

IEEE BRACU STUDENT BRANCH NEWSLETTER

INSPIRIT VOL. 02

VOLUME 09

ISSUE 01

DATE 31 DECEMBER 2021

WINNER OF

**IEEE REGIONAL EXEMPLARY
STUDENT BRANCH AWARD
2021**

**This page is kept intentionally blank to show
respect to all doctors, nurses and
health-employees who are working restlessly
day and night to treat COVID-19 patients.**

INSPIRIT
VOLUME 02

A yearly newsletter from
**IEEE BRAC UNIVERSITY
STUDENT BRANCH**

VOLUME 09

ISSUE 01

DATE 31 DECEMBER 2021



AFFILIATION
BRAC University



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SPECIAL THANKS TO
Soptorsi Paul Shrestha



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ABOUT IEEE BRACU STUDENT BRANCH

The journey of IEEE BRAC University Student Branch started on the 6th of July, 2008. From the very beginning, the student branch is trying to operate its activities with utmost professionalism and is very dedicated to advancing technology for the benefit of humanity. Its recent achievement is winning "IEEE Regional Best Exemplary Student Branch Award 2020" for exemplary performance as an active IEEE Student Branch offering technical programs, activities, professional networking opportunities that enables members in building critical skills.

WORDS FROM THE COUNSELOR

"In 2008, the IEEE BRACU SB was founded by a dynamic EB panel comprising under graduate students and extremely motivated advisers. IEEE BRACU SB has had a long and arduous path to establish itself as one of the most remarkable and ominous branches in Region-10, Bangladesh Section, and beyond. It has become one of Brac University's most active and energetic student groups. The 2019-2020 and now the 2020-2021 sessions have been really thrilling for our branch, with so many possibilities and accomplishments, despite the global COVID-19 upheaval. The pandemic might slow down our regular lives at some point, but our energetic students didn't fall behind. Seemingly, they became stronger than ever and retained their good works. Likewise, this is the second time, that the IEEE BRACU SB has won this international accolade. It would not have been possible without the Ex-Com's positive energy and the student members' unwavering commitment. The IEEE BRACU SB is determined to accomplish unexpected accomplishments under my exquisite guidance. I am happy to announce that the IEEE BRACU SB has become one of the most inspirational models among all other student branches within the Bangladesh section, R-10, as well as other international student branches, over the years."

Prof. AKM Abdul Malek Azad
Counselor, IEEE BRACU Student Branch

WORDS FROM THE CHAIR

Being a part of the IEEE Brac University Student Branch is one of the most memorable milestones of my life. Serving the position of Chair has provided me the opportunity to cultivate and implement my visions for the welfare of the young learners and professionals from both inside and outside the University. Our branch has won the "IEEE Regional Exemplary Award" two times in a row and we are extremely grateful to the previous executive members, our honorable counselor, our respected chapter advisors, and the student members. This gives me immense pleasure while saying that during my tenure, every executive member has worked diligently throughout the year and therefore we could end 2021 with great success and memories. Hopefully, we have set a benchmark for the newcomers and I expect that the upcoming executive bodies will continue uplifting the pride and honor of our branch.

Soptorsi Paul Shrestha
Chair, IEEE BRACU Student Branch

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EXECUTIVE BODY PANEL - 2021



Dr. A.K.M Abdul Malek Azad
BRANCH COUNSELOR
PROFESSOR
Dept. of EEE
BRAC University



Soptorsi Paul Shrestha

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Tahmin Mahmud

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Md. Asif Imran Khan

DESIGNER



Mashaba Nawrin

PUBLICITY COORDINATOR



Syed Zuhair Hossain

WEB MASTER



ACHIEVEMENTS



IEEE Regional Exemplary Student Branch Award 2021

Presented to

Brac University Student Branch
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.

