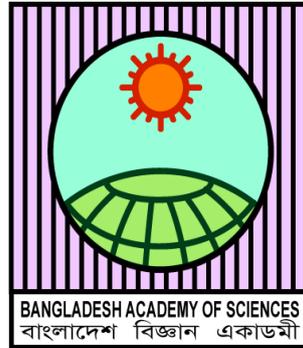


**BAS**  
**Activity Report**  
**July 2021-June 2022**

Edited by  
**Professor Dr. Haseena Khan, Secretary, BAS**



**BANGLADESH ACADEMY OF SCIENCES**  
**National Science and Technology Complex**  
**Agargaon, Dhaka-1207**  
**[www.bas.org.bd](http://www.bas.org.bd)**

## MESSAGE FROM THE PRESIDENT, BAS



Emeritus Prof. Dr. AK Azad Chowdhury

It is my pleasure as the President of the Bangladesh Academy of Sciences to write a few lines on the BAS Activity Report 2021-2022. During this period, we at the Bangladesh Academy of Sciences continued our efforts to achieve two main goals of BAS, promoting the cause of science and technology and advising the government to this effect. The present report reflects the activities pertaining to those objectives

The activities have been organized in major sections such as Policy & Advocacy, Achievements of BAS Fellows, BAS recognition of outstanding scientists, BAS publications, continuing professional education, promotion of science among young researchers, and activities of the BAS-USDA Program, etc. The increasing efforts of BAS in getting involved in advanced science-based policies on contemporary issues are evident in various sections of the Report. Besides, we are still in the middle of a public health crisis and the present reporting period was partially shadowed by the COVID-19 pandemic. Even under this adverse situation, BAS has been able to continue its programs at a reasonable speed.

BAS has always been generously supported by the Ministry of Sciences & Technology of the Government of the People's Republic of Bangladesh. The personal encouragement and support of the Honorable Minister, Architect Yeafesh Osman, have greatly catalyzed BAS efforts. The best thing that has happened during this period is the allotment of office rooms for BAS in the new Science and Technology Complex. We are now housed in the beautiful Science Complex recently built by the government at Agargoan. BAS is grateful to the Honorable Minister, Architect Yeafesh Osman for his kind involvement in resolving the issue when at one point it seemed impossible for BAS to get a space in this new building. I must add that activities of the Academy got a new boost on moving to the new office.

Activities mentioned in this Report have been possible only due to the continued active involvement of BAS Fellows in guiding the organization. Members of the Executive Committee as well as various committees/subcommittees have played a special role in steering the activities. The officials and staff of BAS have also been of crucial help in this regard. Finally, the publication of this Report has been made possible by the sincere efforts of Dr. MA Mazed through coordination and Dr. Md. Samiul Haque's compilation. We express our thanks to all of them and we hope that BAS's efforts will be intensified in the coming year.

**Emeritus Prof. AK Azad Chowdhury**  
President, BAS

## **BAS Council (July 2019-June 2022)**

### **President**

Emeritus Prof. Dr. AK Azad Chowdhury

### **Vice-Presidents**

Prof. Dr. Zahurul Karim

Prof. Dr. Choudhury Mahmood Hasan

### **Treasurer**

Prof. Dr. ZN Tahmida Begum

### **Secretary**

Prof. Dr. Haseena Khan

### **Associate Secretary**

Prof. Dr. Yearul Kabir

### **Immediate Past Secretary (Ex-officio)**

Prof. Dr. Mesbahuddin Ahmed

### **Members**

Dr. M. Idris Ali

Prof. Dr. Md. Anwar Hossain

Prof. Dr. Liaquat Ali

Maj. Gen. Prof. Dr. ASM Matiur Rahman (Retd)

Prof. Dr. Zia Uddin Ahmed

Emeritus Scientist Dr. Firdausi Qadri

## BAS Council (July 2022-June 2025)



President

Emeritus Prof. Dr. AK Azad Chowdhury



Vice-President

Prof. Dr. Zahurul Karim



Vice-President

Prof. Dr. Choudhury Mahmood Hasan



Treasurer

Prof. Dr. Mesbahuddin Ahmed



Secretary

Prof. Dr. Haseena Khan



Associate Secretary

Prof. Dr. Yearul Kabir



Member

Dr. M. Idris Ali



Member

Prof. Dr. ZN Tahmida Begum



Member

Prof. Dr. Shariff Enamul Kabir



Member

Prof. Dr. Liaquat Ali



Member

Maj. Gen. Prof. Dr. ASM Matiur  
Rahman (Retired)



Member

Prof. Dr. Mohammad Abdur  
Rashid

## WE REMEMBER

Since the last AGM till date, Bangladesh Academy of Sciences (BAS) has lost three of its honorable Fellows viz. Prof. Dr. AM Harun ar Rashid, Prof. Dr. Hiranmay Sen Gupta and Dr. AM Chowdhury. BAS remembers with deep respect their incomparable contribution to science and research and prays for their departed souls.

### Professor Dr. AM Harun ar Rashid, Fellow, BAS

Prof. Dr. AM Harun ar Rashid, a famous theoretical physicist and an outstanding researcher of the country expired on 09 October 2021. A distinguished Fellow and former Secretary, Bangladesh Academy of Sciences (BAS) and former Professor, Department of Physics, University of Dhaka, Prof. Rashid was one of the few scientists of his time, who did research on K-meson-nucleon scattering using Tamm-Dancoff Approximation in field theory. The work was published in *Nuovo Cimento*, a very renowned science journal.



Prof. Dr. AM Harun ar Rashid  
(1933-2021)

Emeritus Prof. Dr. AK Azad Chowdhury, President, BAS on behalf of the Academy sent a message of condolence to his wife Mrs. Juthy Mirza and the members of his family.

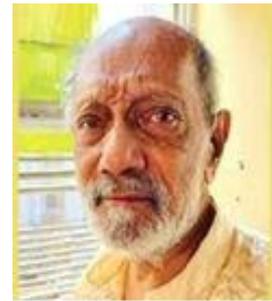
The news came as a great shock to the Fellows of Bangladesh Academy of Sciences. The Academy put on records the great services and contributions of Prof. Rashid to the cause of science and technology, particularly, for his dedicated research and outstanding achievement in science and technology in the country.

His death is a great loss for the Bangladesh Academy of Sciences, the scientific community at large and anyone who has had a privilege of knowing him. The Fellows of the Academy expressed heartfelt sympathy to the members of his bereaved family and prayed to the Almighty Allah, to grant eternal peace to the departed soul of late Prof. Harun ar Rashid and to give strength and courage to the members of his family to bear the loss with fortitude.

Prof. AK Azad Chowdhury, Chairperson, BAS Council, remembered the untiring dedication to research and an outstanding knowledge of Prof. Harun in different fields and his personal relationship with him. Other members of the council praised his contribution to BAS and the country. Finally, a prayer participated by all the members was led by Maj. Gen. Prof. Dr. ASM Matiur Rahman (Retd.) for the eternal peace of his departed soul.

### **Professor Dr. Hiranmay Sen Gupta, Fellow, BAS**

Prof. Hironmay Sen Gupta, a famous Physicist, was born on 01 August 1934 in Barisal. He obtained his Ph.D. in nuclear physics from the University of London in 1963, under the supervision of Nobel Laureate Prof. Joseph Rotblat. He stayed back in the United Kingdom for conducting his postdoctoral research at the Nuclear Physics Laboratory at the University of Oxford and at the Department of Physics, University of Birmingham.



Prof. Dr. Hironmay Sen Gupta  
(1934-2022)

He served as the professor of physics at the University of Dhaka between 1955 and 2000, where he had also served as the chairman of the Department. He was also a Senior Associate at Abdus Salam International Center for Theoretical Physics (ICTP) in Trieste, Italy during 1982 and 1992. He was a visiting professor at the Kyushu University, Japan in 1994. He retired from job in 2000. In a career spanning five decades, he published over 200 research papers and was a fellow of the Bangladesh Academy of Sciences since 1977. His research interests included condensed matter theory specializing in the study of elastic and inelastic scattering. His book in Bangla on nuclear physics, published by University of Dhaka, has been a part of the curriculum for MSc and MPhil students at the university. Prof. Sen Gupta died in Dhaka at the BIRDEM General Hospital on 07 January 2022, at the age of 87 years. On his sad demise, the Academy has lost not only a valued scientist of great intellect but also a great human being. The Fellows of the Academy expressed heartfelt sympathy to the bereaved family of Prof. Sen Gupta and issued a press release.

The Chairperson of BAS Council, Prof. AK Azad Chowdhury mentioned the amiable nature of Prof Hiranmay Sen Gupta, his devotion to research, and his outstanding knowledge of nuclear physics. Prof. Meshbahuddin Ahmed mentioned that Prof. Gupta had produced the largest number of PhD scholars in the University of Dhaka. Prof. Tahmida Begum praised his contribution to BAS and to the country. Finally, a one-minute silence was observed in honor of his departed soul.

### **Dr. A M Chowdhury, Fellow and former Secretary, BAS**

Dr. AM Chowdhury, Fellow, former Secretary, Bangladesh Academy of Sciences (BAS) and former Chairman, Bangladesh Space Research and Remote Sensing Organization (SPARRSO) died on 19 May 2022 (*Inna Lillahi wa Inna Elaihi Rajiun*). Dr. Chowdhury developed satellite meteorology in Bangladesh together with the development of a method for advance prediction of cyclones which helped in saving millions of lives in the country. He was instrumental in developing a prediction method for long range rainfall in Bangladesh which helped in the prediction of floods and droughts.



Dr. AM Chowdhury  
(1941-2022)

All his achievements aided in averting famine in the country and helped save many invaluable lives.

The news of his demise came as a great shock to the Fellows of Bangladesh Academy of Sciences. The Academy would like to put on record the great services and contributions of Dr. Chowdhury to the cause of science and technology, particularly, for his dedicated contribution to the Space Research and Remote Sensing technology in the country.

A truly great scientist, Dr. Chowdhury will be remembered for his intellect, his dedication and his love for the country. The Fellows of the Academy expressed heartfelt sympathy to his bereaved family. A condolence message was sent to Mr. Anir Chowdhury, Dr. AM Chowdhury's son.

The Chairperson of BAS Council, Prof. AK Azad Chowdhury highlighted the dedication of Dr. Chowdhury to research and the influence of the same in different fields especially in agriculture and his personal relationship with Dr. AM Chowdhury. Other members of the Council remembered with gratitude his contribution to the improvement of BAS activities and the country. Finally, a prayer led by Maj. Gen. Prof. Dr. ASM Matiur Rahman (Retd.) for the eternal peace of his departed soul was participated by all the members

## ANNUAL GENERAL MEETING (JULY 2020- JUNE 2021) OF BAS

The Annual General Meeting (AGM) of Bangladesh Academy of Sciences (BAS) for the year, July 2020-June 2021 was held on 12 September 2021 on a Zoom platform. Emeritus Prof. Dr. AK Azad Chowdhury, President, BAS presided.



Attending BAS Fellows in the Annual General Meeting

BAS Secretary, Prof. Dr. Haseena Khan placed the Activity Report for the year July 2020-June 2021 in the meeting. Prof. Dr. ZN Tahmida Begum, Treasurer, BAS presented the Annual Financial Report and the Audit Report for the year July 2020-June 2021 and the budget for the year July 2021- June 2022. After discussion at length, both the reports and the budget were approved in the AGM.

### Number of Council and other Meetings held:

During July 2021-June 2022, following meetings of different committees were held:

|   |      |
|---|------|
| Annual General Meeting (AGM)                                | : 01 |
| BAS Council Meeting   | : 06 |
| Board of Trustees (BAS Endowment Fund)                      | : 01 |
| Sectional Committees' meeting                               | : 09 |
| Editorial Board Meeting of JBAS                             | : 04 |
| Science Olympiad Organizing Committee meeting,              | : 09 |
| Olympiad Questions setting and Moderation Committee meeting |      |
| Examination of candidatures of BAS Expatriate Fellow and    | : 02 |
| Foreign Fellow meeting                                      |      |
| BAS staff service rules committee meeting                   | : 04 |
| BAS Office (new) Interior decoration committee meeting      | : 01 |
| BAS Fellow Election committee meeting                       | : 01 |
| Budget (BAS) Rationalization committee meeting              | : 01 |

## PUBLICATIONS

### a. Journal of Bangladesh Academy of Sciences (JBAS)

Two issues of the Journal of the Bangladesh Academy of Sciences (JBAS) were published:

- Journal of the Bangladesh Academy of Sciences (JBAS) Vol. 45, No. 2; December 2021, Editor: Prof. Dr. Md. Muhibur Rahman, Fellow
- Journal of the Bangladesh Academy of Sciences (JBAS) Vol. 46, No. 1; June 2022, Editor: Prof. Dr. Yearul Kabir, Fellow

### b. BAS Newsletter

Three issues of BAS Newsletter, Vol. 10, No. 2 (May-August 2021); Vol. 10, No. 3 (September-December 2021) and Vol. 11, No. 1 (January-April 2022); Editor: Dr. MA Hamid Miah, Fellow, BAS, were published.

## BAS-BANGLAJOL PROGRAM

There are now 165 journals on BanglaJOL web portal with approx. 2230 Tables of Contents; listing approx. 28,509 articles; Approx. 27,800 articles are available in full text (PDF). In order to give greater visibility to the participating journals, Dhaka University has recently included 11 journals to the BanglaJOL web portal.

### The newly Included journals (July 2021- June 2022)

1. Chest & Heart Journal
2. Social Science Review (Dhaka University Studies)
3. South Asian Journal of Agriculture
4. Journal of Statistical Research
5. Dhaka University Law Journal
6. Sir Salimullah Medical College Journal
7. IAHS Medical Journal
8. Central Medical College Journal
9. Dhaka University Journal of Applied Science & Engineering
10. Bangladesh Journal of Agriculture

### Financial Update

Yearly subscription collection in 2021 : Tk. 16,43,398/- (from 90 journals)

Collected amount from non-paid journals in 2021 : Tk. 6, 79,604/- (from 9 journals)

Yearly subscription collection in 2022 (Till 30 June) : Tk. 7,81,272/- (from 41 journals)

Yearly subscription collection from non-paid journal (2022): Tk. 1,79,248/-(from 2 journals)

## **BAS-INASP PROGRAM**

Activities of BAS-Bangladesh INASP (International Network for the Availability of Scientific Publications)-PERI (Program for the Enhancement of Research Information) Consortium (BIPC) e-Resource network

Bangladesh Academy of Sciences has been managing the e-Resource network of Bangladesh-INASP-PERI Consortium (BIPC) supplying e-Resources (e-Journals, e-Books, etc.) to the major academic and research & development organizations of the country since 2006. This is being done under the banner of Library Consortium of Bangladesh (LiCoB). LiCoB is one of BAS's flagship efforts to support high quality research and education in Bangladesh. BAS has been running this consortium for around 16 years. Under this arrangement, academic libraries of Bangladesh come together to negotiate and obtain access to journals as well as some eBooks and databases. BAS makes the agreements with the publishers, collects the subscription from the institutions and makes the payments to the publishers. Support is also provided on technical issues related to access of the e-resources.

This year, LiCoB is providing access to journals from Springer Nature (including Palgrave-Macmillan and Scientific American), CUP, OUP, EBSCO (a collection of mostly archival access), Project Muse, AIP, APS, ASABE, ASCE, ASME, De Gruyter, Indian Journals, Intl Forestry Review, RSC and eBooks from Project Muse. It may be noted that OUP and RSC have been added this year, while ASME was added last year. Around 35 active institutions including the leading public and private universities, and research organizations, are members of this consortium. About a dozen more are somewhat irregular. The sudden hike in the dollar exchange rate is posing a big challenge for BAS this year. However, despite many challenges in collecting the subscriptions and making the foreign currency payments, it has been possible to make all the payments due up to July to all the publishers. It should be noted that BAS, through LiCoB, has been able to provide this service for these sixteen years, without a single break.

Professor Abdullah Shams Bin Tariq, an Associate Fellow of BAS acts as the Technical Lead, liaising with publishers as well as providing technical support to member institutions.

Undoubtedly, the role of the Academy in this regard has created a good impact on academic and research output of the country and contributed towards the enhancement of excellence in science education and research. The following is a brief record on the performance of BIPC network activities during 2021-2022:

Total number of the publishers : 23 (2020) & 23 (2021), 23 (2022)  
Total number of e-Resources : ± 28,000 (e-Journals) and ± 1300 (e-books)  
Total subscription remitted to the publishers in 2021: USD 2,34,759.85  
Contributing organizations in 2021 : 35 (2021)  
Newly added organizations in 2021 : 4

### **Some of the major publishers are:**

Springer Nature, EBSCO, De Gruyter, Cambridge University Press (CUP), American Institute of Physics (AIP), Project MUSE, Indian Journals.

