Faculty of Engineering and Technology

Newsletter

January 2024 | Issue 2

Engineering Innovations for a Prosperous 2041:
Paving the Way for Smart Bangladesh

UNIVERSITY OF DHAKA
Bangladesh

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TABLE OF CONTENTS

FOET NEWS HIGHLIGHTS

The Illustrious Professor Dr. Hafiz Md. Hasan Babu

Transformative Leadership

Dean Professor Dr. Hafiz Md. Hasan Babu's Impact on FoET

Amidst the rapidly changing panorama of education and innovation, the Faculty of Engineering and Technology (FoET) at the University of Dhaka shines brightly, with its trajectory being ably charted by the esteemed Dean, Professor Dr. Hafiz Md. Hasan Babu. Thanks to his proactive and progressive leadership, FoET has experienced an era of transformation, marked by an array of significant achievements that stand testament to a modern, future-ready approach to engineering education and research. With fervor and commitment, Professor Babu states, "We are unwavering in our mission to foster a milieu where innovation finds its roots, students achieve unprecedented success, and the bridge between academia and industry is strengthened."

The past year has been particularly monumental due to the initiation of robust industry collaborations spanning several departments within FoET. Such partnerships have not only spurred state-of-the-art research but have also opened doors to practical learning experiences, ensuring students are industry-ready upon graduation. Articulating his vision, Professor Babu mentions, "Our endeavor has always been to seamlessly weave theoretical knowledge with hands-on experiences. These partnerships with industry behemoths offer our students a unique lens into real-world applications."

Beyond industry ties, Professor Babu has masterminded a suite of initiatives to bolster the academic environment at FoET. Notable among these are the provision of seed funding for faculty-led research, equipping faculty and students with laptops, and incentivizing publications in top-tier journals. "With these measures, we aim to galvanize our academic community, propelling them to push the frontiers of knowledge and innovation," reflects Professor Babu.

Moreover, under Professor Babu's astute leadership, FoET's journal is gaining traction on the international stage, poised to become a beacon for groundbreaking research. His mission to elevate the journal's standing exemplifies his dedication to spotlighting the University's scholarly prowess. "We envision our journal to be an emblem of our academic excellence, echoing our relentless pursuit of groundbreaking research," asserts Professor Babu. Not one to rest on laurels, Professor Babu has adeptly garnered substantial financial support, both locally and internationally. These resources have been meticulously invested to uplift student education, foster innovative research, and augment FoET's infrastructure. Reflecting on the journey, Professor Babu opines, "While we take pride in our accomplishments, our sights are set on loftier goals. We remain committed to making indelible marks in the industry, enriching society, and ensuring our students receive an education par excellence."

Additionally, Professor Babu has orchestrated the provision of laptops to faculty members and students, a move aimed at fostering research and teaching excellence within FoET. In addition, Dutch Bangla Bank Limited and Prime Bank Limited's donations enabled the acquisition of laptops for faculty research and teaching. American expatriate Professor Dr. Mohammad Harunur Rashid's contributions have created trust funds, scholarships, and support for Ph.D. researchers, and an Engineering Faculty Outreach Program, further solidifying FoET's financial foundation.

Walton Bangladesh, one of the latest multinational electrical, electronics, automobiles, and appliances brands with one of the largest well-equipped R & I facilities in the world, had a productive meeting with Professor Dr. Hafiz Md. Hasan Babu at FoET, DU, on 7th December 2022. This meeting was focused on industry collaboration and resulted in a request for setting up advanced labs in FoET, DU, including Embedded System Lab, IoT and Machine Learning Lab, Smart AI Enabled Display Lab, and Power Electronics and Drive System Lab. Berger Paint Bangladesh Limited also joined hands with FoET in a meeting held on 14th February 2023, where Ms. Rupali Chowdhury, Managing Director and Chief Executive Officer, discussed industry collaboration and the setup of an Advanced Material Lab for FoET, DU.

Distribution of Laptops to Faculty Members

As FoET embarks on its transformative journey under the watchful eye of Professor Dr. Hafiz Md. Hasan Babu, the horizon looks promising, filled with endless opportunities for innovation and excellence.

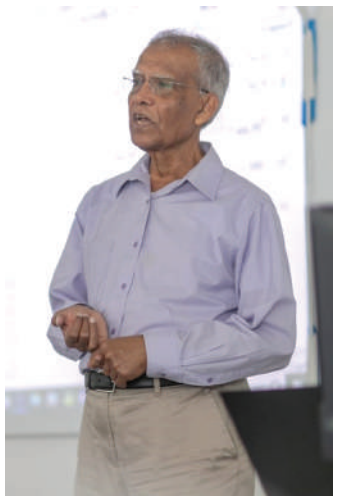
Meeting with Walton Chairman, MD, Board Directors and other High Officials

Meeting with Walton Bangladesh Limited

Meeting with Berger Paint Bangladesh Limited

Grateful Hearts, Lasting Impact

Honoring Professor Dr. Muhammad H. Rashid`s Contributions to FoET



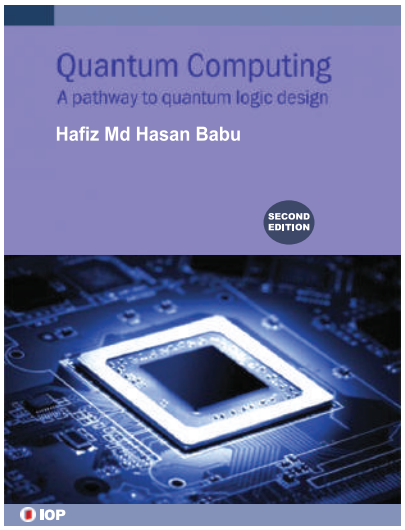
The Faculty of Engineering and Technology (FoET), University of Dhaka greatly acknowledges the generous contributions made by Professor Dr. Muhammad H. Rashid in forming a scholarship trust fund for meritorious but financially challenged students of FoET as well as strengthening FoET`s research infrastructure. Professor Rashid also serves as the editor-in-chief of FoET`s journal. He is currently employed by the Florida Polytechnic University as a Professor of Electrical Engineering. Previously he was employed by the University of West Florida, Pensacola, Florida as a professor of electrical and computer engineering. He was also employed by the University of Florida as Professor and Director of UF/UWF Joint Program. He is a Fellow of the Institution of Engineering & Technology (IET, UK) and a Life Fellow of the Institute of Electrical and Electronics Engineers (IEEE, USA). Dr. Rashid is actively involved in teaching, researching, and lecturing in electronics, power electronics, and professional ethics. He has published 22 books listed in the US Library of Congress and more than 160 technical papers. His books are adopted as textbooks all over the world. His book, Power electronics has translations in Spanish, Portuguese, Indonesian, Korean, Italian, Chinese, Persian, and Indian edition. His book, Microelectronics has translations in Spanish, Italian, and Chinese.

Visionaries Breaking the Binary Barrier

Unveiling Professor Dr. Hafiz Md. Hasan Babu`s Journey into Quantum Computing

Computers have revolutionized the world in numerous ways, transforming various aspects of society, economy, education, healthcare, and more. But what lies at the heart of their functionality? Fundamentally, computers operate based on logic, particularly using logic gates. These gates take basic inputs and transform them into binary outputs: either 1 or 0. By integrating numerous such gates, we form complex circuits capable of handling sophisticated inputs and outputs. For instance, a simple command like "find the nearest metro station" is processed by these circuits, guiding us effortlessly to our desired destination. However, traditional computing systems have their limitations. This is where the innovative realm of quantum computing enters the scene. Currently a

theoretical concept, quantum computing promises a significant leap in computational capabilities for certain types of problems, due to its ability to encode information in quantum states. At the forefront of this pioneering field stands Prof. Dr. Hafiz Md. Hasan Babu, the esteemed Dean of the Faculty of Engineering and Technology. His recent books, "Quantum Computing: A Pathway to Quantum Logic Design" and "Multiple-Valued Computing in Quantum Molecular Biology," offer an unprecedented exploration into the complex and intriguing world of quantum and DNA-based computing.



"Quantum Computing: A Pathway to Quantum Logic Design" delves into the principles of quantum computing, highlighting its potential for energy efficiency and eco-friendliness. This comprehensive guide, organized into four parts, covers quantum circuit implementation, fault tolerance, Quantum-dot Cellular Automata (QCA), and more. Enhanced with new chapters and problem sets, the second edition of this book is an invaluable resource for researchers and students in quantum computing.

"Multiple-Valued Computing in Quantum Molecular Biology" is a groundbreaking twin-volume work that merges quantum physics with molecular biology. It introduces the novel concept of multiple-valued quantum-DNA computing. The first volume covers multiple-valued quantum computing and DNA computing basics, along with applications in arithmetic and combinational circuits. The second volume delves into sequential circuits, memory devices, and nano-processor designs, marking a significant milestone in computational science and biology.

Prof. Babu's contributions are not just academic achievements; they represent a guiding light for future research in quantum computing. His work opens new pathways in understanding and utilizing quantum mechanics for computing, potentially addressing many limitations of current computing systems.

Advancing University Education

Embracing Digital Transformation and SDGs in Developing Countries

On January 3, 2023, the Faculty of Engineering and Technology (FoET) hosted a pivotal workshop on "Digital Transformation, Innovation, and SDGs for Universities in Developing Countries." The event, presided over by the Vice-Chancellor, Professor Dr. A. S. M. Maksud Kamal, aimed to develop a strategic plan for universities in developing countries, focusing on integrating digital transformation, innovation, and alignment with Sustainable Development Goals (SDGs).

The session was chaired by Professor Dr. Hafiz Md. Hasan Babu, Dean of FoET, and effectively facilitated by Professor Dr. Abdur Razzaque from the Computer Science and Engineering department. A key highlight was the keynote address by Prof. Dr. Alamgir Hossain, Vice President (Academic Affairs & Research) at Cambodia

University of Technology & Science. Affairs & Research) at Cambodia University of Technology & Science. Dr. Hossain, with his rich experience in academic leadership, underscored the critical role of universities in contributing to national development through robust educational initiatives, impactful research, and active community engagement.

Dr. Hossain emphasized the importance of capacity building, especially in training and developing faculty members and students. He also highlighted the necessity of strengthening infrastructural and funding resources for the essential digital transformation of academic institutions. His compelling metaphor, "A strategic plan without digital transformation is like a ship without a compass," underscored the importance of navigating the future with innovation and SDGs as guiding principles.

The workshop concluded with a consensus on the need for a strategic focus on digital transformation and innovation in higher education. This focus is seen as crucial for universities, especially in developing countries, to effectively contribute to and align with the Sustainable Development Goals, thereby enhancing academic excellence and societal impact.

FoET and Ulkasemi join forces in Pioneering the Future of Semiconductor Industry for a Smart Bangladesh

On March 3, 2023, a team from Ulkasemi, headed by their CEO, Mr. Enayetur Rahman, visited FoET to initiate dialogues for collaboration and partnership in semiconductor design. ULKASEMI was founded in 2007 with headquarters in Cupertino, California (Silicon Valley) and operations in Dhaka, Bangladesh, Toronto, Canada, and Bengaluru, India. Today ULKASEMI is Bangladesh's #1 semiconductor design services company. The company has over 350 employees distributed around the globe and is aggressively expanding. The company assists their international clients in developing their next generation flagship product lines, such as mobile devices, complex routers/switches, consumer products, storage, microprocessor, and graphics processors. This includes developing cutting edge technologies that are crucial and rare in the industry. Mr. Rahman said "Ulkasemi has an internationally renowned customer base with a diverse portfolio. VLSI design requires a strong background in electrical engineering or a related field. Designers need to be proficient in using EDA tools and have a deep understanding of digital and analog circuit design. FoET at University of Dhaka offer specialized courses and programs in VLSI design to prepare students for careers in the industry and that is what brings us here, today. We need skilled graduates to join us in moving this booming

industry forward". Professor Babu, along with his colleagues, welcomed Ulkasemi to FoET and agreed to provide all support to Ulkasemi. Professor Babu, who has written a book on VLSI design, added "The future vision of smart Bangladesh lies in the hands of chip designing, which is expected to surpass the current RMG sector in terms of revenue. FoET is excited to be a part of the VLSI journey with Ulkasemi in creating skilled graduates that can lead us to the next industrial revolution."

FoET conducts seminar on the History of Engineering Education in Japan

On May 17, 2023, a delegate from Japan International Cooperation Agency (JICA), led by Professor Bidyut Baran Saha of Kyushu University, visited FoET conducted a seminar in FoET discussing the history of engineering education in Japan. Professor Dr. A. S. M. Maksud Kamal, current vice-chancellor, university of Dhaka, was the chief guest and Professor Dr. Hafiz Md. Hasan Babu was the event chair. Professor Dr. Koichiro Watanabe Senior Adviser JICA, Head Office, Tokyo, Japan, delivered the keynote talk. Japan is known for its emphasis on research and development. Professor Watanabe emphasized that engineering students can engage in cutting-edge research projects. Citing examples from Japan, Professor Watanabe said "Engineering programs should include internships or cooperative education (co-op) programs, allowing students to gain real-world experience before graduation. Collaboration between academia and industry is common in Japan, providing students with practical experiences and industry connections." Professor Saha added, "Many Japanese universities are making efforts to internationalize their engineering programs, attracting students from around the world. Some universities have partnerships with overseas institutions, facilitating student exchanges and collaborative research." JICA also agreed to work closely with FoET to enable opportunities for research, collaboration, and industry engagement.

FoET launches industry-academic collaboration with the DBL group

On October 2, 2023, as part of its initiative to develop shared research and industry engagement, the Faculty of Engineering and Technology (FoET), at the University of Dhaka, recently partnered with the DBL group of industries.

A Memorandum of Understanding (MoU) was signed between the DBL Group and FoET, on 2nd October 2023. M. A. Jabbar, Managing Director (MD), DBL Group and Professor Dr. Hafiz Md. Hasan Babu, Dean, FoET, University of Dhaka signed on behalf of their respective organizations. Department chairs and faculty members from all five departments of FoET were present during the MoU signing ceremony along with the officials from the DBL group. The scope of the MoU includes internship opportunities, career counseling, and scholarship facilities for the students of FoET along with joint research work subject to the mutual interest of both parties.

"FoET houses the brightest minds in the country trained in the best laboratories around the world. The goal of this agreement is to utilize this huge pool of talent to understand and mitigate the challenges faced by industries through research, innovation, and technology transfers. The MoU covers initiatives, such as internships, joint

research projects, and industry-sponsored educational programs, that will allow the students of FoET to gain hands-on experience and bridge the gap between academia and the professional world," said Prof. Babu.

M. A. Jabbar added "I am extremely excited about this transformative collaboration between DBL Group and FoET. This strategic partnership is crucial for preparing the workforce for the challenges of the future. Academic institutions generate cutting-edge research, theoretical frameworks, and innovative ideas. However, for these concepts to have real-world applications, they need to be translated into practical solutions by industry experts. This is where DBL, one of the largest business groups in the country, can help. We are committed to work together with FoET, with aligned strategies and objectives and foster innovation, education, and service to our communities.

FoET builds ties Pennsylvania State University, USA, in Research and Innovation

On August 20, 2023, Professor Dr. Vijaykrishnan Narayanan, Associate Dean for Innovation in Engineering and A. Robert Noll Chair Professor of Computer Science & Engineering and Electrical Engineering at the Pennsylvania State University, USA, visited the Faculty of Engineering and Technology (FoET), University of Dhaka, and delivered a keynote talk entitled "Advances in Ferroelectric Devices for Data-Intensive Application". Ferroelectric-based devices and circuits are emerging as a key solution for supporting the storage and computing needs of data-abundant applications. Co-design across the stack from materials to architectures will be vital to addressing cross-cutting challenges posed by the enormity of data that needs to be processed. This talk will highlight opportunities and challenges for ferroelectric electronics. Examples of such co-designed systems include using ferroelectric devices for machine learning, processing-in-memory fabrics, as Ising machines for solving computationally hard problems such as graph matching, and reconfigurable fabrics to enable hardware obfuscation. With the discovery of ferroelectric properties in a new class of materials that can be potentially deposited at low temperatures and higher polarization, there is also significant progress towards the design of true three-dimensional ferroelectric platforms. The event was jointly organized by FoET, IEEE Electron Devices Society (EDS) Student Branch Chapter and IEEE Computer Society Student Branch Chapter at University of Dhaka. Professor Dr. Hafiz Md. Hasan Babu, Dean, FoET, chaired the session. The talk was attended by distinguished faculty members and students from the department of Electrical and Electronic Engineering (EEE), Applied Chemistry and Chemical

Engineering (ACCE), Computer Science and Engineering (CSE), Nuclear Engineering (NE) and Robotics and Mechatronics Engineering (RME).

In his welcome speech, Professor Babu said "I am confident that the visit by Professor Narayanan will open the doors for collaborative and interdisciplinary research between Penn State University in the United States and FoET at University of Dhaka. Both institutions can work together, sharing knowledge and resources, and attracting new funding opportunities for impactful research". Professor Narayan also expressed his interest to work with FoET and sign a Memorandum of Understanding (MoU) soon. He said, "I am highly impressed by the talented students and faculties at FoET and I am eager to initiate and foster a culture of collaboration, leveraging the collective expertise of different academic units at FoET and Penn State for the advancement of knowledge and innovation." Professor Babu presented Professor Narayan with the faculty Newsletter and handed him the copies of Professor Babu`s books published by renowned publishers like Wiley and IOP.

Laal Bus App

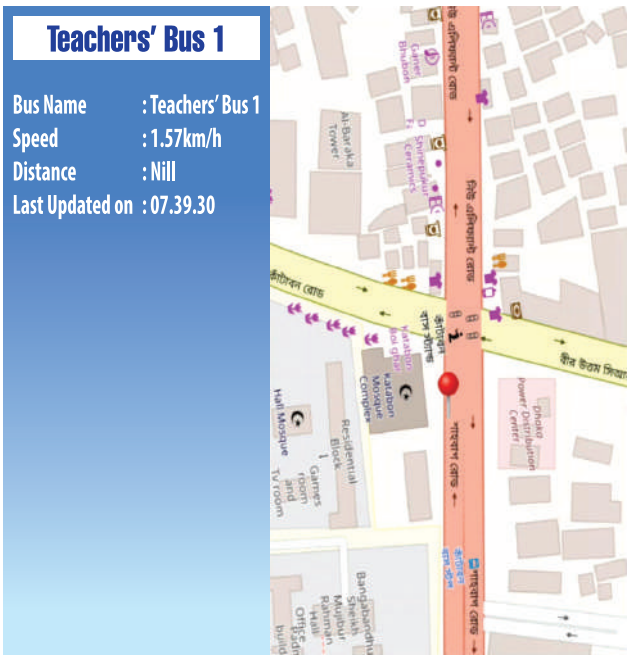
A FoET-Funded Breakthrough in Bus Tracking at Dhaka University

In an ambitious move to enhance the daily commute for its students and faculty, Dhaka University's Faculty of Engineering and Technology (FoET) has strategically invested in a transformative project: the Laal (Red) Bus App. With a generous allocation of 50,000 takas, FoET has propelled the project beyond a mere concept into a tangible reality.

The Laal Bus App, conceived and developed by a group of current and former EEE department students – Sajid, Dhrubo, Rahat, Kowser, Shahadad, and Asif – stands out as a beacon of innovation in the domain of university transportation. This investment by FoET underscores a significant commitment to resolving the university's complex transportation challenges, which include erratic traffic, unpredictable strikes, and varying road conditions that frequently disrupt bus schedules.

What sets the Laal Bus App apart is its bespoke approach to GPS tracking. Unlike standard trackers in the market that often suffer from low accuracy and limited customization, this app is tailor-made to meet the specific

needs of Dhaka University's community. The team's technical acumen, combined with an intimate understanding of local transit issues, led to the creation of a highly accurate and user-friendly GPS tracking system. This system empowers users with real-time data on their designated university buses, allowing them to make well-informed decisions about their travel plans.



The FoET's funding has been pivotal in elevating the project's scope and impact. With this financial support, the Laal Bus App has evolved into a symbol of efficient and reliable transportation within the university, significantly alleviating the daily transportation woes of its community. This project not only showcases the power of innovation and collaboration in solving practical problems but also highlights FoET's role in fostering technological advancements for the betterment of university life.

FoET becomes part of Erasmus+ KA 171 Project from European Commission/DAAD

On November 15, 2023, one of the largest universities of applied sciences in Germany, Technische Hochschule Mittelhessen (THM) received funding in the framework of Erasmus+ KA 171 project from European Commission/DAAD to work with its partner universities in Bangladesh/India. Six of the partner universities are from Bangladesh and one university is from India. These universities are Bangladesh University of Engineering and Technology (BUET), University of Dhaka (DU), Jahangirnagar University (JU), Jagannath University (JnU), Islamic University (IU), Jashore University of Science and Technology (JUST), Indian Institute for Information Technology Allahabad (IIIT Allahabad). A Memorandum of Understanding (MoU) has been signed between THM and all its partner universities in the year 2022.

