



INSTITUTE OF ADVANCED STUDY IN SCIENCE AND TECHNOLOGY
(AN AUTONOMOUS INSTITUTE UNDER THE DEPARTMENT OF SCIENCE AND
TECHNOLOGY, GOVT. OF INDIA) PASCHIM BORAGAON, GARCHUK
GUWAHATI- 781035

Minutes of the FOURTEEN MEETING OF THE SCIENTIFIC ADVISORY Council (SAC) OF THE INSTITUTE OF ADVANCED STUDY IN SCIENCE AND TECHNOLOGY (IASST), GUWAHATI HELD ON 18th & 19th December 2023

Members present:

1. Prof. Sayed E. Hasnain, IIT Delhi, New Delhi	Chairman
2. Dr. Arun Sharma, DG, NECTAR, Shillong,	Member
3. Prof. Amalendu Chandra, IIT, Kanpur	Member
4. Prof. Mahan Maharaj, TIER, Mumbai (present online)	Member
5. Prof. B. N. Goswami, Cotton University, Guwahati	Member
6. Prof. Neela Natraj, IIT Bombay, Mumbai (present online)	Member
7. Prof. Dhruva K. Bhattacharyya, Tezpur University, Tezpur (online)	Member
8. Prof. A.K. Mukherjee, Director, IASST	Member
9. Prof. Neelotpal Sen Sarma, IASST, Guwahati	Member Secretary

Leave of absentia granted to:

1. Prof. Avinash Khare, VC, Sikkim University, Sikkim,
2. Prof. Parameswar K. Iyar, IIT Guwahati and
3. Prof. Pulok Mukherjee, Director, IBSD, Imphal and
4. Dr. Rajlakhsmi Devi, IASST, Guwahati (retired), could not attend the meeting due to their preoccupations/ retirement. The meeting was held in hybrid mode.

AGENDA ITEM NO. 1: Welcome addressed by the Director, IASST

Initially, Prof. A.K. Mukherjee, Director, IASST, welcomed Professor Sayed E. Hasnain, Chairman, Scientific Advisory Council, and the other esteemed members of the 14th Scientific Advisory Council (SAC) meeting of IASST held in the conference

room of IASST. Prof. Mukherjee briefly mentioned that the Institute is growing steadily with the advice and suggestions from the Advisory Council. Prof. Mukherjee then requested Prof. Hasnain, Chairman, SAC, to give his opening remarks and recommendations for the Institute.

AGENDA ITEM NO. 2: Opening remarks by Prof. Sayed E. Hasnain, Chairman, SAC, IASST

In his opening remarks, Prof. Sayed E. Hasnain welcomed all the SAC members and the IASST faculties. He mentioned that Guwahati is now emerging very fast in every aspect. Prof. Hasnain, in his remark, noted that the character of the Institute is very envious as research in IASST has a beautiful blend of almost all the science streams like mathematics, physics, plasma physics, and biology, including issues like probiotics, medicinal plant, and snake bite and venom. Biology is dominating everywhere now, and collaboration with other regional institutes will be beneficial. IASST is unique in that it publishes in high-impact journals and, at the same time, works for the common people with a tremendous societal impact. IASST does not only work on basic science, as few institutes do, or purely on technological science, as IITs do, but also in a lovely balance, which is the Institute's strength.

AGENDA ITEM NO. 3: Progress report of IASST presented by the Director, IASST

Prof. A.K. Mukherjee, the Director of IASST, made a brief PowerPoint presentation on the progress of IASST from February to November 2023. In the introduction, he showed the brief history, divisions, branches, and major thrust areas of IASST.

Prof. Mukherjee showed that IASST had made remarkable progress in research activity during the last few months, apparent from the increased quality and quantity of publications. For example, during the period, IASST had 71 publications with an average Impact Factor of 4.79; 24 papers had an Impact Factor of 5 to 10, and one paper had more than 10. During this period, four patents were granted, and eight were applied. Thirteen research scholars of IASST were awarded PhD degrees during this period.

Prof. Mukherjee highlighted the work with Societal interventions for spreading awareness for the growth of science and technology in the tribal community. IASST has been actively conducting tribal school student and science teacher training programs by arranging their regular visits to IASST laboratories.

