

VISUAL: ALIZA RAHMAN

To succeed in science, a multidisciplinary approach is needed

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molecular perspective. For instance, in the case of a hepatitis C patient, a doctor would focus on assessing liver damage and managing treatment. In contrast, developing an effective drug to combat the disease would require a multidisciplinary approach, involving biochemists, pharmacists, microbiologists, chemists and computer scientists. Thus, collaboration between doctors and scientists is essential for optimal patient management. Unfortunately, such cooperation is still rare in Bangladesh.

One of the renowned scientific institutes in the country where scientists of multiple disciplines are working together to find solutions to biological problems is the National Institute of Biotechnology (NIB). We are dismayed that the research activities of this important institute have been at a standstill since the beginning of August 2024, because of the management's issues against the director-general. The appointment of a new one, who is a graduate from the biotechnology discipline, is also stalled. Appointment in the post of director-general of the NIB as well as top

"Multidisciplinary" is the keyword for the current era of science, and biological science is no different as it has increasingly embraced multidisciplinary approaches to solve complex biological phenomena. This year's Nobel Prize in physics and chemistry is a testament to the power of using artificial machine learning and computational power in solving many problems, including protein structure. The latter in turn would hopefully lead to the production of efficient proteins using synthetic biology for solving many biological problems. So, in effect, we can see the relevance of computer science, physics and chemistry to unravel the structure of a protein, which is in the purview of biological science. Ultimately, a multidisciplinary approach to biological science is the only way to foster groundbreaking discoveries and address pressing global challenges in areas like health, medicine, agriculture, and environmental conservation. Imposing boundaries in science or assuming that only a particular branch of science can deal with a problem would be akin to having tunnel vision in this modern era.

In Bangladesh, however, we choose to compartmentalise science, and in particular biological science, into medicine, agriculture, biochemistry, microbiology, botany, zoology, genetic engineering and biotechnology. But there is a lot of overlap among all of these subjects. Moreover, subjects like agriculture, biochemistry and biotechnology comprise a combination of some of these disciplines. Under the circumstances, any claim that scientists from any one discipline are the most competent in tackling health issues and diseases in plants, animals and humans as well as controlling microbes is highly misleading. On the contrary, collaboration among these disciplines as well as computer science and even engineering is a prerequisite to developing a science infrastructure and culture in Bangladesh that can be globally competitive. Hence, uniting—not dividing—scientists from different disciplines should be the priority in the country.

Unfortunately, in Bangladesh, professionals from these disciplines take an individualistic approach and tend to think that they can tackle problems by relying only on their expertise in a specific area; they are even known to show disdain towards the consideration of any cooperation among different fields. One of the major examples is the lack of collaboration among agriculturists, molecular biologists and/or genetic engineers, and statisticians. In technologically advanced countries like the United States, European nations, and Japan, scientists from these fields collaborate on a single project to support each other and enhance their research output. For instance, the Human Genome Project that was unveiled in 2003 involved biologists, geneticists, computer scientists and statisticians, showing how large-scale scientific accomplishments depend on cross-disciplinary expertise. This approach is always absent in Bangladesh, which severely affects the quality of science here.

A similar scenario exists between medical doctors and other related biological disciplines. While doctors tend to address medical issues by examining organ function and its corresponding physiological impacts, biologists approach these problems from a

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posts in any other research institute should be based solely on scientific merit and international standing. Having said that, any internationally recognised scientist from any discipline of biological science is qualified to hold such a position, provided that their scientific merit and reputation are of international calibre. These disciplines include biochemistry, molecular biology, microbiology, botany, zoology, agriculture, genetic engineering, biotechnology, etc. It is extremely misleading to state that only a scientist from biotechnology is competent enough to hold the post of director-general NIB.

We looked up the detailed qualifications, training and disciplines of the scientists currently working at the NIB. The percentages of different disciplines are: 40 percent for biotechnology; 22 percent for biochemistry and molecular biology; 14 percent for microbiology; 12 percent for agriculture; 10 percent for botany; and two percent for zoology. So, the claim that biotechnologists are being discriminated against cannot be true—not in the case of NIB, at least.

The Society of Global Network of Bangladesh Biotechnologists (GNOBB), founded in 2004, played a key role in formulating the guidelines for the establishment of NIB. Scientists from all disciplines of biological science, including agriculturists, medical doctors, biochemists, microbiologists, botanists, zoologists, molecular biologists, veterinary scientists and biotechnologists, and even computer scientists and statisticians are members of GNOBB and working together to develop a truly multidisciplinary science culture in the country. GNOBB also works to portray important research achievements of Bangladeshi biological scientists both at home and abroad. We have been honouring Bangladeshi scientists for their groundbreaking work by awarding the GNOBB Gold Medal, which is open to professionals in any of the above-mentioned disciplines working in Bangladesh or abroad.