## NATIONAL AND INTERNATIONAL EVENTS

The Academy organized a number of national and international events during this period. The Fellows of BAS and other scientists of the country participated in such events during the reporting period. Brief descriptions of the events are given below:

### Welcoming New Fellows of BAS

#### Election of BAS Fellow 2019

In accordance with the BAS Constitution and Regulations Article 9, the BAS Election Committee declared the following 3 candidates as Fellows of BAS:

#### Dr. Mubarak Ahmad Khan

Scientific Adviser, Bangladesh Jute Mills Corporation  
Former Director General  
Atomic Energy Research Establishment, Savar, Dhaka

#### Dr. Monirul Alam

Senior Scientist  
icddr,b, Dhaka

#### Prof. Dr. Jiban Podder

Department of Physics  
Bangladesh University of Engineering & Technology (BUET)  
Dhaka 1000



Prof. ZN Tahmida Begum, Treasurer, BAS congratulating Dr. Mubarak Ahmad Khan, a newly elected Fellow



Treasurer, Secretary with the newly elected Fellows and Associate Fellows after their induction

#### Election of BAS Associate Fellow 2020

In accordance with the BAS Constitution and Regulations Article 5 (iv) the BAS Election Commission declared the following candidates as Associate Fellows of BAS:

### Earth Sciences:

Dr. Abu Reza Md. Towfiqul Islam  
Associate Professor and Head  
Department of Disaster Management  
Begum Rokeya University  
Rangpur 5400



### Chemical Sciences:

Dr. A. J. Saleh Ahammad  
Associate Professor  
Department of Chemistry  
Jagannath University  
Dhaka-1100



## ACHIEVEMENTS: AWARDS AND RECOGNITION OF FELLOWS

### A. Council Members of BAS

#### Prof. Emeritus Dr. AK Azad Chowdhury

- Prof. Emeritus Dr. AK Azad Chowdhury was awarded a Gold Medal for his contribution to education, research, and human development by Dr. Mohanambrata Foundation for peace and solidarity, Department of World Religion and Culture, University of Dhaka, on 01 April 2022.



#### Prof. Dr. Zahurul Karim

- Prof. Zahurul Karim received the 'National Environment Award-2020' on 05 June 2022 in the environmental research and technology innovation category for his outstanding contribution to the development of the country's environment. The Award was handed over on behalf of Honorable Prime Minister Sheikh Hasina on World Environment Day 2022.
- He received Soil Care Award 2020 as the Best Scientist on World Soil Day organized by the Ministry of Agriculture, Government of Bangladesh and Food & Agriculture Organization of United Nations.
- He has been selected, Chairman of the Government of Bangladesh constituted External Expert Panel to review, evaluate and to provide strategic guidance to all Agricultural Research Institutes for a period of five years from June 2021.
- The United Nations Environment Program (UNEP) has appointed him as an International Technical Advisor for a period of four years to oversee Ecosystem based Adaptations in the Region.



### **Prof. Dr. Haseena Khan**

- She received the first BASIS (Bangladesh Association of Software and Information Services) Luna Shamsuddoha Award 2022.
- She has been elected to the InterAcademy Partnership (IAP) Communications Education and Outreach Development and Program Committee with a mandate of 3 years that runs from 2023-2026.



### **Dr. M. Idris Ali**

- Received a 'Lifetime Achievement Award 2021' on the occasion of Annual Research Workshop from the Bangladesh Institute of Nuclear Agriculture (BINA).



### **Prof. Dr. Firdousi Qadri**

- Industry Advisory Panel (IAP), Department of Pharmacy of East West University (EWU).
- Representative of GTFCC, OCV temporary Commission.
- Advisory Board Member, the Lancet Regional Health, Southeast Asia.
- Board Member, Asian University for Women.
- Convener of Vaccine evaluation and emergency use.
- Quality Assurance Committee for procurement of Covid-19 vaccine, DGDA.
- Ramon Magsaysay Award 2021 for lifelong commitment to vaccine research and development that has had a tremendous impact in saving lives of millions of people in Bangladesh.
- Published 2 Books and 41 research articles in International Journals.
- Supervised 6 PhD students.



## **B. Fellows of BAS**

### **Prof. Dr. AKM Azharul Islam**

- Published a Book entitled Media, Freedom of Speech and Islamophobia and 6 research articles in International Journals.
- Supervised 1 MPhil and 2 PhDs.
- Based on World Scientist and University Rankings-2022 in Physics, he ranked 1<sup>st</sup>, 2<sup>nd</sup>, 1702<sup>nd</sup> and 10341<sup>st</sup> in Rajshahi University, Bangladesh, Asia and the world respectively.



### **Prof. Dr. M. Feroze Ahmed**

- Contributed as Member of the 'Panel of Experts' constituted for the design and construction of the complex bridge on the river Padma, second largest river in the world after Amazon of South America in respect of discharge. This two-level roadway and railway bridge was built by taming the most furious river by world's largest river training works, deepest foundation, longest span truss girder bridge supported on largest double curvature pendulum bearing.



### **Prof. Dr. Md. Saidur Rahman**

- Appointed as an editorial board member of Journal of Graph Algorithms and Applications.
- Served as a Program Chair of WALCOM 2022.



### **Prof. Dr. Zeba Islam Seraj**

- Obtained a project entitled 'Role of *Oryza coarctata* (wild halophytic rice) associated genes and microbiomes to enhance salt tolerance of rice' for the period of 2022-24 from the Bangladesh Climate Change Trust Funds.
- Collaborative Grant with Dr. Rod Wing of KAUST (King Abdul Aziz University of Science and Technology): Neodomestication of a wild perennial halophytic grass, *Oryza coarctata* by efficient in planta transformation and CRISPR-cas9 mediated down regulation of targeted genes.
- Renewal of Visiting Researcher status at the University of Texas at Austin, USA 2022-23.



### **Prof. Dr. Saleh Hasan Naqib**

- Has been elected a Fellow of The World Academy of Sciences (TWAS) in the year 2022.



### **Prof. Dr. M. Sohel Rahman**

- Recognized as a Distinguished Member for Outstanding Scientific Contributions to Computing, the Association for Computing Machinery (ACM) in 2021. He is the first Bangladesh-based Computer Scientists to achieve this feat.
- Appointed as an ACM Distinguished Speaker for the second tenure.



### **Prof. Dr. Md Tofazzal Islam**

- Elected Fellow, The World Academy of Sciences.
- Elected Fellow, American Phytopathological Society (APS). He is first Bengali APS Fellow.
- Winner of the GNOBB Award 2021 for outstanding scientific achievement.
- ATN Bangla Unnayane Bangladesh Award 2021 in the category of agricultural sciences, ATN Bangla Television, Dhaka.
- Ranked Top Scientist in Bangladesh in 2022 in the field of Molecular Biology and Genetics according to AD Scientific Index.
- Appointed Visiting Professor of the Chinese Academy of Agricultural Sciences (CAAS), Beijing, China.
- Member, Expert Working Group on Biocontrol of Wheat Pathogens, Wheat Initiatives, Germany.
- Ambassador (2022-2025) of Hokkaido University, Japan.
- Appointed as an Associate Editor, Frontiers in Microbiology.



### **Prof. Dr. Mirza Hasanuzzaman**

- Named as Highly Cited Researcher 2021 for producing multiple highly-cited papers that rank in the top 1% by citations for field and year in the Web of Science.
- Elected Fellow, Royal Society of Biology.
- Received UGC Gold Medal 2018 (Section: Forestry and Agriculture).
- Winner of the GNOBB Award 2021 for outstanding scientific achievement.
- Appointed as an Associate Editor of the journal 'Frontiers in Plant Science' and 'Stresses'.



### **C. Expatriate Fellows of BAS**

#### **Prof. Dr. Shahjahan Khan**

- University of Southern Queensland, Australia has introduced Professor Shahjahan Khan Scholarship for its International Students.
- Upon the appointment of the Honorable President and Chancellor, he has joined Asian University of Bangladesh as the Vice Chancellor.



#### **Dr. Saleh A. Tanveer**

- Elected Simon's Fellow, Isaac Newton Institute, Cambridge University, 2019
- Elected Nelder Fellow, Imperial College, 2022.



#### **Dr. Muhammad Golam Morshed**

Awarded two projects as the Principal Investigator. They are:

- Characterizing Antibody Response to Emerging COVID-19.
- Accelerating SARC-CoV-2 Sero-prevalence SurveyS through Dried Blood Spots (ASSESS-DBS).



#### **Prof. Dr. Sultana Nurun Nahar**

- American Physical Society (APS) published on the front page of the APS newsletter "International Teaching Can Transform Physics", an article on Sultana Nahar's global online teaching and research training.
- Received the 2022 Leadership award for Outstanding Advisor for student organizations at the Ohio State University, USA.
- Ohio Supercomputer Center published a featured article on "Breaking Barriers Nahar aids female Muslim scientists with supercomputing" in its Annual Report published in 2021
- Vice Chancellor of NED University of Engineering and Technology (NEDUET) in Pakistan awarded the 2021 Centenary Shield of NEDUET.



#### **D. Associate Fellows of BAS**

##### **Dr. Mohammad Abul Hasnat**

- Published 13 Science articles in in different International Journals.



##### **Prof. Dr. Tanveer Ferdous Saeed**

- Received Bill & Melinda Gates Foundation-ITN BUET grant for developing 'Natural energy producing sludge treatment systems' and 'energy producing septic tank system' in Bangladesh.



## CONTINUED PROFESSIONAL EDUCATION

### Academy Lectures by Fellows, BAS

#### i. Lecture on "Saline Tolerant High Yielding Rice: Is the Way Forward through DNA Markers, Genetic Modification or Gene Editing?" by Prof. Dr. Zeba Islam Seraj

Bangladesh Academy of Sciences (BAS) organized the Academy Lecture on "Saline Tolerant High Yielding Rice: Is the Way Forward through DNA Markers, Genetic Modification or Gene Editing?" on 16 August 2021 on a Zoom platform at 5:00 pm. Prof. Dr. Zeba Islam Seraj, Fellow, BAS and Professor, Department of Biochemistry and Molecular Biology, University of Dhaka was the speaker. Emeritus Prof. Dr. AK Azad Chowdhury, President, BAS joined the Lecture as the Chief Guest. Prof. Dr. Zahurul Karim, Vice President, BAS presided over the occasion. Prof. Dr. Haseena Khan, Secretary, BAS, moderated the lecture. About 40 Fellows, scientists, researchers and faculty members participated in the lecture. Secretary, BAS expressed greetings to all participants and welcomed them in the lecture. She then introduced Prof. Dr. Zeba Islam Seraj to the participants and mentioned the bright parts of Dr. Zeba's academic and professional career. Prof. Khan with the permission of the Chair, called upon Prof. Dr. Zeba Islam Seraj to start her presentation.

began her talk with proper addressing the audience.

**A summary of Prof. Zeba Islam Seraj,s presentation is given below.**



Speaker Prof. Zeba Islam Seraj



BAS Fellows and other participants from different Institutions in the Academy Lecture

The swelling of seas due to increased global temperature as well as melting of ice are causing saline water to seep upwards through coastal shores in Bangladesh. In order to stop production loss in the monsoon season and add another planting during the dry season, we need highly tolerant rice. One way out is using of DNA markers to introgress multiple salt tolerant loci into high-yielding rice. Here the bottleneck is identification of the source of the best genes which could work together in fighting salt toxicity. It took her group up to 7 years to characterize and map important genetic loci for introgression from the salt tolerant rice landrace called Horkuch, popular with farmers in the Southwest coastal areas of Bangladesh. This was done in collaboration with International Rice Research Institute (IRRI), BRRI as well as University of Texas at Austin and University of Nebraska at Lincoln, USA with

funds from USAID and NSF. This work culminated in at least two joint PhD's from Dhaka University and several peer-reviewed high impact factor publications. Using the identified important multiple genetic loci from Horkuch, and in collaboration with BRRI, Prof Zeba's team has introgressed these into the commercial rice BRRI dhan 63, 67 and 74 using fluorescent DNA markers in a World Bank funded NATP-2 project in another 3 years with a total timeline of 10 years.

Another strategy is to genetically transform high-yielding rice with regulatory genes, which in turn affects a number of downstream genes for conferring tolerance. Prof. Zeba's research group produced at least 11 stable drought and salt tolerant transgenic rice lines in commercial genetic background, a few with collaboration from ICGEB, India. All the works were backed up by high quality publications in international journals. However, general acceptance of genetically modified crops/rice is still questionable and all these lines produced over a period of 15 years are pending regulatory approval. Gene editing on the other hand can produce plants which are no different than plants which have mutations. In other words, one can select gene-edited plants without any foreign genes at all, since CRISPR-Cas9 gene editing can occur *in trans*. Her team has produced a salt tolerant rice line by down regulating a transporter gene in sensitive IR29 rice in 3 years. This gene had been shown to be down regulated in Horkuch under salt stress during its earlier characterization. So far plants with useful properties have been produced by down-regulating genes using CRISPR-Cas9 technology. Recently however, prime-editing technologies have added another new dimension by which genes can be made more efficient by design using a desired template. Regulatory oversight for gene-edited plants is therefore not expected to be very restrictive, since one can select for gene edited plants without foreign genes. However, regulation of gene edited plants is yet to be introduced in Bangladesh. Many countries in the Asia-Pacific region have already set aside programs and funds at both Government and Private Organization levels for research and production of gene editing climate-resilient crops because it is easy, efficient as well as non-GMO. Bangladesh needs to catch up in such research areas in order to ensure food security for the near future.

Prof. Dr. Zia Uddin Ahmed, Fellow, BAS wanted to know the average acreage of saline soil under cultivation in the country. The Chair replied that on an average 1 million ha out of 9 million ha cultivable land is salinity affected. He further added that land salinity in Bangladesh is mainly due to saline water from the Bay of Bengal in the southern districts of Bangladesh, particularly southern part of Barisal, Khulna and Sathkhira. Salinity is seasonal and particularly prominent in the dry session only. During the dry season the yield of rice cultivation goes down to 1 ton/ha which is much less than the national average.

Prof. Dr. KM Sultanul Aziz congratulated Prof. Zeba I Seraj for the excellent presentation on her research work and said that he had been growing salt tolerant variety of rice in the lab and green house.

Prof. Dr. Tofazzal Islam commented that Dr. Zeba's work is exciting and marvelous. He proposed for training of scientists on CRISPR-Cas9 technique by BAS in cooperation with the Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU).

Professor Zeba stated that no transgenic variety of rice has yet been approved by the National Seed Board but she expressed hope that it would soon be done.

Professor Haseena Khan said, a training program could be organized if approval from BAS Council was obtained since Biotech Consortium of India Limited (and South Asian Biosafety Program) has written to BAS for an opportunity to conduct a workshop on CRISPR-Cas9 gene editing.

The Chief Guest, Emeritus Prof. Dr. AK Azad Chowdhury expressed his opinion that Prof. Zeba Islam Seraj and Prof. Haseena Khan have conducted research work of commendable quality and have made research publications with high impact factor. Their research work is very intense and at par with global research standard. He also commented that it was a wonderful talk and he congratulated Prof. Zeba for her excellent presentation. He opined that collaboration with other countries is important for this type of sophisticated research work.

In conclusion the Chair, Prof. Karim congratulated the speaker for a good presentation on a new subject. He expressed hope that the speaker will contribute much in this emerging field of Biochemistry and Molecular Biology. He also proposed that this could be discussed in BAS Council and a network of research work for down-regulating genes using CRISPR-Cas9 technology can be initiated. Prof. Karim suggested that Dr. MA Hamid Miah, BAS Fellow could be consulted to know whether yield of rice in non-saline areas is comparable with that in saline regions with a focus on the yields of Rabi and the summer season.

The Chair congratulated the speaker and wished a success of the scientists working in this area. He then declared the end of the Academy lecture.

**ii. Lecture on "Bioactive compounds from Endophytic fungi and Medicinal plants of Bangladesh" by Prof. Dr. Choudhury Mahmood Hasan**

The Bangladesh Academy of Sciences (BAS) organized an Academy Lecture titled "Bioactive compounds from Endophytic fungi and Medicinal plants of Bangladesh" on 14 September 2021 on a Zoom platform at 11:00 am. Prof. Dr. Choudhury Mahmood Hasan, Fellow, BAS and Former Professor, Department of Pharmaceutical Chemistry, University of Dhaka was the speaker.

Emeritus Professor Dr. AK Azad Chowdhury, President, BAS joined the Lecture as the Chief Guest. Prof. Dr. Zahurul Karim, Vice President, BAS presided over the occasion. Prof. Dr.

Haseena Khan, Secretary, BAS, moderated the lecture. About 45 Fellows, Associate Fellows, Expatriate Fellows, scientists, researchers and faculty members participated in the lecture. Secretary, BAS expressed greetings to all participants and welcomed them in the lecture. She then introduced Prof. Dr. Choudhury Mahmood Hasan to the participants and mentioned the bright parts of Prof. Choudhury's academic and professional career. Prof. Khan with the permission of the Chair, called upon Prof. CM Hasan to start his presentation.

**A summary of Prof. CM Hasan's presentation is given below:**



Speaker Prof. Choudhury Mahmood Hasan

BAS Fellows and other participants from different Institutions in the Academy Lecture

Prof. CM Hasan addressed the Chief Guest, the Chair, Fellows and participants and began his talk. A summary of his presentation is given below:

Prof. Choudhury at first prayed to the Almighty Allah for the welfare, peace and salvation of the souls of deceased Fellows of BAS and paid respect to them. He then started his presentation by explaining the reasons for doing research on plants and mentioned that a good number of drugs have been derived from medicinal plants and are now available in the world market. Traditionally, Bangladesh being a subtropical country is a good repository of medicinal plants.

There are around 5000 angiosperms distributed among 200 families and 500 of these are being used in traditional medicines for the treatment of different diseases.

Prof. Choudhury then explained the reasons for phytochemical research.

- a. To find lead compounds for drug discovery research;
- b. To standardize phytomedicines (Unani, Ayurvedic etc.) by searching for chemical markers;
- c. To justify the use of phytomedicines by determining the presence of drug-like molecules;
- d. To identify plants by chemotaxonomic studies.

Prof. Choudhury explained the activities by showing the slides through screen sharing. The activities may be summarized as-

- a. Isolation of compounds from plants and endofungi for antitumor, antimicrobial, antidiabetic and other activities;

- b. Structure elucidation of pure compounds by combined spectroscopic analyses (mainly by NMR);
- c. Screening of purified compounds for various biological activities;
- d. Evaluation of safety and efficacy of herbal products.