Prof. Mukherjee introduced the two newly joined faculty members under the Life Sciences Division, Dr Asis Bala and Dr. Vijay Singh, to the members of the SAC. He also introduced Dr. Shibnath Samanta and Dr. Sheo Shankar Pandey, who joined IASST as Ramanujan and Ramalingaswami Fellow, respectively. Further, he informed the SAC that, as suggested by the SAC, IASST is now recruiting Institute post-doc fellows, and their salary is paid from the core budget of IASST. In addition, IASST also encourages DST and DBT post-doc fellows to join the Institute; however, the number is meager at present. IASST expects one or two INSPIRE fellows for the Institute. IASST has started the construction of a 100-seater women's hostel with due approval from DST. The building should be completed at the beginning of next year, and it will be able to accommodate more research scholars on the campus.

Prof. Mukherjee also showed glimpses of the Academic and Scientific Lectures and events organized during the period. He mentioned that Dr. Pedro Alexandrino Fernandes, a computational biochemist from the University of Porto, Portugal, visited IASST to deliver a talk on supercomputing in biochemistry, biotechnology, and drug discovery. Further, IASST and the University of Porot are trying to establish a collaborative linkage and student exchange between these two countries. Prof. Kini from the National Institute of Singapore also visited IASST for a one-to-one discussion with the scientists of IASST.

Prof. Mukherjee highlighted the noticeable progress of the work of Bionest, IASST, where 41 virtual and nine physical incubatees are involved in developing prototypes of their products. Presently, three self-help groups and 32 companies are working with the Bionest group, and the Secretary of DST has appreciated their work. However, Bionest needs a separate building for its progress associated with the overwhelming response from all sectors. The effort is also going on to develop and commercialize ethnic foods and obtain their GI tags.

IASST has to increase its research workforce to enhance its progress. To do so, after a lengthy discussion and effort, DST has revived two posts of Associate Professor II, and the revival process for two more abolished posts is underway.

AGENDA ITEM NO. 4: Action taken Report on the decisions of the last SAC meeting presented by the Member Secretary, SAC, IASST.

Prof. Neelotpal Sen Sarma, Member Secretary, SAC, IASST, informed that the **Action Taken Report** was already circulated among the members, and there was no objection from any member. Therefore, further presenting the action taken report would be unnecessary and may be discarded. Hon'ble Chairman and all the members present agreed on the decision. The Report, which was circulated among the SAC members, is as follows:

Action Taken Report on the decisions/deliberations of the 13th meeting of the SAC held on 13th and 14th February 2023

Item	Suggestions	Action Taken
AGENDA ITEM NO. 7 (of last SAC meeting): Remarks by SAC member:	1. Prof. B.N. Goswami of Cotton University, Guwahati, opined that the Plasma Science group of IASST is currently tiny and needs to be more significant. He recommended collaborating with CPP-IPR Guwahati for bioscience applications as CPP-IPR has several sophisticated instrument facilities, and historically, they have been separated into two centers from a single entity. Prof. Ashis K. Mukherjee lauded the suggestion, which the Chairman also supported. He also suggested initiating any Graduate program if possible. Further, he also recommended writing a big project in collaboration with Plasma Physics. Prof. B.N. Goswami also enquired about the present status of IASST's sericulture programme. Prof. Ashis K. Mukherjee replied that new initiatives had been taken to start work in this field.	This suggestion has been well taken, and accordingly, communication has been made with the Acting Centre Director of CPP-IPR, Guwahati, Prof. B. K. Saikia, for collaboration, and the result is awaiting. Meanwhile, Dr. Subir Biswas of PSD, working with the Basic and Applied Plasma research area, is collaborating with Prof Joydeep Ghosh and Dr. Malay Bikas Chowdhuri of IPR, Gandhinagar, Gujarat, through a joint project entitled "Experimental Investigation of Zonal Flow and Turbulence in Linear Device" funded by BRNS. IASST is also processing the recruitment of three new posts for its Physical and Life Sciences Divisions. The post of one Associate Professor (II) position in LSD will be advertised with the requirement of post-Ph.D. experience working in the field of Sericulture.
	2. Prof. Pulok Mukherjee: He appreciated the work done at IASST during the period and insisted on joint research work in the medicinal plants of the NE region.	As reported in earlier SAC meetings, IASST has been working on Ayurvedic and traditionally used medicinal plants. A MoU with Govt. Ayurvedic and Medical College is also signed. IASST has collaborated on medicinal plants with CSIR-IIIM Jammu, CSIR-NBRI, DBT-THSTI, SCIEX, etc. The comment has been noted, and work on this line is continuing.
	3. Prof. Amalendu Chandra of IIT, Kanpur appreciated the publication made by the Institute in the last six months. He also recommended increasing the computational facility at IASST, the Visiting Scientist program for faculty, and the Travel Grant/ Support policy for the Visiting Scientist program. He opined that this would benefit the institution by bringing ideas through interaction with the outside world. He stressed the presence of intern students for the Institute. He also suggested	IASST is now engaged in developing the Computing Cluster at IASST. The Computational Material Science, Experimental Materials Science, Climate Science research, Mathematical Sciences, and Computational Biology groups will use the cluster of IASST. A substantial number of Ph.D. students, including 47 females, and 49 males are working and 32 project