The name of the organisation and the effort to bring all the disciplines of biological science under one umbrella reflect its strategy to support multidisciplinary science. The GNOBB believes that fostering an international standard of science in Bangladesh requires a united approach. In this transitional time of the nation, unity rather than division is essential. Just as ecological diversity contributes to stability, collaboration among scientists from diverse biological fields strengthens their capacity to make meaningful contributions through interdependence and shared expertise.

Meeting of minds



BLOWIN' IN THE WIND

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SHAMSAD MORTUZA

A two-day international conference commemorating the hundred years of Bose-Einstein statistics was curiously labelled as "A legacy of Dhaka." It was organised by the Dhaka University's Department of Physics, so I thought the organisers would probably highlight their department or the institution as the ground zero of the groundbreaking theories of quantum physics. After all, it was during the formative years of the department that Satyendra Nath Bose came up with the revolutionary idea that he shared with Albert Einstein. The correspondence led to the creation of boson particles, resulting in an exponential leap in quantum physics. The Bose-Einstein condensation (BEC) remained a distant reality in the last century due to the particle's requirement for absolute zero temperature. The final endorsement of the hypothesis came when three scientists got the Nobel Prize in Physics in 2001 for "the achievement of Bose-Einstein condensation in dilute gases of alkali atoms and for early fundamental studies of the properties of the condensates." The spotlight once again shifted to an unlikely correspondence between a young teacher at Dhaka University and the maestro of relativity, Albert Einstein.

The celebration of the place intrigued me. Dhaka in the 1920s was no more than a provincial town. The campus was not even considered a proper part of the city centre. "At the outskirts of Dhaka lies the sprawling grounds of Ramna—a splendid site of about 450 acres" (S.N. Bose: *The Man and His Work*). To think a young reader of this university in his late 20s could reach out to Berlin and offer a solution to a theoretical problem that Einstein was reportedly struggling with is daring, to say the least. But it also shows the promise with which our premier university started and the accomplishments that can be made with the right kind of attitudes and aptitudes.

The celebration of the correspondence between two remarkable physicists of the 20th century allows us to reflect on the glory days of the country's first university, established as an imperial concession. Following the annulment of the Bengal Partition, a Muslim delegation including Nawab Sir Khwaja Salimullah, Syed Nawab Ali Chowdhury, and Sher-e-Bangla AK Fazlul Haq convened with the viceroy to secure their community's

educational advancement through the establishment of their own university. The first vice-chancellor, Sir PJ Hartog, explained this political background in the first meeting of its court (later renamed as senate) in 1921. Hartog handpicked his faculty members to ensure that the university developed as a residential and teaching university that is modelled after Oxford. Satyendra Nath Bose was one of its finest recruits whom Hartog personally met in then Calcutta.

The post for a reader was advertised in the famed scientific journal *Nature*. Bose's classmate from Calcutta University applied for the same job from England, having just finished his Doctor of Science (DSc) degree. Bose was not lucky enough to get any scholarship to travel to Europe, probably due to his strong connection with the Swadeshi Movement earlier. But he did end up coming to Dhaka as a favourite of his department chair Walter Jenkins, who was impressed by an article that Bose had published in the *Phil Mag* journal. Ironically, it is the rejection of another article by the same journal that prompted him to approach Einstein, which I will describe later.

Let's first reflect on Bose's arrival in Dhaka. He left behind a much more vibrant city and a permanent job at Calcutta University. One incentive was the high salary structure planned by Hartog. The endowment for the newly established university allowed Dhaka to offer double the salary paid in Kolkata. However, this was short-lived, as RK Shanmukham Chetty, the first Indian finance minister, adjusted the allocated fund of Tk 55 lakh with the official buildings given to the university. Consequently, the university had to reduce the salaries of its staff. Bose received a fixed salary of Tk 400 instead of the promised Tk 400-1,200 scale. Within two years, Bose became disillusioned and had to confront the university administration over the injustice. The university was in no way in a position to lose him and gave him a two-year study leave to travel to Paris. But the tension between the right incentives to do research still persists.

While in Dhaka, Bose wrote to his friends, lamenting the lack of current journals and equipment. Later, in Calcutta, he told his students, "We used to live on the moon—do you understand, on the moon!" Indeed, Bose felt left out, as many of his

friends by then had travelled to Europe. Dhaka lacked the intellectual milieu of Calcutta. Instead, the green space and gardens gave Bose the peace of mind needed for his research. The garden that he had in his bungalow was proof of his green fingers. He was, however, very happy that the administration was sincere in buying books and journals for the library. He joked that the lab at Dhaka College, run by the White *sahibs*, had so many dispersed apparatuses that it took extensive research to reorganise them. Walter Jenkins headed the physics department at that time. The teaching team included RN Ghosh and Qazi Motaahar Hussain. Bose received courses in thermodynamics and Maxwell's electromagnetic theory. Meghnad Saha served as an external examiner for one of the practical exams. Rumour has it, Saha pointed out the anomaly in one of the recently published papers on quantum theory that he had asked his friend to look into.