Moderated by Prof. Dr. Rahamatullah Khondoker (Professor for IT Security and Digitalization, Department of Business Informatics, originally from Bangladesh, initiated teaching/research activities with Bangladesh/India), the online kick-off meeting of the Erasmus+ KA 171 project with representatives from the six universities in Bangladesh, at which Prof. Dr. Matthias Willems, the President of the THM, gave the welcome speech. Prof. Willems emphasized that the universities in Bangladesh will be benefitted from the intensive contacts of THM with the industries in Germany. Afterwards, Ms. Michaela Zalucki, deputy head of the International Office of THM, presented the funding status and the exchange plans with the Erasmus+ partner universities in Bangladesh. The Vice Chancellor (VC) of BUET, Prof. Dr. Satya Prasad Majumder, concluded the inaugural meeting with a closing speech. Prof. Prasad highlighted that this project will facilitate the THM partner universities in Bangladesh to use the modern THM labs for the research/experiments, thereby, creating excellent cooperative research projects/publications. Representatives from all 6 partner universities were present at the event and introduced themselves. Dr. Mainul Hossain (Assistant Professor, EEE, DU) represented FoET, DU in the meeting.

With this Erasmus+ KA171 funding, teachers and students of Information and Communication Technologies (ICTs) such as CSE, ICT, IT, ICE, EEE, ME from THM partner universities in Bangladesh and India will visit THM as part of joint teaching and research activities (Bachelor/Master/PhD Projects/Theses) in the next three years.

Anwar Group of Industries Commits BDT 2 Million to FoET for Merit Scholarships and Internships

On November 21, 2023, Anwar Group of industries handed over a cheque of of 2 million BDT to the Faculty of Engineering and Technology (FoET), for the "Al-Hajj Anwar Hossain Merit Scholarship" trust fund. The fund will be used to provide scholarships to the financially challenged and meritorious freshman and sophomores of the Faculty of Engineering and Technology (FoET). Mr. Manwar Hossain (Chairman), Mehmood Hossain (Vice-Chairman), Khaled Hossain (Managing Director) and Akhter Hossain (Executive Director) of the Anwar Group of Industries were present in the meeting. Honorable vice-chancellor, Prof. Dr. A.S.M. Maksud Kamal, Treasurer Professor Mamtaz Uddin Ahmed, Registrar Probir Kumar Sarker and Professor Dr. Hafiz Md. Hasan Babu, Dean, FoET, as well as the FoET departmental chairs were present in the meeting. Anwar group committed to provide ten internship opportunities to FoET students every year and agreed to donate more funds for the trust.

Drs. Muhammad Harunur Rashid and Fatima Rashid Engineering Faculty Outreach Program

On September 24, 2023, the Faculty of Engineering and Technology at the University of Dhaka took a significant step towards educational empowerment by holding an Outreach Program at Palashihata M.L High School and College in rural Fulbaria, Mymensingh. This initiative, sponsored by Drs. Muhammad Harunur Rashid and Fatima Rashid Trust, and supervised by the student advisors, was a landmark effort to engage with students from rural communities, who are often underrepresented in our faculty.

The event began with a gesture of goodwill and collaboration, as a student volunteer from our university presented a crest to the principal of Palashihata M.L High School and College. This was followed by the screening of a documentary about the University of Dhaka, setting the stage for what was to be an enlightening day. The heart of the program was the series of speeches delivered by volunteers representing all five departments of our faculty. These talks were tailored to address the specific needs and aspirations of rural students, shedding light on the pathways to pursue a career in engineering. The volunteers shared insights about the admission process, academic life, and the plethora of opportunities that await in the field of engineering. This segment was particularly impactful as it addressed the realities and potential of students in rural Bangladesh, encouraging them to overcome barriers and aspire for higher education.

The "Hail Female Engineers" talk was a highlight, directly addressing young women in the audience and inspiring them to break barriers in a traditionally male-dominated field. This aligns with our university's dedication to promoting gender diversity in STEM. However, it was an interactive question-and-answer session that truly captured the essence of the program. The students' enthusiasm and curiosity were evident as they actively engaged with our volunteers, asking questions that ranged from technical aspects of engineering to personal experiences in overcoming challenges. The session not only provided valuable information but also fostered a sense of belonging and confidence among the students.

The day concluded with snacks and social interactions, offering a chance for students to discuss their aspirations and ideas more personally with our volunteers. This event was more than just an academic outreach; it was a commitment by the University of Dhaka to bridge the gap between urban and rural education, and to ensure that every aspiring student, regardless of their background, has access to the opportunities that engineering education offers.

Global Pioneers

Faculty Members of Engineering and Technology (FoET) leading state-of-the-art research

At the Faculty of Engineering and Technology (FoET), University of Dhaka, we take immense pride in the achievements of our faculty members, both current and alumni, who are making significant contributions to research and academia on a global scale. These remarkable individuals are pursuing their Ph.D. studies or working at prestigious institutions worldwide, bringing distinction to our institution and demonstrating the quality of education and research we offer at FoET.

Sujan Sarker: Human-Robot Interaction at the University of Virginia

Sujan Sarker, an Assistant Professor (on-leave) in the Robotics and Mechatronic department Ph.D. student at the University of Virginia, is a shining example of FoET's global impact. His specialization in Human-Robot Inter- action is essential in an era where robots are becoming integral to various aspects of our lives. Sujan's research focuses on making robots better team- mates by developing strategies for collaborative work in human-robot teams. Through his work, he aims to enhance trust and cooperation between humans and robots, paving the way for more effective and seamless integration of robotics into our society.

Dr. Sumaya Farhana Kabir: Bridging Borders at Louisiana State University

Dr. Sumaya Farhana Kabir: Bridging Borders at Louisiana State University, USA

Dr. Sumaya Farhana Kabir, an Associate Professor (on-leave) at the Department of Applied Chemistry and Chemical Engineering, University of Dhaka, has embarked on a Fulbright Visiting Scholar journey at Louisiana State University. Her research focuses on curriculum development and knowledge exchange in the field of polymer science and engineering. Dr. Kabir's efforts extend beyond personal growth; they create opportunities for collaboration between institutions across borders. Her work not only enriches her own knowledge but also strengthens international ties in academia.

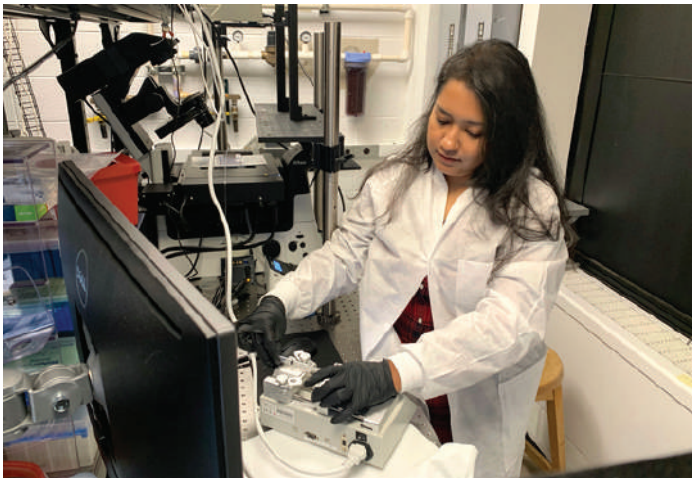
Mir Md. Fahimul Islam: Advancing Technology at Purdue University

Mir Md. Fahimul Islam, Lecturer (on leave), Department of Electrical and Electronic Engineering and currently a Graduate Research Assistant at Purdue University, represents FoET's commitment to cutting-edge technology and innovation. His research focuses on modeling, simulation, and characterization of Back- End-of-Line (BEOL) compatible transistors. These transistors are crucial for enhancing the efficiency and performance of modern chip architectures, making Fahimul's work vital in the rapidly evolving tech landscape. His dedication to the field is emblematic of FoET's ethos of pushing the boundaries of knowledge.

Mir Md Fahimul Islam in front of the main entrance of Purdue University, West Lafayette, USA

Miftahul Jannat Rasna: Pioneering Bio Cell Sorting at Princeton University

Miftahul Jannat Rasna, Lecturer (on leave), Department of Electrical and Electronic Engineering, University of Dhaka, and a Ph.D. candidate in Electrical and Computer Engineering at Princeton University, is focused on bio cell sorting using microfluidic devices based on Deterministic Lateral Displacement. Her research has the potential to revolutionize gene therapy research by enabling the separation of white blood cells from blood samples. With determination and innovation, Rasna is advancing the boundaries of biomedical engineering and making strides towards more effective and targeted therapies.



Miftahul Jannat Rasna in her lab at Princeton University, New Jersey, USA

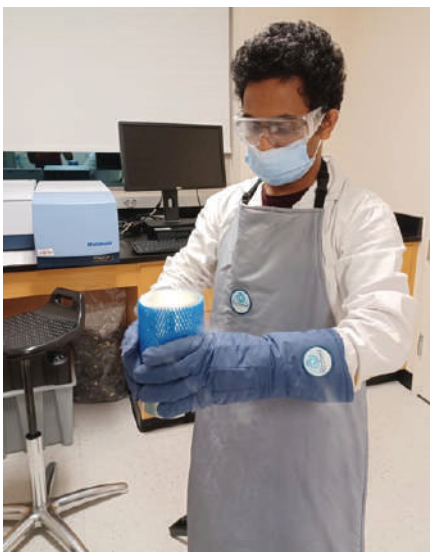
Marshia Zaman Shaily: Revolutionizing Parkinson's Disease Research at the University of Oxford

Marshia Zaman Shaily at the University of Oxford, UK, engaged in Parkinson's disease research.

Marshia Zaman Shaily, Lecturer (on leave), Department of Electrical and Electronic Engineering and a DPhil candidate at the University of Oxford, is at the forefront of biomedical engineering. Her research is dedicated to the detection, diagnosis, and tracking of Parkinson's disease using wearable devices. By bringing together clinical and real-world data, Marshia's work has the potential to revolutionize the early diagnosis and continuous monitoring of this debilitating disease. Her commitment to improving healthcare and quality of life aligns perfectly with FoET's mission of research for the betterment of humanity.

Shaikat Chandra Dey: Revolutionizing Battery Technology at North Carolina State University

Shaikat Chandra Dey, an Assistant Professor of Applied Chemistry and Chemical Engineering, University of Dhaka and a Graduate Research Assistant at North Carolina State University, USA, is on a mission to revolutionize battery technology. His Ph.D. research focuses on converting bio-oil into biographite for lithium-ion battery applications. This innovative approach has the potential to significantly impact the electric vehicle (EV) industry and sustainable energy storage. Shaikat's dedication to sustainable energy solutions aligns perfectly with FoET's commitment to shaping a greener future.

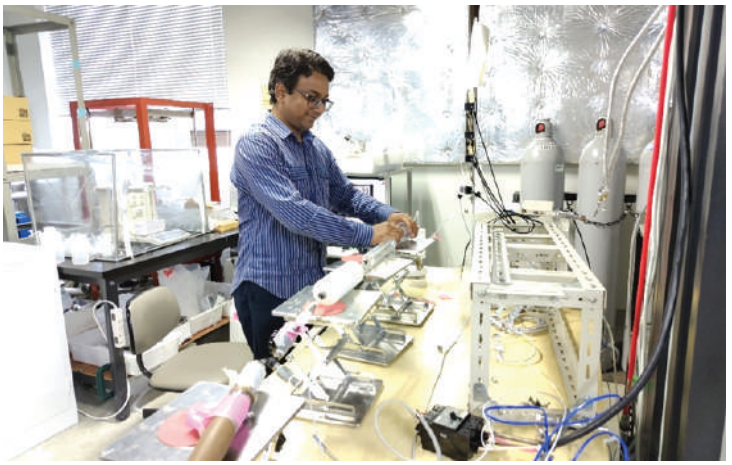


Shaikat Chandra Dey working in his lab at North Carolina State University, USA

Md. Iqbal Hosan: Safeguarding Nuclear Reactor Systems at Kyushu University

Md. Iqbal Hosan, an Assistant Professor of Nuclear Engineering, at the University of Dhaka and a dedicated Ph.D. researcher at Kyushu University, Japan, has set his sights on improving the safety of nuclear reactor systems.

His research encompasses the evaluation of accident source term behavior, radioactive waste management, radiation, and health physics. Collaborating with esteemed international institutions, Iqbal's work is contributing to the overall safety of nuclear power plants, ensuring the sustainable and responsible use of nuclear energy.



Md. Iqbal Hosan in his research lab in Kyushu University, Japan.

Md Faisal Rahman: Revolutionizing Radiation Detection

Md Faisal Rahman, an Assistant Professor in the Department of Nuclear Engineering, University of Dhaka is currently pursuing his Ph.D. at North Carolina State University in the USA. He is a shining example of FoET's global impact with his groundbreaking research in radiation detection. In an era where the need for advanced radiation detection techniques is paramount, Faisal's research stands at the forefront. His specialization in hardware and firmware-based multiplexing techniques promises to revolutionize the field. By developing innovative methods, Faisal aims to reduce the cost and complexity of radiation detection networks.

Md Faisal Rahman at his research lab in North Carolina State University.

Farhana Islam Farha: Making Impact in Dynamic Control Modeling of Modular Integrated Gas High Temperature Reactor

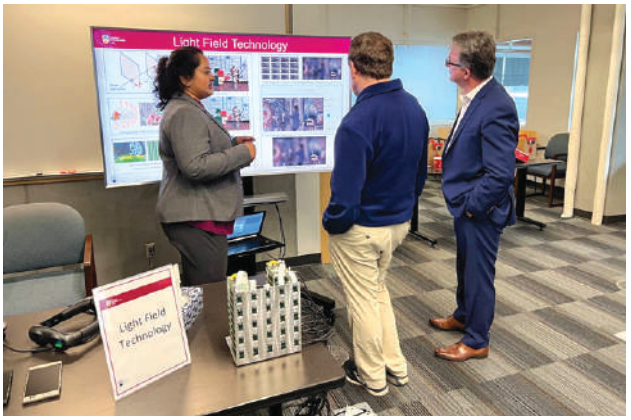
Since January 2023, **Farhana Islam Farha,** Lecturer in the Department of Nuclear Engineering, University of Dhaka, has been working on MIT's Advanced Reactor Demonstration Project (ARDP) to develop a dynamic control modeling of reactor units of the Modular Integrated Gas High Temperature Reactor, led by Professor Brendan Kochunas at the University of Michigan Ann Arbor. Also, she is currently working as Graduate Student Instructor (GSI) of Nuclear Reactor Safety Analysis course. Farha has been offered a six-month internship at Idaho National Laboratory from February 2024 to work on the development of numerical stand-ins for design of autonomous reactor control systems in the Multiphysics Object-Oriented Simulation Environment (MOOSE). This project focuses on instrumentation (sensor) modeling for Nuclear Thermal Propulsion systems. Farha's keen research interest is in fission systems and radiation transport.

Farhana Islam Farha at University of Michigan Ann Arbor, USA.

Nusrat Mehajabin: Advancing Multimedia with Cutting-edge Video Encoding/Decoding

Nusrat Mehajabin, a PhD candidate at the University of British Columbia and a Lecturer at the University of Dhaka, specializes in video compression technologies. Focusing on light field video compression, her research aims to

improve the efficiency of encoding and decoding video content, vital in multimedia applications. Mehajabin has developed algorithms enhancing existing standards, earning recognition through her publications. Her contributions have garnered prestigious awards like the International Tuition Award (2018-2022), the President's Academic Excellence Initiative PhD Award (2019-2022), and the Faculty of Applied Science Graduate Award (2020). She has also won best paper awards at several international conferences, including the IEEE International Conference on Consumer Electronics (2020), DIGITAL 2021 in Athens, and MMEDIA 2022 in Barcelona. These achievements underscore her exceptional work in video compression and reflect the high research standards of both her universities.



Nusrat Mehajabin at University of British Columbia, Canada

Mubin Ul Haque: Advancing Virtualized Software Security through Innovative Automation and Machine Learning Techniques

Mubin Ul Haque at University of Adelaide, Australia

Mubin Ul Haque, a PhD student at the Department of ECMS, University of Adelaide, Australia, is currently on study leave from his position as a Lecturer in the Department of CSE at the University of Dhaka, Bangladesh. His research, funded by the Cyber Security Cooperative Research Centre, concentrates on enhancing security in virtualized software life cycles, particularly in securing container images like Docker Container Images. Haque has created automated systems for selecting security-focused base images and generating secure Infrastructure-as-Code for container orchestrators. These innovations contribute significantly to the secure development, deployment, and runtime management of virtualized software.

A New Era of Collaborative Research and Innovation at FoET

The Faculty of Engineering and Technology (FoET) at the University of Dhaka is buzzing with excitement about two new collaborative research grants. Under the guidance of Professor Dr. Hafiz Md. Hasan Babu, the Dean of FoET, the teams led by Professor Dr. Lafifa Jamal and Dr. Ahsan Habib, and Dr. Mainul Hossain and Dr. Sejuti Rahman have each been awarded a grant of 3 lakh BDT to bring their innovative projects to life.

EEE undergraduate student Tanzim Rahman working on the In-verse Design of Nanophotonics Project

Prof. Jamal and Dr. Habib's project is set to break new ground in the world of nanotechnology. By teaching computers to understand patterns in light, they are pioneering a deep learning-based approach to design structures that can manipulate light for sensing and imaging. This could revolutionize medical diagnostics and is a first for Bangladesh.

Professor Babu is proud of the ingenuity of his faculty. He believes these projects are seeds of knowledge that will grow and strengthen the research capabilities of the institution. Prof. Jamal is grateful for the recognition and support, eager to advance her field. Dr. Habib shares her enthusiasm, anticipating the practical applications of their work.

Meanwhile, Dr. Hossain and Dr. Rahman's project tackles an environmental hazard -microplastics. They aim to develop a quick and affordable way to detect these tiny pollutants in water. This could be a game-changer for environmental protection and public health.

EEE undergraduate students Nafisa Amin and Zayed Arju are working on the Microplastics Project.

Dr. Hossain appreciates the opportunity to impact environmental stewardship, while Dr. Rahman is driven by the prospect of using technology for the betterment of the planet.

The FoET community, inspired by the passion and dedication of their leaders, looks forward to the development of these projects. It's not just about science; it's about the stories of hope, ambition, and the relentless pursuit of knowledge that these grants represent. As these two projects set sail on their respective journeys, the entire faculty awaits the discoveries and innovations they will bring.

Recent Academic Summits of the Faculty of Engineering and Technology

The Faculty of Engineering and Technology recently celebrated two major events, reflecting its dedication to academic innovation and community engagement. These events included the "Research Discussion and Family Picnic-2022" and the "Outcome-Based Education (OBE) Syllabus Implementation Summit-2023."

Faculty Members and Their Families Enjoying the "Research Discussion and Family Picnic, 2022"

Research Discussion and Family Picnic-2022

This unique event, held at Dhalis Amber Nivaas on October 29-30, 2022, combined academic discourse with social engagement. Faculty members presented impactful research ideas in an environment that also welcomed their families, fostering a sense of community and collaboration. Prof. Dr. Hafiz Md. Hasan Babu emphasized the importance of this synergy in enhancing creative thinking and rooting academic pursuits in community values.

Outcome-Based Education (OBE) Syllabus Implementation Summit-2023

From October 16-19, 2023, at Sairu Hill Resorts, this summit focused on the pedagogical transition to an OBE framework, as detailed by Professor Dr. Md. Abdur Razzaque. The OBE model prioritizes a student-centered approach and aligns educational activities with specific outcomes, preparing students for the evolving demands of the engineering sector. The event also included visits to natural sites like the Remakri Waterfall, underscoring the role of the natural environment in academic inspiration, as noted by Dean Prof. Dr. Hasan Babu.

Professor Dr. Md. Abdur Razzaque Delivering an Expert Lecture on Developing Syllabi Grounded in Outcome-Based Education Principles

Looking Forward

These summits, exemplifying a harmonious blend of academic excellence and community well-being, set a precedent for the faculty's future initiatives. As the faculty progresses, it remains committed to nurturing an environment conducive to innovation and adapting educational paradigms to address future challenges.

NEW FACES IN FOET

Sarah Cynthia Gomes
Lecturer, EEE, DU

Sarah Cynthia Gomes has been serving as a Lecturer in the Department of Electrical and Electronic Engineering (EEE), University of Dhaka since July 2022. Prior to this, she worked as a Lecturer in the Department of Computer Science and Engineering (CSE) at BRAC University (2022) and International Standard University (2021-2022). Ms. Gomes holds MSc and B.Sc. degrees in Electrical and Electronic Engineering from the University of Dhaka. She was awarded the most prestigious Dean's Award (2020) for her academic excellence in undergrad. Her research interest concentrates on the applications of nanophotonics, mainly in designing biophotonic devices for real time and label free sensing.

Emraul Islam Emon
Lecturer, EEE, DU

Emraul Islam Emon joined the Department of Electrical and Electronic Engineering as a lecturer in February 2023. Prior to his current role, he worked as an Assistant Manager of Engineering at Bangladesh Submarine Cable Public Limited Company (BSCPLC). He received his B.Sc. and M.S. degrees in Electrical and Electronic Engineering from the University of Dhaka. His research interests mainly focus on green renewable technologies and optically transparent antenna integrated with a thin-film silicon solar cell.

