Institute, Kolkata and there from

joined Management Services Division of Steel Authority of India Ltd., as Assistant Manager, Operations research.

He conducted several techno-economic projects, Optimization of Tap to Tap time using simulation software is his unique contribution. In 1987, he joined the Ramakrishna order of Monks, was offered Sannyasa in 1996. As an ardent scholar of Vedanta, his dissertation on comparative studies on philosophies of Sankara and Ramanuja on the basis of commentaries of Bhagavad Gita is considered as a very unique work. He received PhD in Engineering in Jadavpur University in 2001. With the help of some of the like-minded scientists he was instrumental in framing Vivekananda Institute of Environment and Management, Kolkata, a philanthropic organization striving for one's own perfection as propounded by Swami Vivekananda and conservation/sustainable development of our Mother Earth where he became the President of the organization. He frequently served as an expert of CSIR – NEERI, was a steering committee member of WBREDA for setting up Energy Efficiency centre and was the coordinator of National Renewable Energy Day Programme of the state of West Bengal for the consecutive three years(2007-2009).

Swami Vedajnananda started rendering his expertise (2001) for setting up Chemical Engineering department in Heritage Institute of Technology, with his stewardship around ten laboratories of Chemical Engineering Department was set up and he became the founder Head of the Department. He also looks after in-plant training of both undergraduate and postgraduate students of Chemical Engineering department. Presently as a Professor of Chemical Engineering he has 35 research publications and two books under his credit with excellent citations. He was

also the Principal Investigator of UGC and AICTE projects. He took active role in World Bank funded TEQIP II Project (Rs 6.4 crore) and organized at least a dozen of International/national workshop and conferences. Recently Government of West Bengal made him a coordinator for ISGPP II World Bank Project.

Dr. Swami Vedajnananda is a prolific speaker, he conducts regular classes for common people, industry professionals, in media and Prasar Bharti on various topics including sustainable technology, personality development and Indian Vedantik Management. Dr. Vedajnananda is the office bearer of the Institute of Chemical Engineers from 2011. He was Organizing Secretary of SCHEMCON 2011, the largest national student event of the Chemical Engineers inaugurated by the Union Minister, Chemicals & Fertilizers. He served All India Council of IChE (2014) as Treasurer and presently is the Vice Chairman of IChE, Kolkata. He is a fellow of Institution of Public Health Engineers, and Vice President of Concern for Better Living, a leading NGO of Kolkata.



Dr. Indra Dutt Bhatt
President

Section of Environmental Sciences

Dr. Indra D. Bhatt, M.Sc. (Botany), Ph.D. (Plant Physiology) from H.N.B. Garhwal University

Srinagar Garhwal presently working as a Scientist in G.B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora. Dr. Bhatt has over 20 years of research experience in the field of biodiversity conservation and his specialization areas are medicinal plant cultivation, tissue culture, and phytochemistry. He has diversified his research fields to include assessment of biodiversity antioxidant activity. Dr. Bhatt for the first time submitted 4 plant genomic sequences to NCBI Database and optimized methods for extraction of polyphenolic compounds, *in vitro* production of secondary metabolites, and promoted wild plants for nutraceutical potential. Besides, he has contributed to important country wide programmes i.e., prioritization of conservation sites in the west Himalaya - WWF-India; National Biodiversity Strategy and Action Plan "Wild Plant Diversity"; and actively involved in providing information of biodiversity of Trans Himalaya and Himalaya for "Science Express Biodiversity Special" train.

Dr. Bhatt has worked in various national and international organizations including India, Japan and USA. Over the years he has published 102 research papers in peer reviewed impact factor journals, 15 book chapters, 20 popular articles and 6 monographs. Dr. Bhatt is a member of various scientific societies including National Academy of Sciences, Allahabad; Indian Science Congress Association, Kolkata; the orchid society of India, Chandigarh; the Medplan conservatory society, Bangalore; society for conservation and resource development of medicinal plants, New Delhi, etc. Dr. Bhatt has received INF/Craft fellowship from International Union for Nutrition Research, USA (2009); post doctoral fellowship under the Education or Training Programme of Clayton Foundation, USA (2005); Post Doctoral Fellowship under Japan Society for Promotion of Science Programme, Tokyo (2002-2004); Fast

Track Young Scientist, Department of Science & Technology, New Delhi (2001-2002) and many more.

Dr. Bhatt has been selected as an author for Cross Chapter paper on Mountain and lead author for Chapter 5, IPCC working group II - Impacts, adaptation and vulnerability. He has represented Indian Delegation in regional workshop on 'Tracking options for sustainable management and trade on yarsagumba (*Cordyceps sinensis*) in the Kailash Landscape', Paro Bhutan in 2015 and World Conservation Congress Jeju, South Korea and CoP 11, Hyderabad in 2012.

Currently, Dr. Bhatt is involved in developing approaches for conservation and sustainable utilization of Himalayan bio resources and involved in various project sponsored through National Mission on Himalayan Studies, National Mission for Sustaining Himalayan Ecosystem, Department of Biotechnology, Department of Science and Technology, and several other state sponsored programme.



Dr. Ratnadeep Raghunathrao Deshmukh
President
Information and Communication
Science and Technology (including
Computer Sciences)

Dr. R. R. Deshmukh, Professor & Former Head, M.E., M.Sc. (CSE) Ph.D., PEIN Fellow, FIETE

in Department of CSIT, Dr. B.A.M. University, Aurangabad, (MS), India. He is Principal Program Coordinator for the DST-FIST program in department sanctioned by Department of Science and Technology, New Delhi, Government of India. He is a Fellow member and working as Chairman, IETE Aurangabad Centre. He is Coordinator of Information Technology and Computer Science Dyanmandal, Maharashtra State Marathi Vishvakosh Nirmiti Mandal, Mumbai, Government of Maharashtra He is a University Coordinator for MHRD scheme on Global Initiative of Academic Networks (GIAN). He was the Member of CSI Best Thesis Award Panel Committee, CSI, INDIA. He is a Chairman, Board of Studies in Computer Science and Engineering and Member of Academic Council, Dr. B.A.M. University, Aurangabad(MS) He has been elected as sectional member of ICT section of Indian Science congress Association. He was an Observer, Maharashtra State Eligibility Test for Lecturers (SET) Exam.

Dr. Deshmukh is life member of several organizations and a Senior Member of ACEEE. He was Vice-Chairman of IETE Aurangabad Centre and member of Management Council of Dr. B. A. M. University. He has worked as a Member of Academic Council and Chancellor's nominated Senate member of Dr. B. A. M. University, Aurangabad. He has filed 02 Indian patents, edited twelve books and published more than 160 research papers in reputed International/ National peer reviewed Journals/conferences. He is a Member of Editorial Advisory Board for ISCA journal 'Everyman's Science'. He is reviewer and editor of several journals at national & international level. He has organized several

workshops and International Conferences. He is nominated as a subject expert on various academic & professional bodies at national level government bodies. He has worked as Chairman, Ad-hoc Board of Computer Science & IT, Chairman, Ad-hoc Board of Bio-informatics, Faculty member for Engineering, Science & Management Faculty & Member of various committees at university level. He has completed two major research projects from UGC and DST received grants of more than 1.35 Cr. His areas of specialization are HCI, Speech Signal Processing, Data Mining, GIS and Remote Sensing etc.

Dr. Deshmukh has received "Best Teacher Award" for Outstanding Excellence and Remarkable Achievement in the field of Teaching, Research and Publication from IRDP Group of Journal, Chennai. He received the "BHARATRATNA MOTHER TERESA GOLD MEDAL" Award 2015 for outstanding service in Education and Research to strengthen India's Unity and economic development. He was Coordinator for AVISHKAR organization committee at University Level from 2010 to 2015. He won First prize in Inter University State Level Research Festival "AVISHKAR - 2009" under H. L. F. A. category at Teacher level & for the Team Management. His profile has been published in the 32nd Edition of Marquis Who's Who in world 2014 which consists profiles of more than 55,000 people working in different areas around the world. He has successfully organized one week course on "Perception and modeling of Three Dimensional Scenes" under MHRD Scheme's GIAN Program.



Prof. K. Byrappa

President

Section Materials Science

Prof. K. Byrappa, obtained his Master's degree from the University of Mysore with Distinction, Rank and Medals, and Ph.D. and Post-Doc both from Moscow State University, Russia. He has spent about 31 years at the University of Mysore in different capacities before becoming the Vice Chancellor of Mangalore University, Karnataka during June 2014. He is specialized in Materials Science, Nanotechnology, Solid State Science, Crystal Growth, Chemistry of Materials, Crystallography, Crystal Chemistry, Experimental Mineralogy, and Environmental Science.

He is involved in inter-disciplinary research worth of Rs.65 Crores at the University of Mysore and has successfully guided 20 students for their Ph.D and about 8 scholars are currently working under his guidance. The most highly cited papers from the university of Mysore are the publications of Prof. K. Byrappa. He is the founder Coordinator of the M.Tech. course in Materials Science, Centre for Materials Science and Technology. He was the Chief Coordinator for the project of University with Potential for Excellence (UPE), and also the Coordinator for the Center with Potential for Excellence in a

Particular Area (CPEP), and also Founder Director of Internal Quality Assurance Cell, at the University of Mysore. He has been recognized as Ph.D. Guide in Physics, Chemistry, Materials Science, Earth Science, Environmental Science, Biotechnology, and Microbiology. After his Ph.D. from Russia, he has worked in several international laboratories abroad and visited more than 72 countries.

A renowned academician and researcher Prof.K. Byrappa has over 360 research publications in international journals with more than 6000 citations and is known as a world authority in hydrothermal technology. He has over 34 book chapters and reviews, and has edited 10 books and authored a famous Handbook of Hydrothermal Technology, published by Elsevier Publishers, UK in two editions, and the third edition is in preparation. He is serving as Editor in Chief and Senior Associate Editor, and also Editor of several international journals from highly reputed international publishers. Also he has edited about 5 Special Editions of Materials Science Journals published by international publishers from USA, UK and Germany. He is an Elected Fellow, Royal Society of Chemistry (FRSC), London, UK, Elected Fellow of World Academy of Ceramics, Italy and also an Elected Fellow of Asia Pacific Academy of Materials, Japan. Also the Secretary General of Asia Pacific Academy of Materials. He has received several awards like Dr. Raja Ramanna Award for Science and Technology (2011), the highest state award from Karnataka Government, the Sir C.V. Raman Award in Physical Sciences (1998), Materials Research Society of India Medal (2004), and Golden Jubilee Awards twice during 1987 and 1992 for best research work in the

University of Mysore. He was awarded Sir CV Raman Birth Centenary Award for the year 2016-17 by the Hon'ble Prime Minister of India in recognition of his contribution to Science and Technology in India. Also he has received the Attractive Paper award in the IX International Conference on Crystal Growth, held in Japan during August 1989.



Prof. Nandadulal Bairagi
President
Mathematical Sciences
(including Statistics)

Dr. Nandadulal Bairagi is a Professor of Mathematics at Jadavpur University, Kolkata, India. Prof. Bairagi received his M.Sc. with specialization in Operations Research and Ph.D. in Mathematical Biology from Jadavpur University. Before joining Jadavpur University in 2001, he worked as a Lecturer at Serampur College, Hooghly and Dum Dum Motijheel College, Kolkata. He became professor in 2010 and presently Coordinator of Centre for Mathematical Biology and Ecology. Prof. Bairagi was the Founder Secretary(2008-2017) of Biomathematical Society of India and the Executive Editor (2014-2017) of International Journal of Biomathematics and Systems Biologyrun by the Society. He received Indian National Science Academy—Royal Society of

Edinburgh Bilateral Exchange Program Award in 2013, UGC Faculty Recharge Program (FRP) for five years in 2014 (declined), UGC Research Award 2014-2016, Indian National Science Academy—Czech Academy of Sciences Bilateral Exchange Program Award in 2017.

Dr. Nandadulal Bairagi's research interests include mathematical ecology, epidemiology, host-pathogen interactions, optimal control of biological resources, HIV in-host modelling, delay-differential equations, nonlinear dynamics, discrete dynamical systems, diffusion in biological systems and ecological networks. He has published many papers in international journals of repute and has been the Principal Investigator on 8 research projects from DST, CSIR and UGC.