20th December 2021



Susan K. (Kathy) Land
IEEE President 2021

**IEEE BRACU STUDENT
BRANCH wins**

**IEEE Regional
Exemplary Student
Branch Award
2021**

On October 25, 2021, IEEE BRACU SB received this distinguished award from IEEE-USA for its remarkable and extraordinary operations during the 2020-2021 session. The award is given to each qualified Student Branch in each region once a year for having an active program while staying true to IEEE principles.

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

IEEE, Institute of Electrical and Electronics Engineers, is the world's biggest technical professional organization, with the tagline "Advancing Technology for Humanity." IEEE supports excellent scholarly scientific contribution and technology growth for social or communal goodwill. It is a global hub and gateway for electrical engineers, professors, undergraduate or graduate students and expert practitioners to share their knowledge through its highly cited publications, conferences, technology standards, seminars and other educational activities.

IEEE now has about 419,000 members from all over 160 countries, with more than half of them being from outside the United States. IEEE maintains 3,422 student branches at colleges and institutions across the world.

In 2008, the IEEE BRACU SB was founded by a dynamic EB panel comprising undergraduate students and extremely motivated advisers. IEEE BRACU SB has had a long and arduous path to establish itself as one of the most remarkable and ominous branches in Region-10, Bangladesh Section, and beyond. It is one of Brac University's most active and energetic student groups. The 2019-2020 and now the 2020-2021 sessions have been really thrilling for our branch, with so many possibilities and accomplishments, despite the global COVID-19 upheaval. The pandemic might slow down our regular lives at some point, but our energetic students didn't fall behind. They became stronger than ever and retained their good works. Likewise, this is the second time, that the IEEE BRACU SB has won this international accolade. It would not have been possible without the Ex-Com's positive energy and the student members' unwavering commitment. The IEEE BRACU SB is determined to accomplishing unexpected accomplishments under the exquisite guidance of the honored branch counselor, Prof AKM Abdul Malek Azad. The IEEE BRACU SB has become one of the most inspirational models among all other student branches within the Bangladesh section, as well as other international student branches, over the years.



WEBINARS

A webinar on “From Traditional III-V HEMTs to III-Nitride HFETs: A Pathway to UWBG Transistors”

01

**DEPARTMENT OF
ELECTRICAL AND ELECTRONIC ENGINEERING |
BRAC UNIVERSITY PRESENTS**

WEBINAR ON
**From Traditional III-V HEMTs to III-Nitride
HFETs: A Pathway to UWBG Transistors**

ABSTRACT

SEMICONDUCTOR ELECTRONICS TACKLE TWO APPARENTLY UNCORRELATED DEVICE REQUIREMENTS, ADDRESSING THE NEED FOR DEVICES OPERATING AT VERY HIGH FREQUENCIES AND LOW NOISE AT ONE END, AND DEVICES DELIVERING HIGH POWER, ARE HIGHLY LINEAR, AND PREFERABLY OPERATING AT ELEVATED TEMPERATURES AT THE OTHER END. HOWEVER, WITH THE ADVANCEMENTS IN COMMUNICATIONS, INDUSTRY IS IN THE PROCESS OF OPENING UP THE 5G SPECTRUM, AND MAYBE 6G IN THE VERY NEAR FUTURE THIS REQUIRES DEVICES TO OPERATE AT VERY HIGH FREQUENCIES WHILE DELIVERING HIGH POWER. THIS TRANSITION IS ADDRESSED FROM TECHNOLOGY MOVING FROM III-V HEMTS TO III-NITRIDE HFETs AND NOW TO A NEW CLASS OF DEVICES BASED UPON ULTRA-WIDE-BAND-GAP (UWBG) MATERIAL. IN THIS TALK WE WILL DISCUSS THIS EVOLUTION IN TERMS OF DEVICE MODELING GUIDING TECHNOLOGY DEVELOPMENT.