Prof. Choudhury continued to explain that the achievements so far been made are the result of his group called Natural Products Research Group. In conclusion, Prof. Choudhury summarized the achievement of the group as mentioned below:

- a. Studied 62 medicinal plants of Bangladesh belonging to 30 families;
- b. Isolated and characterized over 250 compounds, including 75 new molecules;
- c. Major classes of natural compounds isolated and determined- Terpenoids, Steroids, Alkaloids, Flavonoids and Coumarins;

Finally, Prof. Choudhury mentioned that some of the isolated compounds have shown prominent antimicrobial, antidiabetic, antioxidant and cytotoxic properties.

After the presentation BAS Fellow, Dr. Hamid Miah asked why the expiry dates of Ayurvedic medicines are not mentioned. He thinks it should be mentioned on the bottle for indicating the validity of the same. Prof. Choudhury Mahmood Hasan replied that it is very difficult to determine the expiry date. He opined that the plants should be correctly identified. He pointed out that now the big pharmaceutical companies in Bangladesh like Square, ACME are making herbal medicines.

Expatriate Fellow, Prof. Ahmed Abdullah Azad pointed out that the excellent findings of new drug leads would go in vain if they are not considered for studies which would allow drug development of the same.

Prof. Dr. Haseena Khan, Secretary, BAS said that it was excellent presentation. She talked about the advantages of working with endophytes.

Prof. Abdul Majid, Dept. of Pharmacy, DU thanked the speaker for a good presentation. He mentioned about the role of fungi as a good source of anti-malarial agents.

Prof. M Jasimuddin of the Dept. of Botany, DU also expressed thanks for the excellent presentation. He proposed for coordinated and translational group research that BAS could undertake. Resources from the sea and the Sundarban forest can be collected and traditional knowledge of the Ayurvedic physicians could be utilized. The medicinal plants from home and abroad may be collected and commercially produced.

The Chief Guest, Emeritus Prof. AK Azad Chowdhury congratulated the speaker for his excellent presentation. He said that Prof. Hasan had explored and carried out research on biomedical products. His work on natural products led to the isolation of many drug-like

products. This he did while working in Bangladesh. President, BAS mentioned that phytochemical products from natural sources differ from country to country. The Chief Guest also acknowledged Prof. Rashid, Fellow, BAS of the same department for his work on anti-cancer drugs from natural sources. The Chief Guest expressed thanks to all and also to Prof. Zahurul Karim, Chair of the session. Prof. Dr. Zahurul Karim said that in Bangladesh research outputs are developed through coordination among national and international organizations like IRRI, CYMMIT etc. He acknowledged that patenting is difficult in Bangladesh and said that in the case of developing new seed varieties, the National Seed Board acknowledges the development by giving certificates for the same. The Chair further commented that Prof. Choudhury has done a lot of work and if the work could be made sustainable, it would be a great asset of the country. In this regard he said a follow up meeting should be arranged with stakeholders.

The Chair, finally, thanked the speaker for his excellent and resourceful presentation. He also thanked all the participants for joining and then declared the end of the Academy lecture.

**iii. Lecture on “Road to room temperature superconductivity: A progress report” by Prof. Dr. Saleh Hasan Naqib**

The Bangladesh Academy of Sciences (BAS) organized the Academy Lecture entitled “Road to room temperature superconductivity: A progress report” on 10 January 2022 on a Zoom platform at 11:00 am. Dr. Saleh Hasan Naqib, Fellow of BAS and Professor, Department of Physics, University of Rajshahi, was the speaker. Eminent physicist, Emeritus Professor Dr. M. Shamsheer Ali, Fellow and Former President of BAS joined the lecture as the Chief Guest. Prof. Dr. ZN Tahmida Begum, Treasurer of the BAS presided over the occasion. Prof. Dr. Haseena Khan, Secretary of the BAS, moderated the academy lecture. Around 35 Fellows, scientists, researchers, and faculty members of different universities participated in the lecture. Secretary, BAS, greeted all the participants and welcomed them to the event. She then introduced Professor SH Naqib to the participants and presented a brief summary of his research achievements. Prof. Haseena Khan with the permission of the Chair, called upon Prof. Naqib to start his Academy Lecture.

**A summary of Prof. Saleh Hasan Naqib’s presentation is given below:**



Speaker Prof. Saleh Hasan Naqib



BAS Fellows and other participants from different Institutions in the Academy Lecture

The phenomenon of superconductivity, a distinct electronic phase in which a condensate of electron pairs (known as Cooper pairs) spontaneously breaks the U(1) gauge symmetry associated with light and electromagnetism, was discovered in 1911. In simple words, superconductivity is the phenomenon of certain materials exhibiting zero electric resistance and the expulsion of magnetic fields below a characteristic temperature termed as the superconducting transition temperature or simply the critical temperature,  $T_c$ . Superconductivity was found first in liquid mercury (Hg) at 4.2 K. Over a thousand other materials have been discovered with different values of  $T_c$  since then. Discovered 101 years ago, superconductivity remains one of the most extensively studied and challenging field in condensed matter physics. As far as prospective applications of superconductors are concerned, the critical temperature is among the most important parameters. Over the last 101 years, due to tireless efforts of thousands of researchers all over the world,  $T_c$  has risen to 268 K under enormous pressure (almost 300 GPa). The journey has been painstaking with unexpected turns and twists together with huge challenges both experimentally and theoretically. The journey is in no way finished. At present, the goal is to discover room-temperature superconductors at ambient pressure and to understand the fundamental physics behind high superconducting  $T_c$ . Such discovery can change the face of existing electronic and electromagnetic technologies.

Professor Naqib has been working on various aspects of superconductivity for the last 26 years. His research on superconductivity has produced extensive literature published in the top journals. In this Academy Lecture, he described the journey towards room-temperature superconductivity in a semi-popular fashion with emphasis on historical development and physical understanding. He also presented a glimpse of his own research related to high- $T_c$  superconductivity on various systems including high- $T_c$  cuprates and recently discovered metallic hydrides. The challenges in achieving room-temperature superconductivity were elaborated. Possible routes to overcome those challenges were also discussed.

Prof. Dr. M Shamsheer Ali congratulated Prof. Naqib for presenting a very complex subject in lucid way. He commented that Prof. Naqib has done research works regarding applications of superconductor in many fields. Presently maximum number of researchers from the field of physics works in solid state physics. He also said that in future, super conductors are going to be used in high-speed trains in Bangladesh. Professor Ali made the following suggestions:

- Prof. Naqib may consider to write his Academy lecture in layman's language for the young people
- He may write a review article on this wonderful work

Prof. Shamsheer Ali congratulated Prof. Naqib for doing research on super conductor at room temperature.

After the presentation, the Chair expressed thanks to the speaker and declared the floor open for discussion.

Mr. Rakib Hasan, a Masters student of Jahangirnagar University, presently pursuing higher degree at the Western University, USA, asked Prof. Naqib, how the properties will change if a solenoid made out of a super conductor is placed in a magnetic field.

Prof. Naqib replied that the properties will remain the same. As for example, Prof. Naqib mentioned about the super conductors in MRI machines, airplanes etc. Super conductor solenoid is fine, other materials will burn out.

Mr. Rakib Hasan also asked about the condition of lithium hydride to which Prof. Naqib replied that it cannot be made stable.

At the end, Secretary, BAS Prof. Haseena Khan congratulated Prof. Dr. Naqib for a very impressive presentation. She also said that the Academy was proud to have Prof. Naqib as a Fellow. She wished the next generation of scientists will raise high the flag of science in Bangladesh.

Prof. Naqib expressed thanks to the Chair and expressed his gratefulness for the rewarding comments by all the participants.

The Chair then declared the end of the Academy Lecture with thanks to all.

#### **iv. Lecture on “Understanding molecular plant-microbe interaction for bio rational management of plant health” by Prof. Dr. Md Tofazzal Islam**

Bangladesh Academy of Sciences (BAS) organized an Academy Lecture on “Understanding molecular plant-microbe interaction for biorational management of plant health” on 24 January 2022 on a Zoom platform at 11:00 am. The speaker of the lecture was Dr. Md Tofazzal Islam, who is a Fellow of BAS and The World Academy of Sciences (TWAS), and a Professor of the Institute of Biotechnology and Genetic Engineering (IBGE) of Bangabandhu Sheikh Mujibur Rahman Agricultural University. The presentation was chaired by Prof. Dr. Zahurul Karim, the Vice President of the BAS Council; Prof. Dr. Choudhury Mahmood Hasan another Vice-President of the BAS graced the Lecture program as the Chief Guest. The Academy lecture program was moderated by the Secretary of the Academy Prof. Dr. Haseena Khan. Fellows of BAS and TWAS, scientists, researchers, teachers and students from home and abroad joined the lecture program online. Prof. Haseena Khan started the program by welcoming the participants and introduced Prof. Dr. Md Tofazzal Islam by reading out his brief resume. She then invited Prof. Tofazzal Islam for delivering his academy lecture.

Some highlights of the lecture of Prof. Tofazzal are summarized below.



Speaker Prof. Md Tofazzal Islam



BAS Fellows and other participants from different Institutions in the Academy Lecture

Prof. Tofazzal Islam started his lecture by expressing gratitude to his PhD Supervisor Professor Satoshi Tahara of Hokkaido University (Japan) for teaching him how to approach science. He also acknowledged the contributions of Prof. Yasuyuki Hashidoko, Prof. Andreas von Tiedemann, Prof. Michele Clarke and Prof. Daniel Panaccione of Hokkaido University, University of Goettingen, University of Nottingham and West Virginia University for being the host and supervisors of his postdoctoral research. He also thanked two Fellows of the Royal Society (FRS), Prof. Sophien Kamoun and Prof. Nicholas J Talbot of The Sainsbury Laboratory (TSL) in UK for their collaborations in his wheat blast research. Some highlights of the lecture of Prof. Tofazzal are summarized below.

In the academy lecture, Prof. Tofazzal presented some major discoveries of his 27 years of research under three major topics: (i) signaling and communications between plant and peronosporomycete phytopathogens; (ii) plant-beneficial bacteria interactions and their usage in crop production and bioprospecting; and (iv) genomics analyses of plant-microbe interactions and biotechnological applications of the discovered knowledge for durable management of plant health.

The peronosporomycete/oomycetes are a group of microorganisms that include some of the most devastating plant pathogens under the genera of *Phytophthora*, *Pythium*, *Plasmopara*, and *Aphanomyces*. The asexually produced motile zoospores of these destructive phytopathogens are thought to locate within their hosts guided by the host-specific chemotactic signaling compounds and then initiate infection by dramatic morphological alterations of zoospores by shedding flagella. Prof. Tofazzal presented his discovery of a host-specific kairomone signal, cochliophilin A (5-hydroxy-6,7-methylenedioxyflavone) in the root exudates of the host plants (e.g., spinach and sugar beet). He devised a convenient bioassay method called 'particle method' for discovering the cochliophilin A from the spinach roots by a bioassay-guided chemical fractionation followed by elucidation of the structure by spectroscopic analyses. He further confirmed that cochliophilin A is not only an attractant to guide zoospores to find the host root but also triggers essential differentiation of zoospores at the root surface to germinated cysts via

cystospores. Through a series of cell biological and pharmacological investigations, Prof. Tofazzal determined that zoospores perceive host signal by a G-protein coupled receptor and then the signal is transduced by PLC/PLD, phosphatidic acid and calcium ions (second messenger). He also elucidated that cochliophilin A triggers dynamic morphological changes in zoospores through dynamic polymerization and depolymerization of filamentous actin. Not only host-specific signals, Prof. Tofazzal discovered a large number of zoospore-inhibitory compounds (chemical-weapons) in the non-host plants and environmental microorganisms that are likely to ward-off zoosporic pathogens. He also discovered that a non-host plant, *Amaranthus gangeticus* (red amaranth) exudes two non-cytotoxic compounds, *N-trans-feruloyl-4-O-methyl*dopamine and nicotinamide that jointly halt motility of zoospores and impair germination of cystospores as a mechanism of its resistance to *A. cochlioides* infection. Some of his discoveries have shown high promise in biorational control of the notorious soil borne peronosporomycete phytopathogens.

Plants harbor a myriad of microorganisms at the surface and in internal tissues. Most of these microorganisms play a vital role in growth and immunity of the host plant that is referred to as plant probiotics. In the second part of his lecture, Prof. Tofazzal highlighted his discoveries on molecular cross-talks between plants and probiotic bacteria. Plant probiotic bacteria are powerful bioagents having practical applications as biofertilizers, biopesticides and bioprospecting. Prof. Tofazzal's team discovered more than 700 probiotic bacteria as epiphyte, endophyte and rhizobacteria from native major crop plants under an umbrella project entitled "*Mining Bangladesh Biogold*". His team developed convenient methods for screening, isolation and characterization of bioactive compounds from the probiotic bacteria. They found that some strains under the genera of *Lysobacter*, *Bacillus*, *Paraburkholderia*, *Pseudomonas*, *Delftia* etc. promote plant growth, development and protect the host plants from the destructive pathogens by using various mechanisms including secretion of phytohormones, fixation of atmospheric nitrogen, solubilization of essential nutrients in soils, secretion of antimicrobial enzymes and secondary metabolites. They discovered that a biocontrol bacterium, *Lysobacter* sp SB-K88 suppresses damping-off disease through a combination of antibiosis (produce a macrocyclic lactam antibiotic, xanthobaccin A) and characteristics plant colonization in a perpendicular fashion. They found that the macrocyclic lactam antibiotic interrupts homing events and disrupt the ultrastructure and cytoskeletal networks of the damping-off pathogens.

In the last part of his lecture, Prof Tofazzal presented his research on the first epidemic outbreak of wheat blast disease in eight districts of Bangladesh in 2016. The yield loss in 15,000 hectares was up to 100%. In a rapid response to that plant health emergency, Prof. Tofazzal led 31 researchers from 4 continents and precisely determined the genetic identity and origin of the wheat blast fungus using field pathogenomics, open data sharing and open science approaches. He also shared his experience in discovering a novel rapid method for the detection of wheat blast using genome-specific primers and revolutionary CRISPR-Cas technology with an effective collaboration of scientists in the United States and China. He

discussed how this biotechnology could be utilized in the quarantine offices, research labs and the fields around the world to prevent the spread of the deadly wheat blast disease to major wheat growing countries. He also presented the progress of his research on the development of durable blast-resistant wheat varieties using CRISPR-Cas genome editing technology and introgression of resistance genes to the commercial varieties of Bangladesh. Prof. Tofazzal highlighted their success in the application of some native probiotic bacteria (*Bacillus* sp. BLK6A, *Bacillus* sp. BTS3, *Bacillus valezensis* BTS3 etc.) in the biocontrol of wheat blast disease in the field conditions in Meherpur. Prof. Tofazzal also demonstrated their research findings on reduction of chemical (N, P and K) fertilizer use in rice by their developed probiotic bacterial technology, which was funded by the BAS-USDA. The molecular mechanism of actions of these beneficial endophytic probiotic bacteria elucidated by his team was also presented.

Prof. Tofazzal Islam said that application of the renewable beneficial bacteria remarkably reduces the dependency on agrochemicals and promotes sustainable agriculture for safe food production in the country. He shared his experience of collaborating with a local industry, the OMC Healthcare Ltd. for commercialization of their developed rapid blast detection technology. He emphasized that the novel biologics (antibiotics, probiotic bacteria etc.) and methods developed by his team should be further evaluated in a large-scale field experiment with partnerships of suitable industries for commercialization as useful technologies for the resource-poor farmers. At the end of his talk, Prof. Tofazzal expressed his gratitude and acknowledged the contributions of his students, collaborators, and national and international donors such as World Bank, BBSRC, KGF, USDA-FAS, BAS-USDA, FAO/IEA, British Council, UGC and the government of Bangladesh for organizations like BAS, UGC and Bangladesh Government for giving the opportunity to do frontier research and in helping him to establish the IBGE at BSMRAU.

Prof. Chowdhury Mahmood Hasan as the Chief Guest expressed his satisfaction on the basic and applied research discoveries of Prof. Tofazzal. He said that basic research is essential to take the country forward. New knowledge is the raw material of new technology. He also opined that the contributions of Prof. Tofazzal in generating new knowledge for solving real problems in agriculture and food security are outstanding and exemplary. He praised the approaches of Prof. Tofazzal for engaging the global scientific community, and the use of genomics technology for solving a big puzzle of the origin of epidemic wheat blast disease in 2016 without any project grant. Prof. Hasan also mentioned that he had collaborated with Prof. Tofazzal in elucidating the structure of some new natural products that were published in some leading American Chemical Society's journals. He strongly recommended for initiatives in the practical application of the discoveries of Prof. Tofazzal for the benefit of the country.

After the presentation of the lecture by Prof. Tofazzal, there was a highly interactive session where many prominent scientists such as Prof. Dr. Ziauddin Ahmed, Dr. MA Hamid Mia,

Prof. Haseena Khan, Prof. Ahmed Abdullah Azad, Dr. Abdul Latif, Prof Zeba Islam Seraj and others participated. Dr. Hamid Miah advised Prof. Tofazzal to provide a list of the probiotic bacteria to BAS that are suitable for utilization as biofertilizers and biopesticides. He opined that BAS may take necessary measures for practical application of these valuable bioresources for promoting eco-friendly sustainable agriculture. Prof. Ahmed Abdullah Azad appreciated the skills of Prof. Tofazzal for arranging huge external funds for fueling research and the establishment of the IBGE. Prof. Ziauddin asked about the practical application of the findings of Prof. Tofazzal and emphasized the importance of solving the real problems by research. Prof. Haseena Khan asked Prof. Tofazzal about the consistency of the probiotic bacteria in various agricultural practices. Dr. Abdul Latif asked questions on how genetic variability of the blast fungus and consortium application of the bacteria is associated with effective management approach of the wheat blast disease. In the chat box, Prof. Zeba highly appreciated Prof. Tofazzal for the outstanding discoveries and excellent presentation. Prof. Tofazzal replied that said he was lucky in getting steady funding from various external sources. Some of his findings such as new rapid blast diagnostic technology and zoospores regulating compounds are under the process of commercialization with industry partners. However, he needs more support from the industry and government for practical applications of his probiotic bacteria as biofertilizers, biopesticides and bioprospecting. He emphasized need-based research with interdisciplinary collaborations. He found that the genome of the newly introduced blast fungus has not evolved much in Bangladesh and consortium application of the probiotic bacteria is more effective in the field than the single bacterium.