	considering an average number of years to complete a PhD degree in IASST, an important parameter. He also suggested initiating a teaching program in the future, which will benefit the Institute in the long run.	students, are doing research at IASST. Seven post-doc fellows are working now at IASST. Regarding the Visiting Scientist program, Dr. Pedro Alexandrino Fernandes a Computational Biochemist from the University of Porto, Portugal, talked on Supercomputing in Biochemistry, Biotechnology, and Drug Discovery. Dr. Pedro also visited IASST recently for a one-to-one discussion with the scientists of IASST. A scientist of IASST has been visiting the University of Newcastle, Australia, for 6 months, starting in September 2023, under SIRE Fellowship. The aim is to build international collaboration through a project to simulate tsunamigenic surface waves surrounding the origin.
	4. Prof. A.K. Mukherjee, the Director of IASST, recommended working on medicinal plants in North East India. He also suggested that Certificate Course (3-6 Months) on Instrumentation may be started in the Institute. He stressed intra-institutional collaborative work for good journal publications. It would also ensure a seamless continuation of the research activity in the event of the absence of any scientist.	Faculties of IASST are now collaborating, and several papers have been published jointly. However, IASST has to increase its research manpower to increase publications, and to do so, with the initiative from the Director, IASST, two posts of Associate Professor II have been revived by DST, and the revival process for two more abolished posts is under process. Recently, one faculty member joined IASST in LSD with a specialization in Microbiology.
AGENDA ITEM NO. 8 (of last SAC meeting): Remarks by the Chairman	Prof. Hasnain appreciated the term "Very Good science" even though the Institute is in the remote NE region. The Chairman appreciated the scientists of IASST for their scientific achievements and work on social issues in the region. He also recommended focusing on plant complexes for their health benefits and effects on microbes rather than just individual plant molecules. While he did not support the idea of teaching programs, he suggested a twist on training programs to provide training for technicians already at the region's institutes. He further made the following remarks: 1. He praised the Institute's Post-Doctoral Training program. 2. He also emphasized increasing the number of incubators in BIONEST. 3. Suggested applying for big joint projects with other institutes of the nation. 4. Suggested that the Institute encourage and have a policy to reimburse APC/publication charges. 5. Prof. Hasnain also recommended that IASST apply to concerned government bodies for hosting the Prime Minister Doctoral/Post-Doctoral Fellowship programs.	These suggestions have been well taken and will be followed. Meanwhile, DBT-NER Advance Level Institutional Biotech hub (Phase-II) conducted two 5-day training programs, one in July 2023 for the researcher on the production of fermented food and beverages and one in October 2023 on the production of fermented fish for the rural empowerment of the females in nearby villages. IASST also organized, jointly with Bio-NEST IASST, a one-day workshop on a fluorescence-activated cell sorter (FACS) supported by BD India Pvt. Ltd on 29th May 2023 at IASST Campus. This workshop was aimed to educate and provide basic knowledge about the principles and workings of a flow cytometer and its applications. Recently, two scientists joined IASST, availing DBT Ramalingaswami Fellow grant

		and Ramanujan Fellowship. They are working on "Understanding the virulence mechanism of <i>Candidatus Liberibacter asiaticus</i> on citrus and developing disease control strategies" and "Electrocaloric effect and energy storage in freestanding films for transparent flexible electronics," respectively. In another project, <i>Musa balbisiana</i> a versatile medicinal plant of the North-East, is scientifically explored to empower the tribal population of a few selected districts of Assam.
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AGENDA ITEM NO. 5: Presentation by the faculties