SPEAKER
Dr. Mehdi Anwar

Dr. Mehdi Anwar currently serves as a Full Professor in the Electrical and Computer Engineering at the University of Connecticut USA. As a Jefferson Science Fellow he served as Special Adviser for Technology Transfer and Innovation in the office of Intellectual Property Enforcement Economic Bureau, U.S. Department of State. Dr. Anwar is assisting U.S. Department of State and other U.S. Government organizations and the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries, and Small Island Developing States to stand up the newly established United Nations Technology Bank for the Least Developed Countries.

PLATFORM:  zoom

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tinyurl.com/puseel
Meeting ID:
891 4300 2625
Passcode: 273598

26 FEBRUARY  9 PM
(GMT+06)

ORGANIZED BY

BRAC UNIVERSITY STUDENT BRANCH

The title of the webinar reads “From Traditional III-V HEMTs to III-Nitride HFETs: A Pathway to UWBG Transistors”.

On February 26, 2021, the Department of Electrical and Electronic Engineering (EEE) in collaboration with the IEEE BRACU Student Branch Chapter organized an enlivening session. The session was specially dedicated to the discerning young minds who will manifest extreme ascendancy in the upcoming days to put forward Bangladesh in every bit of the modern science and technology sector.

Semiconductor Electronics addresses the basic two phenomena of uncorrelated devices. A considerable demand exists for two types of semiconductor devices. The first one is operating at very high frequencies and low noise at one

end. Whereas, the other one is a linear device operated at an elevated temperature that releases high power at one end. With the recent advancement of communication technology from 4G to 5G and even in the 6G to near future, devices need to operate at a very high frequency just when they are supposed to deliver substantial power on the other end. Scientists are working relentlessly to improve the efficiency of semiconductor materials. The transition from III-V HEMTS to III-Nitride devices and recently to the new class of devices based on Ultra-Wide-Band-Gap (UWBG) was addressed by the speaker of this webinar. He discussed the trending device modeling strategies and new contributions to the development of Semiconductor Technology.

The stellar initiative to introduce this series of webinars was taken by Dr. AKM Abdul Malek Azad, honorable professor, founder and counselor of IEEE BRACU SBC. Dr. Azad's visionary approach aligns with BRAC University's internationalization activities and global affiliations. Dr. Azad is very optimistic to initiate outstanding opportunities for undergraduate students so that they can learn the newest tech-trends and reach appreciable landmarks with knowledge. As a counselor of the IEEE BRACU SBC, Dr. Azad closely works with the students and keeps motivating them. Professor Arshad M. Chowdhury, the Dean of the School of Engineering was also present throughout the session.

“We are readily emphasizing to bring the most out of our students. For this, we have made a significant change in our undergraduate curriculum module and improved our pedagogical pattern to keep up with the quality education that we always promise to our students in the first place. We are observing how the global market is changing rapidly. The current technological trend is moving up and several semiconductor industries are growing inside Bangladesh. The fast-paced industrialization has demanded students to master new skills.

A webinar on “From Traditional III-V HEMTs to III-Nitride HFETs: A Pathway to UWBG Transistors”