In his closing remarks, Prof. Dr. Zahurul Karim said, he was highly impressed by the lecture where Prof. Tofazzal highlighted his outstanding research discoveries of 27 years' career in a short period of time. He commented that there is no substitute for basic research to move the nation forward and there is a need to emphasize research for solving the new problems that we are constantly facing in crop production due to various reasons including global climate change. Prof Karim noted that Prof. Tofazzal's approach is unique as he generated knowledge associated with real-life problem in the lab research and tried to apply them in the field. He advised Prof. Tofazzal to intensify his collaboration with the researchers of the NARS institutes for faster practical application of the fundamental research discoveries. He highly appreciated Prof Tofazzal's success in collaborating with some world-renowned scientists including the Fellows of the Royal Society, Fellows of the AAAS, and wished him further success. He also suggested Prof. Tofazzal for sending some recommendations on how his current research findings could be utilized for the biorational management of plant health as alternatives to synthetic agrochemicals. Finally, he congratulated the speaker and thanked all participants from different institutes in Bangladesh, USA, Australia and Canada for actively participating in the academy lecture. A total of 80 participants including the Fellows of the BAS and TWAS, professors, scientists and students participated in the said virtual academy lecture.

**v. Lecture on “Outlooks on Feed industry at Bangladesh development scenarios by 2041” by Dr. Khan Shahidul Huque**

Bangladesh Academy of Sciences (BAS) organized the Academy Lecture on "Outlooks on feed industry at Bangladesh development scenarios by 2041" on 17 February 2022 on a Zoom platform at 11:00 am. Dr. Khan Shahidul Huque, Fellow, BAS & National Consultant, Livestock Project, Development Adviser, FAO of the United Nations was the speaker.

Emeritus Prof. Dr. AK Azad Chowdhury, President, BAS joined the Lecture as the Chief Guest. Prof. Dr. Zahurul Karim, Vice President, BAS presided over the occasion. Prof. Dr. Haseena Khan, Secretary, BAS, moderated the lecture. About 45 Fellows, Associate Fellows and Expatriate Fellows, scientists, researchers and faculty members participated in the lecture. Secretary, BAS expressed greetings to all participants and welcomed them in the lecture. She then introduced Dr. Khan Shahidul Huque, to the participants and mentioned the bright parts of Dr. Huque’s academic and professional career. Prof. Khan with the permission of the Chair, called upon Dr. Khan Shahidul Huque to start his presentation.

Bangladesh targets production of daily average per capita 250.0 ml liquid milk, 120.0 g meat, and 15.7 g egg compared to their global standard requirement range of 0 to 500.0 ml, 0 to 86.0 g, and 0 to 25.0 g (Lancet Commission, 2019) respectively. The country claimed the per capita daily production of 162 ml milk, 123 g meat, and 15.4 g egg in 2019. Bangladesh has intensified development thrusts for self-sufficiency of animal-sourced foods (asf), targeting the increased population, its urban share in 2030 & 2050, and the growing dietary shifts to the asf (185.0 million & 200 million, and 49.0% & 70.0%, respectively). It has widened the scope for modernization of the livestock sector and options for asf food product value addition.



Speaker Dr. Khan Shahidul Huque



BAS Fellows and other participants from different Institutions in the Academy Lecture

Livestock and poultry feed on fibrous roughages and cereals and cereal by-products. They produce asfs, the prime source of essential amino acids and heme-iron which protect humans from wasting, stunting, underweight, and anemia, support rural livelihood and soil health. The conversion efficiency of plant protein of cereals and cereal by-products into animal protein (poultry meat & eggs) by poultry is estimated to be at par with the regional

and global levels. But the deficiency of roughage in terms of quantity and quality and limited or no pasture facility compel farmers to use comparatively higher concentrate feeds resulting in lower conversion efficiency of plant protein to animal protein by ruminant animals as well as lower cost efficiency of milk and meat. This has aided in widening the feed import basket.

Market-driven feeds and fodder development for increasing the production and productivity of dairy and meat in the country may address, among others, the following.

- i. Roughage value chain development through land budgeting and contracting land-rich countries for increasing the availability of quality fodder
- ii. Production of balanced mixed feeds and antioxidant-rich feed additives
- iii. Development of market-based livestock manure value chain
- iv. Farm machinery support to feed and fodder processing

After the presentation was over, the Chair expressed thanks to the speaker and declared the floor open for discussion.

Dr. Mazed, Director, BAS commented that Milk Vita, a co-operative society of milk producers of Bangladesh pays low prices of milk per litre to the milk producers and therefore, the producers are found to sell the milk at a higher price in other places including Dhaka. Dr. Huque agreed, that the growers agree with Milk Vita Co-operatives Ltd. at their set conditions when they take a loan. Later on, they violate the conditions for better prices.

Dr. Idris Ali asked the speaker why there is no quality control of poultry feed in the industries and if it is possible to produce cattle feed through contract growers in the country? Dr. Huque replied that every year 1% of agricultural land is going out of cultivation therefore it is very difficult to select land for growing cattle feed commercially and profitably.

Prof. Dr. ASM Matiur Rahman commented that blood pressure is found to increase in humans due to use of antibiotics in cattle feed.

Prof. Dr. M Shamsheer Ali, opined that since the production of fodder is a big problem in the country steps should be taken to increase its production.

Prof. M Tofazzal Islam mentioned that silage production has to be increased. The prices of silage in other countries are less. The Govt. may give subsidy for silage production for better milk and meat production.

Dr. Khan replied to all queries and questions in details.

The Chair in his closing remarks mentioned that the Academy is grateful to Dr. Khan Shahidul Huque for a very useful presentation. More information is needed on dairy food

and feed. Rural people, the producers of milk and egg do not get good price of their produce. He mentioned that in the poultry industry, Kazi Farm, Aftab Group and PRAN Ltd are the main feed producers of the nation. The Bangladesh Standard Testing Institute (BSTI) has a small laboratory for testing samples coming under its purview.

**vi. Lecture on “Ionic Liquid Based Microemulsion: A Neoteric Medium to Prepare Nanomaterials with Tunable Properties” by Professor Dr. Md. Abu Bin Hasan Susan**

The Bangladesh Academy of Sciences (BAS) organized an Academy Lecture entitled “Ionic Liquid Based Microemulsion: A Neoteric Medium to Prepare Nanomaterials with Tunable Properties” on 24 February 2022 on a Zoom platform at 11:00 am. Prof. Dr. Md. Abu Bin Hasan Susan, Fellow of BAS and Professor, Department of Chemistry, University of Dhaka, was the speaker. Prof. Dr. Choudhury Mahmood Hasan, Vice President, Bangladesh Academy of Sciences joined the lecture as the Chief Guest. Prof. Dr. ZN Tahmida Begum, Treasurer, Bangladesh Academy of Sciences presided over the occasion. Prof. Dr. Haseena Khan, Secretary of BAS, moderated the lecture. Around 55 Fellows, scientists, researchers, and faculty members of different universities participated in the program. Secretary, BAS, greeted all the participants and welcomed them to the event. She then introduced Prof. Dr. Md. Abu Bin Hasan Susan to the participants and presented a brief summary of his academic and professional career. Prof. Haseena Khan with the permission of the Chair, called upon Prof. Susan to start his lecture.



Prof. Abu Bin Hasan Susan



BAS Fellows and other participants from different Institutions in the Academy Lecture

Professor Susan started his lecture by mentioning that nanomaterials with tunable properties have been a fascinating domain of current research for their promising applications in diverse areas. Nanomaterials of these kinds are of different metals, such as, silver, iron, cobalt, nickel, zinc and copper and metal oxides, such as, zinc oxide, manganese dioxide, nickel oxide and titanium oxide, and polymer nanocomposites. Core@shell nanoparticles i.e hetero-structured materials comprising a material coated with another material with the size ranging from 20–200 nm, are also unique for their modular properties and are even more promising since precise control of the size, shape, and composition of the core and shell enable the emission wavelength to be tuned over a wider range than with

either individual conducting or semiconducting materials. There are challenges, which *inter alia*, include: ease of preparation, cost, stability, control of size and shape, and uniform dispersity in a matrix etc. for practical application of such nanomaterials.

In Material Chemistry Research Laboratory of the Department of Chemistry, University of Dhaka, extensive research is being conducted on the preparation, characterization and applications of metal and metallic oxide and core@shell nanoparticles and polymer-nanocomposites from water-in oil (w/o) microemulsions or reverse microemulsions as nanoreactors. It may be worth mentioning that reverse microemulsion, consisting of water droplets dispersed in the oil phase and stabilized interfacially by a surfactant monolayer serve as nanoreactors and therefore has been an ideal template for restraining particle nucleation, growth and agglomeration. The concept has been successfully applied to prepare a wide variety of nanoparticles with tuneable size and distribution by proper choice of surfactants, cosurfactants, oil phase and composition to control the dimension of the hydrophilic core of the reverse micelles. The influence of various ionic liquids with different cationic and anionic structure as medium or additive has also been studied. Metal nanoparticles have been prepared in controllable dimensions and morphology from reverse micelles and ionic liquids. Fe@Au, Au@Ag, Ag@Au and ZnO@Ag core@shell nanoparticles have been synthesized using reverse microemulsions. Polyaniline (PAni)/Ag, PAni/MnO<sub>2</sub>, PAni/NiO, poly (vinyl alcohol)/MnO<sub>2</sub> nanocomposites have also been successfully prepared from reverse microemulsions. Electrochemical deposition of metals, conducting polymers and binary and ternary alloys have also been electrodeposited as thin films with tunable morphology and crystallinity from reverse microemulsions and ionic liquids. The synthesized nanomaterials and thin films exhibited tunable electrical, optical and antibacterial properties and have prospective applications in optoelectronic devices, photonics and biomedical field for drug delivery.

It has been established that hydrophilic and hydrophobic ionic liquids can be used to develop green microemulsions which will govern the size and shape of the nanomaterials of interests. Electrochemical route which has also been feasible will generate nanomaterials with controlled size and morphology. Consequently, series of ionic liquid-based microemulsions have been prepared and their physicochemical properties have been studied in details. Percolation behavior in such microemulsions has been investigated and microstates have been analyzed. The results will be discussed to develop a new methodology for preparation of nanoparticles with tunable physico-chemical properties from ionic liquid-based microemulsions. Nano-structured materials of many different kinds may be prepared using ionic liquid-based neoteric medium which show necessary promises in multidisciplinary areas including chemistry, physics, electrochemistry, biology, materials science, agriculture, food science, pharmacy, medicine, etc. Nanomaterials may thus find applications in chemical, pharmaceutical, textile, and cosmetic industries, and may be suitable for nutritional and drug delivery systems and bio-preservation and may also serve as supramolecular catalysts and heat transfer agents.

At the end of the presentation, the Chair commented that it was a great presentation on a very interesting subject.

Prof. Dr. ASM Matiur Rahman appreciated the lecture. He said the presentation will help understand the beautiful and mysterious creation of God. Prof. M Shamsheer Ali said that it was nice to know that research on nanoparticles is going in Dhaka University. Prof. Ali then gave examples of research work on nanoparticles in the laboratory of Prof. C.R. Rao of India mentioning that Prof. Rao works in this field and he invites students from Bangladesh to work in his laboratory.

While mentioning about his research collaboration with Prof CN Rao, a most distinguished scientist of India, Dr. Susan explained tunability of new particles. Dr. Susan further said that students of his department have been working in the development of smart textiles. Some students are working on liquid based micro-emulsion.

Prof. AKM Azharul Islam commented that new particles were used in the preparation of drugs in the lab. It is usable for bio-medical purposes i. e. in breast cancer. Some students are doing research on cancer. Dr. Susan hoped that within 5-10 years, they would achieve success in health medical issues. Prof. Azharul Islam also wanted to know how they tune nanoparticles with micro-emulsion. Dr. Susan replied that they develop control over the properties. By changing and tuning properties of nanoparticles, it is possible to move systemically. Tunability is done by changing systematically the size of nanoparticles of ionic materials. Electronic structure can be changed by changing properties.

Prof. Muhibur Rahman termed the presentation as an excellent one. He said that a big challenge is working on cylindrical size of nanoparticles. He asked Dr. Susan how far he has been able to overcome these challenges. Prof. Rahman gave example of zinc oxide nanostructures. Prof. Tafazzal Islam appreciated the work of Prof. Susan and termed it as very uncommon work. He mentioned that he had brought some liquid based tunable micro-emulsion from Australia to use it against wheat blast problem in Bangladesh. It can be used in the farmers' field also. Prof. Susan said that they had characterized some bio-chemicals to be used as nanomaterials in developing fertilizers usable in a farmer's field.

Prof. Sharrif Enamul Kabir termed the lecture as fantastic. He opined that it is possible to change nanoparticles to any chemical but very difficult to go for any practical applications. Dr. Susan said that he was trying to develop collaboration with other organizations like BCSIR while mentioning that it is difficult to get students interested in pursuing higher degree like PhDs in the country.

The Chief Guest, Prof. Dr. Choudhury Mahmood Hasan said that Dr. Susan has made outstanding publications in world class journals and he stressed upon practical applications of Dr. Susan's research in target-oriented fields.

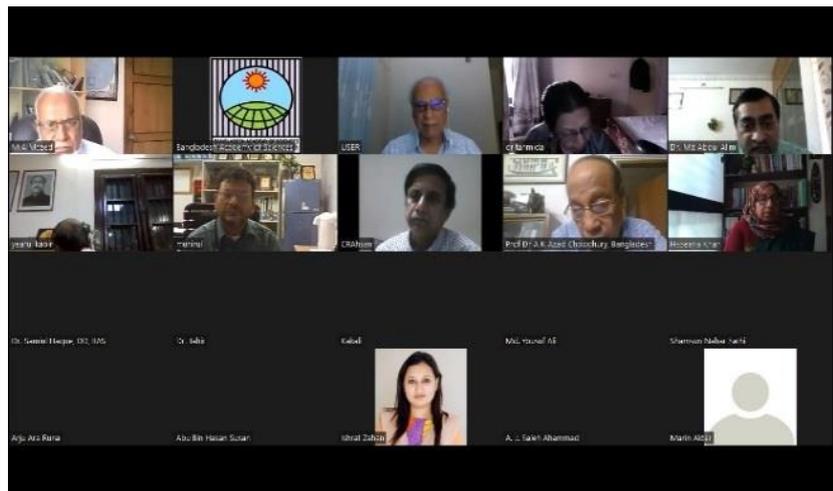
The Chair, Prof. Dr. ZN Tahmida Begum appreciated Dr. Susan’s research as outstanding work. The Chair hoped Dr. Susan will develop fertilizer and textile goods. She wished success of all his work. Prof. Begum advised the speaker to develop international collaboration and visit world class research laboratories. She then expressed thanks to all participants and declared end of the lecture.

**vii. Lecture on "Computation of Fluid Flow and Heat Transfer with Nanofluids" by Prof. Dr. Md. Abdul Alim**

The Bangladesh Academy of Sciences (BAS) organized the Academy Lecture entitled “Computation of Fluid Flow and Heat Transfer with Nanofluids” on 23 March 2022 on a Zoom platform at 4:00 pm. Prof. Dr. Md. Abdul Alim, Fellow of BAS and Professor, Department of Mathematics, Bangladesh University of Engineering and Technology (BUET), was the speaker. Emeritus Prof. Dr. AK Azad Chowdhury, President, Bangladesh Academy of Sciences joined the lecture as the Chief Guest. Prof. Dr. Zahurul Karim, Vice President, Bangladesh Academy of Sciences presided over the occasion. Prof. Dr. Haseena Khan, Secretary of the BAS moderated the academy lecture. Around 30 Fellows, scientists, researchers, and faculty members of different universities participated in the lecture. Secretary, BAS, greeted all the participants and welcomed them to the event. She then introduced Prof. Dr. Alim to the participants and presented a brief summary of his research achievements. Prof. Haseena Khan with the permission of the Chair, called upon Prof. Alim to give his Academy Lecture.



Speaker Prof. Md. Abdul Alim



BAS Fellows and other participants from different Institutions in the Academy Lecture

Prof. Dr. Alim presented his paper on the “Computation of Fluid Flow and Heat Transfer with Nanofluids”. He then explained the complex method of heat transfer with mathematical model.

Fluid flow and heat transfer phenomena are important in thermal engineering and industrial fields because of its effective applications in heat exchanger, cooling of electronic devices, solar technologies, nuclear reactor, geophysics, etc. In heat transfer and fluid flow analysis,

researchers found a major limitation of lower thermal conductivity of the traditional heat transfer fluids including water, oil, ethylene glycol, etc. To overcome this limitation, Maxwell's (1873) developed a new class of heat transfer fluid by dispersing millimetre or micrometre sized particles in convectional fluids. But some major problems were found in this development such as higher sedimentation, clogging force, erosion, high-pressure drop for using millimetre or micrometre sized particles in base fluids.

