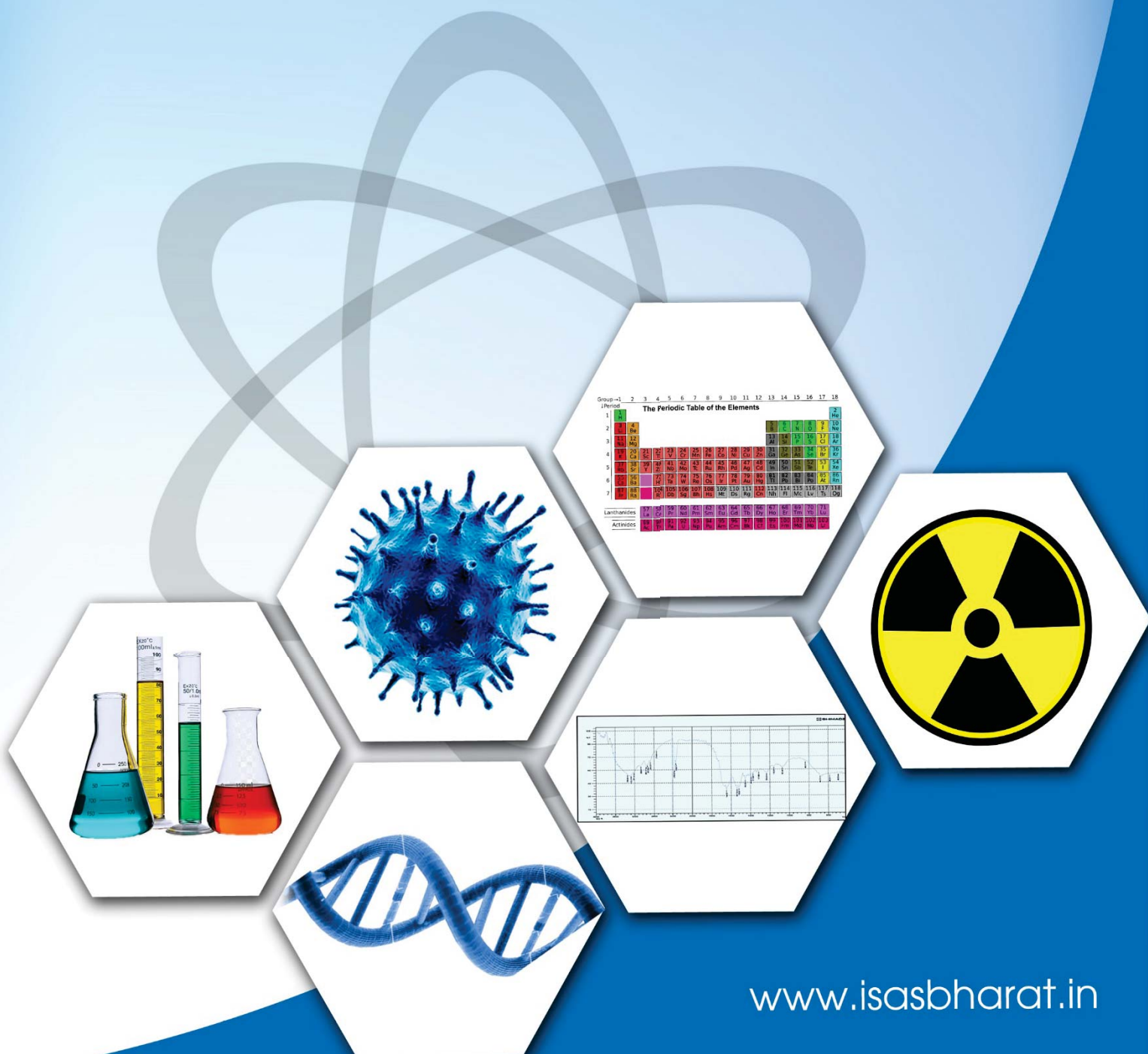




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# Journal of ISAS

An open access peer reviewed quarterly e-journal by  
Indian Society of Analytical Scientists





# Journal of ISAS

An open access peer reviewed quarterly e-journal published by  
Indian Society of Analytical Scientists

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### **Message from Dr R. Chidambaram**

Dear Dr. Chandrachoodan,

I am very happy to note that ISAS, for the first time in India, is bringing out a Journal in Analytical Sciences, named as Analytica India. Analytical sciences are essential for many areas including healthcare and biology, environmental monitoring, forensics, and of course, research in chemistry, physics and other disciplines.