01

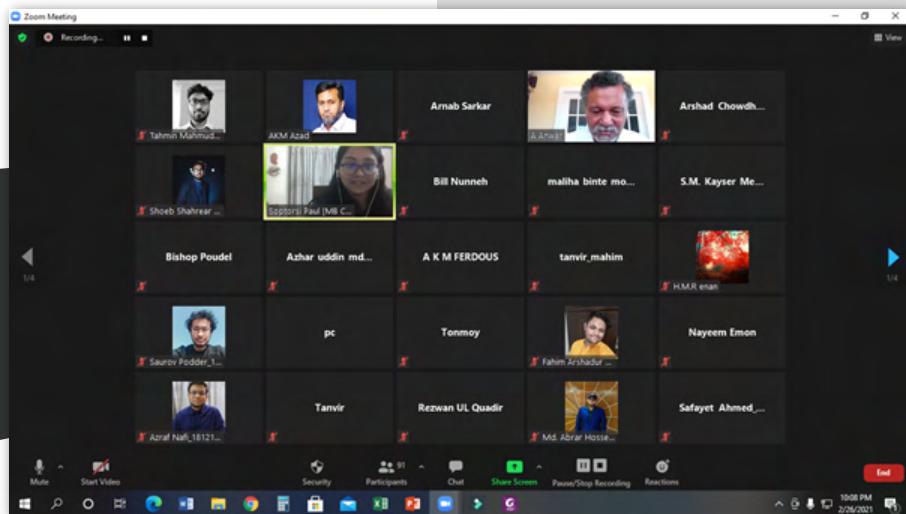
In this regard, I think this is the right time to listen to expert practitioners like Professor Mehdi Anwar. I believe students and faculty members will get benefited from his insightful speech.” adds Professor Arshad Chowdhury at the beginning of the session.

The webinar was moderated by Dr. AKM Abdul Malek Azad. A significant number of audiences showed up including undergraduate students and respected faculty members both inside and outside of Brac University. The main speaker of this session was Dr. Mehdi Anwar, a Jefferson Science Fellow. He is currently serving the Electrical and Computer Engineering department of the University of Connecticut, USA as a Full Professor. Dr. Anwar has more than 240 journal publications, conference proceedings and book chapters. His research work is very impactful and disciplined in the Semiconductor Technology field. Dr. Mehdi Anwar is currently working on ZnO Nanowire-based UV detection and energy harvesting, III-Nitrides and Oxide Semiconductor-based high power and high-temperature quantum cascade lasers, RF Oxide Semiconductor and III-Nitride

HFETs and memristors, to name a few. Throughout the session, he addressed the trending growth of Semiconductor Technology, the different frequency bands and devices, the real-life application of semiconductor devices in the defense/military sector, the methods of technology developments, the transconductance of materials, the effective approach to improve the usefulness of Si materials, the Ultra-Wide Bandgap material, the Wide Bandgap III-Nitride HFET and so on.

Scientists believe that the scholarly contribution towards UWBG transistors will bring unforeseen possibilities for the power and electronic technology. The UWBG transistor will transform the traditional concept of power grid. UWBG can stir the operation of power switching more accurately under high frequency level than a traditional silicon. UWBG's lightweight feature and high-temperature operation mode can alter the transportation models, aerospace and military-defense system. It will be extensively used in power system technology, electric vehicles, mobiles and telecommunications.

The webinar ended with the speaker answering several questions from the audience. Dr. Mehdi Anwar expressed his generous gesture towards the organizers and he agreed upon making more future collaborations with Brac University.



A webinar on “Performance Evaluation of Adaptive Traffic Control Algorithms with Real Diverse Traffic Data for Future Measure of Effectiveness”

02



IEEE BRACU STUDENT BRANCH PRESENTS

Webinar on
Performance Evaluation of Adaptive Traffic Control Algorithms with Real Diverse Traffic Data

SPEAKER



DR. MUHAMMAD ZAFRUL HASAN
Associate Professor
School of Engineering
Texas A&M International University

SCHEDULE
March 26th, 2021
9:00 PM (GMT +6)
zoom

About The Webinar

Vehicle to infrastructure (V2I) communication may eliminate problems associated with traditional traffic control systems. With the SAE J2735 standard and IntelliDriveSM, real time as well as vehicle specific information (such as vehicle occupancy or the engine capacity) is available to a traffic controller. This technology enables the controller to collect data from nearby vehicles periodically. Goal of designing adaptive traffic signal control that utilizes these data elements is to optimize appropriate metric at an intersection. This presentation involves performance evaluation of adaptive traffic control algorithms with real and diverse traffic data. Such algorithms and results of their simulation with traffic data collected from a city junction are presented. Simulation reveals that adaptive algorithms perform better (more than 7%) than the normal algorithm in optimizing several metrics.

