



सीएसआईआर-उत्तर पूर्व विज्ञान तथा प्रौद्योगिकी संस्थान, जोरहाट
CSIR-North East Institute of Science and Technology, Jorhat



INFOWATCH

An In-house Monthly Communication (March, 2024)

CSIR-NEIST celebrated its 64th Foundation Day



From top: Prof. Bhupendra Nath Goswami delivering the Foundation Day Lecture. Dr D Ramaiah delivering his speech as Guest of Honour.

CSIR-NEIST celebrated its 64th Foundation Day on 18 March, 2024 with a day-long programme at its premise. Befitting the Day, a special function was held at Dr J N Baruah Auditorium wherein Prof. Bhupendra Nath Goswami, SERB Distinguished Fellow, Cotton University & Former Director, Indian Institute of Tropical Meteorology (IITM), Pune delivered this year's Foundation Day Lecture as Chief Guest while Dr D Ramaiah, Former Director, CSIR-NEIST attended as Guest of Honour.

Dr Virendra M Tiwari, Director, CSIR-NEIST welcomed the gathering and expressed gratitude to the founding fathers of the institute and the past & present employees for their contribution in building the institute to its present state.

In his Foundation Day Lecture on "Climate Change and Crisis of Sustainable Development" Prof. Goswami held the audience spellbound with his critical analysis on the various aspects of Climate

Change and its implications on Sustainable Development. He explained how the major drivers of climate change are human population growth and industrial developments backed by Global Average Temperature Change. He discussed the findings of scientists such as Michael E Mann, S Arrhenius, Syukuro Manabe and June G Charney on Global Mean Temperature which provided a comprehensive understanding on the major climate change drivers such as earth heat balance, ocean temperature, atmospheric CO₂ level and other anthropogenic green house gases. He informed that the warnings of climate change rang as early as 20th Century and India is the third largest emitter of CO₂ in the world. He said that India is still in a position to control the growth of CO₂ emission and emphasized the need to sensitize on green innovations and mobilize public awareness on our development model so that every development policy is moderated and sustainable.

Addressing the audience, Dr Ramaiah encouraged the young generation to focus on future impact of our activities while initiating or conceptualizing any project. He mentioned that the institute has contributed immensely not only on technology development for industry but also for societal upliftment. He encouraged the present employees to continue its efforts to produce high quality scientific work with high social relevance.

As a part of the celebration, 'Certificates of Appreciation' were awarded to the employees and project staff for their exemplary performance during the year 2023-24 under different categories. Further, 'CSIR-NEIST Annual Report 2022-23' was released by the Chief Guest during the event. Another highlight of the programme was the inauguration of 'CSIR-NEIST Leave Management System (LMS)' and 'Online Guesthouse Booking System' by Guest of Honour. The institute also organized Inter Block Cricket Tournament among its employees and project staff, the winners & champions of which were awarded with trophies & certificates during the programme.

To commemorate the occasion, the Institute also observed 'Open Day' from 09.00 am to 01.00 pm to facilitate school students and general public to visit the institute for scientific exposure. A 'Hands-on demonstration of scientific experiments' was organized during the day wherein a large number of school students, teachers and general public from in and around Jorhat visited the Institute.



Dr Virendra M Tiwari, Director, CSIR-NEIST along with some school students interacting with researchers at 'Hands-on demonstration of scientific experiments' organized under the Foundation Day celebration.



Student visitors visiting various divisions during 'Open Day' held under the Foundation Day celebration.

Loading Frame Facility for Structural Engineering Testing inaugurated at CSIR-NEIST



Dr Virendra M Tiwari, Director, CSIR-NEIST (second from right) along with CSIR-NEIST staff at the Loading Frame Facility after its inauguration.

CSIR-NEIST created a state-of-the-art Loading Frame Facility of capacity 3000 kN at its premise with the support of Min. of Housing & Urban Affairs, Govt. of India through Building Materials and Technology Promotion Council, New Delhi (BMTPC) under Affordable Sustainable Housing Accelerators-India scheme (ASHA-India).