Prof. Prakash Chandra Dhara
President
Section Medical Sciences
(including Physiology)

Prof. Prakash Chandra Dhara received M.Sc. degree in Physiology from Calcutta University in 1978. He performed his pre-doctoral research studies in the Department of Applied Physics, Calcutta University in the field of Biomedical Instrumentation and received Ph.D. degree from the same University in 1989. Prof. Dhara has got vast teaching experience of 31 years. He joined as Lecturer in Physiology at Suri Vidyasagar

College, Birbhum, West Bengal in 1987. Then he joined Vidyasagar University as lecturer in 1990. Still then he is associated with this University. He was a founder faculty member of the Department of Human Physiology with Community Health, Vidyasagar University. Within a few years after joining the University he established the Ergonomics and Sports Physiology division in the department. He also introduced a special paper "Ergonomics and Sports Physiology" in curriculum of M.Sc. in Human Physiology. He has been engaged in active research in that division for last 27 years. He supervised 28 research students for Ph.D. degree. So far, 22 students awarded Ph.D. degree under his guidance. He conducted twelve major Research Projects funded by different funding agencies.. Within his research career he has got five design registrations from the Patent office, Govt. of India. So far he has published 102 research papers in different national and international journals and he has got 205 abstracts publication also. One of his research publications was recognized as an outstanding contribution to sports nutrition by the Research Digest editors of the American Journal of Sports Nutrition in 1995. His field of research interest includes Occupational Health, Sports Physiology, Ergonomics and Community health and Nutrition. He is the author of three books and he contributed chapters in five books. He visited many countries in abroad for participating international conferences. He has been acting as Editor-in-chief of Indian Journal of Biological Science (IJBS) for last 12 years and he was the member of the editorial board of some journals. He is acting as member of the Bureau of Indian Standard for Ergonomics Sectional Committee PDG 15 of BIS. He is acting as Honorary General Secretary of Indian Society of Ergonomics. He is Life Member of a number of other learned societies also. He

tended his duties as Guest faculty, Visiting Fellow and Adjunct Professor at other Universities. He organized 12 national and international Seminar/Conference/Workshop in the capacity of Organizing Secretary/Joint organizing Secretary/Convener. He attended 92 Seminars/Conferences/Workshops including 24 in international level events. He acted as member (including secretary or chairman) of different academic bodies in Vidyasagar University and other Universities in West Bengal and other states. At present he is working as Director of Distance Education, Vidyasagar University. In addition to that he is also acting as honorary director of Internal Quality Assurance Cell (IQAC) and Centre for Continuing and Adult Education (CCAIE) of Vidyasagar University.



Dr. Chinmay Kumar Panda
President

**Section of New Biology (including
Biochemistry, Biophysics & Molecular
Biology and Biotechnology)**

Dr. Chinmay Kr. Panda (born August 13, 1959, West Bengal, India) has made significant contribution in understanding the molecular pathogenesis of solid tumors. He received his bachelor's degree in chemistry from the Scottish Church College, Calcutta University in 1978, followed by master's degree in biochemistry from

Calcutta University in 1980. He spent the following years completing his doctoral degree in biochemistry at Chittaranjan National Cancer Institute, Kolkata where he worked to understand the molecular mechanisms of interaction of Anthracycline anti-tumor drugs with chromatin. He received his Ph.D degree in 1988 from Calcutta University. In 1986, he was appointed as Junior Scientific Officer at Chittaranjan National Cancer Institute. Then in 1988, he received prestigious post-doctoral fellowship/Swedish Institute Fellowship for three years from Karolinska Institute, Stockholm, Sweden to work under Prof. George Klein on molecular cancer genetics deciphering the cellular mechanisms of activation of oncogene c-myc in different types of B-cell lymphomas. He also availed ICRETT fellowship of UICC to learn advanced molecular techniques related to cancer research in Swiss Institute for Experimental Cancer Research (ISREC) under Prof. Susan M. Gasser in December 1990 and in Karolinska Institute under Prof. George Klein in March-April, 1996.

Now, he is working as the Senior Assistant Director Grade Scientist at Chittaranjan National Cancer Institute. His research mainly focused on analysis on carcinomas of head and neck, uterine cervix and breast, due to their high prevalence in Indian subcontinent. Based on copy number variations (CNVs), promoter methylation and mutation profiles followed by expression (RNA/Protein) analysis he has identified several candidate tumor suppressor genes (TSGs) and oncogenes associated with the development of these tumors. These genes were seen to be involved in several cellular pathways like Stem cell renewal, Cell cycle regulation, DNA Repair, Receptor Tyrosine Kinase (RTKs) signaling etc. The validation of these pathways in tumorigenesis has been done in *in vitro* and *in vivo* animal model systems.

Dr. Panda also showed chemopreventive potential of novel natural products (amarogentin, eugenol and some tea polyphenols) in restriction of mouse tongue, liver, skin and lung carcinogenesis. It was evident that the restriction of the carcinogenesis at the pre-malignant stage by the natural compounds might be due to the modulation of several biological pathways like Stem-cell self-renewal, cell cycle, apoptosis etc. At present, he has focused on global genomic analysis of these carcinomas to further shed light on their pathogenesis.

He has published more than 145 scientific papers in different peer reviewed journals. Under his supervision 24 Ph.D students have received their doctoral degree from Calcutta University, Jadavpur University and West Bengal University of Health Sciences.



Prof. (Dr.) Vijay Janardhan Fulari
President
Section of Physical Sciences

Dr. Vijay Janardhan Fulari completed graduation from Pandharpur College Pandharpur Dist.Solapur in the year 1985 and post-graduation from Shivaji University, Kolhapur in the year 1987. His first appointment as a lecturer in the year 1987 in the affiliated college to this University. In the year 2000 promoted as a Reader and Professor in the year 2008, currently working as Professor and Head, Department of Physics,

Shivaji University, Kolhapur since June 2016.

Dr. Fulari had 31 years teaching and 24 years of research experience. He has completed Ph.D in Physics in 1999 entitled as "Double exposure Holographic Interferometry and its Applications" from Shivaji University, Kolhapur. He is In-Charge of Physics of Modern Optics since 2006. Previously he was In-Charge Head of USIC and USIC-CFC in this university from 1st January 2014 to 31 May, 2016. He has chaired various academic positions such as member of BOS, BOE and Member of Academic council in different universities in the country. He is working as a member of BOS and Chairman; affiliation committees in Shivaji University affiliated Colleges. He is also life member of various academic bodies and is an associated editor of Bulletin of Laser and Spectroscopic Society of India. He is working as NAAC Assessor since 2014 and visited more than 20 colleges and universities among the nation for Accreditation and re- Accreditation Process.

He has national and international research collaborations including abroad and visited South Korea, as Visiting professor and research Professor. He has completed 7 research projects funded by national organizations while one international Indo-Koeran joint project with Chonnam National University, South Korea. He has filed 4 Indian patents and also published a book entitled "Synthesis, Characterization and Applications of Multifunctional Materials", NOVA Publishers. More than 160 M.Sc. research projects are completed under his guidance and 15 students awarded PhD. Currently 7 research students are working. He has worked as referee for more than 150 Ph.D theses of different universities within the India. Apart from this he has organized one International conference as a Convener and participated in organization of more than 40 National/International

Conferences/Seminars/Symposia etc. and delivered More than 50 invited talks at National/International Conferences/Seminars and Symposia. He has published more than 140 research papers in well reputed international journals and got more that 1692 citations with h-index 21 and i10 index-44.



Prof. (Mrs.) Seshu Lavania
President
Section of Plant Sciences

Presently the Secretary of the 99 year old Indian Botanical Society, Professor (Mrs.) Seshu Lavania was born in Meerut in 1958 in the family of internationally acclaimed botanist Prof. Y.S. Murty. She did her M.Sc. (1978), M.Phil (1979) and Ph.D. (1983) in Botany, all from the Institute of Advanced Studies, Meerut University (now CCS University), Meerut. On completion of her PhD she was awarded post-doctoral fellowship of CSIR to work at NBRI, Lucknow, and was subsequently appointed as Lecturer at Navayuga Kanya Mahavidyalaya, Lucknow. Later in in continuation in 1985 she joined the Department of Botany of the Lucknow University, Lucknow as a regular faculty. Currently she holds the position of the Professor of Botany and Head of the Department in the University.

Besides teaching and other administrative assignments she is actively involved in research

work in the area of Plant Morphology and Floristics, Biosystematics and Ecotechnology, and value addition in Medicinal and Aromatic Plants. She has mentored 10 PhD students; executed CSIR sponsored research project; contributed invited articles in reference volumes and published 52 research papers in journals of international repute such as : *Annals of Botany*, *Cell Mol Life Sci*, *J Heredity*, *Curr Sci*, *J Genetics*, *Plant Journal*, *Proc Indian Acad Sci*, *Genome*, *Industrial Crops and Products*, *Phytotaxa*, *Jour Jap Bot*. She also has a US patent to her credit.

She has made significant contributions in the area of floral/vegetative morphology and polyploidy of plants from phenomics and developmental biology angle. Her notable contributions are : (i) identification of an intermediary unique form of axio-parietal placentation in *Solanum grandiflorum* providing a unique link in placental specialization, (ii) elucidation of evolutionary significance of trichomes in delineating speciation and microtaxonomic characterization, (iii) experimental strategy for elicitation of bud-sport formation for mining of *de novo* diversity, (iv) development of root ideotype concept for vetiver for its dual utilization for industrial and environmental applications, including root-anatomy bioassay, (v) proposition of 'vetiver grass model' for carbon sequestration in sub-soil horizon, (vi) demonstration of 'polyploid model' for fixation of heterozygosity, and (vii) pinpointing that native secondary metabolites in progenitor diploids have decisive bearing on growth behavior in the derived autopolyploids. She is a recipient of Woman Scientist Medal of the Indian Botanical Society; and international awards such as King of Thailand Vetiver Award Certificate of Excellence; Vetiver Network International Certificate of Excellence. She is

an elected Fellow of the Indian Botanical Society, Fellow of the Linnean Society of London. She has organized All India level Botanical Conferences and Science Academy Workshop. She has actively participated in over 40 nos. of national botanical conferences, and had delivered two invited talks in international conferences abroad. She has actively contributed to the corporate and professional activities of the Lucknow University, as the Member of the Executive Council, Aast. Provost of the Founder Group of Management Girls Hostel and Tilak Girls Hostel, additional Chief Provost, and host of other administrative duties.



Dr. Mausumi Raychaudhuri
Recorder
Section of Agriculture and Forestry
Sciences

Presently working as Principal Scientist in ICAR - Indian Institute of Water Management (Formerly Water Technology Centre for Eastern Region), Bhubaneswar, Orissa. A National Scholar and earned MSc (Ag) and Ph.D (Ag) both the degrees from Calcutta University in 1986 and 1997 respectively.

Started with Soil and Land Use Survey of India (Formerly All India Soil and Land Use Survey), IARI, DOA & Co., MOA, GOI in 1990 as Senior Soil Surveyor, and initiated the application of

GIS and Remote Sensing tools in soil survey with several software applications to develop classified images and thematic maps. Joined ICAR in 1992 as Scientist and devoted 14 years of my early service in Manipur Centre, ICAR Research Complex for NEH Region, one of the remote areas of north-eastern part of India. During this period I got an opportunity to address the problems of the farmers through a multidisciplinary farming system approach and developed technologies for amelioration and management of acid soils for better crop production and introduced Soil Health Card to the farmers. Joined ICAR - Indian Institute of Water Management in 2008 and presently working on prospects of poor quality water use in agriculture, assessment of soil and land quality on the basis of soil physical, hydrological, chemical and biological parameters, development of efficient irrigation and cropping practices under irrigated ecosystems to mitigate excess and deficit water situations in the context of climate change and also developed Decision Support system to assess the suitability of low quality water used in irrigated agriculture on food production in association with Bulgarian Scientists.