In June 1924, Einstein received a letter from an unknown Indian scientist, in which the sender identified himself as a "complete stranger." A follow-up letter contained a five-page article in which Bose addressed a flaw in the quantum theory that Einstein was struggling to solve for some years. *Phil Mag* had previously rejected the article, prompting a confident Bose to forward it to Einstein for his approval.

Bose shared an extraordinary insight into the behaviour of photons—particles of light—that no one before him had articulated. He argued that photons did not follow the classical Maxwell-Boltzmann distribution, which was the norm for describing the behaviour of particles. Instead, he proposed that indistinguishable particles could occupy the same quantum state, thereby paving the way for a fundamentally new understanding of the quantum world. Einstein did not think Bose was right. But he wrote, "It was a beautiful step forward." He also told his young colleague that he would expand this idea in his own research. Einstein invited Bose from Paris to meet him in Berlin. The two remained intellectually committed.

A century later, there are lessons to be learnt from the way Dhaka became part of the intellectual map of the world. The story of Bose's contribution is not merely one of scientific achievement; it is a testament to resilience, courage, and self-belief. Young people today should find inspiration in this spirit of self-assured conviction, especially those who fear their ideas may not receive the necessary attention or appreciation. Bose teaches us that innovation does not require privilege or fame; it requires vision, passion, and an unyielding faith in one's own ability. And if you can dream, the world is not big enough.

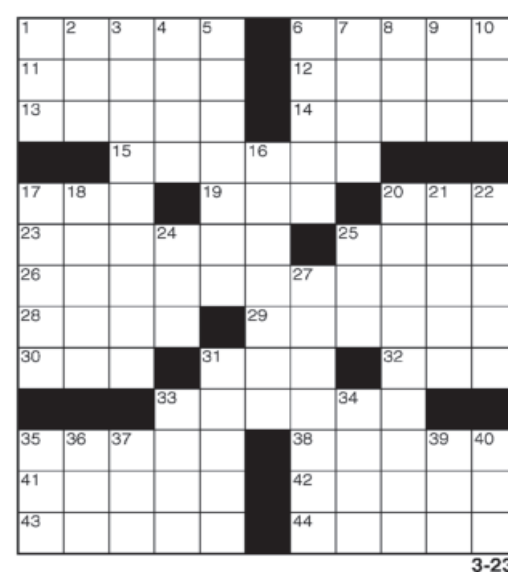
CROSSWORD BY THOMAS JOSEPH

- ACROSS**
1 Sells for
6 Trait carriers
11 Cashew family tree
12 Glorify
13 Bakery come-on
14 "Lassie" boy
15 Friend of Fozzie
17 Wisdom bringer
19 Set fire to
20 Easy victim
23 Moves like a crab
25 High point
26 Ironed
28 Aussie birds

- 29 Go by
30 Match part
31 Vaccine shot
32 Poetic "always"
33 Playwright Pinter
35 Heathen
38 One a-courting
41 Blow away
42 Dodge
43 Himalayan land
44 Bit of info
DOWN
1 Robert E. Lee's org.
2 "— Town"

- 3 Forced from a hiding place
4 Not wild
5 Bright hue
6 "Understand?"
7 Way to go
8 "Platoon" setting
9 Avenue tree
10 Pig's place
16 Get wrong, in a way
17 Cart pullers
18 "I want that!"
20 Eyeballed
21 Tickle
22 Friend of Wendy

- 24 — Alamos
25 Nabokov novel
27 Nudged
31 Leigh of "Psycho"
33 Mist
34 "Damn Yankees" role
35 Contrived
36 French friend
37 Chatter
39 Part of a prof's address
40 "Stand" band



THURSDAY'S ANSWERS

B	O	W	I	E	S	P	O	T	
E	V	A	N	S	A	T	O	N	E
H	E	R	D	S	N	I	L	E	S
A	R	M	Y	F	A	R	O	U	T
L	E	I	I	L	L	S	P	Y	
F	A	S	T	D	A	Y	S		
T	H	E	E	S	A	F	E		
L	A	S	T	D	A	Y	S		
M	A	T	L	O	S	N	E	T	
O	R	I	G	I	N	D	A	T	A
V	E	G	A	S	M	O	T	E	T
I	N	E	P	T	A	R	I	S	E
E	A	R	S	P	A	C	T	S	