The facility was inaugurated on 13 March, 2024 by Dr Virendra M Tiwari, Director CSIR NEIST in presence of CSIR-NEIST staff members. The main objective of the facility is testing the structural behaviour of normal and deep beams, steel and concrete columns, trusses, arches, bearing plates, girders, precast tunnel lining units, sleepers, rails, etc. This facility shall be useful for testing the engineering materials used for the construction of infrastructure projects like bridges, dams, refinery units and power sectors. Considering its importance, the facility will be of great benefit not only for the institute but also for the entire North East region.

CSIR-NEIST celebrated International Women's Day 2024

CSIR-NEIST celebrated International Women's Day 2024 with a series of activities which culminated in a special function held at Dr J N Baruah Auditorium on 8 March, 2024. Dr K Rajeshwari, Founder and Director, Bioklone Biotech Pvt.Ltd., Chennai graced the function as Chief Guest while Prof Ajanta Borgohain Rajkonwar, Vice Chancellor, Assam Women's University, Jorhat was present as Guest of Honour.

Dr Virendra M Tiwari, Director, CSIR-NEIST delivered the welcome address in online mode and extended his greetings for the day. He recalled women's contribution and achievements since time immemorial in social, cultural and economic growth of the society and various other sectors. Taking cue from this year's International Women's Day theme i.e "Invest in Women: Accelerate Progress", he mentioned the importance of promoting equitable society and appealed to all to take forward inclusive growth particularly in the field of Science & Technology.

Addressing the event, Dr Rajeshwari said that the current year's theme is very much apt if we aspire to see a world where we have women leaders in various spheres of life. She highlighted the status of women entrepreneurship in our country particularly women scientists in STEM research which she mentioned is very low. Sharing her message to aspiring women entrepreneurs, she encouraged them to be fearless, take measured risks, define minimum achievable goals and look out for the right opportunities. She also discussed about her company and its activities in developing antibodies and assays.

In her speech, Prof Rajkonwar highlighted the importance of education and its role in women's life. She gave an overview on investing on various sectors such as education, skill development, technology development, etc. which she mentioned must be oriented around women. She mentioned that an inclusive society must look at grass root level and analyze the bridge that is there between the lower and higher sections of the society. She

further conveyed that we need to analyze the challenges and resources to check where we can make real investments so that nobody is left marginalized. She also shared valuable insights on the various benefits of technology for upgrading and empowering women and mentioned some examples such as pod cast, crowd cast, AI, etc. and the emerging holoportation technology which has the potential to revolutionize our way of life.

Dr Swapnali Hazarika, Sr Principal Scientist, CSIR-NEIST gave an overview of the various contributions & achievements of the institute in empowering women employees. She specified the activities under CSIR-NEIST Women Technology Park, CSIR Aroma Mission and various S&T training programmes specially designed for women entrepreneurs. She also highlighted the status of women participation in various research activities during last 3 years.

Dr Saurabh Baruah, Chief Scientist, CSIR-NEIST in his speech encouraged all, particularly women to inculcate and practice the spirit of leadership and empower themselves everyday with knowledge and wisdom. He also discussed the current status of S&T in India based on various parameters such as human resources, GDP investment in scientific research, percentage of publications, percentage of citation index, etc. while quoting a recent report published in Nature Journal. He emphasized the need for increase of GDP investment in science and also an increase in women participation in science.

Under the aegis of the celebration, the institute also organized various competitions such as, Slogan competition, On the Spot Painting competition and Quiz competition among its staff members & research students under the theme of this year's International Women's Day i.e "Invest in Women: Accelerate Progress". Winners of these competitions were awarded with prizes & certificates during the function. Earlier, the audience was left mesmerized with a Sattriya Dance by Ms. Aradhana Devi, Project Fellow and Poem Recitation by Ms Sushma Verma, Member, CSIR-NEIST Ladies Club. The programme concluded with vote of thanks by Dr Jayashree Chiring Phukan, Sr Scientist. The function was attended largely by invitees and CSIR-NEIST fraternity.



Dr Virendra M Tiwari, Director, CSIR-NEIST delivering welcome address at the event through online mode.



Dr K Rajeshwari, Founder and Director, Bioklone Biotech Pvt.Ltd, Chennai addressing the event as Chief Guest



Prof Ajanta Borgohain Rajkonwar, Vice Chancellor, Assam Women's University, Jorhat delivering her speech as Guest of Honour.