Being associated with All India Coordinated Research Project (AICRP) on Irrigation Water Management sponsored by ICAR operational at twenty six centres located at different agroclimatic region gained experience on assessment of surface and groundwater potential using modern tools like GIS and Remote Sensing as well as mathematical models and softwares, artificial recharge techniques for hard rock region and alluvial zones, conjunctive use of groundwater and surface water/canal water under non command/command areas and water pollution. Use of poor quality water for irrigation and their impact on soil, groundwater, crop quality and human health under different agro-climatic region

are being carried out through in-house as well as DST sponsored International Project. Decision support system to assess the impact of use of poor quality water is also a prime area of research. Also associated with 'National Initiative on Climate Resilient Agriculture' Project where impact of climate variability on groundwater recharge is being assessed and groundwater is being used efficiently through integrated water resource management and multiple uses as well as with National Science Fund project sponsored by ICAR for development of biological filtration system to treat wastewater for irrigation.

Dr. Raychaudhuri has gained administrative experience as Joint Director i/c of Manipur Centre, ICAR Research Complex for NEH Region and at present coordinating the activities of 26 centres of AICRP on Irrigation Water Management operational at different parts of India. She is in possession of 130 publications, 3 copyrights, six International visits under bilateral program, two Society awards, best oral presentation awards, guidance to MSc students and other R & D activities.



Dr. Randhir Kumar Singh
Recorder
Section of Animal, Veterinary and
Fishery Sciences

Dr. Randhir Kumar Singh is basically a Zoologist. He has 18 years of teaching and 21 years of research experience. During last 21 years of

research he has worked on different aspects of Fish Physiology, Fish Hematology, Biochemical Composition of Fishes, Toxicology and most significant being "Bioenergetic Modelling in an air breathing Fish, *Anabas testudineus* (Bloch). He has published more than 35 research papers in the Journal of National and International repute; Edited/Published 03 Books, attended over more than 50 National and International Seminars. He is recipient of many Gold Medals and Fellowship of different Academic Societies. He is life member of many societies. He was elected Sessional Committee Member of the Section of Animal, Veterinary and Fishery Sciences for the year 2012-2013.

He is also one of the Managing Editor of the "Proceedings of the Zoological Society of India (an official Journal of ZSI) which is not only UGC enlisted Journal but also having NAAS rating of 4.42. He has also delivered invited lectures during National Seminar and ISCA. At present, he is General Secretary (HQ) of the Zoological Society of India.



Dr. Rajshree Bhargava
Recorder
Section of Anthropological and
Behavioural Sciences
(including Archaeology, Psychology,
Education and Military Sciences)

Dr. (Mrs.) Rajshree Bhargava (D.O.B. 8th, Jan., 1975) M.Sc. Home Science (Extension Ed.) Ph.

D. (Psychology), Dr. B. R. Ambedkar University, Agra. Diploma in Special Education (Mental Retardation) under R.C.I. (Ministry of Social Justice and Empowerment, Govt. of India, New Delhi. Presently she is the Founder Director, Consulting Psychologist and Special Educator of well recognized centre of Psycho-logical Assessment, Guidance & Counselling name 'Samadhan Kendra' established in 2000 under Harprasad Bhargava Memorial Educational Society, Agra and this centre is also associated with prestigious Institute, 'Harprasad Institute of Behavioural Studies' Hardeep Enclave, Sikandara, Agra. During 17 years period She has made, 'Samadhan Kendra' a reliable and trustworthy centre for psychological & educational services to the needy people, persons with different disabilities and individuals facing various of psychological problems. She has been throughout first class and topper at Master's level and also qualified state level eligibilities test (SLET) for lectureship in Home Science.

She is actively associated with about 12 professional organizations, participated in about 35, Conferences, Seminars and Workshops, organized about 15 Conferences and Academic programmes about 6 Workshop for the parents and general people. She is also associated as a member of Editorial Board of many Magazines and Journals.

She has prepared and developed about five CD's and Transparencies on various topics of education, she has also developed and standardized four psychological tools on Career Assessment, Learning Disabilities and ADHD problems. By now, she has edited and authored about 12 books of degree level and references. As a witness of her academic potential and high class intellectual achievements, she has been honoured and awarded about 12 Citations of various bodies and organizations of fame.



Dr. Anand S. Aswar
Recorder
Section of Chemical Sciences

Dr. A. S. Aswar born on June 29, 1962 and presently working as Professor & Head, Department of Chemistry, Sant Gadge Baba Amravati University. He obtained his M.Sc. degree in first class with third rank in order of merit in 1986 and Ph.D degree in 1989 from Nagpur University, Nagpur. He joined as founder faculty in Chemistry department, Amravati University (then) during Dec 1991 as lecturer and then successively become reader and professor of chemistry during the year 2002 and 2007 respectively. He has pleasure to work as In-Charge for biotechnology department for brief period of one year. Prior to join Amravati University, he has also served as the faculty of Institute of science and Priyadarshini College of Engineering, Nagpur for about 3 years.

He has guided 29 Ph.D's and 15 M.Phil students and 6 more are working. His research interests are in coordination and solid state chemistry, catalysis, solvent extraction and molecular interactions. Dr. Aswar made a notable contribution in different areas of chemistry and published over 179 research papers in various national and international journals of repute and also authored of two text books for B.Sc. III. Dr. Aswar is a referee for several

scientific journals in chemistry as well as for Ph.D thesis of various Indian universities and has also worked on the panel of selection committee in various universities, research institutes and colleges. He has completed Major and minor research projects funded by UGC. Beside his regular teaching and research he is also interesting in popularization of science among masses and he is founder president of Team to Restore Entire Environment (TREE).

He has organized more than 12 national conferences/workshops/seminars in various thrust areas of chemistry. He also conducted six refresher courses for college teachers and several workshops/seminar/symposia for up gradation of chemistry syllabi in association with various organizations. He has delivered several lectures under teacher exchange programs at different places and in various conference/seminars. Dr. Aswar has participated in several symposia/conferences/workshops India and abroad and presided many technical sessions and worked as a jury also.

Dr. Aswar is a fellow and life member of a number of professional societies. He is also as council member, associated editor in Indian Chemical Society, Kolkata and former Sectional president of Inorganic Chemistry, Indian Council of Chemists Conference held at Patan, 2009. He has also Visited to KAUST, Thulwar, Saudi Arabia as a visiting scientist in 2011.

Dr. Aswar had rich experience in University academic administration and worked on various academic bodies of home and other Indian Universities Considering his significant contribution and services, Amravat University Honored him by Utkrushtha Seva Gaurav Puraskar during 1998.



Prof. Bindhy Wasini Pandey
Recorder

Section of Earth System Sciences

Bindhy Wasini Pandey received his M. Phil and Ph. D. degree in Geography from Delhi School of Economics, Department of Geography, University of Delhi. He is currently Associate Professor of Geography at Department of Geography, Delhi School of Economics, University of Delhi. He has to his credit 20 Years of Teaching and Research experiences, 08 books and 70 research papers published in books and journals. He has received Young Geographers Awards of NAGI (2000), Host and Travel Grant from United Nations University (UNU), Tokyo and International Geographical Union (IGU) 1996 and 2000. He has also received UNESCO Paris Young Scientist Financial Grant 2001. He has received Shastri Fellowship of Canadian International Development Agency (CIDA) for the project on Hazard Zone Mapping in Himachal Himalaya and British Columbia, Canada in 1995. He has to his Credit NASA (USA) Financial Grants for Global Land Use Project 2010, International Council for Science (ICSU) Financial Support for Our Common Future Under Climate Change Conference, UNESCO Paris France, Centre for Mountain Studies, Perth College, University of the Highlands and Islands, Crieff

Road, Perth, Scotland UK Financial Support for Mountains of our Future Earth' Conference, Perth, Scotland, UK and Mountain Research Initiative, Institute of Geography, University of Bern, Switzerland Financial support to attend Global Fair of Mountain Observatories and European Commission Financial Support for European Geological Science Congress Participation in 7th EUROGEO Congress at Bologna, Italy. He has widely travelled and attended International Conferences and delivered lectures. Dr. Pandey is specialized in Marginality Analysis and Assessment in High Altitudes, Mountain Natural Resources Conservation and Management, Environmental Hazards and Disasters Vulnerability and Management. He is Deputy Executive in India for International Geoscience Education Organization (IGEO).



Dr. Pankaj Kumar Roy
Recorder
Section of Engineering Sciences

Dr. Pankaj Kumar Roy is Associate Professor in School of Water Resources Engineering, Jadavpur University, Kolkata, India. He is an expert in Hydraulics, Hydrology, Water Quality Modelling and Impact of Climate Change on water resources. He has over nine years teaching

experience and provides valuable guidance to Research Scholars of which seven has been awarded. Dr. Roy has attended several national and international conferences. His published works include one hundred forty-seven international reputed journals and thirty-nine national reputed journals along with writing in books. His works have reputed journal reviewer. At present is the member of six Learned Societies and received four awards national as well as international level. He is actively involved in teaching, research and consultancy. His research interests are primarily focused on water treatment, wastewater treatment and reuse, environmental impact assessment, monitoring and modelling of water pollution, geogenic pollutant scavenging etc. He has more than 100 publications in top-ranking International journals and is credited with citations in Scopus.

Dr. Roy is a renowned technical consultant in the arena of environmental engineering having more than forty five completed/on-going projects of national and international importance to his credit. He has developed community based arsenic removal unit (ARU) model for removal of arsenic through application of co-precipitation and adsorption mechanism appreciated the model and intend to recommend the model for its application nationwide in the rural drinking water supply scheme in the arsenic affected villages. Based on the performance of the first four ARUs installed and commissioned in the arsenic affected villages in the district of Murshidabad, West Bengal, the Public Health Engineering Department (PHED), Govt. of West Bengal has expressed its willingness requesting for providing technical expertise to up-scale the model for serving the bigger community (villages in cluster) in arsenic affected areas.



Dr. Priyanka Priyadarshani
Recorder

Section of Environmental Sciences

Priyanka is presently working at ICFAI University Jharkhand Ranchi as an Assistant Professor. Her research interests include Microfinance, entrepreneurship, sustainability and rural development. She has been working on Green Microfinance to explore the synergies between sustainability and microfinance. She received the Best Poster award in the Environmental Section in the 104th Indian Science Congress held in Tirupati, 2017. She holds an MBA from ICFAI Business School and Ph D from IUJ, Ranchi.



Dr. Ajay Kumar Thakur
Recorder

**Section of Information and Communication
Science Technology (including
Computer Sciences)**

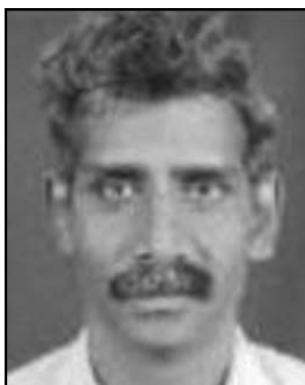
Dr. Ajay Kumar Thakur, received his M.Sc. degree in Physics with specialization in Radio

Physics and Digital Electronics and as well as also, he did his Ph.D. degree on the topic “*Generation of Time Domain SC Networks and study of their performance*” from L.N.M.U, Darbhanga, Bihar. Dr. Thakur has published more than 50 papers in national and international journals and more than 40 papers in National and International conferences/workshops/seminars. He has also published a book entitled-“*Synthesis and Applications of Nanocrystalline Materials*”, by-Manisha Publication Varanasi, India He is a member of editorial board of the Indian Journal of research ANVIKSHIKI bi monthly international Journal of all research, STM Journal of Physics and Editor in chief of weekly science International journal, Solapur, India.

Dr. Thakur is also a member of different research organizations/associations. Dr. Thakur is recipient of Best Poster Presentation award in 98th India Science Congress, 2011 held at SRM University, Chennai, India. He has received Best poster presentation award in National Seminar, Sponsored by University Grants Commission (UGC), New Delhi, Award of Excellent Performance for his contribution to research work and other extra activities at C. M. Sc. College, Drbhanga and several awards like “Bharat Jyoti Award” for meritorious services , outstanding performance & remarkable role, “Glory of India Gold medal” for individual excellence in recognition of sterling merit excellent performance, Best Citizen of India Award -2013 by International Publishing House, Delhi and Best Teacher Award by MTC Global, Bangalore -2017. Dr. thakur has taken 30th teachers training programme for community education. Several talks of Dr. Thakur have been broadcasted by Darbhanga Radio Station.