The faculty members from the Life Sciences Division (LSD) and Physical Sciences Division (PSD), including the Director, presented their research activities for the period February to November 2023 as follows:

- (i) Prof. Ashis K. Mukherjee (Director/LSD)
- (ii) Prof. Neelotpal Sen Sarma (PSD)
- (iii) Dr. J.C. Borah (LSD)
- (iv) Prof. D. Chowdhury (PSD)
- (v) Dr. M.R. Khan (LSD)
- (vi) Dr. D. Thakur (LSD)
- (vii) Dr. A.R. Pal (PSD)
- (viii) Dr. (Mrs) A. Devi (LSD)
- (ix) Dr. S. Kundu (PSD)
- (x) Dr. A. Bala (LSD)
- (xi) Dr. (Mrs) L.B. Mahanta (PSD)
- (xii) Dr. (Mrs) M.B. Sahariah (PSD)
- (xiii) Dr. S. Biswas (PSD)
- (xiv) Dr. B. Choudhury (PSD)
- (xv) Dr. Santu Das (PSD) via online
- (xvi) Dr. (Mrs) Kamatchi S (PSD)

Remark/suggestions on the presentations:

- (i) Prof. Ashis K. Mukherjee (LSD)

Prof. Seyed E. Hasnain and other committee members highly appreciated the work and suggested that it may be done further on an animal model for Alzheimer's





disease. Dr. Arun Sharma, DG, NECTAR, Shillong, suggested interacting with pharmaceutical companies to commercialize products in the future.

(ii) Prof. Neelotpal Sen Sarma (PSD)

Prof. Seyed E. Hasnain suggested doing similar work to detect microbes using QDs. Prof. Dhruba Kumar Bhattacharyya, Tezpur University, Tezpur, told about the smartness of the sensors and the quality of the smartphone used for the work.

(iii) Dr. J.C. Borah (LSD)

The work is appreciated. Prof. Hasnain advised sharing the data with commercial Ayurvedic medicine makers, and if the material has any link/benefit to hypertension, it will help in commercialization. Prof. B. N. Goswami, Cotton University, Guwahati, clarified the patent and publication of this work.

(iv) Prof. D. Chowdhury (PSD)

Members appreciated the work. Prof. Hasnain enquired about the status of the product's commercialization. Dr. Arun Sharma wanted to know whether the product is cost-effective and why mushroom powder is used for synthesizing the material. Prof. B. N. Goswami and Prof. Amalendu Chandra, IIT, Kanpur, inquired about the product's sustainability, durability, and longevity.

(v) Dr. M. R. Khan (LSD)

All the members appreciated the work. Prof. Hasnain proposed a collaborative work combining microbiome and tuberculosis patients. He suggested more publicity and advertisement of this unique work. He also enquired about the project with Bharat Biotech and the people involved in the self-help group.

(vi) Dr. D. Thakur (LSD)

The work is appreciated. Dr. Arun Sharma was surprised to know the large amount of catechins in Dr. Thakur's work. There were questions about the amount of chromium present in the tea and whether the treatment could affect the quality of the tea. Prof. Ashis Mukherjee advised checking the effect of actinobacteria on antibiotic-resistant tuberculosis bacteria and suggested sending it to any unbiased laboratory to test its efficacy.

(vii) Dr. A.R. Pal (PSD)

Prof. B. N. Goswami discussed the application and importance of the CNT and the development of transparent electrodes. Prof. Amalendu Chandra enquired about the



Na catalyst used to initiate the CNT growth and how it affects the CNT's characteristics and growth. The members suggested presenting the work in such a way that it will show one or two better applications than the existing one.