Md. Shahin Parvej

Lecturer, EEE, DU
Md. Shahin Parvej is working as a Lecturer in Department of Electrical and Electronic Engineering, University of Dhaka from February 2023. Mr. Shahin completed his bachelor's and master's Degree from Department of EEE, University of Dhaka in 2019 and 2021, respectively. Before joining as a faculty, Mr. Shahin worked as an Engineer in Bangladesh Telecommunication Company Limited (November 2021- January 2023). Mr. Parvej received several scholarships during his student life for academic excellence, of which the Mitsubishi UFJ Foundation Scholarship is worth mentioning. Mr. Shahin's research interest focusses on the development of present power system scenario of Bangladesh.

Sadit Bihongo Malitha
Lecturer, ACCE, DU

Mr. Sadit Bihongo Malitha joined the Department of Applied Chemistry and Chemical Engineering, Faculty of Engineering and Technology, University of Dhaka as a Lecturer on the May 31st, 2023. He pursued his MS and BSc degrees in Applied Chemistry and Chemical Engineering, University of Dhaka. He was awarded the most prestigious Dean's Award for his academic excellence in undergrad. He also received Md Aminul Huq and Atia Huq Memorial Gold Medal in the 53rd convocation of University of Dhaka and Bangabandhu Sheikh Mujib Scholar Award 2022. His research interest lies

within the fields of nanomaterials and composites, environmental pollution control, air pollution monitoring, industrial instrumentation and process optimization and sustainable development.

Fahim Arefin
Lecturer, CSE, DU

Md. Fahim Arefin joined the Department of Computer Science and Engineering as a lecturer in March 2023. Prior to his current role, he worked as a Lecturer in Green University of Bangladesh for 3 years.He received his M.S. and B.Sc. degrees in Computer Science and Engineering from the University of Dhaka. His research interests mainly focus on Data Mining. During his master's thesis, he designed a correlation metric to measure similarity in transactional database. He was awarded the ICT fellowship by the ICT Division for research during his master's program.

Redwan Ahmed Rizvee
Lecturer, CSE, DU

Redwan Ahmed Rizvee joined the Department of Computer Science and Engineering (CSE), University of Dhaka as a lecturer in March 2023. Prior to his current position, he worked as a full-time lecturer at East West University and a part-time lecturer in the same department where he is currently employed. He received both his M.S. and B.Sc. from the Department of Computer Science and Engineering, University of Dhaka. His current research interests include Data Mining, Machine Learning, and Optimization. He has been awarded a Fellowship Scholarship (2019) by the ICT Division, Bangladesh for his master's thesis due to having a quality contribution to the field of ICT concerning the socio-economic factors of Bangladesh.

Md. Tanvir Alam
Lecturer, CSE, DU

Md. Tanvir Alam joined the Department of Computer Science and Engineering as a lecturer in March 2023. He completed his Master of Science degree from the Department of Computer Science and Engineering, University of Dhaka, and his Bachelor of Science degree from the same institution with the highest CGPA (3.96 out of 4.0) among 65 students. He has experience of working on several domestic and international research projects and his research interests include graph neural networks, graph mining, and machine learning.

Saad Islam Amei
Lecturer, NE, DU

Saad Islam. joined the Department of Nuclear Engineering as a lecturer in December 2022. Before his present role, he worked as a contractual faculty at the Military Institute of Science and Technology and as a Co-Investigator (ongoing) in the IAEA CRP, "Development of Coupled Neutronic and Thermal-Hydraulic Calculational Methodologies for Research Reactors including Analysis and Treatment of Uncertainties" in association with the Reactor Physics and Engineering Division, Atomic Energy Research Establishment, Savar. He received his M.Phil. degree from the University of Cambridge and his B.Sc. degree from the University of Dhaka. His research interests primarily focus on reactor physics and computational modeling. Mr. Islam is an Associate Member of the Energy Institute (UK) and holds membership in the American Nuclear Society and Cambridge University Engineers' Association.

Md. Ali Mahdi
Lecturer, NE, DU

Md. Ali Mahdi joined the Department of Nuclear Engineering as a lecturer in December 2022. Prior to this position, he served as a specialist at the Research and Development Institute of Construction Technology–Atomstroy (NIKIMT-Atomstroy), a division of the Russian state corporation ROSATOM, responsible for overseeing the construction of nuclear fuel and radioactive material handling facilities in Bangladesh's first-ever Nuclear Power Plant at Rooppur. His academic journey began in the Department of Nuclear Engineering at the University of Dhaka. However, he later transferred to the National Research Nuclear University MEPhI (Moscow Engineering Physics Institute) under a collaborative agreement between the University of Dhaka and MEPhI. There, he earned a specialist degree, which integrates both a bachelor's and a master's degree. Mr. Mahdi's research interest primarily focuses on multi-physics simulations of nuclear systems.

Nazmul Hossain
Lecturer, NE, DU

Nazmul Hossain joined the Department of Nuclear Engineering, University of Dhaka as a lecturer in November 2023. Earlier, he completed his master's and bachelor's degree from the same department. Nazmul is awarded the Prime Minister Gold Medal and the Dean's Award in recognition of his outstanding academic excellence. Nazmul's research interest is mainly in reactor physics. In his undergrad thesis, he experimentally analyzed the time dependent behavior of different safety parameters of the only operating nuclear research reactor in Bangladesh.

Md Tanvir Ahmed
Lecturer, NE, DU

Md Tanvir Ahmed assumed the position of Lecturer in the Department of Nuclear Engineering in November 2023. His prior role as a Research Assistant for 12 months, supported by the MoST special research grant (Project no. SRG 22397), underscores his commitment to advancing knowledge in nuclear engineering. He successfully completed his M.S. and B.Sc. from the Nuclear Engineering Department, University of Dhaka in 2022 and 2020 respectively. Mr. Tanvir's research interest lies in transuranic fuel, annular fuel, SMR, MMR, VVER-1000, VVER-1200, Gen IV reactors.

Md. Jubair Ahmed
Lecturer, Dept. of RME, DU

Md. Jubair Ahmed Sourov joined the Department of Robotics and Mechatronics Engineering as a Lecturer in February 2023. Before joining the department, he worked as a Research Assistant in the Centre for Computational Data Sciences (CCDS) in the Independent University, Bangladesh. Jubair completed his MS and BSc degree in Robotics and Mechatronics Engineering from the University of Dhaka in 2022 and 2020, respectively. His research interest focuses on multi agent systems, machine learning and graph neural networks.

FACULTY SPOTLIGHTS

Professor Dr. Subrata Kumar Aditya of the Department of Electrical and Electronic Engineering delivered a keynote talk at the 2023 Regional Cooperation for Higher Education Development - Options for South Asia in Colombo, Sri Lanka. The event had three goals: i) to bring together the South Asia Region (SAR) regional UGC network to discuss further collaboration options; ii) to present a report on

Regional Cooperation for Higher Education Development: Options for the South Asia Region and iii) to showcase recent higher education reforms in Sri Lanka, supported by the World Bank AHEAD (Accelerating Higher Education Expansion and Development) project. The event provided peer-to-peer exchange, networking, and a site-visit.

Professor Dr. Abul Kalam Azad of the Department of Electrical and Electronic Engineering received the prestigious 'Roushan Innas Ali Welfare Trust Gold Medal' in the 53rd convocation of University of Dhaka. The Gold Medal was awarded to Professor Azad on November 19, 2022, for outstanding research work in the field of Electrical and Electronic Engineering.

Dr. M. L. Palash, Associate Professor, Department of Electrical and Electronic Engineering has been appointed as the director of Semiconductor Technology Research Center (STRC) at University of Dhaka. STRC provides hands-on training to students, teaching them how to process materials and synthesize and characterize them. "Characterization means the determination of the materials' properties," said Dr Mujib Lennin Palash, current director of the center. He said that "There are many researchers who work in the laboratory. Sometimes professors also come here, and they also send their students to do research."

Dr. M. L. Palash received the Dean's Award (2022) from the Faculty of Engineering and Technology (FoET), University of Dhaka, in recognition of the outstanding achievement in research. His research interest is in developing environmentally friendly energy systems, especially in the field of energy conservation. His speciality covers the research area on porous materials, surface energy, adsorption, etc. The application areas of his research have numerous prospects which include adsorption chiller, water harvesting, and thermal energy conversion.

Dr. Mainul Hossain, Assistant Professor, Department, of Electrical and Electronic Engineering received the 2022 Dean`s Award from the Faculty of Engineering and Technology (FoET) in recognition of the outstanding achievement in research. Dr. Hossain leads the Emerging Nanoscale Devices (END) Research Group in the department. His group uses a multitude of simulation approaches and/or analytical/numerical techniques and models to explore emerging nanoelectronic and nanophotonic devices for a wide range of applications in low power computing, biosensing and energy harvesting.

Dr. Mainul Hossain received the Outstanding Branch Chapter Advisor Award for his exemplary leadership as the faculty advisor of the IEEE Electron Devices Society (EDS)

Students Branch Chapter at the University of Dhaka. The award acknowledges the dedication of Dr. Mainul Hossain in nurturing and guiding future engineering professionals.

Dr. Mainul Hossain has been elected as the Chair of the IEEE Photonics Society Bangladesh Chapter for the second time in a row

Dr. Mainul Hossain has been elevated to IEEE Senior Member. Senior membership, the IEEE's highest grade, recognizes highly accomplished IEEE members who have made significant contributions to the profession and have been nominated by other IEEE fellows and other senior members. Just 10 percent of IEEE's more than 400,000 members have reached the level of senior membership. Being acknowledged as a senior member by the IEEE requires extensive experience and is a significant milestone, representing a culmination of years of research, innovation, and contributions.

Dr. Shekh Md. Mahmudul Islam, Assistant Professor, Department, of Electrical and Electronic Engineering received the prestigious JSPS Invitational Fellowship Award to conduct research at Kyoto University, Japan. Out of 169 project proposal applications 49 Fellowship were granted in the year 2022-2023.

Dr. Shekh Md. Mahmudul Islam has been elevated to IEEE Senior Member. Senior membership, the IEEE's highest grade, recognizes highly accomplished IEEE members who have made significant contributions to the profession and have been nominated by other IEEE fellows and other senior members. Just 10 percent of IEEE's more than 400,000 members have reached the level of senior membership. Being acknowledged as a senior member by the IEEE requires extensive experience and is a significant milestone, representing a culmination of years of research, innovation, and contributions.

Dr. Shekh Md. Mahmudul Islam presented his research work at the Technical Committee meeting of the largest Flagship Conference IEEE International Microwave Symposium (IMS-2023) of IEEE Microwave Theory and Technology Society (MTT) at San Diego, California, CA, USA.

Dr. Shekh Md. Mahmudul Islam established the new IEEE Microwave Theory and Technology Student Branch Chapter at the University of Dhaka and is currently serving as the Faculty Advisor of the chapter.

Dr. Ahsan Habib, an Associate Professor in Electrical and Electronic Engineering, has founded the Microsystem and Nanoengineering Lab, specializing in engineered nanomaterials for sustainable agriculture and affordable sensor development. The lab is also exploring low-cost clean room-free biosensors for environmental and biosensing applications. Those interested in collaboration can use the provided QR code. The lab has recently secured funding from notable sources including the Faculty of Engineering and Technology, University Grant Commission of Bangladesh, and the Ministry of Science and Technology (MOST). Furthermore, Dr. Habib received the prestigious Best Poster Award at the DU Research and Publication Fair 2022 for his groundbreaking research in optical nano antennas for Brain-Computer Interface applications.

Mr. Sadit Bihongo Malitha, Lecturer, Department of Applied Chemistry and Chemical Engineeringreceived Bangabandhu Sheikh Mujib Scholar Award 2022, from the Honorable Prime Minister of Bangladesh in Physical Science category. Award receiving date: 11 June 2023.

Dr. Sarker Tanveer Ahmed Rumee, Associate Professor, Department of Computer Science and Engineering delivered a keynote talk on Cloud Governance and Security: Best Practices and Strategies for Data Protection at the daylong knowledge-sharing session 'BFSI Cloud Cyber Security'- organized jointly by Bangladesh Bank and Felicity IDC. The session involved discussion from stakeholders on cloud security, data protection, the cloud policy of the Bangladesh Government, and various regulatory aspects of cloud data and service management. The above-mentioned keynote focused on some basic practices to enhance the privacy of cloud service customers and how to further customize the security aspects of services provided by cloud service companies. Along with that, challenges in protecting the cloud from unwanted disclosure and mitigation strategies were also highlighted.

Dr. Md. Shafiqul Islam Successfully Concludes Visiting Professorship in Nuclear Engineering at MIT

Dr. Md. Shafiqul Islam, a Professor in the Department of Nuclear Engineering recently completed a nine-month visiting professorship from October 2022 to June 2023. During this period, he was hosted by the Nuclear Science and Engineering Department at the Massachusetts Institute of Technology (MIT) in the United States, as part of the prestigious Fulbright Visiting Scholar program. At MIT, Dr. Islam played a multifaceted role. He served as a guest professor, instructing both undergraduate and graduate students. Additionally, he conducted research and

provided guidance to students specializing in advanced reactor safety and nuclear waste management. To mark the successful completion of his tenure, he was awarded a certificate.

Eng. Mohammad Monzur Hossain Khan, Associate Professor and Dr. Sabrin Abdus Samad, Assistant Professor, Department of Nuclear Engineering attended training program "Senior Management and Technical Reserve Talents for Nuclear Power Commissioning in Bangladesh " in Qingdao, China from 14 June to 23 June 2023. With a view to promoting the friendship and cooperation between China and Bangladesh and accelerating human resource development and economic and social progress in the People's Republic of Bangladesh.

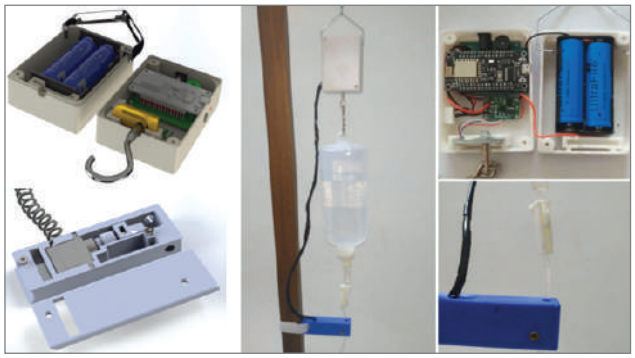
Dr. Afroza Shelley, Professor and Chairperson of the Department of Nuclear Engineering, presided Nuclear Fest and Research Fair-2023 which was focused on showcasing research works and scope, promoting nuclear power, and flourishing academia-industry collaborations. Nuclear Fest has been organized by the Department of Nuclear Engineering at the University of Dhaka, took place on May 16, 2023. It was inaugurated by the Vice-Chancellor of University of Dhaka, at the time. The occasion also witnessed the presence of distinguished guests, including Pro-Vice Chancellor - Administration, Pro-Vice Chancellor - Academic, and Dean of the Faculty of Engineering & Technology. Noteworthy figures from the nuclear industry, such as Project Director of Rooppur Nuclear Power Plant, Chairman of Bangladesh Atomic Energy Commission, Director of Center for Research Reactor, also graced the event. Beyond its celebratory nature, the fair served a vital purpose - demonstrating the diverse spectrum of research endeavors within the Department of Nuclear Engineering and fostering collaborations between academia and industry within the country.

Nuclear Reactor Simulation Facilities

Various research activities in nuclear engineering fields are conducted by the faculties and students in undergraduate and graduate studies. The major research area covers reactor statics, kinetics & dynamics; thermal hydraulics; computational fluid mechanics; nuclear safety and security; radiation detection, and shielding; radioactive waste management; nuclear analytical techniques; nuclear medicine; fusion and plasma etc. As the experimental works regarding this field are very expensive and restricted in the current situation, the students as well as the faculties presently are emphasizing on computation, modelling and simulation. A few tools for such activities are being used nowadays. For neutronic analysis, the department has personal license of the latest version of Monte Carlo N-Particle MCNP6.2 for five years and the official permission of Japanese simulation code SRAC-2006, developed by Japanese Atomic Energy Agency (JAEA). Students also use open-source version of Monte Carlo Code, OpenMC, developed by Massachusetts Institute of Technology (MIT). For thermal hydraulic analysis, this department has a license for ANSYS-FLUENT software. The Department of Nuclear Engineering has number of high configuration computers for both faculties and students to run these softwares. Students also use various programming tools for solving neutron transport equations.

Department of Robotics and Mechatronics Engineering (RME) of the University of Dhaka is involved in organizing the national level Olympiad named as **Bangladesh Robot Olympiad (BDRO).** The participants selected from this competition have been successful in international contests like the International Robot Olympiad (IRO). Winning multiple gold, silver, and bronze awards is a significant achievement and reflects the talent and dedication of the participants and the support they receive from RME. These competitions not only provide a platform for students to showcase their skills but also foster an interest in robotics, STEM fields, and problem-solving among young people.

The 6th Bangladesh Robot Olympiad held in TSC, University of Dhaka



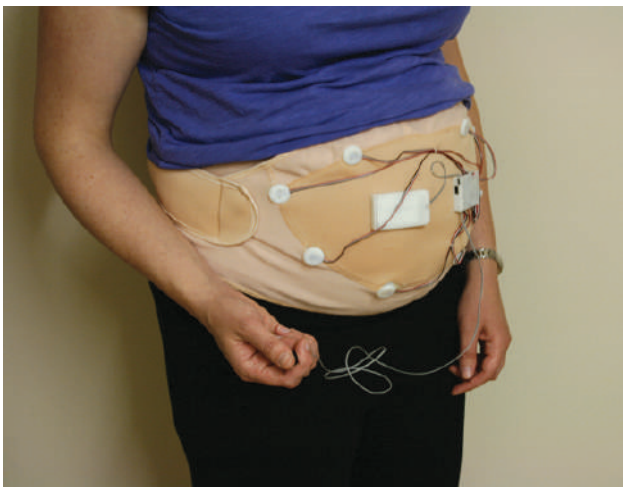
Design of the system and the developed prototype

Professor Dr. Lafifa Jamal of the Department of Robotics and Mechatronics Engineering, University of Dhaka, has submitted a patent application, which has been accepted by the Department of Patents, Designs and Trademarks (DPDT) of the Ministry of Industries of Bangladesh. Dr. SM Jahangir Alam and Dr. Rakibul Haque are the other co-inventors, and the patent application number is 1006649. The invention is related to the automated Saline Flow Stoppage Device where saline and other medicines are pushed directly into the veins of the patients.

Dr. Sejuti Rahman, an Associate Professor in the Department of Robotics and Mechatronics Engineering received an International Research Grant on AI-Project named as "Ma (Mother) Mental Health: Artificial Intelligence-Enabled Detection of Perinatal Depression". The project aims to develop an Artificial Intelligence (AI)-based tool for the early identification of perinatal depression, improving accessibility and scalability in regions with limited mental health resources. The project's head is Dr. Sejuti Rahman and the National Institute of Mental Health, the Obstetrical and Gynaecological Society of Bangladesh (OGSB), and Eminence Associates for Social Development are working together on this initiative. Funding for the research is provided by the Canadian International Development Research Centre (IDRC).

Dr. Sejuti Rahman at the workshop held in Colombo, Srilanka

Dr. Abhishek Kumar Ghosh, an Assistant Professor of the Department of Robotics and Mechatronics Engineering has established a new research lab named Mechatronics and Artificial Intelligence in Medicine (MAIM) (maimlab.com). This lab aims to combine mechatronics design with the power of artificial intelligence to create scalable healthcare solutions. Current research activities of this lab are funded by an international research grant from the Wellcome Leap organization under their In Utero program (https://wellcomeleap.org/inutero/). This research grant was awarded to Dr. Ghosh in collaboration with Imperial College London, UK, and University College Dublin, Ireland to develop a novel wearable device for detecting and characterizing movements of babies in a womb. The proof of concept of this unique wearable device originated from Abhishek's PhD research at Imperial College London, UK.