Dr. Thakur has worked as Project Fellow in Major

Research Project, in the Dept. of Physics of C.M.Sc. College, Darbhanga, where he has worked for the improvement of Broadband of compact dielectric resonator antenna in the area of technology innovation for the emerging information and communication technology (ICT) for socio-economic development. Currently, he is engaged as a faculty member in Mobile communication section of Community College, C.M. Science College, Darbhanga-846004, affiliated to A.K. University, Patna, Bihar. His current research interest is in the field of Microwave technology, circuit simulations and in the field of ICTs for greener and smarter devices.



Prof. Guduru Prasad
Recorder
Section of Materials Science

Prof. Guduru Prasad obtained MSc. in Physics from Osmania University, Hyderabad and Ph.D. from Indian Institute of Technology, Kharagpur. He joined as lecturer in Physics at St. Joseph's College, Bangalore and then as lecturer in Materials Science in Mangalore University, Mangalore.

In 1989 he joined as Assistant Professor in Physics at Osmania University, Hyderabad and became Professor in 2007. He has vast teaching experience and a number of publications in national and international journals. He is a

member of several professional bodies and has been invited to deliver lectures in India and abroad.



Dr. Anil Kumar Vashisth
Recorder
Section of Mathematical Sciences
(including Statistics)

Dr. Anil K. Vashisth is presently Professor and Chairman (Head), Department of Mathematics, Kurukshetra University, Kurukshetra. He has been Dean Students' Welfare; Director, K.U.P.G. Regional Centre; Associate Dean; Deputy Proctor; Programme Coordinator, Youth Red Cross and Vice-Chairman, K.U. Cultural Council, Kurukshetra University, Kurukshetra. He was born on October 2, 1964. He obtained M.Sc. (Mathematics) in 1987 and M.Phil. (Mathematics) in 1988 from Kurukshetra University. He has completed his Ph.D. in the field of Applied Mathematics on 'Effect of Loose Boundaries on Wave Propagation in Porous Solids' from Kurukshetra University in the year 1993. He has a teaching experience of 28 years and research experience of 30 years.

He has done research work in the areas of Poro-Mechanics, Theoretical Seismology, Solid Mechanics, Fluid Mechanics, Differential Equations and Wave Propagation in Smart Materials. He has introduced the concept of loose boundaries in the studies of wave propagation in

porous solids. His work on the formalism of multilayered porous solids, using transfer matrix method, has attracted many citations and applications in the areas of sound absorbing materials and non-destructive techniques. He has provided a theoretical model to incorporate imperfect interfaces in the study of multi layered poroelastic and poro-visco-elastic materials and could obtained analytical solutions also.

He has established the constitutive equations for porous piezoelectric materials. It is a known fact that majority of the pressure sensors, i.e., piezoelectric materials have a residual porosity. First time, a theoretical model to incorporate this porosity of piezo ceramics, which are widely used as sensors and actuators, was established by him in a study on 'Vibrations of Porous Piezoelectric ceramic plates' and then on 'Wave propagation in transversely isotropic porous piezoelectric materials' in the year 2009. This work has provided a realistic model to study wave propagation, vibrations problems and to study crack problems of piezo ceramics. He has also worked in the area of numerical and asymptotic methods to solve singularly perturbed differential equations. He has published 50 research papers in International Journals and has published nearly 30 research papers in National Journals and Conference Proceedings etc. He has contributed to three edited books. He has been invited in many national and international conferences and has delivered 43 invited talks at the national and international levels.

He has successfully completed two research projects, one was funded by the DST, Govt. of India and the other has been funded by the UGC. He has guided 5 Ph.D. theses 34 M.Phil. Dissertations. He has been Reviewer for many International Journals and presently he is on the panel of Editors of two International journals.

He has served as External Expert on the Boards of Studies of many universities. He is a life member of National bodies. He was conferred with Associate Fellow of International Academy of Physical Sciences recently. He was offered Post-Doctoral position at Laboratoire Central des Ponts et Chaussées (LCPC), Nantes, France in the year 2005. He has visited Belgium and France on academic assignments. He has attended nearly 62 International and National conferences. He has organized Refresher Courses and Conferences.

Besides this, Prof. Vashisth has undertaken number of administrative assignments at the university level. He has been member of organizing committee in holding National and International programmes at the university. He has acted as a Nodal Officer, SVEEP programme of Election Commission of India; Nodal Officer, Online Students Grievances Redressal Cell – UGC; Coordinator, recruitments and Convener, Students Grievances Redressal Cell, K.U. Kurukshetra.



Prof. (Dr.) Sujata Maiti (Choudhury)
Recorder
Section of Medical Sciences (including
Physiology)

Prof. (Dr.) Sujata Maiti Choudhury is a Professor in the postgraduate department of Human Physiology with Community Health of Vidyasagar

University, West Bengal, India. She is the In-charge of Biochemistry, Molecular Endocrinology and Reproductive Physiology Laboratory of the above said department. She graduated in 1984 from Midnapore College, and completed M.Sc. in Physiology, in 1986 and M.Phil. degree in Environmental Science in 1988 from University of Calcutta, Kolkata. She was awarded Research Fellowship in 1987 from ICMR, Govt. of India in the Dept. of Pharmaceutical Technology, Jadavpur University, Kolkata. She started her independent position as a Lecturer in the Department of Physiology, Midnapore College in 1990. She was awarded Doctor of Philosophy in 1995 from Jadavpur University, Kolkata. In 2006, she joined in the postgraduate Department of Human Physiology with Community Health of Vidyasagar University. She was also graced as the Founder Director of Women's Studies Centre, of Vidyasagar University (2010-2015).

Teaching physiology along with biochemistry and cancer biology to undergraduate and postgraduate students has been a passion for her. She has been External Examiner of M. Sc. Curriculum (Physiology) in different Universities.

She is actively engaged in researches and her primary focus of work covers Cancer therapeutics and Molecular drug development with particular interest in nanomaterial or nanocojugate and phytomedicine mediated drug fabrication; Toxicological studies on mycotoxin and synthetic pyrethroids and their remedial interventions. She has presented her research findings in various national and international conferences. She has several International and national research publications in peer-reviewed journals. She has completed several major research projects and supervised several Ph. D thesis.

Dr. Maiti Choudhury has been awarded Travel Award for 3rd conference of South Asian Association of Physiologists (SAAP-3), 2012, Colombo, Sri Lanka; 'Shiksha Rattan Puraskar'-2012 from India International Friendship Society; Fellow award from Society for Applied Biotechnology, India in 2012; A. K. Mukherjee Oration award from The Physiological Society of India (PSI), 2016;) and as 'Exchange Visitor Researcher' in Central Michigan University in 2018. Dr. Maiti Choudhury has organized several seminars, workshops, science exhibitions involving the students for elevating scientific aptitude and knowledge among students and common peoples.

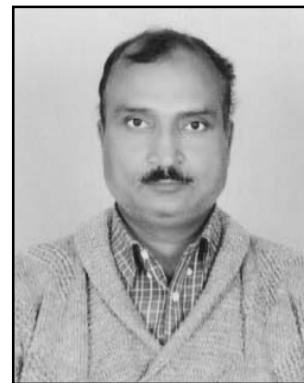


Dr. Sandipan Chatterjee
Recorder
Section of New Biology
(including Biochemistry, Biophysics & Molecular Biology and Biotechnology)

Dr. Sandipan Chatterjee, is basically an Organic chemist, he has 18 years research experience in the interfacial area of Organic Chemistry, Biological Chemistry, Waste utilization and Environmental chemistry. He is currently working as a scientist at Kolkata Regional centre of CSIR-Central Leather Research Institute

(CLRI). Prior to joining CLRI, he has worked as an Assistant Professor at Lovely Professional University (LPU), Jalandhar. Before that, he has worked National Botanical Research Institute as a quick hire scientist fellow on GC-MS/NMR/LC-MS based metabolic profiling of plant and plant products to ascertain the quality of the plant products and to apprehend system biology of a plant in various stressed conditions. Before joining to CSIR-NBRI

Dr. Sandipan has worked as a Post-doctoral Research Fellow at the National Changhai University of Education under Prof. Hon Man Lee. Prior to that, he has worked few months in Dabur Pharma (DRF) in process chemistry division in the area of process development of generic anticancer drug molecules. Before joining DRF he has worked as a researcher at Organic Chemistry division of Indian Institute of Science (IISc), Bangalore under the supervision of Prof. Govardhan Mehta in the development of complex natural product synthesis. Prior to joining IISc he has completed his Ph.D. at Indian Association for the Cultivation of Science (IACS). His PhD work comprises sustainable production of carbohydrate Natural Polysaccharides Chitosan utilizing industrial waste and its application. Till date, Dr. Sandipan has published 20 international research papers with av. Impact factor $3.0 \pm$ with total no. of citation ~ 1500 . His current (2018) H-index is 15 as calculated by Google scholar.



Dr. Vineet Kumar Rai
Recorder

Section of Physical Sciences

Dr. Vineet Kumar Rai S/o Late Dharya Nath Rai; resident of village & post-Sathiaon, District-Azamgarh, Uttar Pradesh, passed B. Sc. & M.Sc. in first division from Postgraduate Shibli National College, Azamgarh, Uttar Pradesh. He has qualified the National Eligibility Test (NET) in Physics conducted by CSIR, New Delhi in 2001. He did Ph.D. from Banaras Hindu University (BHU) under the supervision of well known Spectroscopist & Professor Dr. Shyam Bahadur Rai. He worked as a Research Associate at Department of Physics, BHU and a Post Doctoral Fellow at Departamento de Fisica, UFPE, PE – Brasil under a CNPq program by Brazilian Government.

Currently, Dr. Rai is working as an Associate Professor at Department of Applied Physics, Indian Institute of Technology (Indian School of Mines), Dhanbad. His current area of research interest is on synthesis and optical characterization of lanthanide doped glasses & nanophosphors/nanomaterials and their wide applications in temperature sensing, LEDs, optical devices, biological fields, upconverters, optical nano heater, etc. He is familiar with handling of various sensitive and sophisticated

equipments. He has delivered talks at different academic places and organized various professional academic activities like, conferences, training programs, etc. He is member/life member in the journal editorial board and various academic societies. He has research interactions with various research & academic institutions in India and abroad. He has been awarded as Outstanding JAP Author for the research contribution and Recognized Reviewer Status in recognition of the review made for journal by different reputed journals viz. ACS, Materials Research Bulletin, Journal of Industrial and Engineering Chemistry, etc. The interesting results obtained from his research group serve the purpose of the temperature sensor, fluorescence labeling, bioimaging, fingerprint detection, optical bistability, optical nano heater, etc.

Dr. Rai has published more than 130 research papers of international repute in international journals, several book chapters & papers in conference proceedings and participated in number of national/international conferences. By his research contributions Dr. Rai has given a new direction to the scientific community. Dr. Rai is having total citations of more than 2900, h-index-30 and i_{10} index -78 (as per the google scholar citation report 2018). He has been awarded by Bharat Shiksha Ratan Award in 2013, by GSHEG, New Delhi and Canara Bank Research Publication Award for the recognition of excellence in research in 2015 & 2016 at IIT (ISM), Dhanbad.



Prof. Sunil Kumar Chaturvedi
Recorder
Section of Plant Sciences

Prof. Sunil Kumar Chaturvedi, was born on 10th July, 1955 in Mainpuri district of Uttar Pradesh. After obtaining B.Sc. and M.Sc (Botany) degree from Allahabad University in 1974 and 1976 respectively, he obtained D.Phil. degree in Botany in 1984 from Allahabad University. He was selected as young Scientist of DST, Govt. of India for 1985 to 1987 and 1988 to 1990. In 1996 appointed as Research scientist of DST, Govt. of India, New Delhi and in 1997 he joined the post of Reader in the Department of Botany, Nagaland Central University, Lumami, Nagaland, and was promoted to the post of Professor of Botany in the year 2007. He was selected for "Best Teacher Award 2001", by the Post Graduate Student Union, Nagaland University. In the year 2012 he joined Guru Ghasidas Vishwavidyalaya, (A Central University) as Professor of Botany on lien for three years and taken over as Dean Life Sciences in 2013. In November 2015, he returned to Nagaland University as Professor of Botany and in February 2016 he was appointed as Dean, Research development and Consultancy (Dean, RDC) in Nagaland University, Lumami. In the year 2009, Dr. Chaturvedi was appointed

as Dean, Student welfare, Nagaland University, Lumami.