Recently, researchers and engineers congregated to overcome the problems for using millimetre or micrometre sized particles in convectional fluids and developed another innovative class of heat transfer fluids by dispersing nanometer-sized particles in base fluids named as nanofluids, proposed by Chio in 1995 at the Argonne National Laboratory, U.S.A. Nanoparticles may be metal, metallic oxide, carbides, or carbon nanotubes as those have higher thermal conductivity (e.g. Cu, Ag, Al, Mg, CuO, Al<sub>2</sub>O<sub>3</sub>, MgO, SiO, TiO<sub>2</sub>, etc), increase conduction and convection coefficients, allowing for more heat transfer out of the coolant. The nano particles are smaller than 100nm (1nm = 10<sup>-9</sup>m). As the size of nanoparticles in nanofluids is almost similar to the molecules of base fluids, the conservation equations (mass, momentum and energy) for the base fluid can be directly extended to nanofluids. It is important that nanofluids have super properties compared to traditional heat transfer fluids as well as fluids containing millimetre or micrometre particles such as higher stability, higher thermal conductivity, minimum sedimentation, minimal clogging force, reduced pumping power homogeneity, etc. Such properties make them potentially useful in many applications including microelectronics, fuel cells, pharmaceutical processes, and hybrid-powered engines, engine cooling/vehicle thermal management, domestic refrigerator, chiller, heat exchanger, and nuclear reactor, in grinding, in machining, in space, defense and ships, and in boiler flue gas temperature reduction.

Computation of fluid flow and heat transfer with nanofluids consists of the development of two or three-dimensional physical and mathematical models which include the system of governing equations namely mass, momentum and energy equations. The system is then solved by using different methods like Finite element method, Finite difference method and Finite volume methods, etc. However, Finite element method has been implemented to solve the conservation equations relating to the fluid flow and heat transfer models. In this simulation, the entire domain is discretized into finite element meshes, which are composed of non-uniform triangular elements and the governing equations subject to the boundary conditions have been converted into the finite element equations with the help of weighted residuals method. Resulting integral equations are transformed into nonlinear algebraic equations considering Gauss's quadrature method. These algebraic equations are reduced to linear algebraic equations applying reduced integration procedure and Newton-Raphson method. Finally, Triangular Factorization technique is implemented to solve the obtained linear algebraic equations.

The calculations are performed for different values of Prandtl number (Pr), the Rayleigh number (Ra), nanoparticle volume fraction ( $\phi$ ) and for different Hartmann number (Ha). The simulated results are recorded for nanofluid flow and temperature components and presented via streamline circulations, isotherm distribution, heat transfer rate using average Nusselt number and mean temperature profiles. Based on the numerical results and its plotting, it is evident that fluid flow circulation structure remains same but its strength gradually decreases with the increase in nanoparticle concentration in base fluid. The reason behind is that higher concentration of nanoparticles increase its density and slow down the flow movement. On the other hand, temperature distribution is minutely changed with increase in volume fraction as the heat flow is dominated by conduction mode. Besides this, heat transfer rate is found to increase significantly with the addition of nanoparticles in the base fluid.

Magnetic field (characterized by Hartmann number, Ha) has no effect on the shape of the streamlines as obtained from the present investigation. However, Ha affects the flow by retarding the fluid movement, and thus affects convective heat transfer. It is found that the position of the heated block inside the cavity and Ha had very significant impact on flow pattern and heat transfer and heat flux decreased with increasing Ha. The variations mainly involved thermal conditions of the wall, shape of the object in the cavity, and the fluid properties.

The President, BAS expressed thanks to Dr. Alim for his good presentation and for giving a good description of the subject. The Chair, Dr. Zahurul Karim thanked Dr. Alim for his presentation. He then requested participants to ask questions. After a short Q&A and discussion session the chair declared the end of the lecture.

## **Academy lecture by Expatriate Fellow, BAS**

### **Lecture by Prof. Dr. Ahmed Abdullah Azad**

Bangladesh Academy of Sciences (BAS) organized an Academy Lecture on “Opportunities and Challenges for Producing Affordable Biotech Medicines for Bangladesh and the Developing World” on 20 October 2021 on a Zoom platform at 11:00 am. Prof. Azad, Expatriate Fellow, BAS and FTWAS, FIAS, MASSAf, FRSSA & Secretary General, Islamic-World Academy of Sciences was the speaker.

Emeritus Prof. Dr. AK Azad Chowdhury, President, BAS joined the Lecture as the Chief Guest. Prof. Dr. Zahurul Karim, Vice President, BAS presided over the occasion. Prof. Dr. Haseena Khan, Secretary, BAS, moderated the lecture. About 50 Fellows, Associate Fellows, Expatriate Fellows, scientists, researchers and Faculty members participated in the lecture. Secretary, BAS expressed greetings to all participants and welcomed them in the lecture. She then introduced Prof. Ahmed Abdullah Azad to the participants and mentioned the important parts of Prof. Azad’s brilliant academic and professional career. Prof. Khan with the permission of the Chair, called upon Prof. Ahmed Abdullah Azad to start his presentation.

**Prof. AA Azad addressed the Chief Guest, the Chair, Fellows and participants and began his presentation.**



Speaker Prof. Ahmed Abdullah  
Azad

BAS Fellows and other participants from different Institutions in the Academy  
Lecture

He started with the forecast that Bangladesh can make use of its demographic dividend, develop intellectual capital and S&T and use these resources to build on existing strengths and take advantage of special opportunities. The research engine for sustained economic growth in developed countries is largely driven by doctoral and postdoctoral researchers.

Prof. Azad then said that Bangladesh can focus in research areas of highest national need, existing strength and development priorities like food security, health equity, green energy, environment and climate change. Bangladesh can establish multidisciplinary and multi-institutional collaborations between research groups possessing complementary expertise and facilities within Bangladesh and NRB researchers. Dr. Azad recommended an area of priority research and common interest that can also involve research groups from other developing countries and this area is the production of Biotech medicines for affordable healthcare and wealth creation.

Prof. Azad mentioned the current strengths and future opportunities of the pharmaceutical sector in Bangladesh.

Dr. Azad mentioned two areas of Therapeutic Research that provide best opportunities for collaborations and product development:

- i. Rational bioprospecting of Biota for discovery of novel drugs;
- ii. Development of affordable biosimilar medicines through reverse engineering of very expensive patented biologics.

Dr. Azad then outlined the drug discovery map and development processes and outlined the prospects of the biota for novel drugs. Prof. Azad also outlined the discovery and development pathway for novel drugs, combining strengths in traditional knowledge and

medicinal chemistry with modern molecular biosciences. He said that there is a high potential for multidisciplinary and multi-national collaborations within Bangladesh and involvement of scientists from LDCs and scientifically lagging countries.

Prof. Azad explained the discovery and development pathway for novel drugs from biota and availability of needed expertise and facilities.

Dr. Azad cited two examples of disease-specific molecular targets and target-based bioassays. He then explained the complex methods of drug discovery from different natural resources like the bee venom. He also explained the biologics and biosimilars of medicine discovery and discovery of 1<sup>st</sup> generation recombinant drugs i.e. insulin, interferon, erythropoietin, growth factors etc.

Prof. Azad explained the biosimilars in Bangladesh and gave examples of biosimilars sold in Bangladesh. He outlined the golden opportunity for production of affordable Mab and Fc-Fusion Biosimilars for Bangladesh and other developing countries. Prof. Azad outlined the development of new Fc-Fusion Biosimilars from seed clones constructed in Bangladesh.

Prof. Azad concluded his speech with the following messages:

He recommended for an enabling and catalytic role of BAS in developing R&D capacity to address national priorities.

The Bangladesh Academy of Sciences (BAS) **could play a leading role in the establishment of some critically important R&D-related institutions in Bangladesh** in partnership with Bangladesh authorities (Planning/Finance, MOST, UGC/HEC, Industry), international counterparts (TWAS, IAS, COMSTECH, ICGEB etc) and Development Partners (WB, IsDB, Wellcome Trust, JICA, SIDA):

- A **Trust** or **Foundation** to adequately fund collaborative R&D (local and with developing countries) in areas of common interest and highest priority; PhD, PDF, training and visiting fellowships; and critical cutting-edge technologies.
- A **world-class molecular biosciences research center with state-of-the-art equipment and technologies** as an **educational and training hub for young researchers** from Bangladesh and from scientifically-lagging/developing countries. *This center could be modelled on the EMBL (Heidelberg, Germany) and ICTP (Trieste) and ICGEB (Trieste, New Delhi and Cape Town).*
- A **Technology Transfer Center** as a one-stop advisory and support hub for issues related to IP, Regulatory Affairs and Commercialisation, with uniform and harmonised guidelines for Bangladesh and developing countries. *For Regulatory Affairs the proposed Technology Transfer Center could follow the example of EUMA, which covers regulatory affairs for all EU nations.*

Prof. Azad also made following recommendations for Bangladesh:

i. ***Change in research culture:***

- ❖ Goal-oriented research in areas of national/regional priority
- ❖ Postgraduate research to drive national/regional innovation
- ❖ Involvement of Expatriate scientists in research capacity development, and in provision of intellectual and technological support
- ❖ Multidisciplinary collaboration with other academic and industry researchers in Islamic countries possessing complementary expertise and facilities
- ❖ Generation, protection and utilisation of IP for commercialisation of research

ii. ***Meaningful funding for internationally competitive and productive research***

- ❖ PhD and postdoctoral fellowships for critical mass of fulltime researchers (with required expertise) to drive research engine
- ❖ Competitive research grants to outstanding research proposals
- ❖ Collaborative research grants in areas of national/regional priority (compulsory academia-industry linkages)
- ❖ Rewarding scientists for research productivity and technology transfer (especially where commercial constraints limit or delay in publication)
- ❖ Incentives to companies investing in academic R&D
- ❖ IP generation and protection
- ❖ Preclinical and human clinical trials

Finally, Prof. Azad outlined the establishment of a national and regional core facility for postgraduate and postdoctoral researchers.

At the end of the presentation, the Chair, Prof. Dr. Zahurul Karim said that it was a very good presentation. He then declared the floor open for discussion. Prof. Dr. AKM Azharul Islam wanted to know from the speaker, Professor Azad the type of bee-venom being used for research. Prof. Azad replied that it was the venom of militant type of bees. Prof. Dr. ASM Matiur Rahman said that presently Biotechnology and Information technology are the important areas of research. He mentioned that allopathic medicine has harmful effects in the long run. Herbal and traditional medicines are also used by people now. Prof. Azad said that a report on the development of medicines by biotechnology was prepared and but it is not available presently.

Emeritus Prof. Dr. AK Azad Chowdhury said that Prof. Azad is a world-renowned researcher. He mentioned that thousands of druggable products had been isolated and characterized in Bangladesh. In Bangladesh, local scientists and non-residential Bangladeshis can work together to develop specific drugs. Genetically developed medicines require many trials. Biosimilar products can be developed in the country. INCEPTA is producing medicine in the country. Donor agencies and NRBs can co-operate with INCEPTA to develop medicines from natural products. The suggestions made by Prof Ahmed Azad could be utilized to develop medicines which can also be exported.

Prof. Hannan, Expatriate Fellow expressed gratitude for a very resourceful presentation. He opined that chemists and biotechnologists can cooperate among themselves to develop medical research, since in Bangladesh; a lot of research work is being done. Industries and research laboratories can collaborate with each other to develop and produce medicines. A Center of Excellence for multidisciplinary drug should be established.

Prof. Dr. M Shamsheer Ali said that knowledge of the ethnic groups of the country could be used to develop medicines before it is lost. BAS can take proper steps to preserve the traditional knowledge of the ethnic population. Dr. Ali also said that the Govt. of Bangladesh has contributed Tk. 2000 crores for *Sukub Bond*. Efforts should be made to motivate the Govt. to develop a center for research. Prof. Dr. Aftabuddin, of the Dept of Genetic Engineering and Biotechnology, DU opined that there is no environment of cooperation in Bangladesh among the research organizations. He requested cooperation from all in this respect.

Prof. Azad Chowdhury said that the HEQEP projects have helped universities and research laboratories with research equipment and facilities.

Prof. Md Tofazzal Islam said that a Road Map should be developed to advance research leading to the discovery of new medicine. About 3.5% of GDP has been earmarked for research. BAS can consider developing a central research center. A network with chemists and druggists can be established. Proper utilization of already developed laboratories should be ensured.

Prof. Zeba Islam Seraj said that a Biomolecular Research Foundation has been initiated. BAS and the Foundation can work together to collect funds from different sources for carrying out cutting edge research on developing biotech medicines. BAS can also discuss with the Ministry of Education, Ministry Science and Technology and Ministry of Agriculture and can organize a conference and can open a door for cooperative research.

Prof. ZN Tahmida Begum requested Prof. Ahmed Abdullah Azad to take initiatives in the development of a Central Institute of Biotechnology research.

Professor Ahmed Azad replied that BAS should play an overarching role. Usually everyone gives their consent but nothing happens. If the Government changes, everything is lost. In fact, we need a Central Research institute. We should talk to donor agencies like World Bank and Asian Development Bank.

Prof. Dr. Azad Chowdhury, the Chief Guest in conclusion said that scientists in this country have to face many difficulties in doing research work. If the Govt. is changed everything is stopped and lost. He emphasized upon drawing a complete program for developing

research capabilities. He said a meeting with the Hon'ble Prime Minister could be arranged. However, at present, COVID-19 has restricted access to PM's office. He also suggested that Agricultural, Biotechnological, Chemical scientists and the distinguished Fellows together can take an initiative to start the necessary research culture and establish an institute.

Prof. Dr. Zahurul Karim, the Chair of the session expressed thanks to Prof. Ahmed Abdullah Azad for giving a very useful and impressive talk. He said both hope and frustration have been expressed during the talk. He also suggested starting multidisciplinary initiatives to get some result.

He finally proposed that renowned scientists in biotechnological research should come forward to take an initiative to start a process so that a central laboratory could be developed.

Finally, the following recommendations were made:

1. BAS can form a working group on this matter with the scientists from among the pharmacists, biotechnologists and bureaucrats.
2. Opinions from the retired scientists and present working scientists can be taken.
3. Traditional knowledge resources can be collected and protected.
4. Govt. regulatory authorities and researchers can work together to start an initiative on goal-oriented research on natural products.

The Chair then expressed thanks to all participants and wished a long and active life of the Prof. Dr. Ahmed Azad and declared the end of the lecture.

## POPULARISING SCIENCE

### Popular Science Lecture

#### **Artificial Satellites: Entry of Bangladesh" by Prof. Dr. AKM Azharul Islam, Fellow, BAS**

A popular science lecture was presented by Prof. Dr. AKM Azharul Islam, Fellow, BAS, at the Rajshahi Govt. College, Rajshahi on 14 November 2021. The lecture program was chaired by Prof. Md. Abdul Khaleque, Principal, Rajshahi Govt. College, Rajshahi. Chief Guest of this program was Prof Dr. ZN Tahmida Begum, Treasurer, BAS and Special Guest was Prof. Md. Habibur Rahman, Former Principal, Rajshahi Govt. College, Rajshahi.

Prof. Azharul Islam's lecture was on "Artificial Satellites-Entry of Bangladesh" With permission of the Chairperson, the facilitator Dr. Md. Nazim Uddin, Professor, Department of Physics, Rajshahi College started the program with recitation from the Holy Quran and the Bhagavad Gita. Then the program was formally started with introductory address by Dr. MA Mazed, Director, BAS focusing on the aims and objectives of Bangladesh Academy of Sciences (BAS) and the necessity of such popular lectures to popularize science among the new generation. He also expressed gratitude to the college authority for their cordial cooperation. The facilitator Dr. Nazim, introduced Prof. Dr. AKM Azharul Islam, Fellow, BAS, Emeritus Professor and former Vice Chancellor, International Islamic University Chittagong & former Professor Department of Physics, University of Rajshahi. After the introduction Professor Azharul Islam spoke on the topic "Artificial Satellites-Entry of Bangladesh". The slides and the presentation were in Bengali for a better understanding of the participants. Most of the participants were from classes 11 and 12. The speaker presented the topic very nicely with special emphasis on the details of Bangabandhu Satellite-1.

Then the facilitator Mr. Nazim invited two renowned teachers of the Department of Physics, University of Rajshahi, Prof. Dr. ASB Tariq and Prof. Dr. Saleh Hasan Naqib to comment on the presentation. After deliberation of their comments, the floor was opened for discussion. The students asked several questions regarding artificial satellites.



Prof. AKM Azharul Islam presenting his lecture



Participants of the popular lecture presentation

After an enjoyable discussion, the event ended with an address by the Chief Guest Prof. Dr. ZN Tahmida Begum and the Chairperson of the event. In her speech, she expressed the importance of science for the overall development of the country.



Address by Chief Guest, Prof. Dr. ZN Tahmida Begum



Address by Chair, Prof. Md. Abdul Khaleque, Principal, Rajshahi College

The auditorium was well decorated and was filled with participants. Altogether about 300 participants were present in the lecture. Considering the overall management, the program which was successful was example of an excellent initiative by a BAS Fellow to popularize science among the young generation.

## BAS-FSIBL NATIONAL SCIENCE OLYMPIAD 2022

The 12<sup>th</sup> BAS-FSIBL National Science Olympiad 2022 was held successfully this year both at the divisional and the national levels under the sponsorship of the First Security Islami Bank Ltd (FSIBL). The Science Olympiad 2022 at the divisional level was held on Friday 21 January 2022 at 6 centers in the metropolitan Dhaka and 28 centers throughout the country.

The 12<sup>th</sup> Science Olympiad 2022 at the national level was held on Friday 18 March 2022 at the Curzon Hall premises, Dhaka University. The event started at 9.00 am with the National Anthem and flag hoisting. Prof. Dr. ZN Tahmida Begum, Treasurer of the Academy hoisted the national flag and inaugurated the Olympiad. The Academy flag was hoisted by Prof. Dr. Haseena Khan, Secretary, BAS.