Rural Bio Resource Centre inaugurated in Udalguri, Assam



Inauguration of 'Rural Bioresources Centre' by Shri Govinda Ch. Basumatary, MLA, Udalguri cum Deputy Chief of Bodoland Territorial Region on 06 March, 2024 in presence of CSIR-NEIST officials.

CSIR-NEIST established a "Rural Bioresources Centre" in Udalguri, which is an Aspirational District in Assam with financial support from Department of Biotechnology, Govt. of India. The Bioresource Centre is mostly equipped with the technologies for making products (7 different products) from waste

Banana pseudostem. The Centre was inaugurated on 06 March, 2024 by Shri Govinda Ch. Basumatary, MLA, Udalguri cum Deputy Chief of Bodoland Territorial Region in presence of representatives from DBT, Dr Pulak Kumar Mukherjee, Director, IBSD and Dr Prabodh Borah, Director of Research (Vety) and Dr Jatin Kalita, Principal Coordinator of the project along with a host of scientists and staff from CSIR-NEIST. Dr Virendra M Tiwari, Director, CSIR-NEIST extended his best wishes and stated that the Centre is the first of its kind in Assam which is aimed to help the people of Udalguri in entrepreneurship development and doubling the farmer's income.

CSIR-NEIST researchers' insightful work on synthesis of novel Borophene based Nanomaterials highlighted in ACS Applied Materials & Interfaces and Chemical Communications

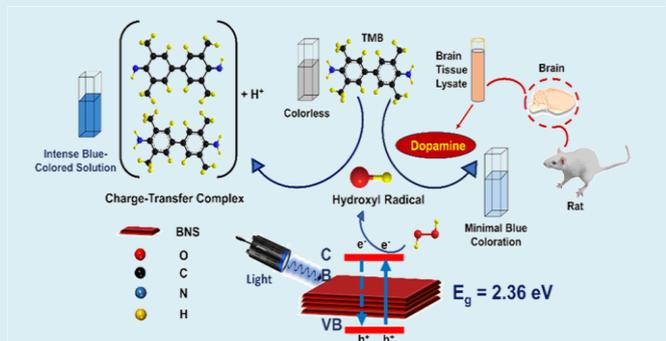


Scheme 1: Illustration of the synthesis of Borophene QDs and their application in colorimetric sensing of antibiotics.

(DOI: <https://pubs.acs.org/doi/10.1021/acsami.3c12108>)

Borophene, composed of a single layer of boron atoms arranged in a hexagonal lattice structure, similar to graphene, has risen as a new exciting two-dimensional (2D) nanomaterial having extraordinary properties, including anisotropic metallic behavior and flexible (orientation-dependent) mechanical and optical properties. The discovery of borophene was first reported in 2015 by a team led by Prof. Mark Hersam at Northwestern University, USA. Borophene exhibits several intriguing properties that make it potentially useful for various applications in electronic circuits, solar cells, energy storage, biomedical, catalysis, chemical processes, transistor components, optoelectronics, etc. Borophene's unique atomic structure gives it properties that differ from graphene and other two-dimensional materials. However, despite of its promising properties, borophene is still in the early stages of research, and many of its potential applications remain speculative. Inspired by the advantages and wide applications of borophene nanomaterials, researchers at CSIR-NEIST synthesized novel

Borophene Quantum Dots (BQD) and 2D Borophene Nanosheets (BNS) adopting hydrothermal liquid exfoliation technique using water medium. They have applied the BQD and BNS nanomaterials for the colorimetric sensing of analytes like antibiotics and biomolecules. The research work has been published recently in two high impact journals - ACS Applied Materials and Interfaces, and Chemical Communications.



Scheme 2: Illustration of the synthesis of 2D Borophene nanosheets and their application in colorimetric sensing of biomolecules.

(DOI: <https://doi.org/10.1039/D3CC06326G>)

CSIR-NEIST developed new biodegradable packaging bag



A sample of biodegradable intelligent packaging bag developed by CSIR-NEIST.

A biodegradable intelligent packaging bag has been developed using cellulose nanofiber obtained from grass, a waste product which contains approximately 30-40% cellulose. The cellulose acetate and nanofiber composite film is converted into smart packaging materials by the addition of natural dyes obtained from vegetables by a research group of CSIR-NEIST led by Dr Swapnali Hazarika, Senior Principal Scientist.