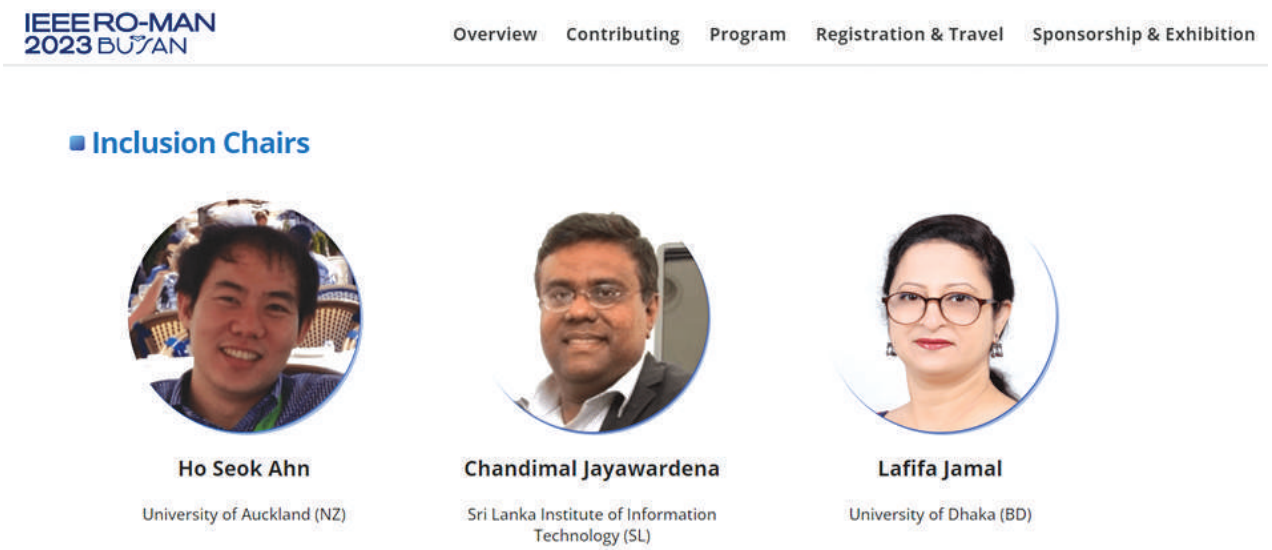
An initial prototype of the wearable fetal movement monitor (Photo Credit: Biomechatronics Lab, Imperial College, London)

MAIM lab members with Prof. Ravi Vaidyanathan from Imperial College London, UK (Photo Credit: MAIM Lab, University of Dhaka)

Congratulations to **Dr. Sejuti Rahman** for securing the prestigious 2nd position at the University of Dhaka Research and Publication Fair 2022 with her research project titled "IHABOT: Intelligent Hospital Assistance Robot to Fight Contagion by Reducing Doctor-Patient Interaction." This achievement is a testament to Dr. Rahman's dedication and the significance of the research in the field of healthcare and robotics.

Additionally, Dr. Sejuti Rahman Received the IEEE Computational Intelligence Society Grant for the paper titled "GEMM: A Graph Embedded Model for Memorability Prediction," presented at International Joint Conference on Neural Networks (IJCNN) Gold Coast, Australia: 2023.

It's great to mention **Professor Dr. Lafifa Jamal's** involvement in the two international conferences. Serving as the Chair of the 32nd IEEE International Conference on Robot and Human Interactive Communication (RO-MAN 2023) in Busan, Korea, and as the Workshop Co-Chair for the 46th International Conference on Software Engineering (ICSE 2024) that will be held in Lisbon, Portugal, indicates her significant contributions and leadership in the fields of robotics and software engineering.



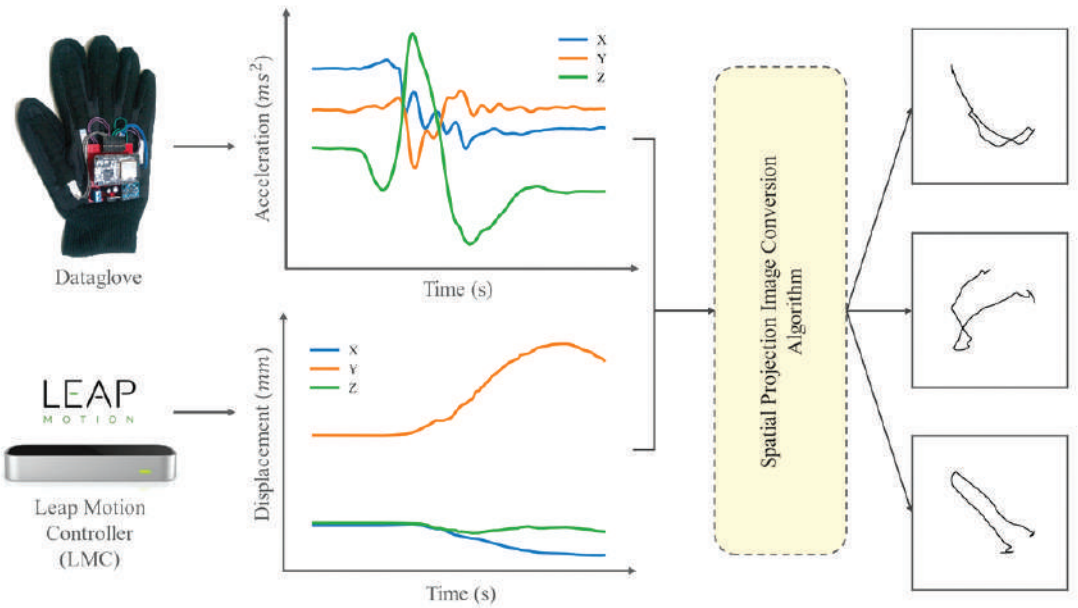
These roles typically involve organizing and overseeing various aspects of the conferences, such as program planning, reviewing submissions, and ensuring the smooth execution of the events.

RESEARCH PROJECT HIGHLIGHTS

Automatic Detection of Bangla Sign Language Detection

A paradigm shift in sign language recognition

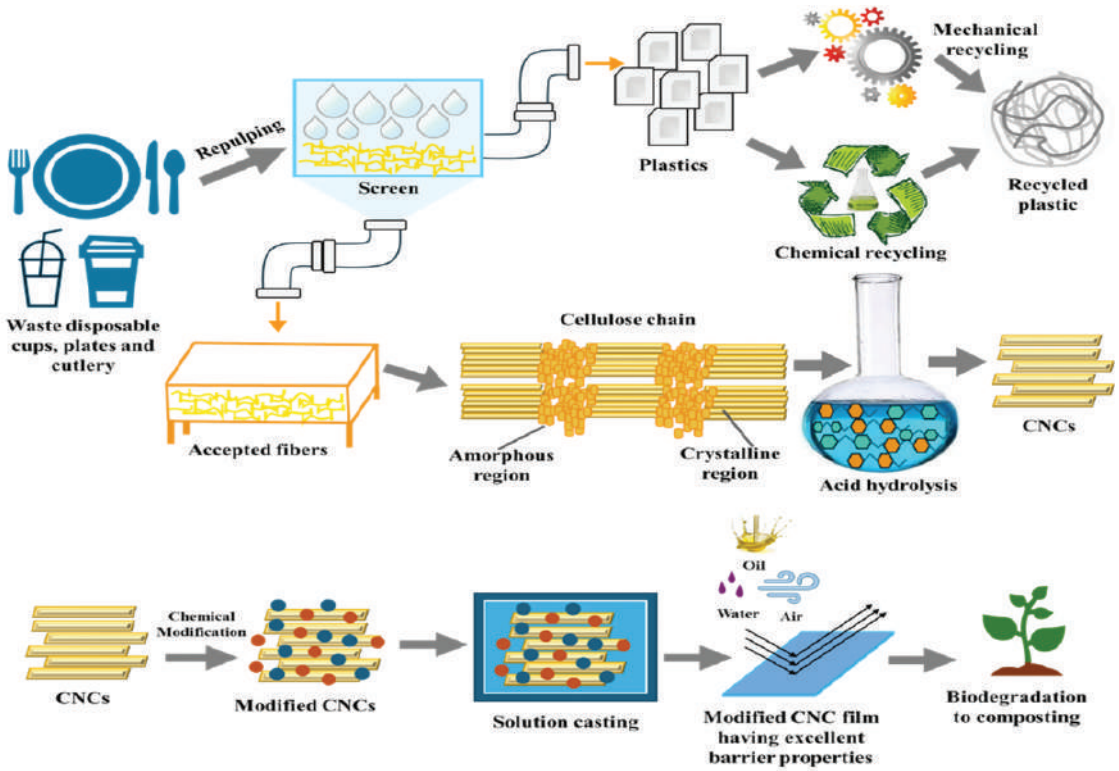
Dr. Mosabber Uddin Ahmed, Professor of the department of Electrical and Electronic Engineering (EEE), University of Dhaka and Professor Dr. Md. Habibur Rahman of the same department received more than half a million taka from the Dhaka University Centennial Research Grant (CRG) to engineer **"Automatic Recognition of Bangla Sign Language (BdSL)".** This one-year (2021-2022) project of 5,93,900 BDT was successfully completed to explore different Sign Language Recognition (SLR) modalities.



Sign Language Recognition (SLR) is one of the most widely explored areas under the Human-Computer Interaction (HCI) domain. Although various modalities and techniques of SLR have been developed over the years, this remains an active domain of research due to the challenges associated with it. One of the hardest challenges of developing a robust dynamic SLR system is to mitigate the effects of spatial and temporal variabilities among different subjects. In this work, we explored two different SLR modalities and proposed a novel algorithm called ProjectionNet that can reduce the inter-subject variability of the dynamic gestures by utilizing Spatial Projection Images of the hand movement. The algorithm was developed to be a universal approach that can be implemented across many different SLR modalities. In this work, the effectiveness of the algorithm has been tested on a custom-made Sensor-Dataglove, the Leap Motion Controller (LMC) device, and on video data. A novel data augmentation technique called Polyfit Augmentation has also been proposed in this work that can augment Spatial Projection Images and hence prevent overfitting of the learning algorithm. We have performed several experiments in this work including static and dynamic Bangla Sign Language (BdSL) recognition and dynamic American Sign Language (ASL) recognition. The proposed approach performed well in all our experiments and outperformed other traditional sign language recognition algorithms. We believe that the proposed approach can lead to a generalized solution of hand gesture recognition for other computer vision and sensor-based systems.

A New Frontier to Circular Economy

Food packaging, being an essential component of the food security and food value chain, is expected to grow over the next several years to address the key challenges of sustainable food consumption and has been considered as an added value for a waste reduction rather than an additional economic and environmental cost. Last year, almost 950 million tons of food and food products were wasted, the majority of which was contributed from the households followed by restaurants, other food services and retails. Moreover, the use of single plastics for food and beverage packaging has contributed to almost 50% of the waste plastics and is a severe threat to the environment as only less than 10% of those can be recycled, and the rest are discarded in landfills or incinerated, or accumulating as litter.

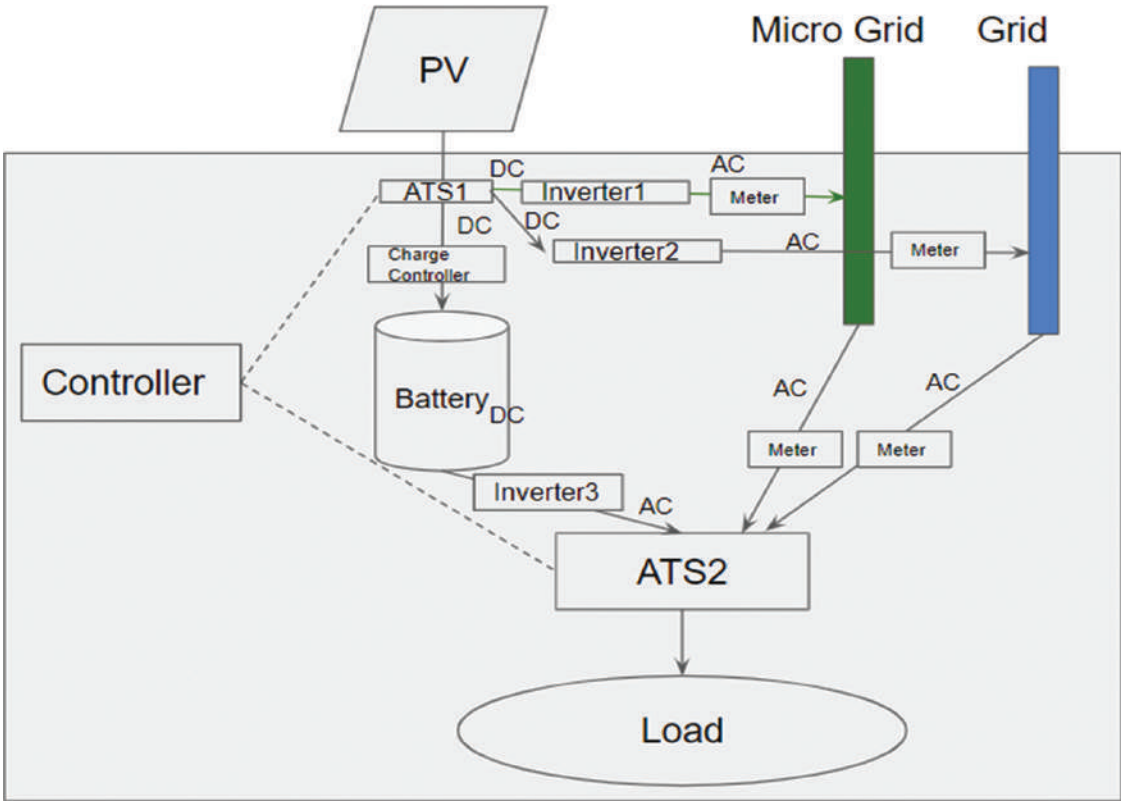


Dr. Khandoker Samaher Salem and Dr. Mohammad Shahruzzaman, Associate Professors of the department of Applied Chemistry and Chemical Engineering (ACCE), University of Dhaka proposed a two-year project on **"Production of nanocellulose from municipal solid cellulosic waste and evaluation of its barrier properties for sustainable food packaging"** to come up with a sustainable solution involving circular economy to mitigate the plastic pollution. The project received BDT 9,45,000/= from the Bangladesh Bureau of Educational Information & Statistics (BANBEIS), Ministry of Education, Govt. of Bangladesh and is expected to be completed by 2024. The aim of the project is to develop a biodegradable film which can be used for food packaging to expand the shelf life of the food and food products. Cellulose rich waste disposal paper cups, plates and cutlery will be collected from different sources and recycled to produce nanocellulose by depolymerization. Then films from the chemically modified nanocellulose will be fabricated and tested for mechanical strength, and different barrier properties. The effect of the film on the food shelf life and their extent of biodegradability will also be evaluated. The sample showing better barrier properties will be used as packaging materials for various food products to evaluate its efficacy as a food packaging material.

Efficient Energy Distribution and Consumption Using Multi-Agent Deep Reinforcement Learning

In the pursuit of sustainability and energy efficiency, Professor Dr. Md Mamun-or-Rashid and Associate Professor, Dr. Md. Mosaddek Khan of the department of Computer Science and Engineering (CSE), University of Dhaka are working on a cutting-edge project: **"Applying Multi-Agent Deep Reinforcement Learning (MADRL) for Energy Sharing in Zero Energy Communities".** This one and half year project received eight hundred thousand (8,00,000) taka and is funded by Innovation Funds, ICT Division of Bangladesh Government.

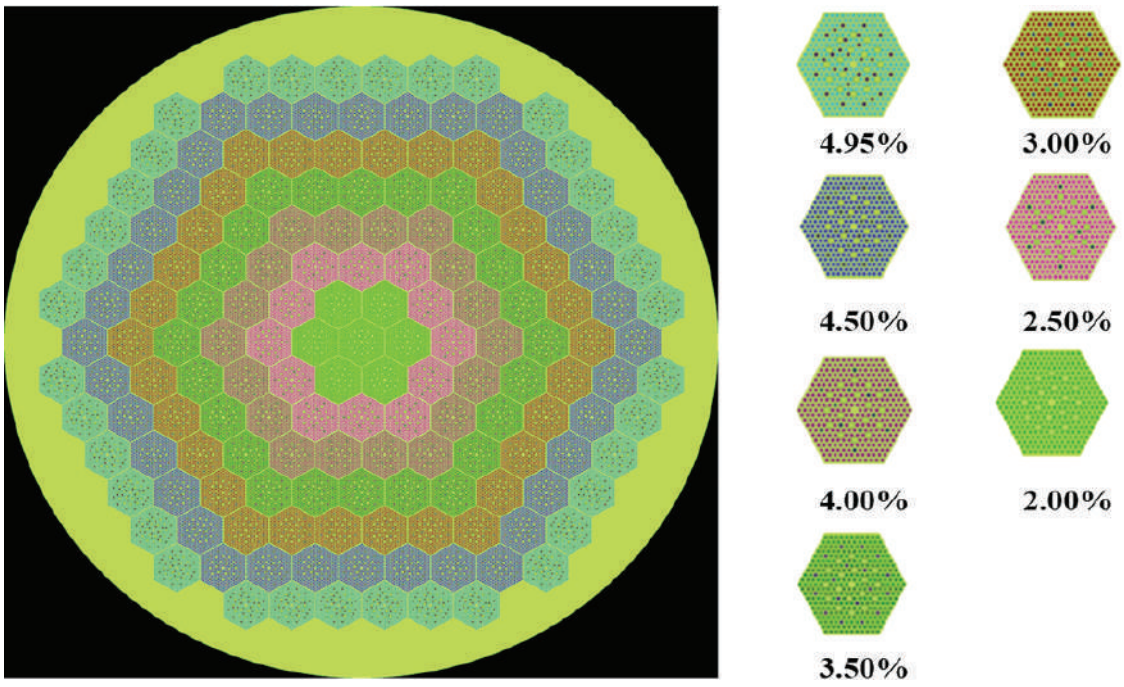
The primary objective is to develop an intelligent, adaptive system that enables efficient energy distribution and consumption among community members, reducing reliance on external energy sources. The methodology involves the creation of a simulated ZEC environment where multiple agents, representing individual households or buildings, interact. Each agent uses deep reinforcement learning algorithms to learn optimal energy usage and sharing strategies based on real-time data, such as energy demand, supply, and storage capacity. The expected outcomes include a significant reduction in energy costs and carbon footprint for the community, enhanced energy security, and a scalable model that can be adapted to different ZEC configurations. The significance of this research lies in its potential to revolutionize energy management in ZECs. By leveraging the power of MADRL, the project anticipates demonstrating a sustainable, efficient, and economically viable model for energy sharing, paving the way for more resilient and self-sufficient communities.



FoET to Analyze Nuclear Spent Fuel Produced in Rooppur Nuclear Power Plant

To attain the high electricity demand, Prime Minister Sheikh Hasina has expressed a firm commitment to build a Nuclear Power plant at Rooppur and in May 2010, an intergovernmental agreement was signed with Russia's State Atomic Energy Corporation (ROSATOM) for VVER-1200 modeled Reactor. Initially, ROSATOM will help us to operate Rooppur Nuclear Power Plant (RNPP) but after the handover, the local scientists and engineer will maintain and manage the reactor by themsleves. In that pursuit, a three-year collaborative project on **"Analysis of Nuclear Spent Fuel of VVER-1200 Reactor (Rooppur Model) and Radiotoxicity Hazard Calculation: from Spent Fuel Pool to Permanent Disposal"** is in progress which is led by Dr. Afroza Shelly, Professor of the department of Nuclear Engineering (NE), University of Dhaka and department of Applied Chemistry and Chemical Engineering (ACCE), University of Dhaka. The project received almost 2 million taka (BDT 19,00,000/=) from the Bangladesh Bureau of Educational Information & Statistics (BANBEIS), Ministry of Education, Govt. of Bangladesh.

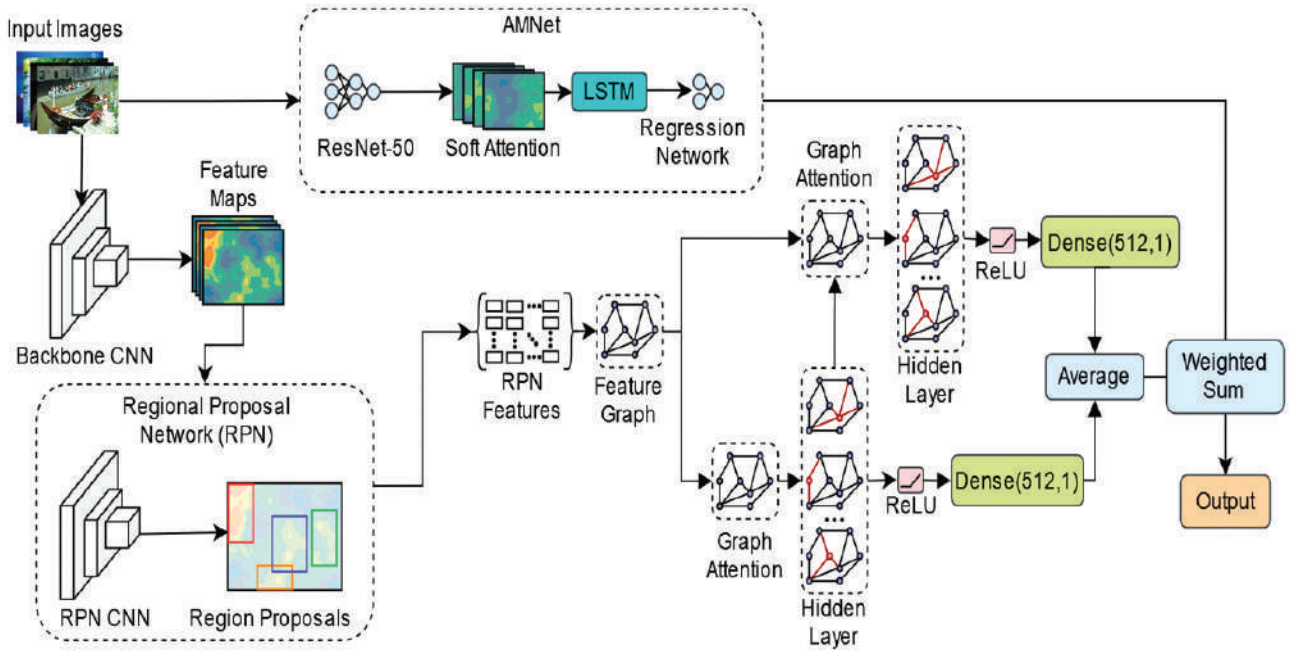
The work is to maintain and expand our reactor properly for the future and improve and understand the reactor in the aspects of burnup characteristics, thermal-hydraulics, and quality of spent fuel. Although Russia has confirmed to take back the spent nuclear fuel of RNPP, but Bangladesh must store these in the spent fuel pool for at least 5-10 years for safe packaging and transportation as these emit a significant amount of heat initially due to the activity of the short-lived radionuclide. The proposed research will provide an idea about the quality, quantity, and radiotoxicity of SNF of our upcoming Rooppur Nuclear Power Plant. Figure shows the core of VVER-1200 reactor with different enriched assembly with appropriate number of integrated burnable absorber rods which is optimized for the study of spent fuel. The calculated results are to be presented to display the radiotoxicity of the SNF nuclides in the pool period and the disposal period up to 10^7 years categorized by their half-lives.