I am sure that Analytica India, as it will be managed by highly experienced and reputed Indian scientists from DAE and ISRO, and other leading Indian academicians, will maintain the highest standards in terms of content and quality,

I send my best wishes to Analytica India for becoming a popular journal of high international repute.

Regards

R. Chidambaram  
AICTE Distinguished Chair Professor &  
Chairman (Honorary),  
School of Advanced Studies in Nuclear Science & Technology, BARC



**Message from Dr Anil Kakodkar**

Dear Dr. Chandrachoodan,

I am very happy to note that ISAS has embarked upon, for the first time in India, the responsibility of running a high quality Journal 'Analytica India' in the field of analytical sciences.

I am sure that it will be of the best standard in content and quality and bridge a key gap through the efforts of active scientists from DAE and ISRO, along with other reputed Indian academicians.

I wish that Analytica India soon becomes a very popular Indian Technical Journal of International reputation.

With best regards,

Anil Kakodkar  
Chairman, Atomic Energy Commission &  
Secretary, Department of Atomic Energy (former)

के. एन. व्यास  
K. N. Vyas



अध्यक्ष, परमाणु ऊर्जा आयोग  
व  
सचिव, परमाणु ऊर्जा विभाग  
Chairman, Atomic Energy Commission  
&  
Secretary, Department of Atomic Energy

June 09, 2022

Dear Dr. Chandrachoodan,

*I am very happy to note that ISAS has embarked upon, for the first time in India, the responsibility of running a Journal in Analytical Sciences, named as Analytica India.*

*I am sure that it will be of the best standard in content and quality, as it is managed by highly experienced and reputed Indian Scientists from DAE and ISRO, along with reputed Indian academicians.*

*I wish that the Analytica India soon become a very popular Indian Technical Journal of International reputation.*

Thanking you & with best regards,

Yours sincerely,



(K.N. Vyas)

Dr. P.P Chandrachoodan  
President, ISAS





भारत सरकार  
Government of India

डॉ. अजित कुमार मोहान्ती  
Dr. Ajit Kumar Mohanty

निदेशक, भाभा परमाणु अनुसंधान केंद्र  
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सदस्य, परमाणु ऊर्जा आयोग  
Member, Atomic Energy Commission



### MESSAGE

Analytical science having footprint across all the domain of science & technology, plays a key role in healthcare diagnostics, environmental monitoring, forensics, chemical biology, pharmaceuticals, chemical engineering, synthetic chemistry and sustainability sciences. With the continuous developments of various advance instruments and also the methodologies of analysis, the arena of quality control which is an essential component of various field assumes great significance. Advances in scientific fields demands faster, efficient, economical, sensitive, selective, accurate, and simple analytical techniques. In this context, the introduction of journal 'Analytica India' by Indian Society of Analytical Scientists is very timely. This will definitely help the researchers to share their research and innovations with scientific community and also help the analysts to adopt the latest analytical techniques in their respective fields.

I am sure that 'Analytica India' with its highly qualified and experienced editorial team members will be of the desired standard in content and quality.

I wish that Analytica India soon become a very popular Indian technical journal noticed internationally.

*Ajit Kumar Mohanty*  
(Dr. Ajit Kumar Mohanty)



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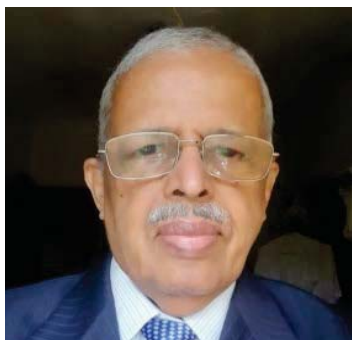
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ISAS

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### **Message from President ISAS**

Congratulations to the **Internationally Reputed Indian Analytical Scientists**, who have contributed to the tremendous All Round technical growth of India, and who are also the strength behind the organisation of this **Journal of ISAS**, titled as **Analytica India**.