Prof. Chaturvedi is Fellow of six Scientific Societies (FBS, FBRs, FIAT, FBSA, FISPRB, FEHST) and life members of twelve National and International scientific Societies. He has Completed eleven Research Projects, Participated in 88 National and International Conferences and presented research Papers. He has been Invited to deliver lectures at National and International conferences and Refreshers/ orientation courses. He is having research and teaching experience in the field of plant morphology, anatomy and embryology of spermatophytes. He was conferred with the best paper Presentation award at conference held at PUSA, New Delhi, India, in 2014. He was invited to deliver Professor R.P. Singh memorial lecture at Botanical Survey of India, Eastern Circle, Shillong (Meghalaya), during the Annual Conference of EHSST held from March 8-9, 2018.

Prof. Chaturvedi has published 65 research papers in National and International Journals, 21 research papers in edited books, 3 popular articles and one book. For his contributions in the field of Flora biology/Pollination biology of Indian Asclepiads and Orchids, Dr. Chaturvedi was conferred with five Gold Medals, including Y.S. Murthy award medal 1991 and Professor S.C. Maheshwari medal 2016, of Indian Botanical Society. So far six students have been awarded Ph.D. degree and eight students are enrolled for Ph.D. degree under his

supervision. He was elected member of sectional committee of Plant Sciences of ISCA for 2004-2005. He was Nominated member of SSC (IUCN) from 2009-2012. He is selected reviewer in various reputed National and International journals. He was elected member of executive committee of Indian Botanical Society from 2004-2007 and 2011-2014. He has visited abroad seven times in connection with his research work. He was Head, Department of Botany and Chairman of BPGS and BUGS, Nagaland University for 10 years 3 months and HOD, Botany at GGV, Koni, Bilaspur for 3 years. He was Coordinator SAP- DRS I & DRS II from 2004-2009 and 2009-2012 respectively, at Nagaland University Lumami.

Dr. Chaturvedi was appointed Director, IQAC, Nagaland University, Lumami, from 2011- 2012. He was Director, centre for Biodiversity study, Nagaland University, 2005 -2010. He was appointed Nodal officer of AYUSH for Nagaland state in 2009. He was appointed Group leader of Botany for DBT BUILDER programme worth Rs. 4.68 crores, at GGV, Koni, Bilaspur (CG). Time to time worked as VC in-charge Nagaland University. His field of research is Conservation and Reproduction biology of Plants with special emphasis on Pollination Biology. He is the first Indian to work on Pollination biology of Orchids of North-East India. He is pioneer in field of studies in Pollination biology of Indian Asclepiads and has made a video film on pollination of Indian Asclepiads.

KNOW THY INSTITUTIONS



THE INSTITUTE OF MATHEMATICAL SCIENCES, CHENNAI (A National Institute for Research in the Theoretical Sciences)

The Institute of Mathematical Sciences (IMSc), founded by Alladi Ramakrishnan in 1962, is an autonomous national institution for fundamental research in the areas of Theoretical Physics, Mathematics, Theoretical Computer Science and Computational Biology. The Institute is governed by a Board and an Academic Council.

Research at IMSc is supported by the Department of Atomic Energy of the Government of India and by the Government of Tamil Nadu.

The Institute has a vibrant academic program, including an active PhD program to which a select group of students are admitted every year. IMSc also supports a large number of scientists at the post-doctoral level and hosts a visiting scientist programme. The Institute organizes several national and international scientific meetings annually. IMSc is also involved in a range of outreach activities for schools, colleges and the general public. The Institute Annual Reports

summarize ongoing research and other institute activities.

IMSc has a comprehensive scientific library and diverse computing facilities including high performance computing and a high speed network. A centrally air-conditioned office and lecture-hall complex houses academic members of IMSc. A 200 seat auditorium, the Ramanujan auditorium, is used for large scientific meetings while smaller lecture halls, classrooms, media rooms accommodate more modest gatherings. The campus is entirely Wi-Fi enabled.

IMSc is located in South Chennai, in the Adyar-Taramani area. Based in the verdant surroundings of the Central Institutes of Technology (CIT) campus, the institute also houses a student hostel, flatlets for long-term visitors, married students and post-doctoral fellows, and the institute guest house. IMSc has its own faculty housing, Lilavati, in Tiruvanmiyur near the seashore. A new housing campus is

coming up in the Pallavaram area of Chennai, near the airport.

THEORETICAL PHYSICS

Theoretical physics group at IMSc is the largest group in the institute with the research interests of the faculty members spanning a wide range of energy scales—from string theory to complex systems.

MATHEMATICS

The mathematics group at IMSc pursues research in diverse subdisciplines. In addition to traditional areas of pure mathematics, some of the faculty have interests in applied and computational aspects as well. Activities in the group include regular graduate courses, research seminars, as well as periodical instructional workshops and conferences. There is a graduate programme for which applications are invited once a year. The group also hosts around 12 postdoctoral fellows at any given time.

THEORETICAL COMPUTER SCIENCE

The primary research focus of the theoretical computer science (tcs) group at IMSc is on the mathematical foundations of computation. These include algorithms, logic, automata theory, combinatorics, and computational complexity. The group currently comprises of nine faculty members, post-doctoral fellows, and doctoral research scholars. The activities of the group include running a highly challenging graduate programme for doctoral students, holding research seminars, and organising research-level workshops and conferences as well as instructional schools and workshops.

COMPUTATIONAL BIOLOGY

The Computational Biology group is the youngest at IMSc and consists of an enthusiastic

group of faculty, post-docs and students who work on a variety of interdisciplinary topics. Various members of the group work on a diverse range of topics from biomolecules and active membranes to regulatory genomics and infectious disease modelling.

LIBRARY

The IMSc Library is the information backbone of the Institute of Mathematical Sciences. It also acts as a regional library for Southern India and provides information resources to support academic and research activities in the areas of Mathematics, Theoretical Physics, Theoretical Computer Science and Computational Biology.

The primary task of the Library is to enhance and maintain its holdings of books, journals and other sources of information. It is equally important for the library to make the access to these resources user-friendly.

IMSc Library—the library of the future will be less a place where information is kept than a portal through which the user community within and outside IMSc will access the vast information resources of the world. This library will bring together the scholars and the information resources without necessarily bringing either one to a physical building with card catalogues and books. The IMSc Library is committed to:

- Use of technology to enable user access in a global context;
- Designing and refining innovative services to meet user needs;
- Wise and responsible use of fiscal resources through sharing;
- Providing the richest array of information possible; and
- Remaining the premier academic and research library in the country with global access

SOME OF THE FEATURES THAT DISTINGUISH IMSC LIBRARY ARE

- Finest collections of early printed books and research materials.
- NBHM has recognized this library as Regional library in the areas of mathematics and allied subject areas.
- The library enjoys intensive use of its resources and services. The library possesses a state of the art IT infrastructure that includes RFID based system for self check-in/check-out of library materials.
- 24×7 access to the library services, perhaps the only library of this kind in the country.

IMSc library actively participates and contributes for mutual benefits in resource sharing activities among DAE units.

MEDIA CENTER

IMSc Media Center Provides e-learning through video contents in the disciplines of Mathematical and Physical Sciences. Media Centre of IMSc was established during 2009 for the purpose of creating higher educational video contents of broadcast quality in Mathematics & Physical Sciences. In this regard, a mini studio is being available for recording the video content with the following facility:

- A sound proof, professional PTZ video camera based broadcast quality studio setup with
- A/V mixing
- Video Editing
- Video Conferencing
- Web Streaming

The IMSc studio facility is utilised for

- Class room video recordings
- Remote class room activities through VC
- Meeting/Interview/Viva-Voce sessions through VC or other modes available with remote end
- Web streaming of activities

IMSc Media center has a total collection of video content of about 900 hrs in mp4 video format and serves to the need of faculty for online bookings of Video recordings and for the public viewing.

CONTACT

Director
The Institute of Mathematical Sciences
IV Cross Road, CIT Campus
Taramani
Chennai 600 113
Tamil Nadu, India.
Phone : 91-44-22543100
Fax : 91-44-22541586

CONFERENCES/MEETINGS/SYMPOSIA/SEMINARS**NATIONAL CONFERENCE ON POSITIVE PSYCHOLOGY AND HOLISTIC HEALTH, 1-3 OCTOBER, 2018, AGRA****Themes :**

- Promises and Prospects of Elementary Teacher Education
- Role of Central Govt. in resolving many social issues & Challenges.
- Impact of Language Literature, Fine Arts & Music for upliftment of better life.
- Skills Development of better community harmony.
- Coping with various mood disorders and neurological impairment.
- Emergent need of psychological assessment and counseling, special education in all types of secondary schools.

Contact :

The Director, HARPRASAD INSTITUTE OF BEHAVIOURAL STUDIES (HIBS), 41-42, Hardeep Enclave (Opp. Reliance Tower), Near Bajrang Nagar and Neerav Nikunj, Opp. K. K. Nagar, Sikandra, AGRA-282 007, E-mail: hibs2000agra@gmail.com, Drmaheshbhargava47@gmail.com, npc_agra@yahoo.com

88TH ANNUAL SESSION OF THE NATIONAL ACADEMY OF SCIENCES, INDIA AND SYMPOSIUM ON "SCIENCE, TECHNOLOGY AND ECOSYSTEM FOR SUSTAINABLE RURAL DEVELOPMENT", DECEMBER 6-8, 2018, CHITRAKOOT, SATNA, M.P.**Contact :**

Dr. Niraj Kumar, Executive Secretary, The National Academy of Sciences, India
5-Lajpatrai Road, Allahabad-211002, Ph: +91-0532-2441243, 2640224;
Email: aes.nasi@gmail.com; Website : <http://www.nasi.nic.in>, <http://www.nasi.org.in>;

2ND INTERNATIONAL CONFERENCE ON SMART TECHNOLOGIES IN DATA SCIENCE AND COMMUNICATION (SMART DSC-2018), VISAKHAPATNAM, DECEMBER 06-08, 2018**Topics :**

Data Analytics, Communications, Soft Computing

Contact :

Dr. N. THIRUPATHI RAO
Associate Professor & Asst. HOD, Department of Computer Science & Engineering; Vignan's Institute of Information Technology, (An Autonomous Institution); Visakhapatnam, Andhra Pradesh,
Mobile No. : 9966968368 Website: <http://www.conferen.org/SMARTDSC-2018/>

**TECHNO SOCIETAL—2018 : 2ND INTERNATIONAL CONFERENCE ON
ADVANCED TECHNOLOGIES FOR SOCIETAL APPLICATIONS, 14-15 DEC 2018,
PANDHARPUR****Contact :**

Dr. P. M. Pawar (Coordinator), Dean Research and Development, SVERI's College of Engineering,
Pandharpur Gopalpur-Ranjani Road, P. B. No.54, Gopalpur, Pandharpur-413304.
Email:-techno@sveri.ac.in Website <http://techno.sveri.ac.in/committee.php>

**1ST INTERNATIONAL SPRINGER CONFERENCE ON “COMPUTATIONAL
INTELLIGENCE IN PATTERN RECOGNITION” (CIPR-2018), 19-20 JANUARY
2019, SHIBPUR, HOWRAH, WEST BENGAL****Topics**

- 1: Intelligent Algorithms for Pattern Recognition
- 2: Application of Computational Intelligence
- 3: Advance Computing

Contact :

E-mail: cipr2019@gmail.com, Ph. No: +91-8017799141, +91-8240104427, +91-9230266400,
+91-8777731539, www.cipr.in

**NATIONAL CONFERENCE ON CHALLENGES AND OPPORTUNITIES IN
STATISTICS AND INFORMATICS FOR FUTURISTIC HUMANOSPHERE
ESPECIALLY IN AGRICULTURE (COSIFHA), 29-31 JANUARY, 2019, TIRUPATI****Topics :**

The thrust areas of the conference include but not limited to the following topics:

- | | |
|--|---|
| 1. Artificial Neural | 12. Food and Nutritional Security and Sustainable |
| 2. Bayesian Inference | Agriculture |
| 3. Big Data Analytics Unlocking the future for | 13. Geo and Spatial Statistics |
| Agriculture | 14. Multivariate Analysis |
| 4. Bio Medical Informatics | 15. Official Statistics |
| 5. Bio-Informatics | 16. Operational Research |
| 6. Bi-statistics | 17. Probability and Distribution Theory |
| 7. Business Analytics | 18. Reliability Theory |
| 8. Data Mining | 19. Rural Urban Divide |
| 9. Digital Agriculture | 20. Sampling Techniques |
| 10. Design of Experiments | 21. Smart Farming vis-à-vis Internet of things |
| 11. Financial Statistics | (IoT) and Data Science |

- | | |
|--|-----------------------------------|
| 22. Soft Computing | 28. Survival Analysis |
| 23. Statistical Decision Theory | 29. Sustainable Development Goals |
| 24. Remote Sensing Techniques | 30. Statistical Quality Control |
| 25. Statistical Modeling for economic and agricultural phenomena | 31. Total Quality Control |
| 26. Statistical Genomics | 32. Total Quality Management |
| 27. Time Series Analysis and Forecasting | 33. Stochastic Modeling |

Contact :**Dr. V. Srinivasa Rao**

Professor & University Head, CONVENER, COSIFHA-2019, Student Placement Officer
Dept. of Statistics & Computer Applications, Editor, The Andhra Agricultural Journal, Nodal officer
SAS & NISAGENET, Agricultural College, ANGRAU, BAPATLA-522 101, A.P.
Ph: 08643-222006 (O), Mobile : 9441080987

**22ND ANNUAL CONFERENCE OF THE INDIAN ASSOCIATION OF
CARDIOVASCULAR THORACIC ANAESTHESIOLOGISTS, 22-24 FEBRUARY
2019, KOLKATA****Contact:**

Mr. Gaurav Sinha, CIMGlobal India Pvt. Ltd, BB-31, Ground Floor, Salt Lake City, Sector-I, Near
Punjab National Bank, Kolkata-700064, E: gaurav@cimglobal.in

S&T ACROSS THE WORLD

PALEONTOLOGISTS DISCOVER LARGEST DINOSAUR FOOT EVER

The Black Hills region of the United States is famous today for tourist attractions like Deadwood and Mount Rushmore, but around 150 million years ago it was home to one of the largest dinosaurs known. This dinosaur was a member of the sauropod family with long necks and tails. These giant plant-eating dinosaurs like *Brontosaurus* and *Diplodocus* were the largest land animals that ever lived on this planet.

The foot described in a new scientific paper recently published in the open-access journal *PeerJ* — the *Journal of Life and Environmental Sciences*, 6, 2018 was excavated in 1998 by an expedition from the University of Kansas, with Anthony Maltese, lead author of the study, as member of the crew. As he writes, it was immediately apparent that the foot, nearly a meter wide, was from an extremely large animal — so the specimen was nicknamed “Bigfoot.”

Now, after detailed preparation and study, Maltese and his international team of researchers from the USA, Switzerland, and Germany identified it as belonging to an animal very closely related to *Brachiosaurus*, famous for its appearance in the 1993 film *Jurassic Park*.

Anthony Maltese, Emanuel Tschopp, Femke Holwerda, and David Burnham used 3D scanning and detailed measurements to compare Bigfoot to sauropod feet from numerous species. Their research confirmed that this foot was unusually large. According to Holwerda, a Dutch PhD student at the Ludwig Maximilians University of Munich, Germany, comparisons with other sauropod feet showed that Bigfoot was clearly the largest dinosaur foot discovered to date.

It also confirmed that brachiosaurs inhabited a huge area from eastern Utah to northwestern Wyoming, 150 million years ago. “This is surprising,” says Tschopp, a Swiss paleontologist working at the American Museum of Natural History in New York, “many other sauropod dinosaurs seem to have inhabited smaller areas during that time.”

According to Maltese, who was part of the original University of Kansas team in 1998 but is now at the Rocky Mountain Dinosaur Resource Center in Woodland Park, Colorado, the rock outcrops that produced this fossil hold many more “fantastic dinosaur skeletons,” and the research team hopes to continue their studies on fossils from there.

Source : <https://www.sciencedaily.com/releases/2018/07/180724110119.htm>

A NEW KIND OF SPRAY IS LOADED WITH MICROSCOPIC ELECTRONIC SENSORS

Talk about cloud-connected devices.

Using tiny 2-D materials, researchers have built microscopic chemical sensors that can be sprayed in an aerosol mist. Spritzes of such minuscule electronic chips, described online July 23, 2018 in *Nature Nanotechnology*, could one day help monitor environmental pollution or diagnose diseases.

Each sensor comprises a polymer chip about 1 micrometer thick and 100 micrometers across (about as wide as a human hair) overlaid with a circuit made with atomically thin semiconducting materials. This superflat circuit includes a photodiode, which converts ambient light into electric current, and a chemical detector. This chemical detector is composed of a 2-D material that conducts electric current more easily if the

material binds with a specific chemical in its environment.

Researchers can choose from a vast menu of 2-D materials to fashion detectors that are sensitive to different chemicals, says study coauthor Volodymyr Koman, a chemical engineer at MIT (*SN Online*: 1/17/18). In lab experiments, Koman and colleagues created a sensor spray that detected toxic ammonia vapor inside a sealed section of piping, as well as a spray that ID'd soot particles sprinkled across a flat surface.

Right now, researchers can determine whether their sensors have come in contact with certain particles only after the fact — by collecting the chips and hooking them up to electrodes. These electrodes test how easily electric current flows through a chip's chemical detector, which reveals whether it touched a particular chemical after it was sprayed. But future sensors could emit light signals when in contact with target particles, says study coauthor Michael Strano, a chemical engineer at MIT.

The team is also investigating ways to power the circuits without ambient light and to integrate multiple chemical detectors onto a single chip. The simpler, single-chemical detection systems tested so far are “only the beginning,” Koman says.

“It's very exciting,” says Kourosh Kalantar-Zadeh, an electrical and chemical engineer at the University of New South Wales in Sydney whose commentary on the study appears in the same issue of *Nature Nanotechnology*. Sprayable sensors could someday detect gas leaks, pollution from power plants, volatile organic compounds and other air and water contaminants (*SN*: 3/17/18, p. 12).

Being so tiny, the devices could also be injected into a person's bloodstream to monitor its chemical composition for medical purposes —

like a blood test that wouldn't require drawing any blood, Kalantar-Zadeh says. Or chemical sensors could be taken as nasal spray or swallowed to track digestive health. Unlike silicon-based devices that might pose environmental or health hazards, the polymers and the minute amounts of 2-D materials used to make the new devices are expected to be more biofriendly, he says.

By Maria Temming : Source : <https://www.sciencenews.org/article>

OCEAN ACIDIFICATION A CHALLENGE FOR SCIENCE, GOVERNMENTS, AND COMMUNITIES

A new IMAS-led paper published in the science journal *Nature Climate Change*, 2018 has highlighted the challenges faced by scientists, governments and communities as rising levels of CO₂ are absorbed by the world's oceans.

Researchers have found that in recent centuries surface ocean pH has fallen ten times faster than in the past 300 million years and that impacts are being felt on ecosystems, economies and communities worldwide.

The economic cost to coral reefs, wild fisheries and aquaculture alone of the process known as Ocean Acidification is projected to reach more than US \$300 billion per annum.

Associate Professor Catriona Hurd, the IMAS Lead Author of the paper, which also included researchers from CSIRO Oceans and Atmosphere and ACE CRC, said Ocean Acidification posed a range of significant challenges.

“Studying how the oceans will change as they absorb more CO₂ from the atmosphere is a comparatively recent field of science,” Associate Professor Hurd said.

“The more scientists look at Ocean Acidification the more we're coming to understand how

complex it is, and how wide-ranging and diverse the impacts will be.

“The process is not happening at uniform rates around the world, and scientists have found large regional and local variability, driven by physical, chemical and biological differences across the oceans.

“Detecting trends and changes in pH is also complicated by the wide range of other dynamic processes that are affecting the oceans, including circulation, temperature, carbon cycling and local ecosystems.

“In some parts of the world, such as Chile and the US West Coast, some fisheries are already adapting to Ocean Acidification through partnerships between scientists, industry and government.

“Other global impacts are likely to require similar collaboration and action at an international level.” Associate Professor Hurd said a major question for scientists and policy-makers is whether humans should attempt to mitigate Ocean Acidification by altering ocean chemistry, or whether communities must simply adapt.

“Even if global carbon emissions were to cease today, future changes in Ocean Acidification are expected to be very long-lasting due to the amount of CO₂ already in the atmosphere and the oceans.

“Our challenge as scientists is to increase our observations and modelling of changes in ocean pH around the world.

“We will then be better placed to work with governments and communities to raise awareness of the threat of Ocean Acidification and to help develop responses,” Associate Professor Hurd said.

Source :<https://www.sciencedaily.com/releases/2018/07/180724110247.htm>

GENES COULD RECORD FORENSIC CLUES TO TIME OF DEATH

Dying, it turns out, is not like flipping a switch. Genes keep working for a while after a person dies, and scientists have used that activity in the lab to pinpoint time of death to within about nine minutes.

During the first 24 hours after death, genetic changes kick in across various human tissues, creating patterns of activity that can be used to roughly predict when someone died, researchers report February 13, 2018 in *Nature Communications*.

“This is really cool, just from a biological discovery standpoint,” says microbial ecologist Jennifer DeBruyn of the University of Tennessee in Knoxville who was not part of the study. “What do our cells do after we die, and what actually is death?”

What has become clear is that death isn't the immediate end for genes. Some mouse and zebrafish genes remain active for up to four days after the animals die, scientists reported in January 2017 in *Open Biology*.

Some human body tissues show greater levels of gene activity shortly after death than others, a new study finds. Here, the number of genes that changed detectably after death is shown for a subset of tested tissue type.

In the new work, researchers examined changes in DNA's chemical cousin, RNA. “There's been a dogma that RNA is a weak, unstable molecule,” says Tom Gilbert, a geneticist at the Natural History Museum of Denmark in Copenhagen who has studied postmortem genetics. “So people always assumed that DNA might survive after death, but RNA would be gone.”

But recent research has found that RNA can be surprisingly stable, and some genes in our DNA

even continue to be transcribed, or written, into RNA after we die, Gilbert says. "It's not like you need a brain for gene expression," he says. Molecular processes can continue until the necessary enzymes and chemical components run out.

"It's no different than if you're cooking a pasta and it's boiling — if you turn the cooker off, it's still going to bubble away, just at a slower and slower rate," he says.

No one knows exactly how long a human's molecular pot might keep bubbling, but geneticist and study leader Roderic Guigó of the Centre for Genomic Regulation in Barcelona says his team's work may help toward figuring that out. "I think it's an interesting question," he says. "When does everything stop?"

Tissues from the dead are frequently used in genetic research, and Guigó and his colleagues had initially set out to learn how genetic activity, or gene expression, compares in dead and living tissues.

The researchers analyzed gene activity and degradation in 36 different kinds of human tissue, such as the brain, skin and lungs. Tissue samples were collected from more than 500 donors who had been dead for up to 29 hours. Postmortem gene activity varied in each tissue, the scientists found, and they used a computer to search for patterns in this activity. Just four tissues, taken together, could give a reliable time of death: subcutaneous fat, lung, thyroid and skin exposed to the sun.

Based on those results, the team developed an algorithm that a medical examiner might one day use to determine time of death. Using tissues in the lab, the algorithm could estimate the time of death to within about nine minutes, performing best during the first few hours after death, DeBruyn says.

For medical examiners, real-world conditions might not allow for such accuracy.

Traditionally, medical examiners use body temperature and physical signs such as rigor mortis to determine time of death. But scientists including DeBruyn are also starting to look at timing death using changes in the microbial community during decomposition (*SN Online*: 7/22/15).

These approaches — tracking microbial communities and gene activity — are "definitely complementary," DeBruyn says. In the first 24 hours after death, bacteria, unlike genes, haven't changed much, so a person's genetic activity may be more useful for zeroing in on how long ago he or she died during that time frame. At longer time scales, microbes may work better.