National and BAS flags hoisted by the Fellows and Guests during the inauguration of 12<sup>th</sup> BAS Olympiad

The flag of First Security Islami Bank Ltd was hoisted by Mr. Md. Tahirul Haque, Executive Vice Chairman. Pigeons, balloons and festoons were released by the Fellows and guests during the inauguration. Prof. Dr. ZN Tahmida Begum, Prof. Dr. Haseena Khan and Mr. Tahirul Haque encouraged and inspired the students to study science for the development of the country. The Olympiad 2022 examination started in Curzon Hall of Dhaka University at 10.00 am and continued for an hour and a half.



Q&A session chaired by Prof. M Shamsheer Ali, Former President, BAS



Popular Lecture by Prof. Muhammed Zafar Iqbal

After the examination, the students were addressed by Prof. Dr. M Shamsheer Ali, Former President, BAS who encouraged the students to study science and take part in the development of the country. The participants greatly enjoyed a presentation by the popular teacher, novelist and writer of science fiction Prof. Dr. Muhammed Zafar Iqbal.



Address by Chief Guest, Architect Yeafesh Osman, Hon'ble Minister, Ministry of Science & Technology



Address by Emeritus Prof. Dr. AK Azad Chowdhury, President, BAS

The Prize Distribution Ceremony for the winners of the National Science Olympiad 2022 was held at 03:30 pm. Honorable Minister for Science and Technology, **Architect Yeafesh Osman**, was the Chief Guest and **Mr. Md. Tahurul Haque**, Executive Vice Chairman, FSIBL was the Special Guest. The ceremony was Chaired by **Emeritus Prof. Dr. AK Azad Chowdhury**, President, BAS. The Chairman, Organizing Committee **Prof. Dr. Mesbahuddin Ahmed** and **Prof. Dr. Haseena Khan**, Secretary, BAS delivered the welcome speech and vote of thanks respectively. Then **Prof. Dr. Yearul Kabir**, Associate Secretary, BAS declared the names of the winners during the prize distribution ceremony. The Chief Guest, the Special Guest and BAS Fellows distributed the prize money, medals, certificates, and science books to the Olympiad winners of the School and College Groups. About 400 students participated in the National Science Olympiad 2022. All the participants of the National Science Olympiad 2022 were presented with a popular science book and a certificate of participation.



Guests cheering a winner



Guests with the winners

## BAS-PROFESSOR EMERITUS DR. SULTAN AHMED CHOUDHURY SCIENTIFIC TALENT NURTURE FUND AWARD CEREMONY

BAS-Professor Emeritus Dr. Sultan Ahmed Choudhury (SAC) Scientific Talent Nurture Fund Award Ceremony was held on Thursday, 31 March 2022 at 2:00 pm in the Multipurpose Hall, 12<sup>th</sup> floor, National Science and Technology Complex, Agargaon, Dhaka 1207. **Emeritus Prof. Dr. AK Azad Chowdhury**, President, BAS was the Chair. **Architect Yeafesh Osman**, Hon'ble Minister, Ministry of Science and Technology, Government of the People's Republic of Bangladesh, was present as the Chief Guest. **Mrs. Zakia Rouf Choudhury**, Chairman of the Professor Emeritus Dr. Sultan Ahmed Choudhury Memorial Trust Fund and daughter of late Dr. Sultan Ahmed Choudhury was present as the Special Guest. Prof. Dr. Haseena Khan, Secretary, Bangladesh Academy of Sciences moderated the ceremony.



Address by Chief Guest, Architect Yeafesh Osman, Hon'ble Minister, Ministry of Science and Technology



Address by Emeritus Prof. Dr. AK Azad Chowdhury, President, BAS

At the start, Prof. Dr. Haseena Khan briefly presented the life and work of Late Professor Emeritus Dr. Sultan Ahmed Choudhury and his magnanimity in creating a fund at the Bangladesh Academy of Sciences to give scholarships to meritorious but poor students. Prof. Khan then requested Mrs. Zakia Rouf Choudhury to address the recipients of the SAC-Scientific Talent Nurture Fund. A total of 73 students received the scholarship of which 50 were from schools and 23 from colleges. Mrs. Choudhury addressed the students and got emotional while talking about Dr. Sultan Ahmed Choudhury. She described how her father loved all children like his own. Mrs. Choudhury recollected her childhood memories and described the time spent with her father and his' dedication for his patients.

Architect Yeafesh Osman, Hon'ble Minister, Ministry of Science and Technology, Government of the People's Republic of Bangladesh in his speech praised Dr Sultan Ahmed Choudhury's initiative to provide scholarships to science students and his family for continuing Dr Choudhury's philanthropic activities. He then gave away the scholarships to the students. Students from almost all over Bangladesh were among the recipients of the scholarship. The Chief Guest impressed upon the students to be like Late Emeritus Prof. Dr. Sultan Ahmed Choudhury and asked them to love children as Dr. Ahmed did.



Address by Prof. Haseena Khan, Secretary, BAS



Address by Mrs. Zakia Rouf Choudhury, Chairperson, SAC-Scientific Talent Nurture Fund

Emeritus Prof. Dr. AK Azad Chowdhury, President, BAS in his speech congratulated the students and wished them a bright future and expressed gratitude to Dr Sultan Ahmed Choudhury's family for ensuring a continuation of the scholarship program by providing instantly a handsome amount of BDT 50 lacs to the endowment when they learned that a decrease in the bank interest rates was hampering the scholarship program.



An awardee receiving scholarship money from Hon'ble Minister



Guests with the awardees

## THE BANGLADESH ACADEMY OF SCIENCES GETS A NEW HOME

For the first time the Bangladesh Academy of Sciences now has its own office space. Since 1999, the Academy had been temporarily housed on the 2nd floor of the National Museum of Science and Technology (NMST) building. Later, the Director General of NMST allowed BAS the use of the 3rd floor of NMST. However, as all Fellows will recall the space was insufficient for the Academy.

On April 01, 2022, the Academy moved into its new office premise on the 3rd floor of the newly constructed National Science and Technology Complex at Sher-e-Bangla Nagar, Agargaon, Dhaka 1207. BAS had advocated for the building of a Science Complex in the country from the very beginning and kept requesting the Ministry of Science and Technology to allot a space for Academy in the complex once the building was completed. BAS is grateful to Architect Yeafesh Osman, the Honorable Minister for Science and Technology, Government of Bangladesh for finally allotting this beautiful office space in an impressive structure built to provide a platform for scientists in the country. There are 8 spacious rooms, which are being used as offices for the President, Treasurer, Secretary, and other staff of the Academy.

It goes without saying that the new office space has revitalized BAS activity.



Front view of the National Science and Technology Complex



BAS office on the 3<sup>rd</sup> floor of the National Science and Technology Complex

## BAS FELLOWS MEET AT AN EID REUNION IN THE NEW BAS PREMISE

All BAS Fellows and Associate Fellows were invited to the new premises of BAS for an Eid Reunion on 15 May 2022 at 3:00 pm. The event started with a request by BAS President, Emeritus Prof. Dr. AK Azad Chowdhury to all Fellows to join him for tea. While having tea the Fellows exchanged greetings among themselves and used the opportunity to catch up with each other on events that occurred since they last met before the outbreak of COVID in March 2020. After tea President, BAS took the Fellows on a visit to the new office premises of the National Science and Technology Complex, Agargaon, Dhaka 1207. All Fellows were very happy to see the new office and opined that for the first time BAS got an office that it deserved and one which was worthy of its image.



Address by Emeritus Prof. Dr. AK Azad Chowdhury, President, BAS



BAS Fellows and Associate Fellows

After the visit the fellows gathered for a short brief on the background of obtaining the new BAS premise. BAS President, Emeritus Prof. Dr. AK Azad Chowdhury chaired the session. Prof. Dr. Zahurul Karim, Vice President, BAS, Prof. Dr. ZN Tahmida Begum, Treasurer, BAS were in the dais. Prof. Dr. Haseena Khan, Secretary, BAS moderated the meeting. The following Fellows and Associate Fellows (31 in total) were present:

1. Prof. Dr. Zahurul Karim
2. Prof. Dr. Mesbahuddin Ahmad
3. Prof. Dr. ZN Tahmida Begum
4. Prof. Dr. Shariff Enamul Kabir
5. Prof. Dr. Liaquat Ali
6. National Prof. Dr. AK Azad Khan
7. Prof. Dr. KM Sultanul Aziz
8. Maj. Gen. Prof. Dr. ASM Matiur Rahman (Retired)
9. Prof. Dr. Zia Uddin Ahmed
10. Prof. Dr. Haseena Khan
11. Prof. Dr. Mesbahuddin Ahmed
12. Prof. Dr. AK Azad Chowdhury
13. Prof. Dr. M Feroze Ahmed
14. Emeritus Scientist Dr. Firdausi Qadri

15. Prof. Dr. Md. Saidur Rahman
16. Prof. Dr. Md. Abdur Rashid
17. Dr. Md. Sirajul Islam
18. Prof. Dr. Md. Abdul Alim
19. Prof. Dr. Yearul Kabir
20. Prof. Dr. M. Jahiruddin
21. Prof. Dr. Choudhury Rafiqul Ahsan
22. Prof. Dr. M. Tofazzal Islam
23. Prof. Md. Abu Bin Hasan Susan
24. Prof. Dr. Md. Anwar Hossain
25. Dr. Khan Shahidul Huque
26. Prof. Dr. Mirza Hasanuzzaman
27. Dr. Mubarak Ahmad Khan
28. Dr. Munirul Alam
29. Prof. Dr. ABM Md. Khademul Islam
30. Prof. Dr. Md. Mamun Molla
31. Dr. A. J. Saleh Ahammad

The Chair after exchanging Eid greetings with all Fellows present expressed his gratitude to the Hon'ble Minister, Architect Yeafesh Osman, Ministry of Science and Technology. He then, recapitulated the background of building the new Science and Technology Complex. Particularly, he mentioned late Dr. M A Wazed Miah and Prof. Dr. M Shamsheer Ali, Prof. Dr. Naiyyum Choudhury and Prof. Dr. Mesbahuddin Ahmed for their valuable contributions behind building this new complex and for allotting this space to BAS. The Chair again expressed thanks to the Ministry of Science and Technology and the scientists who worked behind for the development of this complex.

Prof. Chowdhury remembered Prof. Dr. M O Ghani, Prof. Dr. M Innas Ali, Prof. Dr. Aminul Islam and Prof. Dr. Quazi Abdul Fattah for their contributions to the development of the Academy.

The Chair also mentioned about the management of the Endowment funds, particularly that of Late Prof. Dr. Sultan Ahmed Choudhury. He expressed thanks to Mrs. Zakia Rouf Choudhury, the present chair of the Sultan Ahmed Choudhry Trust Fund for contributing Tk. 50 lac (fifty lac) to the present fund.

He expressed thanks to all for participating in the Eid Reunion and considering the functioning of BAS in a new place as its office he called it a 'house warming' party.

Prof. Dr. Z. Karim, Vice President, BAS expressed thanks to the President and Secretary, BAS for organizing this wonderful meeting. He commented that during his long-time association with BAS, he had not come across such a meeting before. He mentioned about the role of BAS-USDA fund in doing applied research for the benefit of agriculture in the country. He

requested all Fellows to visit this Academy every now and then. In conclusion, Dr. Karim prayed to the Almighty Allah for the wellbeing of BAS and its Fellows.

Prof. Dr. ZN Tahmida Begum, Treasurer, BAS, appreciated the presence of Fellows and particularly, she thanked Associate Fellows for their presence. She then talked about BAS-USDA Endowment for granting funds to the young researchers. More than 400 projects were submitted by the researchers in the 5<sup>th</sup> phase. About 104 projects were preliminarily selected and the principal investigators asked for submission of a complete project proposal.

Prof. Dr. Haseena Khan, Secretary, BAS, mentioned about the background of getting the space in the new complex and the transfer of the Academy office with the combined efforts of all BAS employees. She also appealed to the Fellows for guidance in running the Academy and requested them to be present in the next Annual General Meeting.

The Chair, Prof. Chowdhury mentioned about his participation in the discussion meeting with the Commonwealth Secretariat which was held virtually before the Commonwealth Heads of Government Meeting (CHOGM).

Emeritus Scientists Dr. Firdausi Qadri thanked the Secretary for organizing the Eid Reunion. She also said that the country has gone forward in agriculture but not in medical sciences. During Covid-19, much work has been done by molecular biologists and microbiologists. She suggested BAS to look into funds for carrying out research in medical sciences.

Prof. Dr. ASM Matiur Rahman addressed all Fellows and Associate Fellows and said that the reunion was a historic moment. He said that all of us have realized the importance of the Academy. He further said that the Academy of Sciences include all sciences. As such, the Academy should work in all branches of sciences. Prof. Rahman put emphasis on publicity of the Academy in the national electronic and printing media. He requested all Associate Fellows to be involved with the Academy. He praised the labor and time of the Treasurer and Secretary in running the Academy.

Then, Prof. Dr. Mesbahuddin Ahmad remembered Dr. Naiyyum Choudhury and his contribution for bringing the Academy to its present position. He thanked Prof. Tahmida Begum and Prof. Haseena Khan for their contribution. Prof. Ahmad talked about the possibility of contribution by Expatriate Fellows.

Prof. Dr. Mesbahuddin Ahmed, mentioned the background of getting the space in the new complex. He expressed thanks for organizing the Eid Reunion. He particularly thanked Prof. Haseena Khan for this. He requested all Fellows to give more time for the Academy. Prof. Ahmed mentioned about the big secretariat of the Indian National Science Academy in Delhi (INSA) and how with the help of the secretariat INSA organizes different programs. He

further said that we have to encourage young scientists to do more meaningful research. He requested all Fellows to give ideas for uplifting the image of BAS.

Prof. Dr. KM Sultanul Aziz encouraged all participants to work together in a structured way. He hoped that it would be possible to do so now in the new premise.

At the end of the session, the Secretary invited all Fellows to a photo session.



BAS Fellows and Associate Fellows at the Eid Reunion



BAS Fellows, Associate Fellows and Office staff at the Eid Reunion

## BAS HONORS OUTSTANDING SCIENTISTS

Selection of scientists for different Gold Medal Awards 2021 are mentioned below:

| Name of Gold Medal Award  | Field of Sciences   | Recommended person/s by the respective Gold Medal Committees   | Images  |
|---|---|--|---|
| BAS Gold Medal Award 2021   | Physical Sciences (Senior Group)                            | Prof. Dr. Mohammad Ferdows<br>Department of Applied Mathematics<br>University of Dhaka, Dhaka 1000   |    |
|   | Physical Sciences (Junior Group)                            | Dr. Md. Zaved Hossain Khan<br>Associate Professor<br>Dept. of Chemical Engineering<br>Jashore University of Science and Technology, Jashore      |    |
|   | Biological Sciences (Senior Group)                          | Prof. Dr. Mamun Al Mahtab<br>Department of Hepatology<br>Bangabandhu Sheikh Mujib Medical University   |   |
|   | Biological Sciences (Junior Group)                          | Dr. Md. Khairul Alam<br>Natural Resources Management Division<br>Bangladesh Agricultural Research Council (BARC), Farmgate, Dhaka 1000           |  |
| BAS-Dr. Sultan Ahmed Choudhury S&T Gold Medal Award 2021          | Medical and Health Sciences                                 | Dr. Aliya Naheed<br>Scientist & Head, Initiative for Non-Communicable Diseases<br>Health Systems and Population Studies Division, icddr,b, Dhaka |  |
| BAS-Dr. MO Ghani Memorial Gold Medal Award 2021                   | Physical, Biological, Engineering and Agricultural Sciences | Prof. Dr. Yearul Kabir<br>Dept. of Biochemistry and Molecular Biology<br>University of Dhaka   |  |
| BAS-National Prof. Dr. M Innas Ali Memorial Gold Medal Award 2021 | Science and Technology                                      | Dr. Md. Abdul Latif<br>Chief Scientific Officer & Head<br>Plant Pathology Division<br>Bangladesh Rice Research Institute                         |  |

## INTERNATIONAL RESPONSES/EVENTS

### **i. Participation of the President, BAS in the AASSA Annual General Assembly**

Emeritus Prof. Dr. AK Azad Chowdhury, President, Bangladesh Academy of Sciences (BAS) had joined the 5<sup>th</sup> AASSA General Assembly held on 15 October 2021 on a Zoom Platform. He was elected a Member-at-Large of the Executive Board Member of AASSA for the term 2021-2024. Dr. Yoo Hang Kim, President, AASSA welcomed Professor Chowdhury and praised the Bangladesh Academy of Sciences for organizing the webinar on Plastic Pollution: Causes, Effect and Solution. In this regard, the Secretary and the Council congratulated Prof. AK Azad Chowdhury for being selected a Member-at-Large of the Executive Board Member of AASSA for the term 2021-2024.



President, BAS Emeritus Prof. Dr. AK Azad Chowdhury selected as Member-at-Large of the Executive Board Member of AASSA for the term 2021-2024

### **ii. Webinar on “Genome editing in agriculture: Potential opportunities and way forward in Bangladesh”**

Bangladesh Academy of Sciences (BAS), South Asia Biosafety Program (SABP), Agriculture & Food Systems Institute (AFSI), and Biotech Consortium India Limited (BCIL) jointly organized a webinar on “Genome editing in agriculture: Potential opportunities and way forward in Bangladesh” held on 04 October 2021 at 3:30 pm on a Zoom platform.

At the start, Prof. Dr. Haseena Khan, Secretary, Bangladesh Academy of Sciences welcomed all participants, speakers and panel discussants in the webinar and presented different activities of the Bangladesh Academy of Sciences including research project funding through BAS-USDA endowment funds. She said the webinar would help the BAS-USDA funded projects which involve gene editing. She also thanked Prof Zeba Islam Seraj, Dr. Vibha Ahuja and Dr Aparna Islam for taking the initiative for organizing the timely webinar.