I wish the Analytica India a grand popularity amongst the Indian National and International scientific fraternity, both in terms of Content and Quality, as well as Relevance and Acceptability.

I wish to acknowledge the yeomen efforts put in by the Advisory Committee and the Editorial Committee of the ISAS Journal, as well as appreciate the prudence and Wisdom expressed by the Executive Committee of Indian Society of Analytical Scientists, for embarking upon a much needed Indian Journal on this topic.

Further, I wish to gratefully acknowledge the highly appreciative and supportive Messages to Analytica India, given by the contemporary leaders and achievers of great land marks of Self Reliance in Indian Science and Technology Scenario, like Dr R. Chidambaram, Dr Anil Kakodkar, Dr KN Vyas and Dr AK Mohanty, included in this issue of Analytica India.

I wish well for Analytica India to become a very reputed International Journal, very soon.

(Dr. P. P. Chandrachoodan)  
President, ISAS.



Indian Society of Analytical Scientists

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### **Message From Dr. Raghav Saran**

Vice President, ISAS (India)

Chief Advisor and Publisher, 'Analytica India'

Friends, I am very much humbled to publish and present to you all the very first inaugural issue of Vol.1(1), July 2022, an open access peer reviewed e-journal, all settled with the name 'Analytica India' but suddenly, to our utmost dismay, it was brought to our notice that the name was already registered trademark of some other organisation leaving us with the only sensible logical solution of changing the name to an already registered name available to us. The matter was quickly resolved by changing the name from Analytica India to **Journal of ISAS**. After all a stitch in time saves nine and friends, after all what is there in a name, rose is after all a rose only. Dedication of the whole team behind the publication of journal is absolutely the same. It's indeed a great dream come true moment to all the executive members of ISAS and also to all the members associated with the process of publishing the journal.

The inconvenience caused to one and all, due to changed name, subscribing authors, reviewers, sponsors is deeply regretted. Above all, our sincere most apologies to the great leaders of scientific world, Chairman, AEC, Secretary to the govt. of India, DAE (Former and present), Director BARC who had blessed our Journal with inspiring and motivating messages, due to discomfort caused by the change of name of the journal to **Journal of ISAS**. All concerned, directly or indirectly, may please note that name of the journal mentioned as Analytica India stands changed to **Journal of ISAS** with immediate effect (as resolved by the competent authority) and the use of Analytica India, as name of ISAS journal is totally withdrawn from the messages from dignitaries or in any other form.

So far ISAS, in general was confined to conferences, theme meetings, half day seminars and various other activities across ten chapters of ISAS. During pandemic, we resorted to the webinar mode and organised 75 talks, one on every Saturday evening, delivered by eminent speakers from wide cross section of scientific, technology and industrial community pertaining to various parts of the country. Recently, we organised two conferences, IASC-2022 (national) and NHCHTCS-22 (*international*) respectively, at Kerala and Nagpur. But still we were restless to realize our long-cherished desire of have our own journal. The matter was proposed by our President and was happily agreed by Dr. Nilima Rajurkar, Chairman, ISAS Pune Chapter, to be Editor in Chief for the journal. Subsequently, our journey began with the rocket speed consisting of formulations of the journal, various committee members and many more aspects, the result of which is **Journal of ISAS**' a journal open to you all, freely, today.