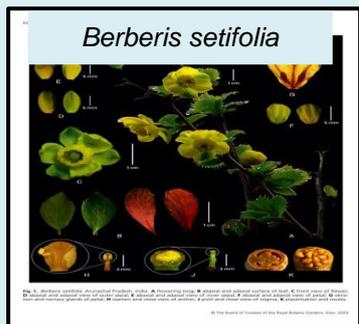
CSIR-NEIST discovers new species of Begonia

A new plant species, *Begonia naraharii* has been discovered from Mishmi Hills of Arunachal Pradesh by a team of scientists from CSIR-NEIST and USTM (Meghalaya). The plant has been named in honour of Dr G Narahari Sastry, Former Director, CSIR-

NEIST, in recognition of his immense contribution in S&T intervention in North East. Article link: <https://t.co/XdLj86ZXJ4>



CSIR-NEIST discovers new species of *Berberis*



A new alpine plant species, *Berberis setifolia* (Berberidaceae), a new rank for *Berberis macrosepala* var. *setifolia* has been discovered from Se La, Arunachal Pradesh. This work is based on two parallel investigations from India (led by Dr Pankaj Bharali and Mr Bipankar Hajong both from CSIR-NEIST Jorhat) and UK (Dr Julian Harber) which is based on a morphological examination of herbarium specimens from Me La, NE Bhutan and Se La, Arunachal Pradesh, India and living plants from Se La. *Berberis* is one of the highly medicinally important shrubs found in the mountainous regions of the World. This has been published in the KEW BULLETIN. Article link: <https://t.co/TnhxVEKM1T>

MoUs/Agreements signed

CSIR-NEIST signed MoU with Central Council for Research in Unani Medicine (CCRUM), Min. of Ayush

CSIR-NEIST signed MoU with Central Council for Research in Unani Medicine (CCRUM), Min. of Ayush on 07 March, 2024 for promoting collaborative R&D activities in traditional Unani Medicine.



Dr V M Tiwari, Director, CSIR-NEIST (second from left) and Dr N Zaheer Ahmed, DG, Central Council for Research in Unani Medicine (CCRUM), Min. of Ayush signing the MoU on 07 March, 2024 at Regional Research Institute of Unani Medicine (RRIUM), Silchar.

Activities under CSIR Floriculture Mission



Participants of the programme along with CSIR-NEIST team.

Under the CSIR Floriculture Mission, CSIR-NEIST organized a day-long seeds distribution cum farmer awareness & training programme at Soreng district, West Sikkim on 07 March, 2024. Around 65 farmers joined in for a session that combined seed distribution with training. Tulip, marigold, and peony seeds were handed out to help farmers diversify their crops and improve their farming techniques. This event aimed to promote floral cultivation, boost economic growth, and enhance the region's agricultural practices. It left farmers equipped with seeds and knowledge, ready to cultivate a more vibrant agricultural landscape.

CSIR-NEIST participated in North East Startup & Entrepreneurs' Conclave

CSIR-NEIST participated in the exhibition held under North East Startup & Entrepreneurs' Conclave held at Sankardev Kalakshetra, Guwahati during 27-28 March, 2024. During the event, CSIR-NEIST showcased various major products and technologies of the institute relevant for start-ups, MSME entrepreneurs and industries.



Dr Arvind C Ranade, Director, National Innovation Foundation and Sri Prabin Ram Das, Secretary, Bigyan Bharati along with Dr V M Tiwari, Director CSIR-NEIST and other officials from the institute at CSIR-NEIST exhibition stall.

Mr Ranjeet Kumar Das, Hon'ble Minister of Panchayat and Rural Development, Food and Civil Supplies and Consumer Affairs, Govt. of Assam visited CSIR-NEIST



Mr Ranjeet Kumar Das (third from right), Hon'ble Minister of Panchayat and Rural Development, Food and Civil Supplies and Consumer Affairs, Government of Assam visited CSIR-NEIST experimental farm accompanied by a team of scientists.

Mr Ranjeet Kumar Das, Hon'ble Minister of Panchayat and Rural Development, Food and Civil Supplies and Consumer Affairs, Government of Assam visited CSIR-NEIST on 09 March, 2024. He showed keen interest in aromatic & medicinal plants cultivation and various societal activities implemented by the institute under CSIR Aroma Mission.