"The biggest challenge is nailing down variability," DeBruyn says. Everything from the temperature where a body is found to the deceased's age could potentially affect how many and which genes are active after death. So scientists will have to do more experiments to account for these factors before the new method can be widely used.

By Erika Engelhaupt, <https://www.sciencenews.org/article>



भारतीय विज्ञान कांग्रेस संस्था

14, डॉ० बिरेश गुहा स्ट्रीट, कोलकाता-700 017, भारत

THE INDIAN SCIENCE CONGRESS ASSOCIATION

14, Dr. Biresh Guha Street, Kolkata-700 017, INDIA

दूरभाष / Telephone : (033) 2287-4530, 2281-5323

फैक्स / Fax : 91-33-2287-2551

वेबसाइट / Website : <http://sciencecongress.nic.in>

ई-मेल / E-mail : iscacal@vsnl.net

es.sciencecongress@nic.in

सदस्यता की शर्तें और सदस्यों की विशेषाधिकार/Terms of Membership and Privileges of Members :

संस्था की सदस्यता उन सभी लोगों के लिए खुली है, जो स्नातक या उसके समान स्तर पर शैक्षणिक योग्यता अर्जन कर चुके हैं, और जिन्हें भारत में विज्ञान की तरक्की में रूचि है।

Membership of the Association is open to person with Graduate or equivalent Academic Qualifications and interested in the advancement of Science in India.

1. **वार्षिक सदस्य** : जो व्यक्ति नये रूप से वार्षिक सदस्यता ग्रहण करना चाहता है उसे वार्षिक सदस्यता शुल्क ₹ 200/- के साथ भर्ती शुल्क ₹ 50/-* (विदेशियों के लिए** U.S. \$ 70) मात्र देने पड़ेंगे। वार्षिक सदस्यता शुल्क प्रत्येक वर्ष के 01 अप्रैल को देय हो जाएगा। जो भी 15 जुलाई के भीतर अपनी सदस्यता शुल्क नहीं अदा कर पाएगा वह उस साल के लिए अपनी वोट देने की क्षमता से वंचित हो जाएगा और/या वह उस वर्ष के लिए संस्था के कार्यालय को भी नियंत्रण नहीं कर पाएगा। वार्षिक सदस्य अपनी सदस्यता दोबारा अगले साल 15 जुलाई के भीतर बिना शुल्क दिए पुनः अपनी सदस्यता प्राप्त कर सकता है।

सदस्यगण अपना पेपर कांग्रेस सत्र के समय पेश कर सकते हैं। उन्हें वार्षिक विज्ञान कांग्रेस सत्र की कार्यविवरण की एक प्रति बिना मूल्य में प्राप्त हो सकती है। इसके साथ वे संस्था के रोज़नामचा "एवरीमैन्स साइंस" की प्रति भी बिना मूल्य उस साल के लिए प्राप्त कर सकते हैं। सदस्यता के नवीकरण के लिए कृपया ISCA वेबसाइट से फार्म डाउनलोड करें।

1. **Annual Member** : A person willing to be enrolled as new Annual Member has to pay an annual subscription of ₹ 200/- along with an admission fee of ₹ 50/-* (for foreign** U.S.\$ 70) only. The annual subscription of a Member shall become due on the 1st April of each year. Anyone who fails to pay the subscription on or before the 15th July in any year shall lose the right of voting and/or holding any office of the Association for that year. A member failing to pay the annual subscription by the end of March of the following year shall cease to be a Member. Annual members can renew their Membership without paying the admission fee in the next year by remitting subscriptions in time i.e. within 15th July. Members may contribute papers for presentation at the Science Congress. They will receive, free of cost, reprints of the Proceedings of the Session of any one section of their interest and also the bi-monthly journal of the Association Everymans Science for that year only. For Renewal of Membership please download the form from ISCA website.

2. **सत्र सदस्य** : यदि कुछ कारणों से वार्षिक सदस्य अपनी सदस्यता उस वर्ष के 15 जुलाई के अंदर दोहराना भूल जाएँ, तो उनकी सदस्यता, सत्र सदस्यता के रूप में बिना वोट डालने की क्षमता में सीमित कर दिया जाएगा। सत्र सदस्यको ₹ 200/- (विदेशियों के लिए \$ 50) अदा करना पड़ेगा। एक सत्र सदस्य को लेख/पोस्टर प्रस्तुतीकरण का अधिकार प्राप्त होगा जिस कांग्रेस सत्र का वह सदस्य है। एक सत्र सदस्य वोट प्रक्रिया में भाग लेने के योग्य नहीं है। सत्र सदस्य को विभागों के व्यवसाय बैठकों और साधारण बैठकों में भाग लेने की योग्यता प्राप्त नहीं है।
2. **Sessional Member** : If for some reasons, Annual Members fail to renew their Membership by remitting subscription prior to 15th July each year, their Membership for the year would be restricted to Sessional Membership without voting right. Sessional Member has to pay ₹ 200/- (for foreign \$50). A Sessional Member shall have the right to present paper/poster at the session of the congress of which he/she is a member. A Sessional Member shall not be eligible to participate in the voting process. A Sessional member shall not be eligible to participate in the Business meetings of the Sections and the General Body.
3. **छात्र सदस्य** : जो व्यक्ति स्नातक स्तर से नीचे पढ़ाई कर रहा है, उसे वार्षिक सदस्यता शुल्क ₹ 100/- मात्र देने पड़ेंगे अपना नाम छात्र सदस्य के रूप में लिखवाने के लिए, बशर्ते उसके आवेदन पत्र पर उसके प्राचार्य/विभागाध्यक्ष/संस्थान के प्रधान के हस्ताक्षर हों। एक छात्र सदस्य को यह अधिकार दिया जाएगा, कि वह अपना पेपर कांग्रेस सत्र के समय पेश कर सकें, बशर्ते वह पेपर वह किसी वार्षिक सदस्य या संस्था के कोई अवैतनिक सदस्य के साथ पेश करें। उसे वोट करने का या कार्यालय को नियंत्रण करने का अधिकार प्राप्त नहीं होगा। छात्र सदस्य को विभागों के व्यवसाय बैठकों में भाग लेने की योग्यता प्राप्त नहीं है।
3. **Student Member** : A person studying at the under-graduate level may be enrolled as a Student Member by paying an annual subscription of ₹ 100/- **only provided his/her application is duly certified by the Principal/Head of the Institution/Department.** A student member shall have the right to submit papers for presentation at the Session of the Congress of which he/she is a member, provided such papers be communicated through a Member, or an Honorary Member of the Association. He/She shall not have the right to vote or to hold any office. A student member shall not be eligible to participate in the Business Meetings of the Sections and the General Body.
4. **आजीवन सदस्य** : एक सदस्य अपने भविष्य की सारी वार्षिक सदस्यता शुल्क एक बार में ₹ 2,000/- (विदेशियों के लिए U.S. \$ 500) मात्र अदा करके पा सकता है। एक व्यक्ति जो 10 साल या उससे अधिक नियमित रूप से सदस्यता प्राप्त कर चुका है, उसे उसकी संयुक्त सदस्यता शुल्क के ऊपर प्रतिवर्ष ₹ 50/- की छूट दी जाएगी, बशर्ते कि उसकी संयुक्त शुल्क ₹ 1,200/- से नीचे न हों (विदेशियों के लिए U.S. \$ 12.50 और U.S. \$ 300 क्रमशः)। एक आजीवन सदस्य को उसके पूरे जीवन काल में सदस्यता की सारे विशेषाधिकार प्राप्त होंगे।
4. **Life Member** : A Member may compound all future annual subscriptions by paying a single sum of ₹ 2,000/- (for foreign** U.S. \$ 500) only. Any person who has been continuously a member for 10 years or more, shall be allowed a reduction in the compounding fee of ₹ 50/- for every year of such membership, provided that the compounding fee shall not be less than ₹ 1,200/- (for foreign** U.S. \$ 12.50 and U.S. \$ 300 respectively). A life Member shall have all the privileges of a member during his/her lifetime.
5. **संस्थान सदस्य** : एक संस्थान जो ₹ 5,000/- सदस्यता शुल्क के रूप में दे वही संस्था के संस्थान सदस्य उस वित्तीय वर्ष के लिए बन सकता है, (विदेशियों के लिए U.S. \$ 2,500)। इसमें वह विज्ञान कांग्रेस के वार्षिक सत्र में अपने एक व्यक्ति का नाम नामांकित कर सकता है, जो उनका प्रतिनिधि हों। एक संस्थान सदस्य

को वार्षिक विज्ञान कांग्रेस सत्र की कार्यविवरण की एक पूर्ण प्रति बिना मूल्य में प्राप्त हो सकती है। इससे साथ वे संस्था के रोज़नामचा "एवरीमैन्स साइंस" की प्रति भी बिना मूल्य प्राप्त कर सकते हैं।

5. **Institutional Member** : An Institution paying a subscription of ₹ 5,000/- (for foreign** U.S. \$ 2,500) only, can become an Institutional Member of the Association for that financial year. It shall be eligible to nominate one person as its representative to attend Annual Session of the Science Congress. An Institutional Member shall be eligible to receive, free of cost, a copy of the complete set of Proceedings of the Annual Science Congress Session as also a copy each of the Associations journal Everymans Science.

6. **दाता** : कोई भी व्यक्ति जो एकसाथ ₹ 10,000/- (विदेशियों के लिए U.S. \$ 5,000) मात्र दें, वह संस्था के दाता बन सकते हैं। एक व्यक्तिगत दाता को वह सारे अधिकार और विशेषाधिकार मिलेंगे जो एक सदस्य को उसके पूर्ण जीवन काल में प्राप्त होते हैं।

एक संस्थान जो एकसाथ ₹ 50,000/- (विदेशियों के लिए U.S. \$ 25,000) मात्र दें, सदा के लिए इस संस्था के संस्थान दाता बन सकते हैं, जिसे वह एक व्यक्ति को नामांकित करके उसे अपने संस्थान के प्रतिनिधि के रूप में विज्ञान कांग्रेस के वार्षिक सत्र में भेज सकते हैं। एक संस्थान/व्यक्तिगत दाता वार्षिक विज्ञान कांग्रेस के कार्यविवरण और संस्था के रोज़नामचा "एवरीमैन्स साइंस" की प्रति भी बिना मूल्य प्राप्त कर सकते हैं।

6. **Donor** : Any person paying a lump sum of ₹ 10,000/- (for foreign** U.S. \$ 5,000) only, can become an Individual Donor of the Association, an **INDIVIDUAL DONOR** shall have all the rights and privileges of a member during his/her lifetime.

An Institution paying a lump of ₹ 50,000/- (for foreign** U.S. \$ 25,000) only, can become an **INSTITUTIONAL DONOR** of the Association forever, which shall have the right to nominate one person as its representative to attend Annual Session of the Science Congress. An Institutional/Individual Donor shall be eligible to receive, free of cost, a copy of the complete set of Proceedings of the Annual Science Congress Session as also the Associations journal Everymans Science.

* भर्ती शुल्क ₹ 50/- सिर्फ एक नये वार्षिक सदस्य के लिए ज़रूरी है। यह सत्र सदस्य/आजीवन सदस्य/संस्थान सदस्य/छात्र सदस्य/दाता के लिए ज़रूरी नहीं है।

* *Admission fee of ₹ 50/- is needed only for becoming a new Annual Member and not for Sessional Member/Life Member/Institutional Member/Student Member/Donor.*

** (एक विदेशी सदस्य का अर्थ है, जो भारतवर्ष के बाहर का नागरिक हों।)

** (*A Foreign Member means one who is normally Resident outside India.*)

- (अ) **पेपर पेश करना** : एक पूर्ण पेपर की प्रति उसके साथ तीन सारांश की प्रति जो 100 शब्दों से ज्यादा न हों और जिसमें कोई आरेख या फार्मूला न हों, वह प्रत्येक वर्ष 15 सितम्बर के अंदर अनुभागीय अध्यक्ष तक पहुँच जाना चाहिए।

- (A) **Presentation of Papers** : A copy of complete paper accompanied by an abstract in triplicate not exceeding one hundred words and not containing any diagram or formula, must reach the Sectional President latest by September 15, each year.