New Technology to Diagnose Neurodegenerative Diseases Achieves the State-of-the-Art Performance

Dr. Sejuti Rahman, Associate Professor of the Department of Robotics and Mechatronics Engineering (RME), University of Dhaka and Dr. Md Mehedi Hasan, Assistant Professor of the same department received four hundred thousand (BDT 4,00,000/=) taka from the Ministry of Science and Technology, Bangladesh to develop **"Deep Learning-Driven Automated Diagnosis of Neurodegenerative Diseases Using Image Memorability".** This one-year (2022-2023) project was successfully completed to predict human memorability - a person's ability to remember previously seen images or objects.

This work investigated Graph Convolutional Networks (GCNs) and Graph Attention Networks (GATs) to approach the problem. The object-centric features within the images are extracted using deep CNN-based models, which contain the structural information of the image. A generic baseline model is created and improved upon iteratively through structural data by constructing graphs and attention mechanisms on the graph edge connections. The constructed graph nodes represent the objects within the image, and the edge connections between the nodes represent the spatial relation to the objects. These graph embeddings are used to train our proposed Graph Embedded Memorability Model (GEMM), which shows significant improvements from the baseline as the attention improves the edge connections of the graph nodes. The model is then evaluated on the LaMem, SUN memorability, and FIGRIM datasets. Although existing state-of-the-art models perform well on one or two datasets, the proposed model generalizes over all three datasets with a Spearman's rank correlation of 0.71 on LaMem, 0.69 on SUN memorability, and 0.59 on the FIGRIM dataset. This model achieves a new state-of-the-art performance compared to the existing literature.



STUDENT ACHIEVEMENTS AND AWARDS

The Faculty of Engineering and Technology at the University of Dhaka takes immense pride in presenting the achievements and awards of our diligent students. In the following, we highlight the exceptional accomplishments that our students have garnered in various fields, showcasing their dedication, skill, and innovative spirit. These accolades not only honor individual successes but also reflect the faculty's commitment to fostering excellence and inspiring future generations.

Winner of Seeds for the Future

Arpan Saha and Mohammad Ajmain Fatin from the department of EEE, University of Dhaka won the "Seeds for the Future" competition organized by Huawei and had the opportunity to visit China recently. They visited Huawei's world-class R&D centres and headquarters, took part in technology and cultural exchange programs, and experienced both traditional and modern China throughout this 10-day excursion. They visited two of the most popular cities of China, one of which is Shenzhen, often referred to as the Silicon Valley of Asia. The other city was Shanghai, the business capital of the country. Huawei enabled them not only to learn about state-of-the-art technology on 5G, AI and Digital power but also experience one of the most culturally rich places in the world.

IEEE Regional Exemplary Student Branch Award 2022

In a moment of pride and recognition, the IEEE Student Branch at the University of Dhaka achieved the prestigious IEEE Regional Exemplary Student Branch Award in 2022. Bestowed by the IEEE MGA Student Activities Committee, this esteemed accolade was granted on the **8th of October 2022.** The award is a testament to the exceptional operations of the IEEE Student Branch, signifying public acknowledgment for their outstanding activities and contributions. The University of Dhaka's IEEE Student Branch stands as a proud winner, demonstrating excellence and setting a benchmark for exemplary performance in the realm of student branches.


IEEE

IEEE Regional Exemplary Student Branch Award 2022

Presented to

University of Dhaka

Bangladesh Section, R10

For exemplary performance as an active IEEE Student Branch offering technical programs, activities, professional networking opportunities that enable members in building critical skills.

8th October, 2022

K. J. Ray Liu
IEEE President 2022

Women in Engineering (WIE) Outstanding Student Branch Affinity Group 2022

Highlighting dedication to advancing women in engineering, the IEEE Women In Engineering (WIE) Affinity Group at the University of Dhaka's IEEE Student Branch received the "WIE Outstanding Student Branch Affinity Group 2022" award. Conferred by the IEEE Bangladesh Section on March 18, 2023, this award acknowledges the group's exceptional contributions throughout the year, reinforcing their commitment to diversity, inclusion, and excellence in the field of engineering.

IEEE EDS Chapter Subsidy Program 2021 (Awarded in April 2022)

The IEEE Electron Devices Society (EDS) recognized the efforts of the IEEE EDS Student Branch Chapter at the University of Dhaka through the IEEE EDS Chapter Subsidy Program 2021. Awarded on **April 12, 2022,** the chapter was granted $1000 under the subsidy program. This financial support acknowledges the chapter's role in fostering a common platform for graduate and undergraduate students, researchers, and engineers to engage and stay updated on the latest developments in electron devices. The University of Dhaka's IEEE EDS Student Branch Chapter continues to serve as a dynamic hub for knowledge exchange and professional development.

IEEE HTB/SIGHT Fund for Proposals Focused on Pressing Community Needs 2023 (Awarded on July 2023)

The IEEE SIGHT Student Branch at the University of Dhaka achieved a notable milestone by securing funding from the 2023 IEEE HTB/SIGHT Projects Call. Their project "Archer: A Cost-effective Computer System (23-HTB-115)" was awarded $2650 by The IEEE Humanitarian Technologies Best Practices and Projects Committee on July 18, 2023. Composed of Executive Members from IEEE SIGHT SB DU and volunteers from the Department of Electrical and Electronic Engineering, the Archer Team plans to provide 10 orange-pie based computers to a school in Netrokona, Bangladesh, enabling students to learn skills like photo editing and programming.

IEEE Electron Devices Society Undergraduate Student Fellowship 2023

Yeasin Arafat Pritom, a senior in the Department of Electrical and Electronic Engineering (EEE) at the University of Dhaka, has been the Chair of the IEEE EDS Student Branch Chapter, University of Dhaka since January 2023. He received the prestigious IEEE Electron Devices Society Undergraduate Student Fellowship 2023 in region 10, on **November 3, 2023,** recognizing his outstanding academic achievements and commitment to advanced studies in electron devices. This fellowship includes a plaque and a $1,000.00 USD check to support undergraduate-level study and hands-on experience in the EDS field. Yeasin's research on nanoelectronics and nanophotonic devices, resulted in his first publication in the prestigious Nanoscale Advances journal in 2023.

ACS Student Chapter at the University of Dhaka won the Student Chapter Award for 2022-2023 academic year.

We are absolutely thrilled to share that the ACS Student Chapter at the University of Dhaka has received the prestigious Outstanding Student Chapter Award for the year 2022-2023. The Society Committee on Education (SOCED) selects ACS Student Chapters to receive special recognition based on their programs and activities, as described in their chapter reports. This achievement is a testament to the hard work, dedication, and unwavering motivation which help the incredible to march through the challenges. The following message from the Chair of the ACS Committee on International Activities (IAC) sums up the impression created by ACS Student chapter, DU.

Dear University of Dhaka,

Congratulations on achieving an Outstanding Student Chapter Award for the 2022-2023 Academic Year! To help you in the future, please read the feedback from the reviewers:

Congratulations on an excellent and productive year. Your events all look like they were a great success, especially the Chem Festivals. Both events sounded like everyone who participated as volunteers and as patrons had a good time and had many opportunities to gain knowledge. The Chem shows you also organized also sounded like great outreach activities to children. It is great that you took safety precautions very seriously. These were all wonderful outreach events for younger audiences and gave them an opportunity to reach the resources they wouldn't normally have access to. You also hosted a variety of seminars, speakers, and workshops for professional development, which is great. It is also good to see that there was also an event on CV's and undergraduate research. As for chapter development, you seem to be very organized and by different teams and hosting bimonthly meetings. It is great to see member retention and using social media seems to be working well for you. Continue your great job promoting chemical science in your country!

As the co-advisor of the chapter, Dr. Khandoker Samaher Salem hopes that this honor would not only motivate the student chapter to continue its efforts but also reinforce the commitment to excellence in all its future endeavors. He also said – "We extend our heartfelt gratitude to everyone who has been a part of our extraordinary journey. Together, we look forward to reaching even greater heights and making a lasting impact. Thank you for being a part of our success story!"

University of Dhaka in OPTICA Student Leadership Conference

On October 2023, Nafisa Amin Hridi, current president of OPTICA student chapter University of Dhaka and a senior in the department of EEE, attended the OPTICA **Student Leadership Conference,** held jointly with Frontiers in Optics in Seattle, Washington, USA. She was the first Bangladeshi undergraduate student to make it to this event, representing a Bangladeshi Student Chapter for the first time ever as well. OPTICA Student Leadership Conference is a special travel grant awarded to 100 Optica student members every year from all around the world. These attendees are selected through a rigorous application process, coming from students pursuing Undergraduate, Master's, or Ph.D. OPTICA covers their round-trip airfare, accommodation, and meals during the events.

ACSDU Leaders at the Asia-Pacific Leadership Summit: Fostering Global Chemistry Connections

Mahfuz Ahammed Swadhen and Saiful Islam, two student leaders from the American Chemical Society Student Chapter at the University of Dhaka (ACSDU), along with their faculty co-advisor Dr. Mohammad Shahruzzaman, participated in the Asia-Pacific Leadership Summit-Kuala Lumpur 2023. Organized by the American Chemical Society (ACS) Malaysia Chapter, the summit took place from March 9 to 12 in Kuala Lumpur, Malaysia. This gathering of student leaders from various countries facilitated the exchange of experiences, challenges, and best practices in leading student chapters and event management. The summit's agenda included workshops, panel discussions, networking opportunities, and cultural tours. Mahfuz, President of the Executive Committee for 2021-2022, and Saiful, President for 2022-2023, represented ACSDU, which is committed to enhancing chemistry knowledge and research opportunities for students. Dr. Shahruzzaman, an Associate Professor in the Department of Applied Chemistry and Chemical Engineering at the University of Dhaka and ACSDU's faculty co-advisor, participated as a mentor. This event offered Mahfuz and Saiful invaluable insights from diverse student leaders and faculty, equipping them with new ideas and inspiration to enhance their roles in ACSDU and beyond.

Champion in ICMEC 2022 Poster Competition

Shahriar Atik Fahim, a student from the 34th batch of the Department of Applied Chemistry and Chemical Engineering (ACCE) at the University of Dhaka, was awarded first prize in the poster competition category at the International Conclave on Materials, Energy & Climate. This event took place on December 20, 2022, at the Nabab Nawab Ali Chowdhury Senate Bhaban of University of Dhaka. The ACCE department hosted the conference in celebration of its Golden Jubilee. Fahim's presentation, titled "Synthesis and characterization of B–Sn/TiO2 nanoparticles for the photocatalysis of metronidazole under natural sunlight", garnered significant attention. Barrister Mohibul Hasan Chowdhury, the Deputy Minister of Education, Government of the People's Republic of Bangladesh, presented the awards to the winners.

A Prestigious Honor: ACCE Students Win Mitsubishi UFJ Foundation Scholarship

Kazi Imtiaz Ahmed Nakib and Raamisa Anjum, 4th year students of Applied Chemistry and Chemical Engineering, received the esteemed Mitsubishi UFJ Foundation Scholarship for the year 2022 and 2023, respectively. The Mitsubishi UFJ Foundation Scholarship is a highly competitive and coveted award granted annually to outstanding students who demonstrate exceptional academic merit, leadership qualities, and a commitment to community service. Established in November 1953, by sole endowments of the former Mitsubishi Trust and Banking Corporation (currently: Mitsubishi UFJ Trust and Banking Corporation), it continues its activities of grant programs for scholarship through nominated universities in Japan and around the globe. The scholarship program aims to foster future leaders and innovators by providing financial support and mentorship opportunities. The Scholarship had been offered to the University of Dhaka to the students according to their academic activity along with their merit and leadership excellence.

ICPC 2023 CHAMPION

November 4, 2023, marks another remarkable achievement for the University of Dhaka at the ICPC Asia Dhaka Regional Contest 2023. Demonstrating their dominance in the competition, the university has clinched its fourth consecutive regional championship. The winning team, DU_Ascending_, comprising Jubayer Rahman, Ayon Shahrier from the CSEDU 24th batch, and Nayeemul Islam Swad from the CSEDU 25th batch, has not only won the regional contest but also secured a place in the ICPC World Finals. Another commendable performance was by team DU_Tennessine, which includes Md. Ibrahim Khandakar of the CSEDU 24th batch, alongside Mohidul Haque Mridul and Sakib Hassan from the CSEDU 25th batch, who achieved a respectable 4th place in the competition. Further showcasing the university's depth of talent, other teams achieved notable positions at 13th, 17th, 19th, 35th, and 42nd. This string of successes underscores the CSEDU's excellence in nurturing skilled programmers and their commitment to excellence in computer science education.

ICPC 2022 CHAMPION

On March 11, 2023, the University of Dhaka solidified its status as a powerhouse in programming competitions by clinching the ICPC Dhaka Regionals title for the third consecutive year. In the 2022 contest, the university's team DU_Kronos, consisting of Sakib Hassan from the 25th batch, Yeamin Kaiser, and Bholanath Das Niloy from the 26th batch, emerged as champions. Another impressive accomplishment came from team DU_NotReadyYet, which

secured the 1st Runner-up position. This team included Fahim Khandakar from the 24th batch, Mohidul Haque Mridul from the 25th batch, and Shakil Muhit from the 26th batch. These victories on March 11, 2023, underscore the University of Dhaka's continued excellence and leadership in the field of computer science and programming competitions.

CODE SAMURAI 2022 CHAMPION

In December 2023, the University of Dhaka again demonstrated its prowess in the realm of technology and programming by triumphing in Code Samurai 2022. This unique 24-hour contest, which brings together participants from various universities, challenges them to stay on-site and solve industry-level programming and software development problems. The team DU_Mountain DU, comprised of Jubayer Rahman, Raheeb Hasan, and Rahat Hossain from the CSEDU 24th batch, showcased exceptional skill and endurance by winning the championship for the second consecutive year. Their victory in Code Samurai, known for its rigorous blend of problem-solving and software development under time pressure, highlights the University of Dhaka's enduring excellence in these fields. Additionally, the achievement of another team from the CSEDU 24th batch, securing the 4th position in this intense and multifaceted inter-university hackathon, further underscores the university's depth of talent and commitment to excellence.

Jubayer Rahman Nirjhor: A Journey of Excellence in Competitive Programming

Jubayer Rahman Nirjhor, a prodigious talent from the Department of Computer Science and Engineering at the University of Dhaka (Session 2018-2019), has carved a niche for himself in the world of competitive programming. As a three-time world finalist in the International Collegiate Programming Contest (ICPC), he has not only brought laurels to his university but also set a benchmark for aspiring programmers worldwide.

Nirjhor's journey, originating from the humble town of Brahmanbaria, is a tale of passion and perseverance. His fascination with mathematics, evident from an early age, saw him constantly challenging himself with complex mathematical problems beyond his grade level. This zeal led him to the top 16 in the Bangladesh Mathematics Olympiad during his final year of high school. He also clinched victory in the Creative Talent Search Competition, a prestigious contest organized by the Bangladesh government. The world of competitive programming beckoned Nirjhor in the tenth grade, a year after he first accessed the internet. The intriguing blend of mathematics and programming spurred him to explore the C programming language, setting the stage for his future triumphs. During his tenure at Notre Dame College, Nirjhor delved deeper into algorithms and problem-solving. His skills and

dedication bore fruit when he represented Bangladesh at the International Olympiad in Informatics in Russia (2016) and Iran (2017), clinching a bronze medal in the latter.

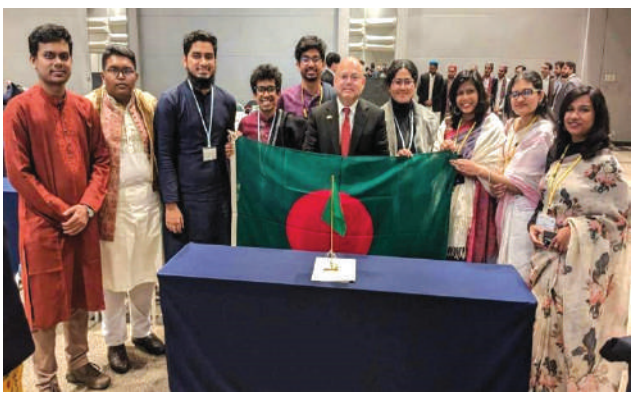
Nirjhor's admission to CSEDU marked the beginning of a new chapter. The university's vibrant culture of programming contests, coupled with training sessions and guidance from faculty members and experienced seniors, catalyzed his growth. He quickly made a mark by winning the Inter-Department Battle of Brains, a National Inter-University Programming Contest, and becoming the first-ever Grandmaster from CSEDU in Codeforces in 2019.

The year 2020 was a watershed moment for Nirjhor. His team, DU_Swampfire, not only qualified for the World Finals at the Asia West Continent Finals of the ICPC in India but also won the National Collegiate Programming Contest. His individual achievements continued to soar as he won the BRACU Traction Inter-University Individual Programming Contest and made significant strides in the Google Code Jam and Facebook Hacker Cup, ranking first in Bangladesh. In 2021, Nirjhor's team won the Gold Medal in the Iranian Combinatorics Olympiad and represented the University of Dhaka in the ICPC World Finals in Moscow, ranking 33rd worldwide. The following year, with team DU_NotStrongEnough, he continued his winning streak in multiple IUPCs and the International Mathematics Competition for Undergraduates. He also shone as a coach at the ICPC 2021 World Finals in Dhaka, ranking 7th among coaches globally. 2022 saw Nirjhor winning the Code Samurai Hackathon and the ICPC Asia West Continent Finals. In 2023, his achievements continued with victories in the Cefalo SUST Inter-University Programming Contest and the SRBD Code Contest organized by Samsung. His recent win with team DU_Ascending in the ICPC 2023 Regionals in Dhaka adds to his impressive portfolio.

Nirjhor, who graduated in 2022, is now pursuing his Master of Science in the department. His journey, punctuated by hard work and a relentless pursuit of excellence, is a source of inspiration. As he prepares to represent the University of Dhaka in upcoming ICPC World Finals in Egypt and Kazakhstan, his vision extends beyond personal achievements.

Spearheading Educational Innovation and International Engagement

As a dedicated student at the University of Dhaka's Faculty of Engineering and Technology, Mridula has made significant strides in the field of education and international engagement. She is proud to be a co-founder of Edvive, a pioneering startup focused on language learning solutions for students, which contributes to their global mobility.



Additionally, she had the honor of representing Bangladesh in the JENESYS SAARC BATCH 2022: ENERGY program, organized by JENESYS and the Japan Ministry of Foreign

Affairs. Here, she actively participated in cultural exchanges and discussions on sustainable energy production, sharing insights about our country's situation. These achievements reflect her commitment to education, innovation, and cross-cultural collaboration, making her a valuable asset to both her university and the global community.

Online Nuclear Dilemma 6: Champion

Team 'Poisoned_Pawn', composed of Rabeya Akter Joti, Galiv Hasan Anwoy, and Nargis Pasha from the Nuclear Engineering Department of the University of Dhaka, emerged as champions in the "Online Nuclear Dilemma 6" contest. This event, held from April 26 to May 1, 2023, at the Information Center on Nuclear Energy within the Bangabandhu Sheikh Mujibur Rahman Novo Theatre in Dhaka, focused on decision-making challenges in the nuclear industry. The team's success is a testament to their strong problem-solving skills and deep understanding of nuclear engineering concepts. Their achievement in this contest highlights the quality of education at the University of Dhaka and positions them as promising contributors to the field of nuclear engineering.