Achievement in Sports

Mrs Rumi Borah, Technician, Chemical Sciences & Technology Division (CSTD), CSIR-NEIST has won the Runners-Up Trophy in Carrom (singles) at the 51st SSBMT Indoor Final Tournament held at CSIR-IMMT, Bhubaneswar during 15-19 March, 2024.



Mrs Rumi Borah holding the winning trophy

Papers published

In International Peer Reviewed Journals

- Title:** Triple quadrupole liquid chromatography–mass spectrometry–mediated evaluation of vitamin D2 accumulation potential, antioxidant capacities, and total polyphenol content of white jelly mushroom (*Tremella fuciformis* Berk.).

Authors: Marium Begum, Ratul Saikia and Siddhartha Proteem Saikia.

Journal: *Mycologia* 2024
(<https://www.tandfonline.com/doi/full/10.1080/00275514.2024.2313435>).

IF: 2.8
- Title:** Extraction, physicochemical and structural characterisation of palm grass leaf fibres for sustainable and cleaner production of textile and allied cellulosic applications.

Authors: Amit Kumar, Dipanka Dutta, Dipul Kalita, Bijan Majumdar, Siddhartha Proteem Saikia and Dipanwita Banik.

Journal: *Journal of Cleaner Production*, 2024 Vol. 448, 141733
(<https://www.sciencedirect.com/science/article/pii/S0959652624011818?dgcid=author>).

IF: 11.1 (Highest Impact Factor Paper)
- Title:** Insight into a traditional culinary practice: Late-stage addition of spiny coriander (*Eryngium foetidum* L.) in Indian cooking system.

Authors: Gitasree Borah, Sajjad Hussain, Avisek Mondal, Siddhartha Proteem Saikia and Saikat Halder.

Journal: *South African Journal of Botany* 2024 Volume 168, May 2024, pp: 26-31
(<https://www.sciencedirect.com/science/article/abs/pii/S0254629924001571?via%3Dihub>).

IF: 3.1
- Title:** Emerging trends in nano-carrier based gene delivery systems for targeted cancer therapy.

Authors: Gulshan Kumar, Misbah Tabassum, Bhupesh K Sharma, Rajesh Kumar, Javeed Ahmad Tali, Davinder Singh, Ravindra K Rawal, Sanket K Shukla and Ravi Shankar.

Journal: *Molecular Structure*, 2024, Vol. 95, 105546
(<https://www.sciencedirect.com/science/article/abs/pii/S0254629924001571?via%3Dihub>)

IF: 3.8
- Title:** One pot synthetic approach to 2-methyl-5-phenyl-7-amino-[1,3,4]-thiadiazolo[3,2-a]pyrimidine-6-carbonitrile derivatives with antifungal evaluation.

Authors: Rimpi Saikia, Jumi Bharali, Sukanya Borthakur, Pabitra Kumar Kalita, Pradyut Sarma, Prakash Jyoti Saikia, Mintu Maan Dutta and Susanta Kumar Borthakur.

Journal: *Journal of Heterocyclic Chemistry*, 2024 (<https://onlinelibrary.wiley.com/doi/10.1002/jhet.4801>)

IF: 2.4

6. **Title:** Density Functional Theory Studies of van der Waals Heterostructures Comprised of MoSi₂P₄ and BAs Monolayers for Solar Cell Applications.

Authors: N Bedamani Singh, Rajkumar Mondal, Jyotirmoy Deb, Debolina Paul, and Utpal Sarkar.

Journal: *ACS Applied Nano Materials*, 2024 (<https://pubs.acs.org/doi/10.1021/acsanm.4c00884>)

IF: 5.9

7. **Title:** Borophene Quantum Dots as Novel Peroxidase-Mimicking Nanozyme: A Dual-Mode Assay for the Detection of Oxytetracycline and Tetracycline Antibiotics.

Authors: Devipriya Gogoi, Chayanika Hazarika, Gayatri Neog, Prosenjit Mridha, Himangsu K Bora, Manash R Das, Sabine Szunerits and Rabah Boukherroub.