(viii) Dr. (Mrs) A. Devi (LSD)

Prof. B. N. Goswami advised possible applications of the remediation technique developed for water formation. He also opined on the tolerable level of fluoride contamination and the efficiency of the fluoride removal technique that has been created.

(ix) Dr. S. Kundu (PSD)

The committee members appreciated the presentation.

(x) Dr. A. Bala (LSD)

Dr. Arun Sharma suggested Dr. Bala to check the efficacy of the cold atmospheric plasma for skin cancer treatment and wanted to know the typical parameters and the dimension of the arc used.

(xi) Dr. (Mrs) L.B. Mahanta (PSD)

Prof. Dhruva K. Bhattacharyya discussed on the extraction encoder and whether it can also be used for the optimal selection of features. It was suggested that she include statistical techniques and better GPU for faster response.

(xii) Dr. (Mrs) M.B. Sahariah (PSD)

Prof. Amalendu Chandra inquired about the origin of the formation of unconventional interfaces in the Cu-Nb interface structure. Dr. Arun Sharma explained the use of tungsten as a nuclear material in fusion reactors and the recent developments. He suggested that Dr. Sahariah focuses on materials with application potential in the actual field.

(xiii) Dr. S. Biswas (PSD)

The members appreciated the work. Prof. B.N. Goswami opined experimental results should match with the preliminary theoretical model and Dr. Biswas's idea on the theoretical model be rectified.

(xiv) Dr. B. Choudhury (PSD)



All the members appreciated the work. Prof. Amalendu Chandra discussed on the characterization of the defects in SnS₂ and the reason for the alkaline hydrogen evolution in cobalt-doped SnS₂.

(xv) Dr. Santu Das (PSD)

Prof. Neela Natraj, IIT Bombay, Mumbai, opined on the convolution neural network used and other networks. It was suggested that he should use other methods for better justification and low limitation. Prof. B.N. Goswami proposed a collaboration through which this model can reach the India Meteorological Department.

(xvi) Dr. (Mrs) Kamatchi S (PSD)

The SAC members appreciated the work and said it is more relevant for the basic and applied sciences. Prof. Amalendu Chandra enquired about the kinetics process of the protein fibrils and its implications with Polyoxometalates incubation, which was clarified.

AGENDA ITEM NO. 6: Presentation on activities of SAIC and procurement of new instruments by Dr. S. Kundu, Head, SAIC

Dr. Sarathi Kundu, Head of SAIC and Associate Professor of PSD, gave an informative presentation on SAIC's exciting activities and developments. He highlighted the range of advanced instruments available and provided data on usage and sample records, income from external samples, and instruments procured in 2023. He also outlined plans for future instrument procurement and noted that IASST faculties would propose one new instrument for acquisition over the next 1-2 years.

In the discussion, the Director of IASST suggested revising the sample analysis charges for external academic and industrial users. The internal users should also pay a nominal amount as per DST instructions.

Prof. Mukherjee also suggested keeping a logbook for each instrument, and users must always acknowledge SAIC in their publications and presentations. Members suggested that it is to be verified during instrument procurement whether the warranty starts from the installation date or the delivery. All the sophisticated instruments should be labeled/displayed with the date of installation, the total cost, and the name of the



funding agency in front of it. All the instruments must have a logbook and mandatory entry. Moreover, Users of SAIC must always acknowledge SAIC in their publications and presentations.

AGENDA ITEM NO. 6.1: Liquid Nitrogen Generator. The budget is Rs. 150 lakhs. In an engaging presentation, Dr. M.R. Khan, Associate Professor of LSD, IASST, discussed the current difficulties of procuring Liquid Nitrogen and the daily requirement at IASST, which is around 750 liters per month. In IASST, Liquid Nitrogen is required for instruments like NMR, TEM, and BET, for Cell line storage, in the Cryo chamber of the Cell culture laboratory, for DNA extraction and preservation of samples, snap freezing, and so on. The specification of the proposed Liquid Nitrogen generator will be such that the system must be easy to use with a capacity of producing more than 20 liters of >99.995% pure liquid nitrogen per day.