- (ब) सभी वर्गों के सदस्य जो विज्ञान कांग्रेस सत्र में भाग लेने के पश्चात लौटते समय के टिकट में रियायत प्राप्त कर सकता है, बशर्ते कि उनकी यात्रा के खर्च का थोड़ा भी भाग सरकार (केन्द्रीय या राज्य), कोई कानूनी

सत्ता या कोई विश्वविद्यालय या कोई नगरपालिका न उठाएँ और उनकी कुल कमाई या परिलब्धियां ₹ 5,000/- (प्रति माह पाँच हजार रुपए) से अधिक नहीं हैं। कृपया ISCA वेबसाइट से रेलवे रियायत फार्म डाउनलोड करें।

- (B) Members of all categories are entitled to **Railway Concession** of return ticket by the same route with such conditions as may be laid down by the Railway Board for travel to attend the Science Congress Session provided that their travelling expenses are not borne, even partly, by the Government (Central or State), Statutory Authority or an University or a City Corporation and their total earning of or emoluments drawn do not exceed ₹ 5,000/- (Rupees Five Thousand per month). Please download the Railway Concession form from ISCA Website.
- (स) संस्था के पुस्तकालय में सभी वर्गों के सदस्य को पढ़ने की सुविधा सुबह 10.00 बजे से शाम को 5.30 बजे तक सभी काम के दिनों में (शनिवार और रविवार) को छोड़कर प्राप्त होगी।
- (C) Members of all categories are entitled to reading facilities between 10.00 a.m. to 5.30 p.m. on all weekdays (except Saturdays & Sundays) in the library of the Association.
- (ड) समय समय पर संस्था द्वारा तय की गई मूल्य दरों पर विश्रामगृह, सभागार आदि सुविधाओं की प्राप्ति भी सभी वर्गों के सदस्य कर सकते हैं।
- (D) Members of all categories may avail Guest House facilities, Lecture Hall hiring at the rates fixed by the Association from time to time.
- (ई) भविष्य में भारतीय विज्ञान कांग्रेस संस्था द्वारा आयोजित परिसंवाद, सम्मेलन और वार्षिक कांग्रेस में सभी वर्गों के सदस्यों द्वारा भाग लेने के लिए अपनी—अपनी सदस्यता पत्र को लाना ज़रूरी होगा।
- (E) Members of all categories should bring the Membership Card always for attending any Seminar, Conference and Annual Congress organized by ISCA in future.

ध्यान दें : (1) सभी बैंक ड्राफ्ट The Indian Science Congress Association के नाम से ही लिखा जाएँ, सदस्यता के विषय में बैंक ड्राफ्ट की प्राप्ति और जो कोलकाता के किसी भी शाखा में देय हों। सदस्यों से यह निवेदन किया जा रहा है, कि वे अपनी सदस्यता संख्या का उल्लेख भारतीय विज्ञान कांग्रेस संस्था के कार्यालय के साथ पत्राचार के वक्त अवश्य करें।

(2) भारतीय विज्ञान कांग्रेस संस्था द्वारा मनीऑर्डर, आई. पी. ओ., ई. सी. एस. या चेक से भुगतान ग्रहण नहीं किया जाएगा। कोई भी सदस्यता निर्धारित सदस्यता फार्म (आवेदन-पत्र नई सदस्यता/सदस्यता की नवीकरण के लिए) में विधिवत बिना भरने से नहीं लिया जाएगा।

(3) नकदी केवल ISCA मुख्यालय में हाथ से लिया जाएगा। कृपया डाक द्वारा लिफाफे के भीतर नकदी नहीं भेजें।

Note : (1) All Bank Drafts should be drawn in favour of *The Indian Science Congress Association*, membership subject to realisation of the bank draft, Payable at any branch in Kolkata. Members are requested to mention their Membership No. while making any correspondence to ISCA office.

(2) No money order, I.P.O., ECS or cheque will be accepted by ISCA. No Membership will be taken without duly filled in prescribed Membership Form (Application Form for New Membership/Application for Renewal of Membership).

(3) Cash will only be taken by hand at ISCA Hqrs. Pl. do not send the Cash by Post within the envelop.



भारतीय विज्ञान कांग्रेस संस्था

14, डॉ० बिरेश गुहा स्ट्रीट, कोलकाता-700 017, भारत

THE INDIAN SCIENCE CONGRESS ASSOCIATION

14, Dr. Biresh Guha Street, Kolkata-700 017, INDIA

दूरभाष / Telephone : (033) 2287-4530, 2281-5323

फैक्स / Fax : 91-33-2287-2551

वेबसाइट / Website : <http://sciencecongress.nic.in>

ई-मेल / E-mail : iscacal@vsnl.net

es.sciencecongress@nic.in

सदस्यता के लिए नया आवेदन पत्र/Application Form For New Membership

सेवा में/To

महासचिव (सदस्यता कार्य)/The General Secretary (Membership Affairs)
भारतीय विज्ञान कांग्रेस संस्था/The Indian Science Congress Association
14, डॉ० बिरेश गुहा स्ट्रीट/14, Dr. Biresh Guha Street,
कोलकाता-700 017/Kolkata-700 017

स्टैम्प आकार का
फोटो /
Stamp Size
Photograph

महोदय/Dear Sir,

मैं भारतीय विज्ञान कांग्रेस संस्था का आजीवन सदस्य/वार्षिक सदस्य/सत्र सदस्य/छात्र सदस्य/संस्थान सदस्य/व्यक्तिगत दाता/संस्थागत दाता अपना नाम लिखवाना चाहता/चाहती हूँ।

I like to be enrolled as a Life Member/Annual Member/Sessional Member/Student Member/Institutional Member/Individual Donor/Institutional Donor of The Indian Science Congress Association. (Pl. Tick)

मैं इसके साथ ----- सदस्यता शुल्क के रूप में नकद ₹ -----/बैंक ड्राफ्ट संख्या ----- दिनांकित ----- प्रचालक बैंक ----- 01 अप्रैल 20----- से 31 मार्च 20----- तक भेज रहा/रही हूँ।

I am sending herewith an amount of ₹ in payment of my subscription by Cash/Bank Draft No. _____ dated issuing bank from the year 1st April 20_____ to 31st March 20_____.

मैं निम्नलिखित विभाग में रुचि रखता/रखती हूँ (कृपया किसी एक में निशान लगाएँ)/I am interested in the following section (Please tick any one).

विभाग/Sections

1. कृषि और वानिकी विज्ञान/Agriculture and Forestry Sciences
2. पशु, पशुचिकित्सा और मत्स्य विज्ञान/Animal, Veterinary and Fishery Sciences
3. मानवशास्त्रीय और व्यवहारपरक विज्ञान (जिसमें सम्मिलित, हैं, पुरातत्व-विज्ञान, मनोविज्ञान, शैक्षिक विज्ञान और सेना विज्ञान)/Anthropological and Behavioural Sciences (including Archaeology, Psychology, Education and Military Sciences)
4. रसायन विज्ञान/Chemical Sciences

5. भू-पद्धति विज्ञान/Earth System Sciences
6. अभियन्ता विज्ञान/Engineering Sciences
7. पर्यावरण विज्ञान/Environmental Sciences
8. सूचना और संचारण विज्ञान और प्रौद्योगिकी (जिसमें कंप्यूटर विज्ञान भी सम्मिलित है)/Information and Communication Science & Technology (including Computer Sciences)
9. भौतिक विज्ञान/Materials Science
10. गणित विज्ञान (जिसमें सांख्यिकीय सम्मिलित है)/Mathematical Sciences (including Statistics)
11. चिकित्सा शास्त्र (जिसमें शरीर विज्ञान भी सम्मिलित है)/Medical Sciences (including Physiology)
12. नया जीवविज्ञान (जिसमें जीव रसायन, जीव भौतिकी और आणविक जीवविज्ञान और जीव-प्रौद्योगिकी भी सम्मिलित है)/New Biology (including Bio-Chemistry, Biophysics & Molecular Biology and Biotechnology)
13. भौतिकीय विज्ञान/Physical Sciences
14. वनस्पति विज्ञान/Plant Sciences

(कृपया टंकित करें या ब्लॉक अक्षरों में भरें/Please type or fill up in Block Letters)

नाम/Name (ब्लॉक अक्षरों में/in Block Letters) :

श्री/सुश्री/श्री/श्रीमती/डॉ०/प्रो०/Mr./Ms./Shri/Shrimati/Dr./Prof (कृपया टिक करें)/(Please tick)

कुलनाम/Surname

प्रथम नाम/First Name

मध्य नाम/Middle Name

शैक्षणिक योग्यता/Academic Qualifications :

(अंतिम शैक्षणिक योग्यता प्रमाण-पत्र अंक-सूची का स्वतःसत्यापित जिराक्स प्रति संलग्न करना है/Self attested xerox copy of last educational certificate/marksheet must be attached)

पदनाम/Designation

सम्पर्क का पता/Address of communication :

(राज्य, शहर/नगर और पिन कोड सहित/including state, city/town and pin code)

दूरभाष संख्या/मोबाईल संख्या और ई-मेल/Phone No./Mobile Number & E-mail :

किसी भी सरकारी अनुमोदित पहचान पत्र (अनिवार्य)/Any Govt. approved ID Card (Mandatory) :

वर्तमान वर्ष विश्वविद्यालय प्रवेश-पत्र/Current Year University Admit Card :

स्थायी पता/Permanent Address :

दिनांक/Date :

भवदीव/Yours Faithfully

हस्ताक्षर/Signature

ध्यान दें : (i) सभी बैंक ड्राफ्ट The Indian Science Congress Association के नाम से ही लिखा जाएँ, सदस्यता के विषय में बैंक ड्राफ्ट प्राप्ति और जो कोलकाता के किसी भी शाखा में देय हों।

- Note :**
- (i) All Bank Drafts should be drawn in favour of *The Indian Science Congress Association*, membership subject to realisation of the bank draft, Payable at any branch in Kolkata.
 - (ii) सभी सदस्यता और सदस्यता के नवीकरण के लिए आवेदन-पत्र आवेदकों को अपने खुद के पते उपलब्ध कराके करने चाहिए न कि देखभाल के पते प्रस्तुत करने चाहिए।
 - (ii) All Application Forms for Membership and the renewal of Membership must be submitted by providing the address of the applicants themselves only and not any care of address.
 - (iii) भर्ती शुल्क ₹ 50/- सिर्फ एक नये वार्षिक सदस्य के लिए ज़रूरी है। वह सदस्य/आजीवन सदस्य/संस्थान सदस्य/छात्र सदस्य/दाता के लिए ज़रूरी नहीं है।
 - (iii) Admission fess of ₹ 50/- is needed only for becoming a new Annual Member and not for Sessional Member/Life Member/Institutional Member/Student Member/Donor.
 - (iv) सदस्यों से यह निवेदन किवा जा रहा है कि वे अपनी सदस्यता संख्या का उल्लेख भारतीय विज्ञान कांग्रेस संस्था के कार्यालय के साथ पत्राचार के समय अवश्य करें।
 - (iv) Members are requested to mention their Membership No. while making any correspondence to ISCA office.
 - (v) भारतीय विज्ञान कांग्रेस संस्था द्वारा मनीऑर्डर, आई. पी. ओ., ई. सी. एस. या चेक से भुगतान ग्रहण नहीं किया जाएगा।
 - (v) No Money Order, I.P.O., ECS or Cheque will be accepted by ISCA.
 - (vi) कोई भी सदस्यता निर्धारित सदस्यता फार्म (आवेदन-पत्र नई सदस्यता/सदस्यता की नवीकरण के लिए) में विधिवत बिना भरने से नहीं लिया जाएगा।
 - (vi) No Membership will be taken without duly filled in prescribed Membership Form (Application Form for New Membership/Application For Renewal of Membership).
 - (vii) नकदी केवल ISCA मुख्यालय में हाथ से लिया जाएगा। कृपया डाक द्वारा लिफाफे के भीतर नकदी नहीं भेजें।
 - (vii) Cash will only be taken by hand at ISCA Hqrs. Pl. do not send the cash by Post within the envelope.