Success in Extracurricular Activities

The teams from the Nuclear Engineering Department at the University of Dhaka, led by Galiv Hasan Anwoy and his teammates, has exhibited exceptional prowess in both chess and carrom competitions in 2023. They first achieved remarkable success by winning the championship in the Chess category of the Inter-University Chess and Carrom Championship, which was held from June 12 to 14. Later in the year, the team continued their impressive performance in the Inter University Chess Championship, organized by the Bangladesh Chess Federation and Sports Bangla. Here, competing under the name 'Castle Crushers,' they secured the 2nd runner-up position in the chess competition, held from September 14 to 17. The event concluded with a prize-giving ceremony on September 18. Participating in a Swiss League system and contending against twelve teams from seven universities, the University of Dhaka's team from the Nuclear Engineering Department demonstrated strategic excellence and versatility, marking significant achievements in these extracurricular activities.

Advancing in Nuclear Security at ICTP-IAEA School

Rahnuma Aziz Nisa from the Department of Nuclear Engineering has marked a significant milestone in her career with her participation in the Joint ICTP-IAEA International School on Nuclear Security. Held from March 6 to 17, 2023, in Trieste, Italy, this event provided her with an invaluable opportunity to engage with global experts in the field. Through this platform, Rahnuma not only deepened her understanding of nuclear security issues but also established vital international connections, positioning herself as a knowledgeable and connected professional in this critical domain. Her achievements at this event shine brightly, highlighting her commitment to advancing in her field.

CHAMPION of NASA Space Apps Challenge 2022

In October 2023, Team_Icarus distinguished themselves as Champions at the NASA International Space Apps Challenge 2022, a testament to their innovative abilities and teamwork. This prestigious event brings together diverse talents from across the globe, including coders, scientists, designers, and innovators, to develop solutions using NASA's open data for Earth and space challenges. Among the six adept members of Team_Icarus, Saadman Sakib and Md. Arban Hossain from the 5th Batch of the Department of Robotics and Mechatronics Engineering (RME) at the University of Dhaka, played pivotal roles. Their expertise and contributions were significant in the team's overall success. The collaboration with members outside the University of Dhaka added a valuable dimension of diversity and cross-institutional partnership, further enriching the team's experience and perspective. This accomplishment not only highlights the individual talents but also emphasizes the strength of collaborative efforts in achieving remarkable feats.

Mindsparks 2019: First Runner-up

In a remarkable display of technical prowess and innovation, a team from the Department of Robotics and Mechatronics Engineering (RME) at the University of Dhaka achieved the 1st Runner-up position at Mindsparks 2019, held in January of that year. This event marked the first-ever Inter-University and College tech/business competition organized by the AUST Innovation and Design Club in collaboration with IIT Roorkee, India. It brought together participants from diverse departments in the fields of Engineering and Business from Ahsanullah University of Science and Technology. The team, comprising Niloy Irtisam, Raiyaan Abdullah, and Moniruzzaman Akash, showcased their exceptional skills in the Roborace competition, a segment that tested the limits of engineering creativity and efficiency. Their accomplishment not only highlighted the caliber of the RME department at the University of Dhaka but also underscored the importance of interdisciplinary collaboration in technological advancement and innovation.

CHAMPION of BUP Techsurgence 2019

The team from the Department of Robotics and Mechatronics Engineering (RME) at the University of Dhaka clinched the title of Champion at 'BUP Techsurgence 2019'. Organized by the Bangladesh University of Professionals (BUP) Robotics Club and its InfoTech Club, this event was a highlight of the year, taking place on the BUP campus on April 6 and 7, 2019. The inaugural ceremony, chaired by Telecom and ICT Minister Mustafa Jabbar on April 6, set the stage for a competition that drew widespread attention. The RME DU team excelled in one of the key segments of the competition, demonstrating their expertise and innovative capabilities. Their victory at BUP Techsurgence not only marked a moment of pride for the University of Dhaka but also underscored the growing talent and capabilities in the field of robotics and mechatronics engineering.

NSU Cybernauts National Programming Contest 2019: Champion (Project Showcasing)

The team from the Department of Robotics and Mechatronics Engineering (RME) at the University of Dhaka achieved notable success at the 'NSU Cybernauts National Programming Contest 2019'. This event, hosted by the NSU Computer & Engineering Club, took place on November 8-9, 2019, at the North South University campus in Dhaka. Comprising three students and a faculty coach from RME, the team excelled in the Project Showcasing category, earning the champion title. Additionally, they secured a commendable 24th place in the programming challenge, demonstrating a broad range of skills and technical acumen.

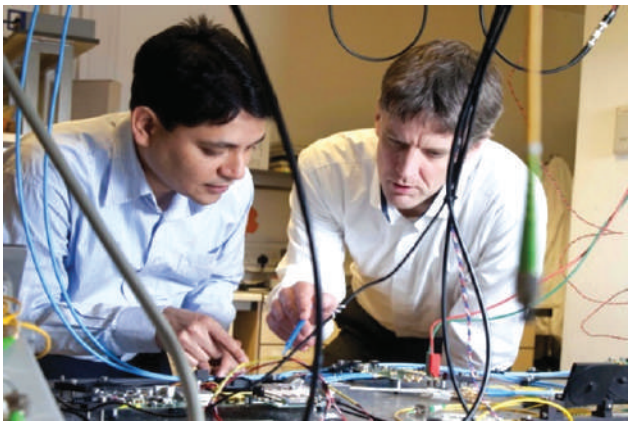
Digital Khichuri Challenge 2019: Runner-Up

The RME team from the University of Dhaka showcased their innovative spirit and commitment to creating a safer digital environment by securing the Runner-up position at the Digital Khichuri Challenge 2019. Held on December 11, 2019, at the BCC Auditorium, ICT Division, this competition aimed at engaging young Bangladeshi changemakers in developing solutions for a more secure and tolerant digital space. The team's achievement in this event highlights their ability to address contemporary challenges with effective and forward-thinking solutions.

ALUMNI SPOTLIGHT

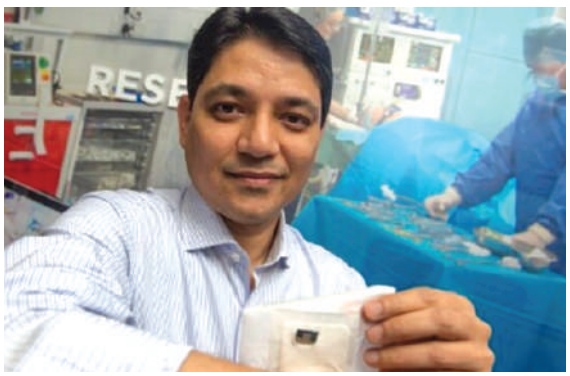
Dr. Kafil M. Razeeb

Dr. Kafil M. Razeeb (SMIEEE, CPhys), an alumni of the Department of Electrical and Electronic Engineering, is currently a Principal Scientist at Tyndall, Ireland, specialising in the development of novel materials for energy generation and storage. He is leading the Advanced Energy Materials group at Tyndall National Institute in University College Cork (UCC), Ireland.



Dr Razeeb's deep expertise empowers him to address global biomedical and environmental energy challenges. His significant deep-tech innovation, invention and impact in energy materials has led to cutting-edge research in this very specialised field. Dr Razeeb shares his path to Research Excellence.

"After completing my B.Sc. and Master's degrees in Applied Physics and Electronics (now Electrical and Electronic Engineering) from the University of Dhaka, I was offered a PhD position in the Department of Physics at the University of Limerick in 2000, where I investigated the magnetic properties of nanowire arrays. I completed my PhD in 2003 and joined what was formerly known as the National Microelectronic Research Centre (NMRC), and now Tyndall as a postdoctoral fellow. I received my first funding as a Principal Investigator (PI) in 2005 and commenced developing my core research activities in the application of nanostructured materials in the area of thermal management and thermoelectric, energy storage and sensors. At present, I am leading the Advanced Energy Materials group at Tyndall."



Dr Razeeb`s role as a PI at Tyndall and coordinator of several international EU projects has given him the opportunity to develop high efficiency thermoelectric materials on Si platform. Recently, he discovered enhanced thermoelectric properties of electrodeposited copper-doped tellurium and copper doped bismuth telluride films as an n-type thermoelectric material for near-room-temperature applications. His work on enhancing the thermoelectric properties of p-type BiSbTe thin films received the 2015 UCC Innovation of the Year Award. This also led to an invitation to participate in the IRDS 2020 Roadmap for the More than Moore White Paper.

As part of the €4 million H2020 project (www.smartvista.eu), Dr. Razeeb`s team has pioneered the concept of developing and applying a high efficiency thin film based thermoelectric generator on Si platform to convert human body heat into usable electricity to power a multimodal flexible sensor system to monitor the electrocardiograph, respiratory flow, oxygen flow and temperature of the patient. This information will then be transmitted wirelessly for online health processing. *"Monitoring vital signs is key for patient health and well-being; the SmartVista technology will revolutionise patient care enabling remote, real-time monitoring. The latest nano and energy research from partners across the EU will combine at Tyndall National Institute, and this multi-million-euro investment will be strategically deployed to deliver a new digital health patch application which will have global applicability."* Dr. Razeeb added. The team led by Dr. Razeeb has partnered with leading industries like Analog Devices and Nokia Bell Labs Ireland though EI Innovation Partnership, SFI spoke, IRC Enterprise Fellowship and SFI Industry Fellowship and EU 2020 projects for the development of thermoelectric materials and micro-devices on Si platform for both power generation and micro-cooler for thermal management of photonic devices. Dr. Razeeb has made significant contributions in mentoring and developing early career researchers and next Generation Leaders. He has supervised more than 30 interns, masters, doctoral and post-doctoral researchers who are currently working at renowned research institutes and universities.

Dr. Muhammad Mominur Rahman

Dr. Muhammad Mominur Rahman of ACCE 29th batch, University of Dhaka has joined as a chemistry research associate at Brookhaven National Laboratory and an incoming Weinberg Distinguished Staff Fellow at Oak Ridge National Laboratory (January 2024). He received his BS (2014) and MS (2015) in Applied Chemistry and Chemical Engineering from University of Dhaka before receiving his PhD in Chemistry (2021) from Virginia Tech. His research spans from developing new electrodes and electrolytes for Li/Na-ion, Li-metal, and Li-S batteries as well as gaining key understanding on the multiscale processes of battery materials through synchrotron characterizations. He has accepted/published articles in Nature, Nature Communications, Energy & Environmental Science, Angewandte Chemie, Matter, Advanced Energy Materials, ACS Energy Letters, Nano letters etc. He received Dean's Award 2014 for his academic accomplishments in University of Dhaka. For his research accomplishments, he received the Electrochemical Society Battery Division Student Research Award, 2021. The award is given to two graduate students each year working in batteries around the world. He provides regular peer review service to journals such as Joule, Matter, Materials Today, Energy Storage Materials, Small, Small Methods, ACS Applied Materials and Interfaces, Journal of the Electrochemical Society etc.

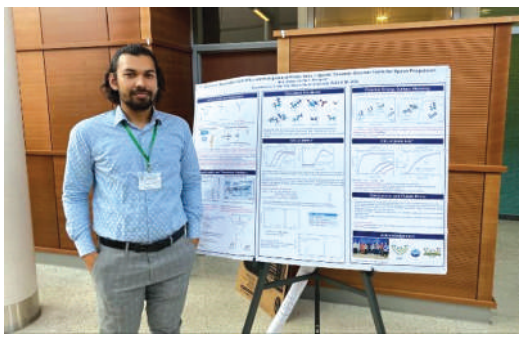
Dr. Tahmina Akter

Dr. Tahmina Akter, a Senior Engineer at Intel Corporation, exemplifies excellence in semiconductor research. She completed her PhD at the University of Texas, USA, specializing in this advanced field. Dr. Akter's academic journey began at Dhaka University, where she earned her Bachelor of Science and Master of Science degrees from the ACCE department. Her expertise in semiconductor technology is highlighted by her significant contributions to research, with several of her papers published in prestigious international journals, including ACS Applied Nano Materials. Additionally, Dr. Akter has presented her innovative work at renowned conferences, establishing her as an expert in her field.

Outside her professional sphere, Dr. Akter is passionately involved in artificial intelligence and machine learning projects, including work with OpenAI's ChatGPT. This personal interest in AI demonstrates her dedication to exploring and contributing to the forefront of tech innovation. Her involvement with cutting-edge AI projects like ChatGPT underscores her commitment to both her professional field and the broader landscape of technological advancement.

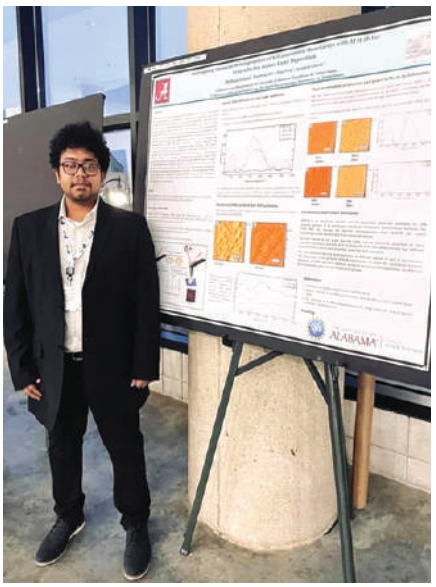
Md. Asibul Hasan

Md Asibul Hasan, a member of the 33rd batch at ACCE, University of Dhaka, has recently joined Thermo Fisher Scientific's Bioanalytical lab in Middleton, Wisconsin as a scientist. He attained his BS in Applied Chemistry and Chemical Engineering from the University of Dhaka in 2019. Following this, he pursued his MS in Chemistry at Wayne State University, Detroit, Michigan, graduating in 2023.



During his MS, his primary research centered on comprehending the CID of protic ionic liquids for space propulsion through the utilization of mass spectrometric techniques in collaboration with the Air Force Research Laboratory. Presently, at Thermo Fisher, he actively contributes to diverse stages of drug development by employing LC-MS/MS methods.

Md. Hasan Ul Iqbal



Md. Hasan Ul Iqbal, former student of ACCE, has recently joined as a Process Engineer in EPI module (Epitaxial growth) at Intel Corporation. He completed my Master's degree in Analytical Chemistry from the University of Alabama. In his graduate studies, his focus was understanding different thin film chemistry using infrared imaging; formation and stability of perovskite films and enabling area-selective atomic layer deposition of metal oxides for microchip patterning were the major projects he was working on. Alongside the popular surface analytical techniques, he mostly relied on a home-built Infrared microscope, and an atomic force microscope-coupled with infrared laser, which helped me comprehending nanoscale topology and underlying chemistry of thin films.

Dr. Anna Fariha

Anna Fariha, now an Assistant Professor at the Kahlert School of Computing, University of Utah, USA, embodies the spirit of academic and research excellence. Her journey, from the University of Dhaka to becoming a co-leader of the Data Management Research Center, is a testament to her dedication and skill. Her tenure at Microsoft PROSE Research and Engineering, followed by a Ph.D. from the University of Massachusetts, Amherst, highlights a trajectory marked by persistence and brilliance. Anna's time at the Department of Computer Science and Engineering, University of Dhaka (CSEDU), was marked by remarkable programming skills and academic prowess. Her inclination towards competitive programming led her to numerous victories in programming competitions. Her research portfolio is equally impressive, with several influential publications to her name. In a candid conversation, Anna reflected on her motivations, choices, and experiences. She emphasized the fun and challenge of competitive programming and her natural gravitation towards academic excellence. Choosing research over industry was a decision driven by her desire to contribute to global science and technology. She acknowledges the role of CSEDU in her journey, highlighting the financial support and inspiration from teachers. Anna also pointed out the limitations of the research culture in Bangladesh and suggested improvements, including increased funding and a more research-friendly environment.

Dr. Muhammed Tawfiqul Islam

Dr. Muhammed Tawfiqul Islam's path from CSEDU to Lecturer at the University of Melbourne's School of Computing and Information Systems, Australia, is a story of dreams realized through hard work and determination. Tawfiq, a holder of a Ph.D. from the University of Melbourne, has shown a deep commitment to research and teaching, with interests spanning from big data to software-defined networks.Tawfiq's journey is marked by analytical skills, a thirst for knowledge, and a profound understanding of complex problems. His experience as a sessional lecturer at Monash University further honed his academic capabilities.In his

interview, Tawfiq emphasized the importance of a common research collaboration platform to enhance the research community in Bangladesh. He advised aspiring researchers at CSEDU to master core subjects, develop problem-solving skills, and connect with faculty for specialized knowledge. Reflecting on his academic journey, Tawfiq shared insights into overcoming challenges and the importance of effective collaboration for research advancement in Bangladesh.

Dr. Mahmood Jasim

Dr. Mahmood Jasim recently joined as an Assistant Professor at Louisiana State University, USA. His research encompasses human-computer interactions, information visualization, applied machine learning, and social computing. A recipient of several best paper awards, Mahmood's academic journey took him from the University of Dhaka to the University of Massachusetts Amherst, where he completed his Ph.D. Mahmood's early academic challenges at CSEDU became the catalyst for his drive towards excellence. His work at TigerIT on facial recognition software sparked his interest in research. Mahmood emphasized the and the need for effective mentorship. Addressing funding aspects of Ph.D. programs, Mahmood highlighted the variety of financial support options available in the U.S. He also shared insights into the challenging aspects of research, emphasizing the importance of extensive literature review and the development of efficient paper reading skills. Mahmood's advice for stress management includes engaging in a meaningful hobby and having a support system for discussions and feedback. He also stressed the importance of collaboration with alumni for improving research in Bangladesh.

Dr. Md Mofijul Islam

Dr. Md Mofijul Islam, an alumnus of the University of Dhaka's Department of Computer Science and Engineering (CSEDU), exemplifies a blend of academic excellence and industry innovation. Now an Applied Scientist II at Amazon Web Services (AWS) Generative AI Innovation Center, Mofijul's journey is a testament to his dedication to the field of AI. Graduating with Bachelor's and Master's degrees from CSEDU, Mofijul pursued a Ph.D. in Systems Engineering at the University of Virginia. His research delved into Multimodal and Multitask Representation Learning, positioning him at the cutting edge of AI technology. His Ph.D. work resulted in significant contributions to multimodal machine learning and AI, with publications in prestigious journals and conferences. An internship at Amazon Alexa AI further honed his skills, leading to breakthroughs in language models and knowledge graphs. Mofijul's role at AWS in Generative AI Innovation showcases his commitment to advancing AI technology and his impact on the global tech community. His story, bridging the gap between academia and industry, is a source of inspiration for current and prospective students at CSEDU, illustrating the potential and global reach of the university's graduates.

Mohammad Shafiqul Alam

In November 2023, Mohammad Shafiqul Alam assumed the role of Lecturer in the Department of Nuclear Engineering at Chittagong University of Engineering and Technology (CUET), marking a marking a transformative milestone in his academic and professional trajectory. His unequivocal commitment to advancing nuclear engineering

is demonstrated by his tenure as a Research Assistant at the University of Dhaka, a position sustained for six months and substantiated by the distinguished Centennial Grant Research (CRG) Project. Mohammad Shafiqul Alam, who earned M.Sc. and B.Sc. degrees in Nuclear Engineering from the University of Dhaka in 2022 and 2020, embodies a scholarly commitment to the field. His research covers various aspects of Nuclear Engineering, such as Environmental Radioactivity, Gamma Spectrometry, and Radiation Dosimetry, showcasing his deep understanding. One notable focus of Mohammad's work is on Gamma Spectrometry and Radiological Hazard Analysis, highlighting his intense dedication to using advanced methods in Nuclear Engineering problem-solving. His impactful research includes detailed examinations of radon levels in Dhaka city's water sources and precise measurements of radionuclide distribution in environmental samples from St. Martin's Island. Overall. Mohammad Shafiqul Alam has significantly contributed to the scholarly discussion in Nuclear Engineering.

Moniruzzaman Akash

Moniruzzaman Akash from RMEDU 2nd batch and the brilliant minds at Nivoso, a robotics startup, have secured victory at the Division Level of the Minnesota Cup, bringing home a well-deserved prize of $25,000!. The competition was held in September 2023 and conducted in a couple of phases.

Moniruzzaman Akash is now employed as an RA in MAIM lab, DU. He was with 'Future Concepts Technology' in the capacity of a remote Robotics Engineer. The company's headquarters are located in Adelaide, Australia. Additionally, he was employed at DataSoft Manufacturing & Assembly (DMA) as an Engineer on a part-time basis currently.