Then, Dr. Vibha Ahuja, Senior Adviser, SABP and Chief General Manager, Biotech Consortium India Ltd. (BCIL) mentioned the theme and aims of the webinar to the participants.

She then introduced Emeritus Professor Dr. AK Azad Chowdhury, President, BAS and requested him to deliver his introductory remarks.



Address by Emeritus Professor Dr. AK Azad Chowdhury, President, BAS

Emeritus Professor Dr. AK Azad Chowdhury, President, BAS in his talk mentioned the development of Biotechnology in the country. He said in Bangladesh fungus infection in wheat has been controlled, stress tolerant rice varieties have been developed, and the importance of gene editing in the field of agriculture is enormous. He also mentioned how genome editing is offering significant hope of medical cure against *cancer* and other *deadly diseases*. He gave the examples of Dr. Haseena Khan, Dr. Zeba Seraj, Dr. Md. Tofazzal Islam, Md. Khademul Islam and their achievements in the area of biotechnology research. Prof Chowdhury mentioned the possibility of developing genome editing products and that in order to face the challenges in coming days, our scientists will have to embrace the new technology of gene editing.

Dr. Ahuja then introduced Dr. Jimmy Botella, University of Queensland, Australia and requested him to deliver his lecture on genome editing.

Dr. Botella spoke on the introduction of gene editing in agriculture. He talked about mutation breeding. He also talked about the different CRISPR-CAS technologies.

He first talked about the following on mutation breeding—

- Spontaneous ‘natural’ mutants used for crop improvement
- First example of mutant selection for breeding: Chinese book “Lulan” 300 BC 1<sup>st</sup> documented book
- Artificial mutagenesis used since 1930
- Until today
  - 3365 released commercial plant varieties in super markets from
  - 228 species and
  - 72 countries involved in gene editing including Bangladesh.

Dr. Botella explained that genome editing (CRISPR) is equivalent to mutation breeding, instead of 50,000 mutations CRISPR deals with a single mutation.

Instead of random, CRISPR is extremely precise.

Instead of having changes all over genome, CRISPR is applicable at a single location.  
Instead of producing hundreds of lines, CRISPR allows working on only 4-6 lines.  
Instead of multiple generations CRISPR requires to deal with only 2 generations.  
Genome editing CRISPR/Cas 9 method uses homing device by molecular scissor. In Cas 9, Sg (single guide) RNA is used.

Dr. Botella also explained the complex process of gene editing. He elucidated the gene editing process from rice to sorghum. He described the new CRISPR technologies as mentioned below:

- New Cas family of nucleases
- Base editing (DNA & RNA)
- RNA targeting
- Epigenome modifications
- Prime editing
- Gene replacement

He gave the examples of Base Editing in 2 recent articles:

1. Engineering herbicide-resistant watermelon Cas 9-mediated base-editing, by Shouwei Tian *et al* (2018).
2. Precise base editing of non-allelic acetolactate synthase genes confers sulfonyleurea herbicide resistance in maize, by Yanmin Li *et al* (2020).

Dr. ABM Md. Khademul Islam, Professor, Department of Genetic Engineering and Biotechnology, University of Dhaka spoke on CRISPR-Cas-based diagnostic tools and other technologies used for diagnosis of infectious and non-infectious diseases. He spoke about the use of genome editing for establishing CART cells having robust resistance to immune cell-suppressive molecules. Dr. Khademul Islam also talked about the ethical issues regarding genome editing in human.

Then Dr. Zeba Seraj, Professor, Department of Biochemistry and Molecular Biology, University of Dhaka presented her work on gene editing for crop improvement in Bangladesh and the key research initiatives on the development of salt stress tolerant varieties of rice. She talked about the increase in crop yield through gene editing. She also mentioned about the improvement of tomato, and the development of salt tolerant rice variety. Dr. Zeba Seraj explained the development of non-GMO crops through gene editing by CAS 9 method. She explained the development of transgenic plants expressing the CAS 9/ sg RNA system with targeted genome editing at different stages. Transgene free homozygous mutants with desired genetic modifications at targeted loci and without R-Gen transgene construct could be selected by selfing of first (GE-0) generation plants and after segregation of the transgene in the next GE-1 generation. The GE plants could be selected by PCR and DNA sequencing of clones and negatively selecting for the transgene free plants with desired modifications in the first generation only. She mentioned commercial companies are available for producing non-GM crops. They do the transformation using

CAS-9. Edited plants which are non-transgenic are now available. Dr. Zeba explained the process of increasing yield of crops with the use of CRISPR/CAS 9. She explained the development of tomato with increased lycopene, an antioxidant with anti-cancer properties.

She explained the domestication of wild rice having biotic and antibiotic trait resistance. She further explained salt tolerant variety, *Horkuch* in which the transporter gene AKTI is downregulated under salt stress.

- Transporter gene AKTI is down regulated under salt stress in salt tolerant Horkuch so this gene has been downregulated in commercial cultivar as BR-29 using CRISPR-Cas 9 gene editing.

Finally, she explained the time requirement for crop improvement techniques through cross breeding (8-10 yrs.) mutation breeding (8-10 yrs.), transgenic breeding (8-12 yrs.) and genome breeding (4-6 years).

Then Dr. Andrew Roberts, Chief Executive Officer, Agriculture and Food Systems Institute, Washington, USA presented the regulatory status of gene edited crops throughout the world. He mentioned that the majority of the countries do not grow genetically modified crops. He mentioned the situation in Latin America in Argentina, Brazil and Chile, Australia, New Zealand, Canada and USA.

Dr. Roberts also commented that the regulatory status of gene edited plants varies globally. Dr. Roberts described the status of regulation in USA by the United States Department of Agriculture.

- USDA has updated their regulations, clarifying an earlier policy statement that gene edited products (SDN-1 and likely SDN-2) are not subject to regulation.
- US FDA has a voluntary premarket consultation process for GE plants. They have not issued any clarifying statement on whether the developers of gene edited plants will participate in the voluntary process.
- US EPA has not made any policy statement regarding gene editing. He mentioned the only gene edited plant is soybean in USA.

Dr. Roberts concluded his presentation with the following remarks:

- Gene editing encompasses a range of molecular methods to induce targeted mutations:
- Especially useful for plants that are hard to transform
- Difficult to use conventional breeding methods
- Varieties may be hard to backcross
- The regulatory status of gene edited plants varies globally
- Some countries are choosing to regulate as GMOs others are not.
- Risk assessment using the same paradigm for GE plants is possible, but may not be worthwhile.

Dr. Ahuja then requested to Dr. K C Bansal, Secretary, National Academy of Agricultural Sciences to present his paper. Dr. Bansal shared the 'Recommended Framework' for regulating gene editing in plants in India. Dr. Bansal described the different and more strategies for targeted gene editing. He described 6 types of gene-editing. Dr. Bansal also described science-based regulation and recommendations that are necessary to be placed to policymakers. Dr. Bansal described the role of Bangladesh Academy of Sciences a think-tank to advise the Govt. in agriculture and other scientific matters.

Dr. Bansal explained targeted genome editing which results in SDN1 SDN 2 SDN 3. Dr. Bansal also explained precise plant genome editing using base editors and prime editors.

He explained 6 categories of genome editing:

1. Induction of single point mutation or INDEls (SDN-1)
2. Short insertions or editing of a few base-pairs by an external DNA template sequence (SDN2)
3. Insertion of longer strands or full-length gene (SDN-3)
4. ODM or oligonucleotide-directed mutagenesis (equivalent to SDN 2 based on template requirement)
5. Use of base editors (BEs)
6. Use of Prime editors (PEs)

Dr. Bansal explained the policy making organizations of different countries as below:

- JRC: Joint Research Center of the European commission-2011
- EFSA: European Food Safety Authority 2012, 2015, 2020
- EASAC: European Academies of Science Advisory Council 2015
- Leopoldine: German National Academy of Sciences 2015 and finally
- NAAS: National Academy of Agricultural Sciences, India 2020

Dr. Bansal mentioned the core committee of India which comprises of:

President: DG, ICAR

Co-Chairs: Past President, NAAS

Convener: National Institute of Plant Biotechnology, Delhi

Members: From different organizations

Dr. Bansal made some key observations-the final products developed through genome editing are free from foreign DNA and indistinguishable from the products developed through conventional breeding. Dr. Bansal described the proposed Regulatory pathway for the release of genome-edited plants. Dr. Bansal commented finally that - Global regulatory coordination is a must for sustainable agricultural innovation and international trade. He opined that Bangladesh should develop policies similar to that of India.

His presentation was followed by panel discussion. The panelists were Prof. Dr. Mirza Hasanauzzaman, Fellow, BAS, Dr. Tahmina Islam, Professor of Botany, Dhaka University, Prof. Dr. Md. Tofazzal Islam, Fellow, BAS and Dr. Aparna Islam, of BRAC University.

Dr. Hasanuzzaman, Professor of Agronomy, SAU, said that genome editing is very popular for crops. It is applicable for developing heat tolerant, salt tolerant, other stress tolerant, climate change resilient crop varieties. He recommended for the development of a policy and clear guidelines for sustainable development using gene editing techniques.

Prof. Tahmina Islam, opined that genome sequence data gives us the blueprint where we can edit according to our needs without going through trails and errors. Genome editing is well known because of its precision in altering genetic components within a short period of time, whereas precision is not found in case of traditional breeding. Traditional breeding depends more on luck in terms of getting the desired phenotype. More precise genome editing like base editing and prime editing are also available, using which we can change a single base according to our needs. Desired gene activation can also be achieved through the CRISPR/Cas system.

Dr. Aparna Islam said regulating gene editing plants in Bangladesh has been updated. Bangladesh is an agro-based country and the total production of crops is increasing. However, many difficulties will have to overcome in order to combat the effects of climate change. Regulations are controlled according to the Cartagena Protocol. Bangladesh has signed Cartagena Protocol. Agriculture in Bangladesh is presently facing different types of environmental stresses like salinity, weather-related stresses and other biotic stresses. Gene editing can be used to develop varieties tolerant to all the stresses together with an increase in the production as well.

Bangladesh can use conventional breeding under the aegis of Ministry of Agriculture. Policy can be adopted in Bangladesh, where SDN-1, SDN-2 category could be regulated by the existing regulations under the Ministry of Agriculture. Japan has developed gene-edited tomato; we should develop similar gene edited crops free from foreign DNA.

Prof. Dr. Tofazzal Islam, mentioned about the use of this revolutionary technology, CRISPR-Cas in agriculture. Bangladesh is self-sufficient in food. But salt stress is a big threat to agriculture. Biotic and abiotic stresses are present in Bangladesh. Bangladesh can use CRISPR-Cas as a method to develop wheat variety free of fungal blast. Young scientists working in molecular biology should be trained in countries like China to develop diagnostic tools, quick and reliable methods to detect wheat and barley blast. BAS can take the lead to develop policies in collaboration with India. Nationally approved regulations, trained manpower and young scientists well trained in gene editing should be developed. A national policy needs to be framed.

In concluding remarks, Prof. Dr. Zahurul Kairm, Vice President of the Bangladesh Academy of Sciences talked about:

- Loss of biodiversity in Bangladesh
- Enormous opportunity for gene editing for food safety and security

- Co-operation among regional countries
- Need to have a good regulatory system framed with people of different fields, researchers, policy makers and farmers
- Sound regulatory system
- Regional network along with India and other neighbouring countries can be formed.

Policy makers can take it to the Parliament and can get it approved. Capacity building should be developed by BAS and Indian Academy of Agriculture of Science and BAS can cooperate to develop policy for the region.

#### **Recommendations of the webinar:**

1. To develop a national policy for gene editing.
2. To develop local capacity, research and laboratory facilities for gene editing.
3. To organize training for scientists in countries like, China, Japan and other developed countries working in this field.
4. To provide sufficient fund for research in this field.
5. To combat climatic, biotic and abiotic stresses by gene editing by CRISPR-CAS.
6. Co-operation with the regional countries to develop national policy.
7. National policy for crop development should be developed through participation of scientists, policy makers and farmers.
8. Regulatory system for gene editing should be developed.
9. Bangladesh Academy of Sciences, Indian National Science Academy, Indian Academy of Agricultural Sciences should jointly develop national policy and this should be made into a law through the policy makers and the parliament.
10. To combat crop diseases like wheat blast in Bangladesh CRISPR-CAS method could be used.
11. To ensure bio-diversity, and conservation of traditional varieties, gene editing is necessary.

In this regard, Secretary BAS informed the house the above recommendations will be discussed in details in a forthcoming BAS meeting.

#### **iii. Follow-up Webinar on Gene Editing**

##### **Genome Editing Research in Agriculture: Status in Bangladesh and Way Forward**

As a follow-up of the first webinar on gene editing held on October 04, 2021 the second webinar was organized on 1<sup>st</sup> June, 2022, 3.30-6.00 PM on a Zoom platform.

At the start, Prof. Dr. Haseena Khan, Secretary, Bangladesh Academy of Sciences welcomed all participants, speakers and panel discussants in the webinar and introduced the different activities of the Bangladesh Academy of Sciences to the participants. She mentioned about the easing of the gene editing of crops by SDN1 and SDN 2 by India. She was hopeful that

Bangladesh will also take similar initiative and that the Bangladesh Academy of Sciences will take necessary steps regarding the same since a number of researchers of the country are working on research projects for harnessing this innovation to accelerate genetic improvement through plant breeding in different crops. She said the webinar would help the BAS-USDA funded projects which involve gene editing.

Then, Dr. Vibha Ahuja, Senior Adviser, SABP and Chief General Manager, Biotech Consortium India Ltd. (BCIL) mentioned the theme and aims of the webinar to the participants.

She then introduced Emeritus Prof. Dr. AK Azad Chowdhury, President, BAS and requested him to deliver his opening remarks.

Emeritus Prof. Dr. AK Azad Chowdhury, President, BAS and Chief Guest of the Session expressed the importance of the topic both in national and global perspectives. This modern tool, genome editing has an enormous potential in the field of agriculture, nutrition, healthcare and can also address the impediments of climate changes be it drought, flood, salinity etc. Today genome editing is mostly used in the field of agriculture for developing modern varieties of different crops the ones which can combat the adverse climatic conditions. In the present situation, it is very difficult to release a GMO crop variety. In this context, development of desired variety through genome editing using CRISPR-Cas9 technique could be a suitable alternative to bypass the stringent regulations of GMO as it is not a true GMO. Finally, he expressed a grand success of the seminar.

Then one of the Guests, Dr. Md. Shahjahan Kabir, Director General, Bangladesh Rice Research Institute (BRRI) spoke on the prospect and progress of genome editing technique so far being practiced in BRRI. He mentioned that BRRI has taken various initiatives to develop pest and disease resistant, salinity and drought tolerant, micronutrient enriched, and vitamin fortified rice varieties through genome editing using CRISPR-Cas9 technique.

Another Guest Dr. Md. Salimullah, Director General, National Institute of Biotechnology (NIB) spoke on the potential benefit of genome editing using CRISPR-Cas9 technique. He told that NIB has developed a GMO eggplant rich in  $\beta$ -carotene but he is worried regarding the release of the variety considering the existing rules and regulations. In India, genome edited varieties are not treated as true GMOs and are released normally he added. He also told that NIB has started two projects to develop crop varieties through genome editing using CRISPR-Cas9 technique.

This was followed by presentations on:

- a. Scope of gene editing in wheat in Bangladesh by Dr. Md. Tofazzal Islam, Professor, Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) and Fellow, BAS.

- b. Gene Editing in Eggplant by Mst. Muslima Khatun, Senior Scientific Officer, National Institute of Biotechnology
- c. Gene Editing in Rice (Aromatic and Insect Resistance) by Dr. Md. Panna Ali, Senior Scientific Officer, Bangladesh Rice Research Institute
- d. Gene Editing in Agriculture: Global Developments by Dr. Stuart Smyth, Associate Professor, University of Saskatchewan, Canada.

Next Dr. Vibha Ahuja gave an update on Gene Editing Regulation in India.

This was followed by a discussion session on the support required for taking forward research to commercialization where Prof. Dr. Haseena Khan, Secretary, BAS, Dr. Andrew F Roberts, Chief Executive Officer, Agriculture and Food Systems Institute Dr. Aparna Islam, Professor, BRAC University and Dr. Rakha Hari Sarker, Country Coordinator, South Asia Biosafety Program and Professor, University of Dhaka stressed the necessity of capacity building and training for gene/genome editing research in Bangladesh and to have a policy developed for gene editing in Bangladesh.

The closing remarks were made by Dr. Zahurul Karim, Vice President of BAS. He said that the organization of the seminar was very important and timely. He mentioned that the rules and regulations to release a GMO or genome edited crops is yet to be finalized. The Ministry of Agriculture is also waiting for expert report and the Department of Environment has not yet framed the rules and regulations for releasing genome edited crops, but he stressed that it is necessary to speed up the same. He then thanked all the participants, presenters, and moderator and suggested SABP to organize a national workshop on this issue.

#### **Suggestions from participants of the second webinar**

- Capacity building and training required for genome editing research in Bangladesh
- Policy for genome editing in Bangladesh to be developed
- Request to BAS for setting up an expert working group for preparation of policy on genome editing and recommend to the government in line with NAAS in India.