The committee approved the purchase and setup of the liquid nitrogen plant in principle. However, utilization details and the possibility of selling the excess liquid nitrogen should be explored.

AGENDA ITEM NO. 7: Remarks by the members of the SAC

Prof. B.N. Goswami opined that the quality and quantity of publications are impressive, and the combination of fundamental and translational research is commendable. Empowering locals, self-help groups, and research that benefits society is an outstanding achievement. Since the institution has already set high standards in basic and translational research, it is time to go to the next level to set high aspirational goals and address more significant science questions. He also commented that the Institute has very young faculty members and internal collaborators. There is much scope for extraordinary work.

Prof. Amalendu Chandra appreciated the research work at IASST in both the physical and life sciences divisions. In his opinion, an impressive amount of work has been done in the last six months, which is genuinely praise-worthy. He praises the activities of Bionest and the Heritage Food and Beverages Laboratory.

Prof. Chandra was pleased to see that Prof. Pedro Fernandes, an excellent computational chemist from Portugal, visited the Institute as suggested in the last SAC meeting to establish a structured program for Visiting scientists. It will be great to have



more such visitors, which will increase the Institute's visibility. A structured program for visiting scientists from India and abroad may be implemented if not in place. Prof. Chandra also appreciated that the Institute is now setting up an in-house computational facility to boost computational research.

Prof Chandra opined that limiting the maximum number of students per faculty may discourage the active faculties. Some buffer to the extent of 1-2 more students can be given for a limited period, subject to lab space availability. He suggested that in addition to regular semester-wise admission of research students, walk-in interviews may be conducted to attract NET-JRF-qualified students whenever such candidates are available, subject to the availability of vacancies. He also suggests a review of courses at periodic intervals. Further, the possibility of starting academic programs at the master's and undergraduate levels may be explored, which would be good for the future growth of the Institute. For active researchers, the Institute may like to put some scheme in place for post-retirement continuation for another 3-5 years.

Prof. A.K. Mukherjee, the Director of IASST, stressed the importance of intra-institutional and international collaborative work for good journal publications. It would also ensure a seamless continuation of the research activity in the event of the absence of any scientist.

AGENDA ITEM NO. 8: Concluding Remarks by the Chair and comments from the members. (Due to the health-related issue, a part of the meeting was chaired by Prof. B. N. Goswami, Cotton University, Guwahati)

The Chairman appreciated the scientists of IASST for their scientific achievements and work on social issues in the region. He opined that combining diverse research areas of science and providing them to society is the unique combination of this Institute. There are endless possibilities for this Institute to achieve higher goals. The number of post-doctoral fellows should be increased, and the PDF program should be more attractive. The research on microbiomes and probiotics should be continued on a large scale, and the study and other activities of IASST should be communicated to society at national and international levels. The Institute should work on science communication and outreach for the broader audience.

Finally, the members of the committee agreed with the following points/minutes for the meeting:



1. The Institute should introduce the program to engage visiting scientists and visiting professors.
2. The Institute should increase the number of national and international research collaborations and start joint research programs like Joint Ph.Ds with other international universities and institutes.
3. Collaboration with industries should be increased, and the possibility of commercialization of products should be explored.
4. Members suggested increasing the number of Institute's post-doctoral fellows and making the PDF program more attractive with increased salaries and incentives for them.
5. Members unanimously agreed that the students having national research fellowships could join the Institute at any time throughout the year following an assessment by a committee. However, they may be registered for Ph.D. in the next session as per the IASST and AcSIR rules and are subject to qualifying for the entrance test.
6. Members agreed on introducing academic programs like Master's degrees and Integrated Ph.D. programs in the future, subject to getting more faculty positions from the funding agency. However, certificate courses and diplomas may be started with due approval from UGC or a relevant agency.
7. Members suggested that from the next SAC meeting, presentations from the faculties should show only the highlights of the work and achievements.

AGENDA ITEM NO. 9: Vote of Thanks by the Member Secretary, SAC, IASST

Prof. Neelotpal Sen Sarma, Head PSD and Member Secretary, SAC, IASST, proposed the vote of thanks.

Approved by:



(Sayed E. Hasnain)

Chairman



(Neelotpal Sen Sarma)

Member Secretary