Journal: *ACS Applied Materials & Interfaces*, 2024 (<https://pubs.acs.org/doi/10.1021/acsami.3c12108>)

IF: 9.5

8. **Title:** PLGA-Based Drug Delivery Systems: A Promising Carrier for Antidiabetic Drug Delivery.

Authors: Bhaben Sharmah, Amarjit Borthakur and Prasenjit Manna.

Journal: *Advanced Therapeutics*, 2024 (<http://dx.doi.org/10.1002/adtp.202300424>)

IF: 4.6

9. **Title:** A Pd(ii)-catalyzed denitrative alkyne annulation reaction for the synthesis of cyclopenta[b]chromanes.

Authors: Pratiksha Bhorali, Deep J Kalita, Babulal Das and Sanjib Gogoi.

Journal: *Organic Chemistry Frontiers*, 2024 (<https://pubs.rsc.org/en/content/articlelanding/2024/qo/d4qo00344f>)

IF: 7

10. **Title:** Facile synthesis of lanthanum carbonate octahydrate and lanthanum oxide nanoparticles by sonochemical method: systematic characterizations.

Authors: Sentienla Imsong, Punazungba Imsong, Swapnali Hazarika and M Devi.

Journal: *Zeitschrift Fur Physikalische Chemie-International Journal of Research in Physical Chemistry & Chemical Physics*, 2024 (<http://dx.doi.org/10.1515/zpch-2023-0396>)

IF: 2.5

11. **Title:** Screening and Optimization of α -Glucosidase Inhibitor Production by Potent Strain of *Bacillus subtilis* Isolated from Peryaan, Fermented Soy-Food of Northeast India.

Authors: Mir Ekbal Kabir, Anupriya Borah, Hiranmoy Barman, Bhaben Sharmah, Nazim Uddin Afzal, Tridip Phukan, Jatin Kalita and Prasenjit Manna.

Journal: *Journal of Food Biochemistry*, 2024 3199103

(<http://dx.doi.org/10.1155/2024/3199103>)

IF: 4

12. **Title:** Photoactivation of peroxymonosulfate (PMS) over a CuO-ZnO p-n heterojunction for the selective C2 trimerization of indoles.

Authors: Arpita Devi, Mrinmoy Manash Bharali, Seonghwan Lee, Young-Bin Park, Lakshi Saikia, Rafikul Ali Saha, Tanmoy Kalita, Dhruvajyoti Kalita, Subir Biswas, Tonmoy J Bora, Salma A Khanam and Kusum K Bania.

Journal: *Journal of Food Biochemistry*, 2024 3199103

(<http://dx.doi.org/10.1155/2024/3199103>)

IF: 5

13. **Title:** Antihyperglycemic and antihyperlipidemic effects of fruit extract of *Hodgsonia heteroclita* (Roxb.) Hook. f. & Thomson in diabetic mice.

Authors: Silu Basumatary, Partha Pradip Adhikari, Ajit Kumar Das, Nanjian Raaman, Gauri Dutt Sharma, Jatin Sarmah, Anjum Dihingia, Rinku Baishya, Prasenjit Manna and Jatin Kalita.

Journal: *Journal of Ethnopharmacology* 2024, Vol. 328, 28 June 2024, 118094

(<https://www.sciencedirect.com/science/article/pii/S0378874124003933?via%3Dihub>)

IF: 5.4

14. **Title:** Molecular Property Diagnostic Suite for COVID-19 (MPDSCoVID-19): an open-source disease-specific drug discovery portal.

Authors: Lipsa Priyadarsinee, Esther Jamir, Selvaraman Nagamani, Hridoy Jyoti Mahanta, Nandan Kumar, Lijo John, Himakshi Sarma, Asheesh Kumar, Anamika Singh Gaur, Rosaleen Sahoo, S aikundamani, N Arul Murugan, U. Deva Priyakumar, G P S Raghava, Prasad V Bharatam, Ramakrishnan Parthasarathi, V Subramanian, G Madhavi Sastry and G Narahari Sastry.

Journal: *GigaByte* 2024, 1–17

(<https://gigabytejournal.com/articles/114>)

IF: --

Farewell

The following member(s) of the staff have retired from Council's service on superannuation from CSIR-NEIST w.e.f 31 March, 2024.

1. Mr. Krishna Kanta Borah, Group C (MTS)
2. Mr. Bipul Ch Boruah, Group C (MTS)