## WORKING FOR THE YOUNG SCIENTISTS

### Nomination of candidates for 13th HOPE meeting held online during 7-11 March 2022 in Japan

Bangladesh Academy of Sciences nominated the following candidates for participation in the 13th HOPE meeting held online via web conferencing system, during 7-11 March 2022 in Japan:

Dr. Gulshan Ara  
Associate Professor  
Department of Chemistry  
Jagannath University,  
Dhaka-1100  
Bangladesh



Enamul Haque  
PhD student  
Materials Science and  
Engineering,  
Monash University  
Australia



Kawser Parveen Chowdhury  
PhD student  
Department of Chemistry  
University of Dhaka  
Dhaka-1000  
Bangladesh



### III. Nomination of young scientists for 71<sup>st</sup> Lindau Nobel Laureate meeting, 2022

Bangladesh Academy of Sciences had nominated the following young scientists to participate in the 71<sup>st</sup> Lindau Nobel Laureate Meeting dedicated to Chemistry which was held during 26 June-1 July 2022:

**Waziha Farha, PhD**  
Post-doctoral Researcher  
Department of Chemistry  
University of Dhaka  
Dhaka 1000  
Bangladesh



**Khondaker Afrina Hoque**

Master of Philosophy (M.Phil.)  
Department of Chemistry  
Bangladesh University of  
Engineering and Technology  
(BUET), Dhaka 1000  
Bangladesh



**III. Nomination for India Science and Research Fellowship (ISRF) Program 2021-2022 from Bangladesh**

Bangladesh Academy of Sciences (BAS) nominated the following four candidates to the India Science and Research Fellowship (ISRF) Program 2021-2022:

**DR. CHAYON GOSWAMI**

Professor and Head  
Department of Biochemistry and  
Molecular Biology  
Bangladesh Agricultural University  
Mymensingh-2202  
Bangladesh



**MD. ZIAUR RAHMAN**

Senior Research Officer  
Infectious Disease Division  
Icddr,b, 68 Shaheed Tajuddin Ahmed  
Sarani, Mohakhali, Dhaka 1212,  
Bangladesh



**DR. MD. ZULFEKAR ALI**

Scientific Officer  
Animal Health Research Division  
Bangladesh Livestock Research Institute  
(BLRI), Savar, Dhaka-1341,  
Bangladesh



**DR. MD. HAFIZUR RAHMAN**

Research Associate  
Jashore University of Science  
Technology (JUST),  
Jashore Sadar, Jashore-7408  
Bangladesh



### III. Nomination for TWAS Young Affiliates- 2022

Bangladesh Academy of Sciences nominated the following candidates for TWAS Young Affiliates 2022:

DR. TAHMINA ISLAM  
Assistant Professor  
Plant Breeding & Biotechnology Laboratory  
Department of Botany  
University of Dhaka  
Dhaka-1000  
Bangladesh



DR. TANIA SHARMIN KHALEQUE  
Associate Professor  
Dept. of Applied Mathematics  
University of Dhaka  
Dhaka-1000  
Bangladesh



PROF. DR. A. B. M. ALIM AL ISLAM  
Dept. of Computer Science and Engineering  
Bangladesh University of Engineering and  
Technology (BUET)  
Dhaka-1000  
Bangladesh



DR. MD SHAMSUZZOHA BAYZID  
Dept. of Computer Science and Engineering  
Bangladesh University of Engineering and  
Technology (BUET)  
Dhaka-1205  
Bangladesh



### IV. Nomination for TWAS Regional Partner Award 2022

Bangladesh Academy of Sciences nominated the following candidates for TWAS Regional Partner Award 2022:

DR. ABDUL MANNAN  
Associate Professor  
Department of Physics  
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## **INTERNATIONAL REPRESENTATION**

### **Nomination of Board Members for IAP Elections 2022.**

The Inter Academy Partnership (IAP) had requested nominations from the Member Academies to fill the following positions through election-

- a. Co-chair from Low and Middle-Income Country to sit on the IAP Board (3)
- b. Member of the Advisory Committee (5)
- c. Member of the Academy Capacity Building Committee Development and Program Committee.
- d. Member of the Policy Advice Development and Program Committee.
- e. Member of Communications Education and Outreach Development and Program Committee.

The following nominations were made:

Position : Co-chair from Low and Middle-Income Country to sit on the IAP Board

Nominated person : Emeritus Prof. Dr. AK Azad Choudhury, President, BAS

Position : Member of the Advisory Committee (5)

Nominated person : Prof. Dr. Zahurul Karim, Vice President, BAS

Position : Member of the Academy Capacity Building Committee Development and Program Committee.

Nominated person : Prof. Dr. Choudhury Mahood Hasan, Vice President, BAS

Position : Member of Communications Education and Outreach Development and Program Committee.

Nominated person : Prof. Dr. Haseena Khan, Secretary, BAS

Position : Member of the Policy Advice Development & Program Committee.

Nominated person : Prof. Dr. Mesbahuddin Ahmed, Immediate Past Secretary, BAS

### **Nomination for international conference on Tropical Sciences**

Bangladesh Academy of Sciences (BAS) nominated the following Fellows of BAS to participate in the International Conference on Tropical Sciences (TropSc2021) held during 25-27 October 2021.

Prof. Dr. Liaquat Ali, Fellow, BAS

Prof. Dr. Md. Tofazzal Islam, Fellow, BAS

Prof. Dr. A A Mamun, Fellow, BAS

Prof. Dr. Mirza Hasanuzzaman, Fellow, BAS

# BANGLADESH ACADEMY OF SCIENCES-UNITED STATES DEPARTMENT OF AGRICULTURE (BAS-USDA)

## MAJOR ACTIVITIES

### TECHNICAL ADVISORY COMMITTEE (TAC) MEETING

Five Technical Advisory Committee Meetings (71<sup>st</sup> – 75<sup>th</sup> TAC Meeting) were held:

71<sup>st</sup> TAC Meeting on 11 October 2021

72<sup>nd</sup> TAC Meeting on 24 November 2021

73<sup>rd</sup> TAC Meeting on 27 February 2022

74<sup>th</sup> TAC Meeting on 01 March 2022

75<sup>th</sup> TAC Meeting on 18 June 2022



71<sup>st</sup> TAC Meeting held on 11 October 2021



72<sup>nd</sup> TAC Meeting held on 24 November 2021



73<sup>rd</sup> TAC online Meeting held on 27 Feb 2022



75<sup>th</sup> TAC Meeting held on 18 June 2022

### PROJECT MONITORING

Currently implementation of 30 projects under the 4<sup>th</sup> phase of BAS-USDA Endowment Program is going on. The duration of the 4<sup>th</sup> phase projects is from October 2020 to September 2023. Each project is supposed to be monitored every six months but the COVID 19 pandemic has hampered timely monitoring of the project activities. The 1<sup>st</sup> monitoring of all projects (30) and the 2<sup>nd</sup> monitoring of 28 projects have been completed during the reporting period.



Field visit by the Monitoring Team at Rajshahi University on 20 Feb 2022



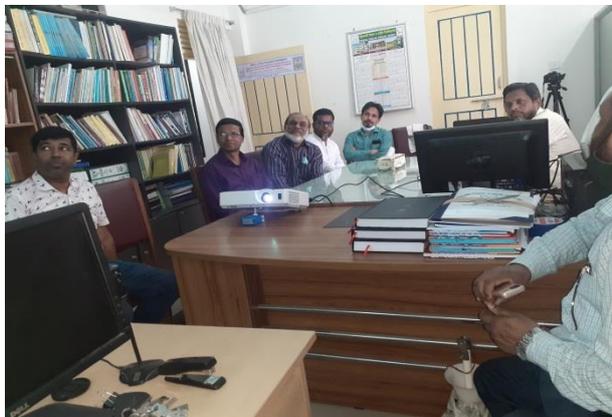
Monitoring Team is in the presentation session at the Dept. of Microbiology & Hygiene, BAU on 02 June 2022



Lab visit by the Monitoring Team at the Dept. of Agricultural Engineering, BSMRAU on 24 Feb 2022



Field visit by the Monitoring Team at the Dept. of Crop Botany and Tea Production Technology, SAU, Sylhet on 03 March 2022



Monitoring Team in a presentation session at PSTU on 7 April 2022



Monitoring Team in a presentation session at BLRI on 11 June 2022

## PARTICIPATION IN FARMERS FIELD DAY

A day-long field day on ratoon management for extension and adoption of this technology among the beneficiaries was arranged in farmers' field of Carew & Company (Bangladesh) Ltd, Chuadanga, Mubarakganj Sugar Mill Ltd, Jhenaidah and Kushtia Sugar Mill Ltd area on 20, 21 and 22 November 2021 respectively. BSRI Scientists (DG, Directors and Scientists), Sugar Mill officials (MD, GM and DGM-agricultural extension related) and BAS personnel (Dr. M A Hamid Miah, Fellow, BAS and Mr. Md. Mokshead Ali, Program Manager) and about 25 progressive farmers and some extension workers who are devoted to new technology and can voluntarily spread the technology participated in each field day. Each field day was divided into 3 parts: introductory talk and inauguration, field inspection and discussion on technology.

Although, ratoon sugarcane management is an old technology, the practice of this technology is not very common in Bangladesh. Farmers are reluctant to cultivate ratoon sugarcane, because in this method they are not benefitted. Their perception changed when they saw for themselves the effectiveness of scientific and systematic cultivation of ratoon sugarcane. They expressed their satisfaction and they decided to cultivate ratoon sugarcane.

The performance of sugarcane at fields treated with fungicide was clearly different from untreated cane fields in case of growth, cane height, girth and internodes etc. In each of 3 locations, five canes were cut randomly from both the treated and untreated ratoon fields in front of the participants and data were measured. The growth and height of treated canes were 2 to 3 feet more than the untreated canes. The girths as well as the lengths between the internodes were also more than that of canes of untreated fields.

In these field days, sugarcane growers (farmers) and sugar mills were the beneficiaries. Through an introduction of this technology, sugarcane growers will be benefitted getting more value (return) at lower production cost and sugar mills will get early maturing canes and relatively more sugar containing canes. As a result, the mills will be benefitted by running the mills for a longer time which would allow for the extraction of more sugar.



Farmers Field Day on 20 Nov 2021 at Uthuli, Jibannagar, Chuadanga



Farmers Field Day on 21 November 2021 at Mubarakganj, Jhenaidah



Farmers Field Day on 22 November 2021 at Shishir Math, Boltoil, Kushtia

**Megan Francic, Agricultural Attaché, U.S. Embassy in Bangladesh and Head of USDA/Dhaka post visits the Bangladesh Agricultural University**

A presentation was organized by the BAS-USDA Endowment Program in Bangladesh Agricultural University, Mymensingh at the BAURES Seminar Room at 11:00 am on Monday, 27 June 2022. The purpose of this event was to discuss the progress and challenges of on-going six projects under 4<sup>th</sup> phase (October 2020 – September 2023) in BAU funded by the BAS-USDA Endowment Program.

Prof. Dr. M. Rafiqul Islam, Dept. of Soil Science and Vice Chancellor (In-charge), Bangladesh Agricultural University was the Chief Patron of the presentation and Prof. Dr. Bahanur Rahman, Dept. of Microbiology and Hygiene, BAU moderated the event.

Megan Francic, Agricultural Attaché, U.S. Embassy in Bangladesh and Head of USDA/Dhaka post, Dr. Tanvir M.B Hossain, Agricultural Specialist, FAS/USDA, Dhaka, Dr. Khan Shahidul Huque, Fellow, BAS and Member, TAC, Dr. M. A Mazed, Director, BAS, and Mr. Md.

Mokshead Ali, Program Manager, BAS-USDA Endowment Program joined the presentation. The Principal Investigators, Co-Principal Investigators, Ph.D and MS students of on-going 6 projects participated in the presentation. Prof. Dr. Zahurul Karim, Fellow, BAS and Chairperson, TAC, BAS-USDA Endowment Program and Prof. Dr. Haseena Khan, Fellow, BAS and Secretary, BAS could not attend the visit program as both had test positive to COVID 19. In the welcome address, Dr. M. Abdul Mazed, Director, BAS gave an introduction to the BAS-USDA Endowment Program which was inaugurated in 2010. The Program has completed its 3 phases of funding cycles. Currently, the 4<sup>th</sup> Phase projects are being implemented by different universities and research institutes. Over the last 12 years in total four phases, a total of 132 projects were funded by the Program approving a total of Bangladeshi Taka 50,82,00000 (BDT 50 crore and 82 lac).

**Progress of the following on-going projects were presented on the occasion:**

1. Silicon, an alternative agrochemical for mitigating biotic and abiotic stresses, and improving grain quality and yield of rice, Principal Investigator: Prof. Dr. M. Rafiqul Islam, Dept. of Soil Science, BAU
2. On-farm testing and scaling up Assisted Reproductive Technology (ARTs) in Sheep production through public-private partnership, Principal Investigator: Prof. Farida Yeasmin Bari, Dept. of Surgery and Obstetrics, Faculty of Veterinary Science, BAU
3. Polyvalent vaccine development for Mastitis in dairy cow, Principal Investigator: Prof. Dr. Bahanur Rahman, Dept. of Microbiology and Hygiene, BAU
4. Development of inactivated Brucella vaccine from local isolates, Principal Investigator: Prof. Dr. Md. Ariful Islam, Dept. of Microbiology & Hygiene, BAU
5. Development of a field scale nutrient balance calculator for crops under intensively managed agricultural system, Principal Investigator: Prof. Dr. M.M.R Jahangir, Dept. of Soil Science, BAU and
6. Genetic audit of hilsa shad (*Tenulosa ilisha*) across its distribution range, Principal Investigator: Prof. Dr. Md. Shahidul Islam, Dept. of Biotechnology, BAU under BAS-USDA Program, Phase IV.

The Principal Investigators made presentation on their projects focusing on background/rationale, objectives, action plan and outputs achieved so far, final expected outputs and challenges in implementation of the projects.



Presentation at the Seminar Room, BAURES, BAU



## CALL FOR RESEARCH PROJECT PROPOSAL

A call for preliminary research project proposals under the 5<sup>th</sup> phase of BAS-USDA Endowment Program was published in two national dailies "Daily Star" and "Daily Ittefaq" on 10 August 2021. The deadline of submission of proposals was 10 September 2021. In response to this call, a total of 306 preliminary project proposals were submitted to BAS. Area-wise research breakup of preliminary project proposals is as follows:

| Serial       | Research Area                            | Nos. of Preliminary Project Proposals |
|--------------|--|---------------------------------------|
| 1.           | Crop (CR)                                | 43                                    |
| 2.           | Fisheries (FI)                           | 43                                    |
| 3.           | Livestock (LS)                           | 58                                    |
| 4.           | Health and Nutrition (HN)                | 41                                    |
| 5.           | Natural Resources (NR)                   | 15                                    |
| 6.           | Economics and Marketing (EM)             | 14                                    |
| 7.           | Climate Change (CC)                      | 41                                    |
| 8.           | Agricultural Mechanization (AM)          | 8                                     |
| 9.           | System Research (SR)                     | 14                                    |
| 10.          | Microbial Practices in Agriculture (MPA) | 25                                    |
| 11.          | Others (O)                               | 4                                     |
| <b>Total</b> |  | <b>306</b>                            |

In the 71<sup>st</sup> TAC meeting held on 11 October 2021, reviewers from among the TAC members were selected for a review of the preliminary project proposals. Four preliminary project proposals which did not follow the guidelines for proposal writing were rejected and 302 preliminary project proposals were assigned to 11 TAC members for review.

In the 72<sup>nd</sup> TAC meeting held on 24 November 2021, the review comments were overviewed and 112 preliminary project proposals (PPPs) were qualified for detailed project proposals from the respective Principal Investigators.

In the 73<sup>rd</sup> and 74<sup>th</sup> TAC virtual meetings held on 27 February 2022 and 01 March 2022 respectively, a list of reviewers for the 110 (one PI failed to submit detailed PP and one PI passed away in this period) detailed project proposals were prepared.

As per decision taken in the 73<sup>rd</sup> and 74<sup>th</sup> TAC meeting, 110 detailed project proposals were sent to respective reviewers, two for each proposal. In the 75<sup>th</sup> TAC meeting held on 18 June 2022, a total of 53 project proposals were selected for presentation based on review comments of the peer reviewers. It may be noted that 215 review reports out of 220 were received as of 18 June 2022. The five projects {28 (2), 68 (1), 93 (1), 99 (2), 104 (1)} for which one review comment was received were reviewed by the members of TAC in its 75<sup>th</sup> meeting.

## Compilation Report of the 3<sup>rd</sup> Phase Projects

As per decision taken in the 68<sup>th</sup> TAC meeting held on 31 March 2021, 40 project completion reports under 3<sup>rd</sup> phase (April 2017 – August 2020) were sent to respective evaluators and they submitted their evaluation report to BAS. In the 73<sup>rd</sup> Meeting of the Technical Advisory Committee held virtually on 27 February 2022, a committee for report compilation of 3<sup>rd</sup> phase projects was constituted as follows:

- |   |            |
|---|------------|
| 1. Dr. MA Hamid Miah                              | - Convener |
| 2. Dr. M Idris Ali                                | - Member   |
| 3. Major Gen. (Retd.) Prof. Dr. ASM Matiur Rahman | - Member   |
| 4. Dr. Khan Shahidul Huque                        | - Member   |
| 5. Prof. Dr. Abu Tweb Abu Ahmed                   | - Member   |

The 1<sup>st</sup> meeting of the Report Compilation Committee was held on 17 March 2022 (Zoom Online). In this meeting, the following Outline of Compilation Report was prepared:

1. Project Title
2. Name of PI, Department and Institute
3. Objectives
4. Methodology
5. Results
6. Achievement
  - Technical : Capacity building of institute
  - Academic : Articles & PhD/MS
7. Conclusion : National Impact
8. Recommendation : Should be promoted or not

The 2<sup>nd</sup> meeting of the Committee was held on 17 March 2022. A draft compilation report was prepared in the meeting and it was decided to present the draft compilation report in the 75<sup>th</sup> TAC meeting.