Raiyaan Abdullah

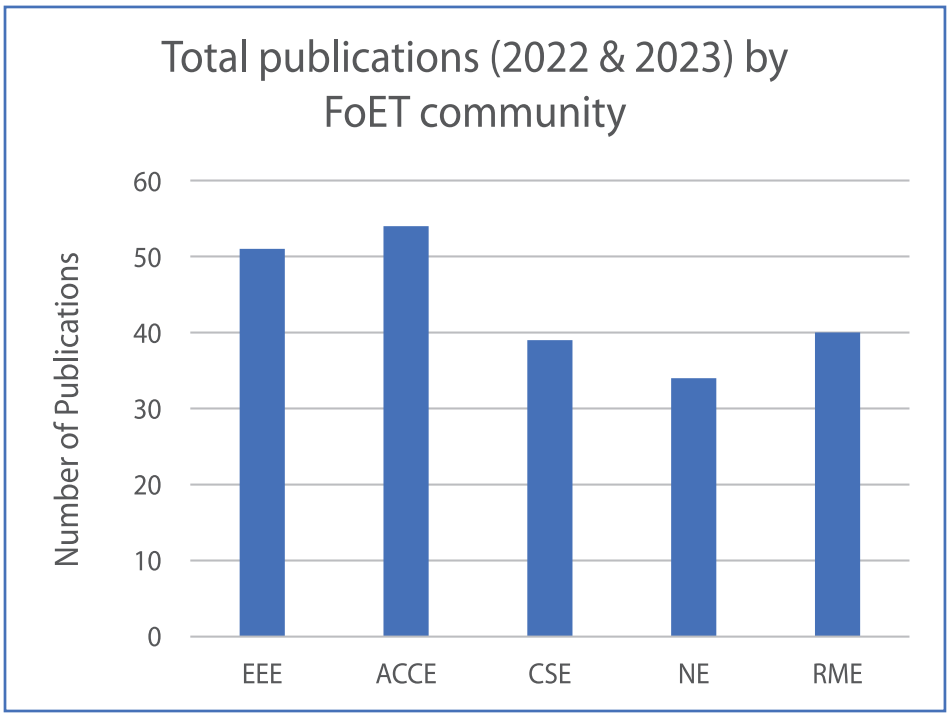
Raiyaan Abdullah is one of the cofounders of BiTechX, a technology agency based in the United States that specialises in providing services related to motion design and video editing, as well as visual design and software development. The year 2021 marked the completion of his graduation from RME. In the year 2023, he enrolled in the University of Central Florida to pursue a degree in Computer Science, specifically in Artificial Intelligence and Computer Vision. At the moment, he is employed at the University of Central Florida Centre for Research in Computer Vision as a Graduate Research Assistant.

Ragib Amin Nihal

Ragib Amin Nihal was a member of the very first batch of students at RMEDU. 2019 marked the year that he successfully finished his internship at Datasoft Manufacturing & Assembly Inc. Limited - DMA. Following the

RESEARCH PAPER HIGHLIGHTS

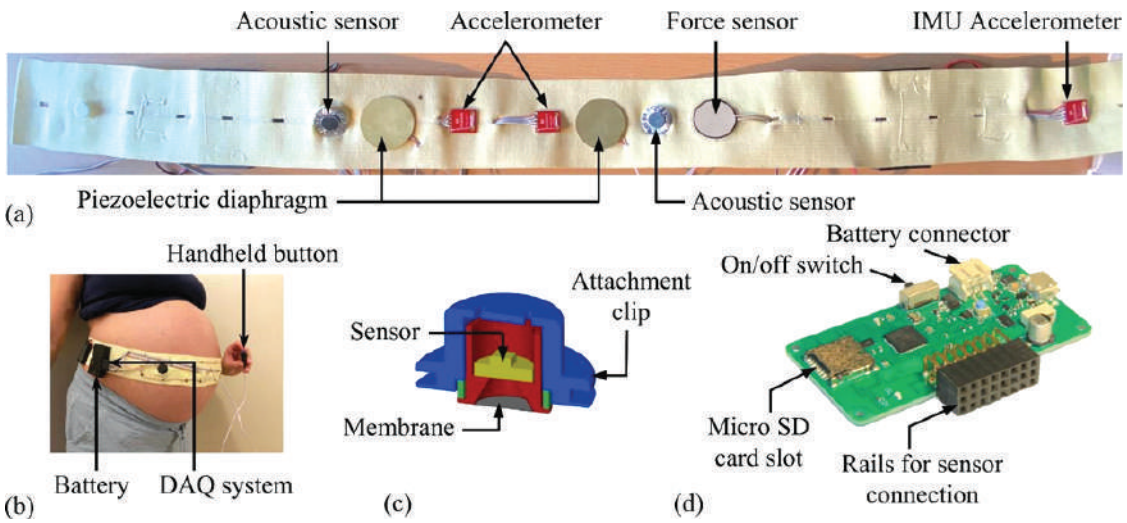
Despite the limitations in adequate research funding and facilities, and new challenges brought on by Covid-19, FoET community achieved important milestones on the frontiers of science and engineering in last two years, publishing 197 articles in scientific journals. Our faculty and students are relentless in their quest of excellence, and apply their knowledge and skills to push the boundaries of research in the most high-tech and innovative areas affecting society.



A. K. Ghosh, D. S. Catelli, S. Wilson, N. C. Nowlan, and R. Vaidyanathan, "Multi-modal detection of fetal movements using a wearable monitor," Inf. Fusion, vol. 103, p. 102124, Mar. 2024, doi: 10.1016/j.inffus.2023.102124. **[Impact Factor: 18.6]**

Dr. Abhishek Kumar Ghosh, an Assistant Professor in the Department of Robotics and Mechatronics Engineering at the University of Dhaka and a distinguished researcher in the field of healthcare technology and monitoring, has made a significant contribution to the scientific community with his article titled "Multi-modal Detection of Fetal Movements Using a Wearable Monitor." This groundbreaking research paper, published in the esteemed Information Fusion Journal with an impressive impact factor of 18.6, showcases Ghosh's expertise in the intersection of technology and maternal-fetal health.

In this article, Ghosh and his co-authors present a cutting-edge approach to fetal movement detection through the utilization of wearable technology. The study explores the development of a novel monitoring system that leverages multiple data modalities, providing a comprehensive and real-time assessment of fetal activity. This innovative approach not only enhances the convenience and accessibility of prenatal care but also holds the potential to revolutionize how healthcare professionals monitor the well-being of both expectant mothers and their unborn children. Ghosh's work underscores the critical role of technology in advancing healthcare, ultimately improving the quality of care and the safety of pregnancies worldwide.

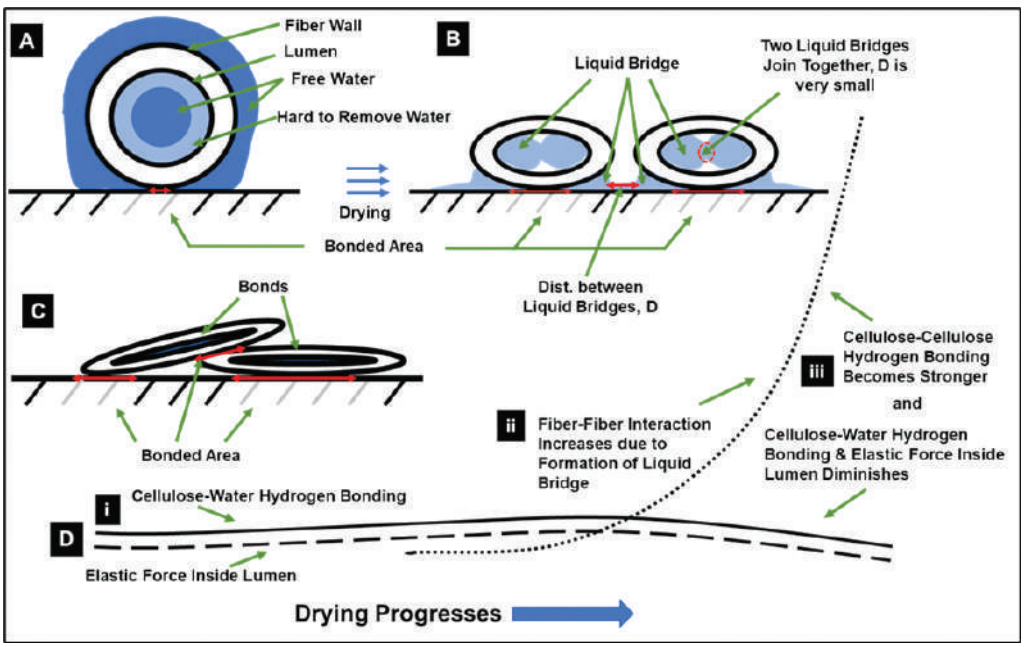


The figure represents the hardware system for the wearable FM monitor. (a) Sensors embedded in an elastic belt, (b) belt worn by a pregnant participant, (c) CAD design of the custom-made acoustic sensor, and (d) miniaturized (62 mm × 31 mm) DAQ system designed for the FM monitor.

K. S. Salem, V. Naithani, H. Jameel, L. Lucia, and L. Pal, "A systematic examination of the dynamics of water-cellulose interactions on capillary force-induced fiber collapse," Carbohydr. Polym., vol. 295, p. 119856, Nov. 2022, doi: 10.1016/j.carbpol.2022.119856. **[Impact Factor: 11.2]**

In a recent publication in Carbohydrate Polymer, **Dr. Khandoker Samaher Salem,** an Associate Professor of Applied Chemistry and Chemical Engineering (ACCE) department, described cellulose fiber collapse behavior which is a phenomenon of fundamental importance for many technologies that include tissue/hygiene to packaging because it governs their essential materials properties such as tensile strength, softness, and water absorption. Dr. Salem and his team attempted to directly correlate cellulosic fiber collapse and entrapped or hard-to-remove (HR) water content through DSC, TGA and SEM. SEM of the fibers at different moisture contents show that irreversible collapsing begins as entrapped water departs the fiber surface. The removal of HR water pulls cell walls closer due to strong capillary action which overwhelms the elastic force of the fiber lumen which results in partially or fully irreversible collapse. The initial moisture content and refining intensity were found to regulate HR water content and consequently played a vital role in fiber collapsing. This understanding can enable control of collapsing behavior by regulating HR water content through physical or chemical modification and even by changing drying techniques and will lead to the possibility of obtaining better physical properties of end products such as tissues or paper towels leading to the ability to higher bulk, greater water absorption, better tensile strength, and higher softness.

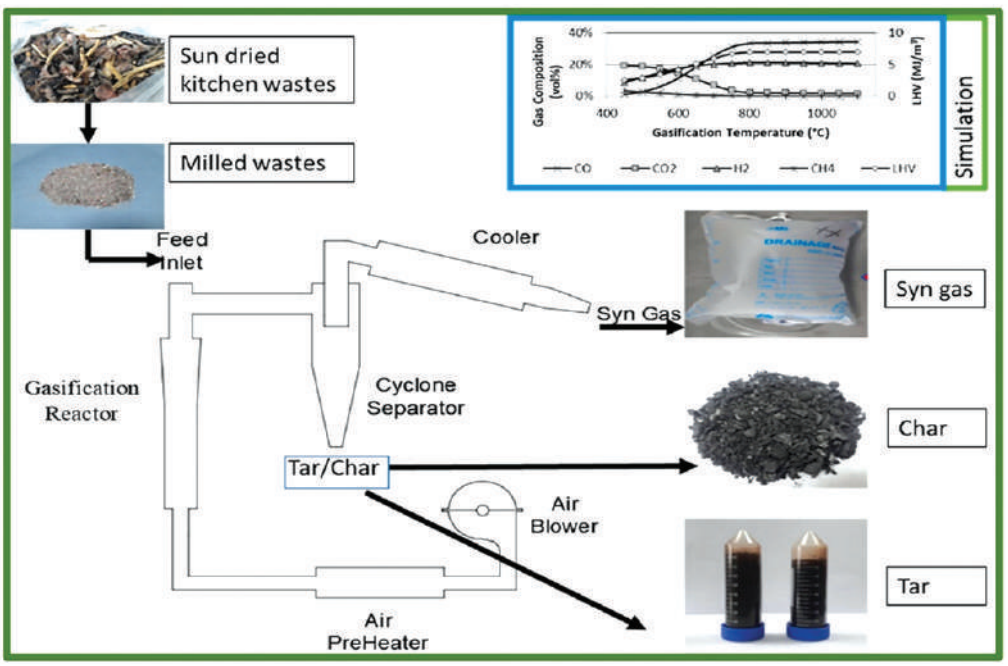
Conceptual model of fiber collapsing. When water is evaporated (A → B → C), capillary action pulls the cell wall together and the pore size becomes smaller, D) Formation of cellulose-cellulose hydrogen bond due to drying at the expense of cellulose-water hydrogen bond.



J. Fatema, **T. Ahmed, M. M. Islam,** M. N. Sakib, **A. M. S. Chowdhury,** and **P. Haque,** "Gasification of kitchen wastes in an updraft fluidized bed gasifier and simulation of the process with Aspen Plus," J. Clean. Prod., vol. 371, p. 133670, Oct. 2022, doi: 10.1016/j.jclepro.2022.133670. **[Impact Factor: 11.1]**

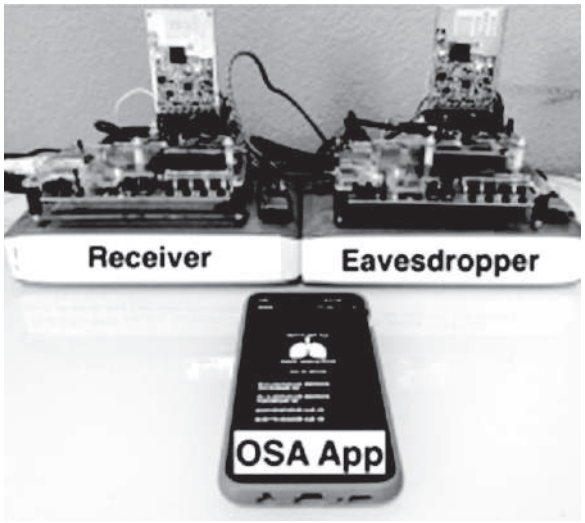
In this era of energy crises, depletion of fossil fuels, global warming and environmental pollution, a team of researchers of ACCE lead by **Professor Dr. Papia Haque,** finds a way for the utilization of kitchen wastes as a source of renewable energy and to minimize the environment pollution. The work has been published by t*he Journal of Cleaner Production* in 2022. The kitchen waste was converted into a gaseous source for the generation of energy rather than being dumped around recklessly which results into environment pollution. The gasification of kitchen wastes was carried out cost-effectively in an in-house designed laboratory scale updraft fluidized bed gasifier along with a cyclone separator and a cooler. Variation of temperature in a range of (400–800) °C, air flow rate (2.8 L/h and 7 L/h), moisture content (30% wt. of feed) and feed weight (50–150) g were investigated on the gasification of kitchen wastes to optimize the process in respect to the production of CO, CO2, CH4, tar and char. The higher the temperature utilized in the process, the conversion into gases was obtained the higher up to 800 °C.

A simulated model for the gasification process involving the different parameters applied in the gasifier was developed with the help of Aspen Plus V8.8 software to compare the experimentally obtained data with the theoretically simulated results. All the results suggested that the kitchen waste can be directly converted to valuable energy sources materials at a low temperature conversion process in a fluidized bed gasifier using non-treated air as a fluidizing agent, which helps to distribute the heat throughout the reactor uniformly and facilitate the gasification. **Professor Dr. A. M. Sarwaruddin Chowdhury** and Assistant Professors **Md. Minhajul Islam** and **Tanvir Ahmed** from the same department were the co-authors in the paper.



S. M. M. Islam et al., "Cross-modality continuous user authentication and device pairing with respiratory patterns," IEEE Internet Things J., vol. 10, no. 16, pp. 14197–14211, Aug. 2023, doi: 10.1109/JIOT.2023.3275099. **[Impact Factor: 10.6]**

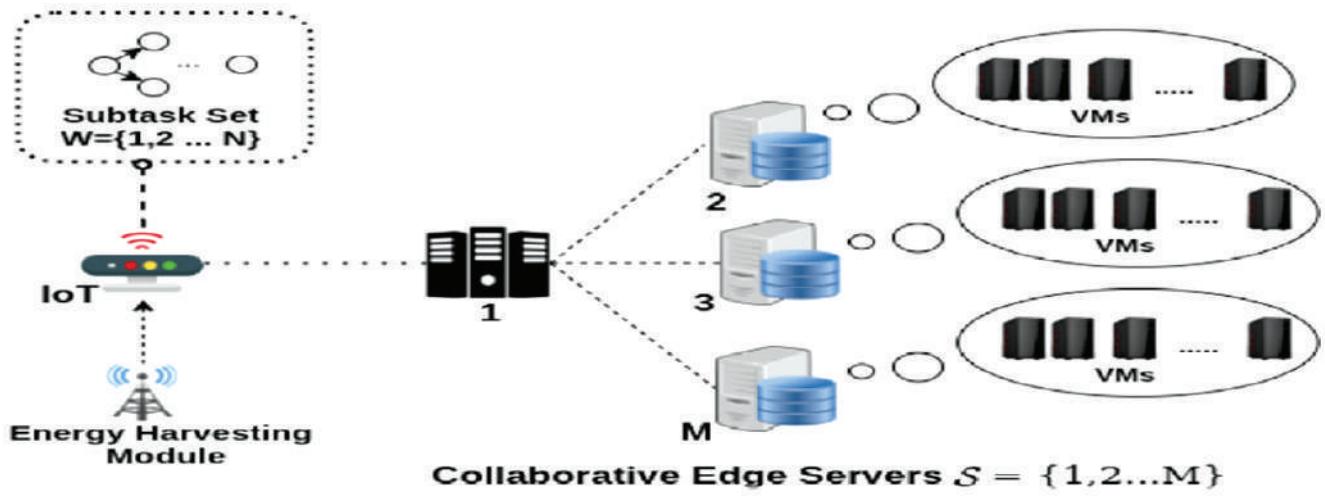
Dr. Shekh Md. Mahmudul Islam, an Assistant Professor in the Department of Electrical and Electronic Engineering (EEE) developed an at-home Obstructive sleep apnea (OSA) screening that can bring a paradigm shift to the healthcare system. The present proposed at-home OSA screening system is subject to spoofing and unintentional interference from the household members. This work proposed a robust insider-resistant breathing-based authentication/pairing protocol that leverages the uniqueness of breathing patterns to automatically and continuously authenticate a user and pairs a mobile OSA app and a physiological radar monitoring system. Experimental results demonstrated that the proposed system can achieve reliable user authentication and secure device pairing with an accuracy of 90% in a noisy environment against an attacker with full knowledge of the authorized user's breathing biometrics.



P. K. Nandi, M. R. I. Reaj, **S. Sarker, M. A. Razzaque, M. Mamun-or-Rashid,** and P. Roy, "Task offloading to edge cloud balancing utility and cost for energy harvesting Internet of Things," J. Netw. Comput. Appl., vol. 221, p. 103766, Jan. 2024, doi: 10.1016/j.jnca.2023.103766. **[Impact Factor: 8.7]**

Task offloading from many Internet of Things (IoT) devices to a mobile edge computing (MEC) system, consisting of multiple collaborative edge servers (CES), results in reduced task execution delay as well as energy consumption. However, the exploitation of computation resources of CESs incurs additional costs. Existing works in the literature either focused on minimizing execution latency or energy consumption. In this paper, Professor Dr. Md. Abdur Razzaque from the Computer Science and Engineering (CSE) department, along with his collaborators, has developed a task offloading policy that aims at making a trade-off between device utility and execution cost. The utility is defined as a function of task execution latency and energy consumption of energy harvesting IoT devices. The task offloading problem is formulated as a subset selection problem that makes the desired trade-off. The offloading problem is proven to be NP-hard and thus we develop a meta-heuristic approach, namely SCOPE, inspired by Social Cognitive Optimization (SCO) to obtain the desired polynomial time execution. The results show its potency compared to the state-of-the-art methods in terms of task execution latency, energy consumption,

utility per unit cost, and task drop rate. Professor Dr. Md. Mamun-Or-Rashid from the CSE department and Assistant Professor Sujan Sarker from the Robotics and Mechatronics Engineering (RME) department were the co-authors in the paper.