With the title “Performance Evaluation of Adaptive Traffic Control Algorithms with Real Diverse Traffic Data for Future Measure of Effectiveness” - **IEEE BRACU SBC** successfully organized another far-sighted virtual talk session that transfixed the audience with the keynote speaker’s crackajack harangue. Episode 2 was a continuing session of the Technical Webinar Series 2021 hosted by the Department of Electrical and Electronic Engineering (EEE), Brac University in association with IEEE BRACU SBC. The virtual session was held at Zoom Platform on Friday, 26 March 2021.

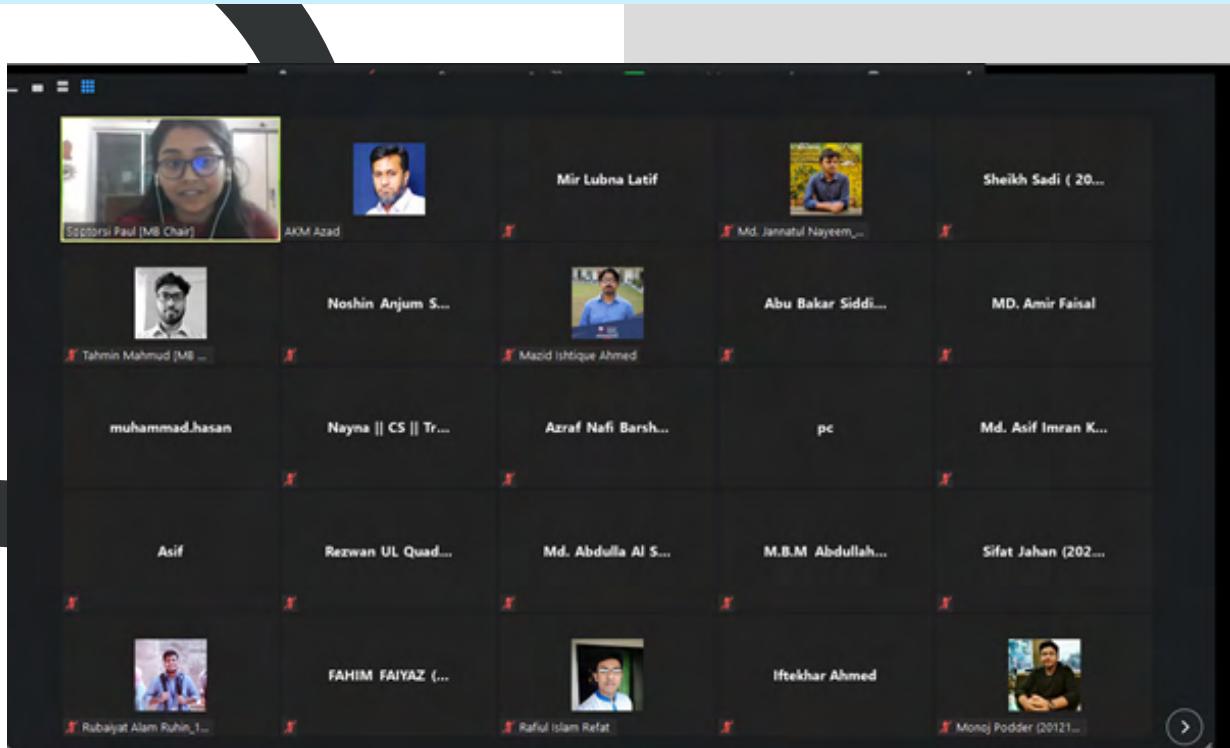
We invited Dr. Muhammad Zafrul Hasan, an Associate Professor in the School of Engineering, Texas A&M International University as the keynote speaker of this session. As an expert practitioner in the research field with an elongated prolific career as an impactful academician, Prof. Hasan has