Needless to mention that during conferences, the interactions amongst scientific community are of time bound nature and to some extent not that long lasting, hence partially fructified. On the contrary, journal, that too e journal, with no fees for publishing at the end of authors and also for readers, researchers, totally being free, can be a permanent platform to have continued interactions. Also, the pace with which the science is progressing, analytical sciences assume newer dimensions so rapidly that analytical figures of merit, once thought impossible, is becoming reality. Creative thinking in analytical sciences and then bringing it to the application end is possible just because of new, constant researches across the globe, free access to knowledge, and all, assuming a real dimension today. This is mainly due to like-minded people working hard to innovate new ready to use applications, through off line, online interactions and data publication with high pace daily in various journals. The present attempt by ISAS to publish our own ISAS Journal, **Journal of ISAS** is one such milestone to encourage, motivate younger generation scientists affiliated to various universities, institutions and industries, We also aim to integrate our younger generation researchers across the country and also globally with ISAS playing a pivotal role with the expertise available with it in form of executive member scientists, advisors and editors for journal who have expertise in various areas of analytical sciences for over three decades at least. I am very confident that communicating research papers in '**Journal of ISAS**' journal, provides an opportunity for your paper to get reviewed by experts with par excellence expertise in respective fields ensuring the high quality of papers. I am happy to let you know that we have already received papers sufficient even for the next issue.

My whole hearted gratitude to our ISAS President for keeping faith in me and bestowing the team to shoulder the responsibility of a very exciting journey towards the task of completion of the first inaugural issue of the journal '**Journal of ISAS**'. I am very much thankful to the Editor in Chief, Analytica India' for carrying out the highly strenuous job of bringing the manuscripts, meticulously to the 'acceptance' level scientifically as per journal's guidelines, who is well backed by strong team of advisors, editors, reviewers, EC members of ISAS, layout designers and printing press personnel. I wish to express my sincere thanks to Dr V. Balram for his continued support. My special thanks to all our sponsors for supporting us by the way of advertisements in the current issue of the journal

Our gratitude needs no bound for the kind inspiring motivational messages blessing us to move ahead incessantly on the new path from Chairman, Atomic Energy Commission, Secretary to the Department of Atomic Energy, Govt. of India (former and present) and Director, BARC, for the journal. Deeply gratified to you all Sir!

I wish to place on record, my special thanks to one and all who have contributed directly or indirectly, towards bringing out this issue of our journal. Lastly and most importantly to all the authors for sending the manuscripts to us. As is well known that the manuscripts published in the journal will always be permanent. I on behalf of my all-vibrant team members of journal and EC members of ISAS would be happy to keep the promise to you all towards taking the level of the journal to greater heights by way of acquiring ISSN, doi, UGC approval, etc. very soon and incorporating novel research articles from various domains of analytical sciences across the country and globe to be an equal partner in all round development of science leading to betterment of mankind.



Dr. Raghaw Saran



Indian Society of Analytical Scientists.



### Editorial

It is with immense pleasure, pride and enthusiasm, I invite you to read the inaugural issue of our Journal “Journal of ISAS”. It represents the collective thinking of a group of innovative individuals from different disciplines of scientific fields with whom I am privileged to work. In this inaugural issue you will find an array of works right from cost effective techniques for waste water treatment to an exhaustive review on widely used technique of ICPMS and its applications. Quite a lot of efforts have been put in the development of this journal and I am sure you will see them reflected in this volume and its subsequent impact on the scientific community. “Journal of ISAS” will be always innovative providing a special space for scholarly works representing the integration of all branches of science.

I must give special thanks to Dr. P.P. Chandrachoodan, President ISAS who had the vision to embark a new venture of starting our own scientific journal. His ability to draw together diverse talents and his confidence in board members brought this journal to fruition. It has been an interesting journey right from the inception of journal to making a dream true. I would like to express my sincere gratitude towards Dr. Raghaw Saran, Vice president ISAS and Chairman, Advisory board of Journal of ISAS for his constant guidance, inspiration and support at each stage of journal progress. I wish to express my special thanks to Editorial board members: Dr. Vijayalaxmi Adya and Dr. Vinay Bhandari for their continuous cooperation in this journey. Without the guidance, support, and feedback of the Editorial and Advisory board members and reviewers, it would have been impossible to offer the selections you will see in this issue. I congratulate all the researchers who contributed their work in this inaugural issue. I would like to put on record my sincere thanks to Kailash Gharat, Shivani Kantak and Vaibhav Parse for their technical support.

I am very much grateful to all the dignitaries for their blessings to the journal in the form of inspirational and motivational messages.

*Nilima Rajurkar*

Dr. Nilima Rajurkar  
Editor in Chief, Journal of ISAS

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# Journal of ISAS

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