M. M. Hasan, **M. Jahan,** and **S. Kabir,** "A trust model for edge-driven vehicular ad hoc networks using fuzzy logic," IEEE Trans. Intell. Transp. Syst., vol. 24, no. 12, pp. 14037–14050, Dec. 2023, doi: 10.1109/TITS.2023.3305342. **[Impact Factor: 8.7]**

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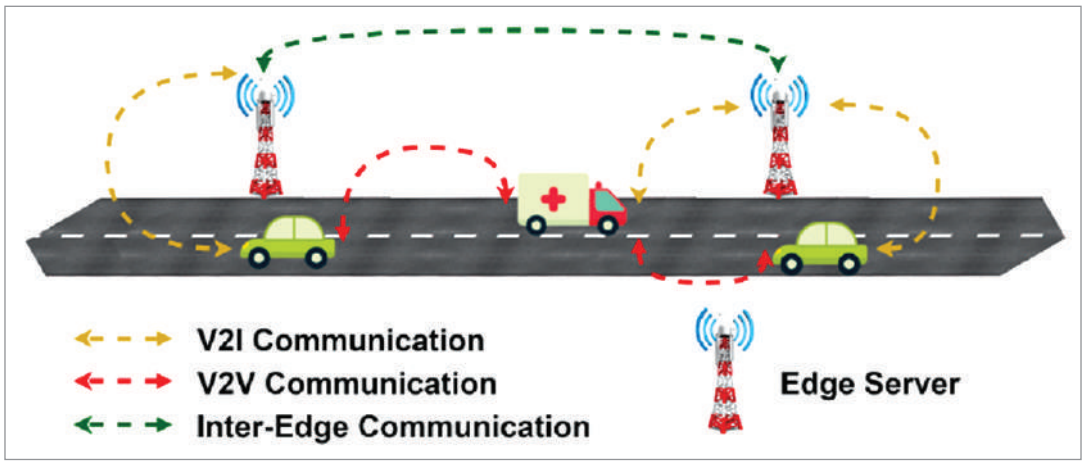
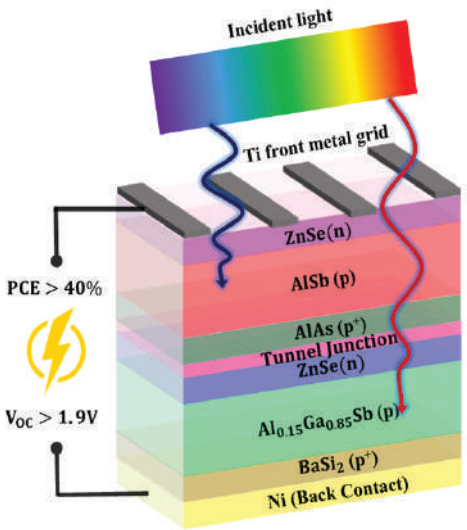
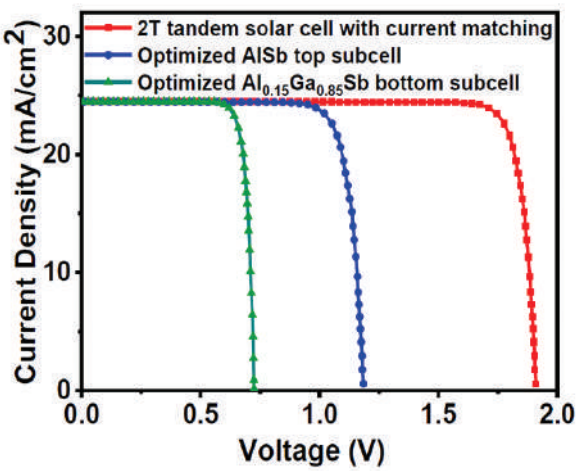


M. J. Hossain, T. Jahan, J. Hossain, and **M. Hossain,** "Numerical simulation of all-inorganic two terminal AlSb/Al0.15Ga0.85Sb tandem solar cell with high-open circuit voltage (>1.90 V) and >40% conversion efficiency," Sol. Energy Mater. Sol. Cells, vol. 263, p. 112595, Dec. 2023, doi: 10.1016/j.solmat.2023.112595. **[Impact Factor: 6.9]**

Is it possible to beat the Shockley-Queisser (S-Q) efficiency limit in single junction solar cells? The quest to achieve conversion efficiencies beyond the Shockley-Queisser limit in single junction solar cells has led to the development of tandem photovoltaics. While significant advancements have been made in realizing commercially viable perovskite/Si tandems, the search for alternative materials with improved stability and higher power conversion efficiency (PCE) continues. **Dr. Mainul Hossain,** an Assistant Professor from the Department of Electrical and Electronic Engineering, in collaboration with Professor Dr. Jaker Hossain`s group at University of Rajshahi, used numerical simulations to demonstrate a novel two-terminal (2T) all-inorganic tandem solar cell where the top subcell consists of the wide bandgap (1.60 eV) AlSb as the main absorber layer and the bottom subcell consists of the narrow bandgap (0.852 eV) Al0.15Ga0.85Sb absorber. Optimizing the structure matches the current between the top and the bottom subcells, yielding a PCE as high as 40.95% with an open-circuit voltage of over 1.91 V. The outcome of this research has significant implications in the development of highly efficient, non-toxic, and stable tandem solar cells for next generation photovoltaics surpassing the S-Q limit.

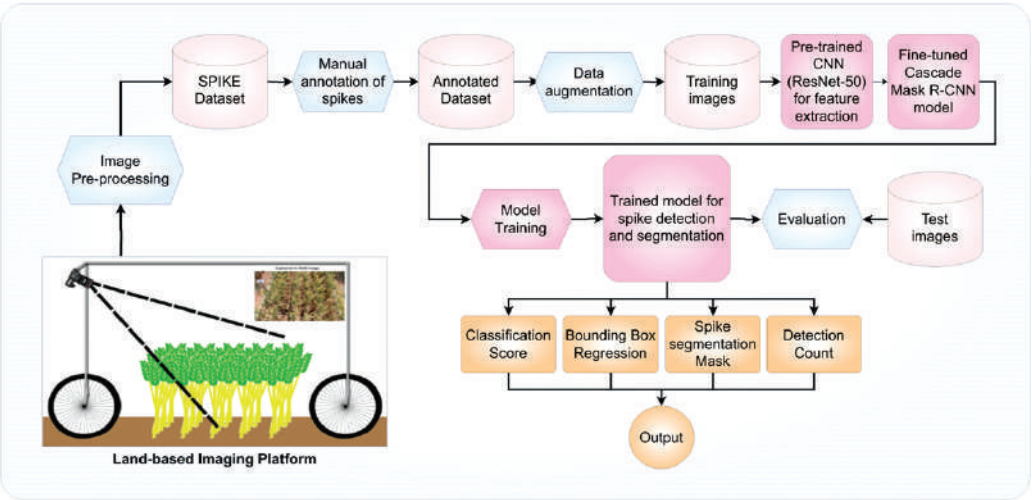




MA Batin, M. Islam, **MM Hasan,** AKM Azad, SA Alyami, MA Hossain, and SJ Miklavcic "WheatSpikeNet: an improved wheat spike segmentation model for accurate estimation from field imaging," Front. Plant Sci., vol. 14, Aug. 2023, doi: 10.3389/fpls.2023.1226190. **[Impact Factor: 6.6]**

Dr. Md Mehedi Hasan, an Assistant Professor in the Robotics and Mechatronics Engineering (RME) department, has made a significant contribution to the field of agriculture and plant science with his research article titled "WheatSpikeNet: An Improved Wheat Spike Segmentation Model for Accurate Estimation from Field Imaging," which was published in the prestigious Frontiers in Plant Science Journal with an impressive impact factor of 6.627.

In this groundbreaking study, Dr. Hasan presents WheatSpikeNet, an advanced model designed to enhance the accuracy of wheat spike segmentation from field images. Accurate estimation of wheat spikes is crucial for assessing crop yield and plant health, and Dr. Hasan's work addresses this critical need by leveraging cutting-edge computer vision and deep learning techniques. His research not only provides a more reliable tool for researchers and farmers to monitor wheat growth and health but also exemplifies the potential of artificial intelligence in revolutionizing agriculture. Dr. Md Mehedi Hasan's dedication to improving crop analysis and his innovative approach underscores the importance of his work in the agricultural sciences. His article is a valuable resource for scientists and practitioners striving to enhance food security and crop management.

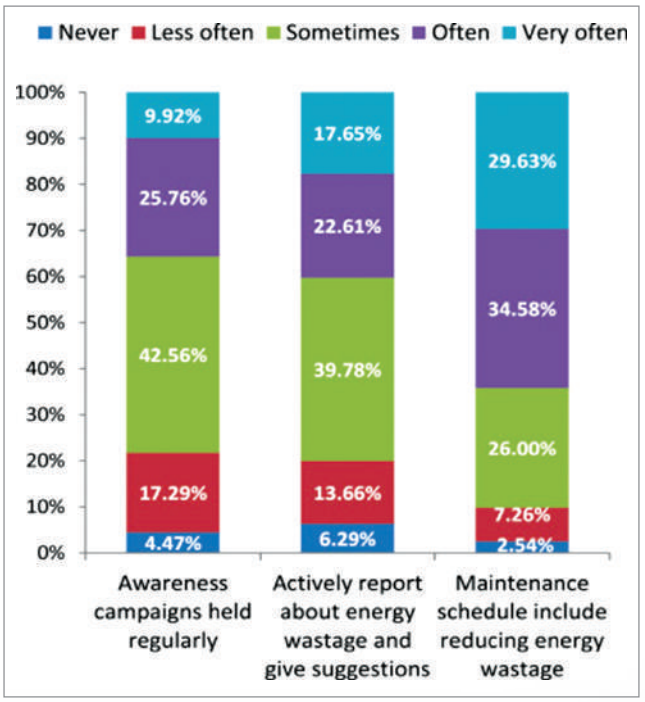


The investigation and study by Dr. Hasan and the team propose a meticulously curated and annotated dataset, named SPIKE-segm, taken from the publicly accessible SPIKE dataset, and an optimal instance segmentation approach named as WheatSpikeNet for segmenting and counting wheat spikes from field imagery. The proposed method is based on the well-known Cascade Mask RCNN architecture with model enhancements and hyperparameter tuning to provide state-of-the-art detection and segmentation performance. A comprehensive ablation analysis incorporating many architectural components of the model was performed to determine the most efficient version. In addition, the model's hyperparameters were fine-tuned by conducting several empirical tests. With bbox and mask mean average precision (mAP) scores of 0.9303 and 0.9416, respectively, on the test set, the proposed model achieved superior performance on the challenging SPIKE datasets. Furthermore, in comparison with other existing state-of-the-art methods, the proposed model achieved up to a 0.41% improvement of mAP in spike detection and a significant improvement of 3.46% of mAP in the segmentation tasks that will lead us to an appropriate yield estimation from wheat plants.

M. S. Islam, M. A. I. Rayhan, and T. H. Mojumder, "Behavioral factors underlying energy consumption pattern: A cross-sectional study on industrial sector of Bangladesh," Heliyon, vol. 8, no. 11, p. e11523, Nov. 2022, doi: 10.1016/j.heliyon.2022.e11523. **[Impact Factor: 4]**

Dr. Shafiqul Islam, Professor in the Department of Nuclear Engineering at the University of Dhaka and his collaborators have made a substantial contribution to the fields of energy with their research article titled " Behavioral factors underlying energy consumption pattern: A cross-sectional study on industrial sector of Bangladesh " which was published in the prestigious Journal Heliyon.

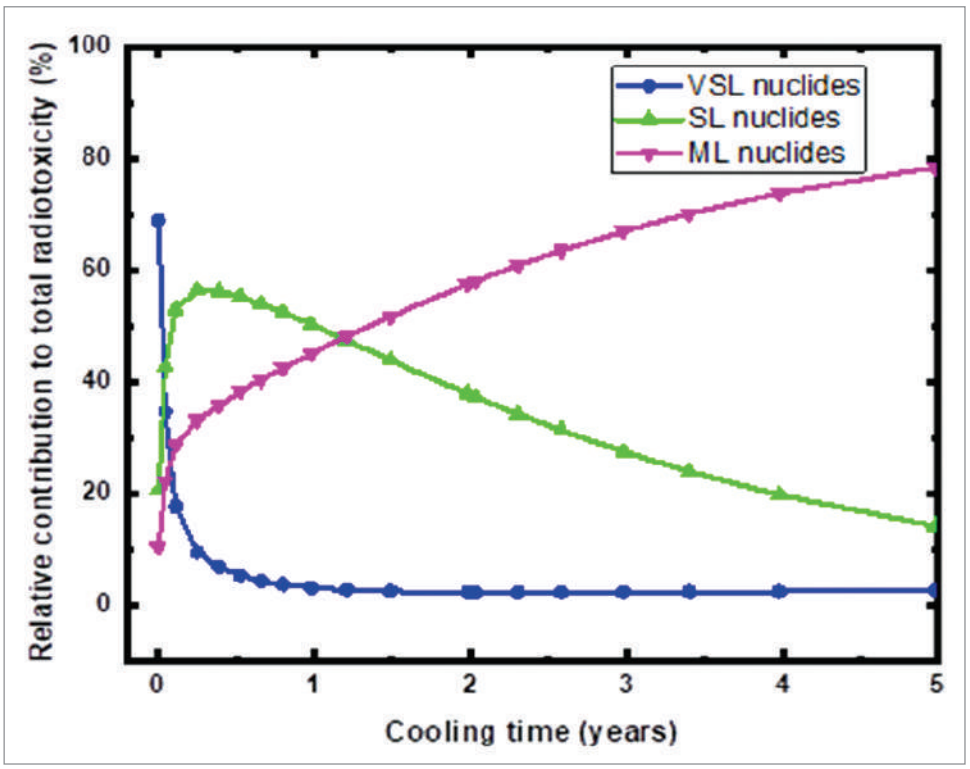
Dr. Islam and his collaborators reveled that energy consumption and wastage are increasing proportionally with the growth of the industrial sector of Bangladesh based on the feedback of 827 employees from the 20 types of industries. Their study explores the energy consumption behavior of industrial staff in the light of sociodemographic and behavioral aspects using questionnaire sourced survey data. In addition, a descriptive statistical analysis and a logistic regression model are used to identify the impact of these constructs as well as sociodemographic variables on staff's consumption behavior. Eight constructs were selected based on the different behavioral theories and energy culture model. They include personal consumption behavior, technology adoption norms, training and supervision, openness to change, technological ignorance, energy self-efficacy, engagement, and responsibility. Analysis of the data reveals that awareness building program through training is notably neglected in the industries of Bangladesh. Their work can be considered as baseline data on the energy conservation pattern in the industrial sector of Bangladesh. They recommend developing policies, regulations, and guides to give equal importance to both energy efficiency and conservation programs for exploiting maximum energy saving opportunities.



F. Sharmin, M. H. Ovi, and **A. Shelley,** "Radiotoxicity analysis of the spent nuclear fuel of VVER-1200 reactor," Prog. Nucl. Energy, vol. 156, p. 104538, Feb. 2023, doi: 10.1016/j.pnucene.2022.104538. **[Impact Factor: 2.7]**

Dr. Afroza Shelley, Professor in the Department of Nuclear Engineering at the University of Dhaka and her students have made major contributions to the field of nuclear spent fuel with the publication of their research paper, "Radiotoxicity analysis of the spent nuclear fuel of VVER-1200 reactor," in the prestigious Journal Progress in Nuclear Energy.

Dr. Shelley and her students analysed the radiotoxicity of spent nuclear fuel (SNF) of the VVER-1200 reactor, which is under construction in Bangladesh at Rooppur Nuclear Power Plant (RNPP). As estimated, around 30 tons of SNF per year will be moved to the spent fuel pool during the operation of RNPP. Bangladesh has to store this spent fuel in the pool for at least 5-10 years for safe packaging and transportation as these emit a significant amount of heat initially due to the short lived radionuclides activity. In this article, the radiotoxicity of the SNF nuclides is calculated in the pool period and the disposal period categorized by their half-lives. They claimed that in the pool period, very short-lived (VSL) nuclides contribute the most to the total radiotoxicity but their contribution drops to a negligible level (~3%) after 1 year of cooling. The relative contribution of short-lived (SL) nuclides increases after 17 days of cooling, dominating the total radiotoxicity and this trend continues up to 1 year. They found that the medium-lived (ML) nuclides contribute the most to the total radiotoxicity and remain the highest contributor in the entire pool period (10 years). After pool period, 90% of the total radiotoxicity decreases. The relative contribution of ML nuclides drops to 4% after 500 years of cooling. Subsequently, the long-lived (LL) nuclides dominate the total radiotoxicity At the end of disposal period, the radiotoxicity becomes 99.9% less than the initial radiotoxicity. They suggested that, Pu to be removed from the SNF, by doing this the radiotoxicity level of SNF will drop like the natural uranium within 1000 years.



completion of his Master of Science degree in RME, he enrolled in Tokyo Institute of Technology to pursue a degree in Systems and Control Engineering. In the present moment, he is employed at Tokyo Tech Academy for Super Smart Society in the capacity of Research Assistant (RA).

Tihan Mahmud

In the year 2022, Tihan Mahmud Hossain successfully finished his degree from RMEDU. The company that he worked for, Datasoft Manufacturing & Assembly Inc. Limited - DMA, employed him as an engineer.

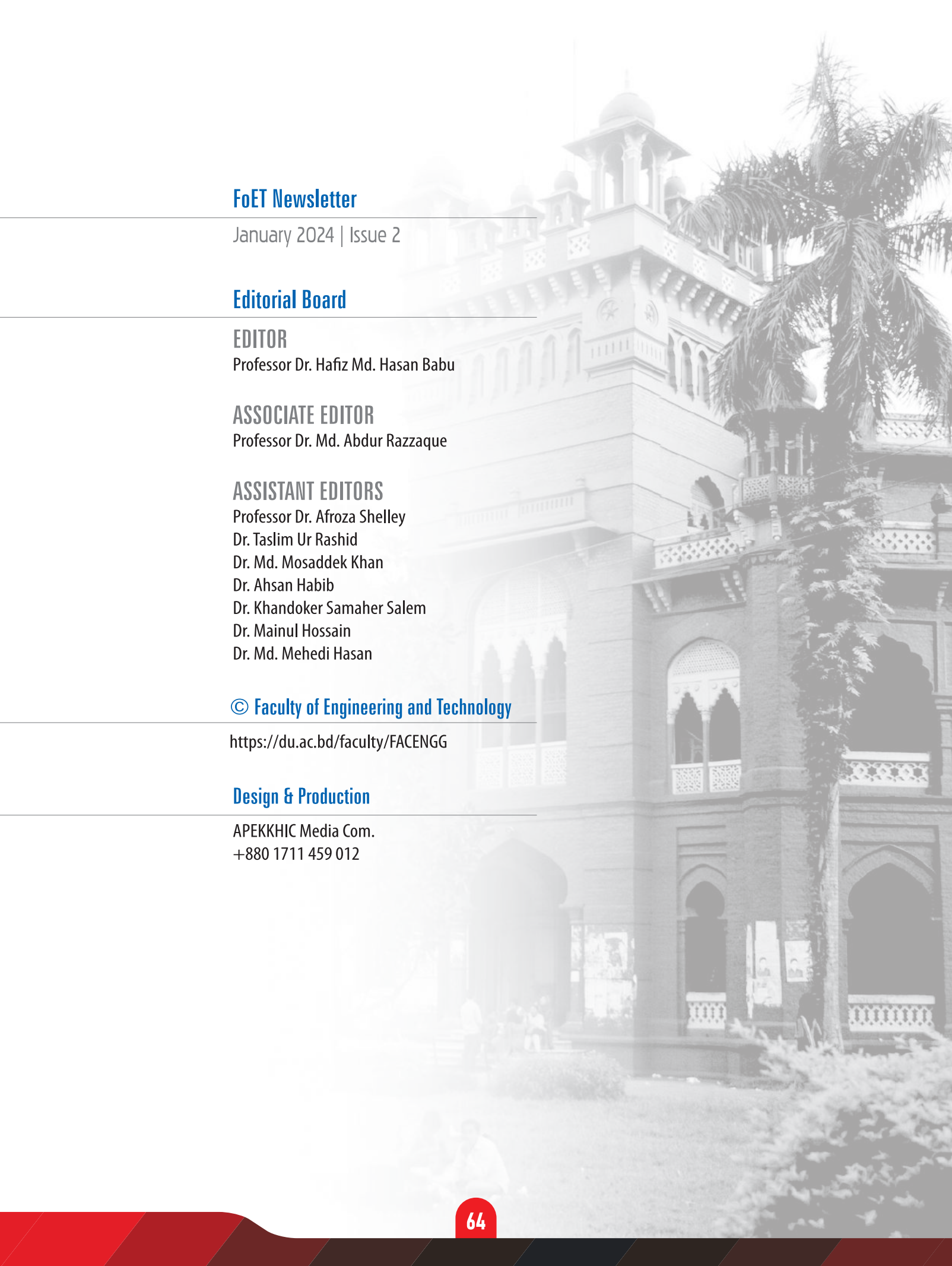
At the moment, he is attending the University of Toulon in France since he is working towards earning his Erasmus Mundus Joint Master's Degree in Marine Robotics- MIR.

Tahmeed Abdullah

In the year 2020, Tahmeed Abdullah successfully finished his degree from RME. In the year 2019, he was one of the cofounders of a professional training centre called Mindcraft Labs. Brac University's Department of Computer Science was where he held the position of Contractual Lecturer during his time there. At the moment, he is employed with Ontik Technology in the capacity of Chief Marketing Officer.

Foysal Khandakar Joy

Khandakar Foysal Joy attended RMEDU in the first batch. He was a Computer Vision Engineer intern at Barikoi till he finished. Datasoft Manufacturing & Assembly Inc. Limited (DMA) was another employer where he worked as an Internet of Things software engineer. Subsequently, he became a Software Engineer at MicroSec. His most recent position is that of backend engineer at ELife, a startup located in the US.



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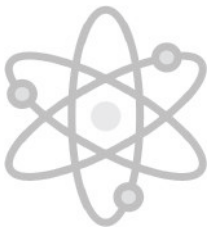

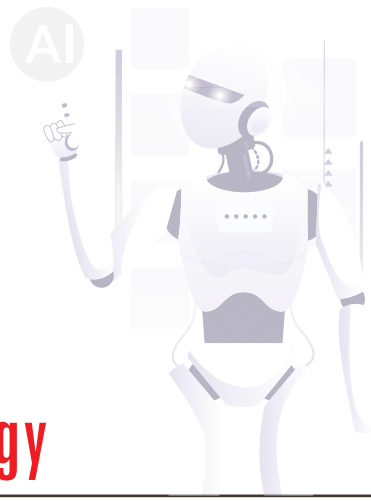

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