been teaching Embedded Systems, Intro to Control Systems, Robotics, and Automation, Software Development, Sys Eng Senior Design Project at Texas A&M. His current research projects are namely Smart Cities: Adaptive Traffic Light Control, Smart Health: Blood Flow Controller, Smart Systems: Energy-Efficient Processors, Smart Buildings: Energy Efficient Elevator Control and so on. Prof. Hasan’s research interests include the design, implementation, and testing of embedded systems for energy conservation, performance evaluation of computer architectures, and behavioral synthesis and testing of digital systems. He was granted by the government of the USA for his several scholarly contributions. He is an awardee of the prestigious Hashimoto Fellowship Award by the New Jersey Institute of Technology.

The webinar commenced with Prof. AKM Abdul Malek Azad’s warm introduction. He is a Senior Member, IEEE USA inc and currently serving as our Brach Counselor. Both Prof. Azad and Prof. Hasan had worked together for over 6 years. In the webinar, Prof. Hasan talked about the broader aspects of the problem area. Traffic congestion has been affecting people's lives in the developed country. Due to heavy traffic, a huge amount of time is being spared in each day of a person's life. To create a feasible solution of this problem, Dr. Hasan and his team have been working on an Adaptive Traffic Control Algorithm. A traffic signal system incorporated with a more accurate responsive algorithm that can work based on real-life traffic characteristics is surely deemed as a top-notch initiative that can help mitigate the waiting time of the vehicles in busy cities. It can also curb frequent vehicular accidents. A more prospective approach to this research is to integrate AI and Machine Learning in the algorithm. Under his supervision, his research students have carried out this study in the USA.

A webinar on “Performance Evaluation of Adaptive Traffic Control Algorithms with Real Diverse Traffic Data for Future Measure of Effectiveness”

02



He shared with us the overall methodology, mathematical calculations of his research as well as the findings of the simulation. He briefly discussed the final results and analysis of his research work.

The webinar is ended with an engaging Q&A session. Dr. Hasan answered a few questions asked from the audience panel.

The discernment of this session will surely help our undergraduate students to think about real-life problems like Traffic Congestion. It will enable them to cater excellent research works addressing issues that can alter human life and make the community a safer place for living.

A webinar on “Thermophotovoltaic for Industrial Waste Heat Recovery”

03

The legacy of the joint venture of **EEE Department, Brac University and IEEE BRACU SBC** installed the second event on 11th April, 2021 entitled “Thermophotovoltaic for Industrial Waste Heat Recovery” moderated and hosted by Prof. AKM Abdul Malek Azad. The preeminent focus of the webinar was the speaker, Dr. C.M. Iftekhar Hussain who is a BracU Alumni and established a benchmark with his outstanding endeavors.

Being an engineering project management professional and sustainable energy applications technologist, Dr. C.M. Iftekhar Hussain is currently working as a postdoc researcher at Technological University Dublin and leading Enterprise Ireland funded commercialization project of TPV for industrial waste heat recovery. A handful number of projects have been led by Dr. Hussain on large-scale solar PV power plant installation and commissioning in Bangladesh. Furthermore, he has recently got his patent on “A SOL-GEL MATERIAL AND USE OF THEREOF” and on the way of his upcoming one.

The speaker projected on the rejection of 50% of their thermal energy of the industries into the environment as desolated heat and mentioned the difficulties due to reclamation of cost and complexities in installing conventional heat-recovery systems. Dr. Hussain uplifted the necessity of a scheme that can be conveniently and cost-effectively retrofitted or integrated to recover this industrial waste heat. Since the thermophotovoltaic (TPV) can generate electricity minimizing the mobility of instruments and therefore significantly disintegrates the maintenance and replacement costs. A TPV system is capable of transforming heat into electricity using solid-state materials, enabling an easy execution process he added.



Wander to know the path to glorified future?
Know from our very own legend, pride of our department

Dr. C.M. Iftekhar Hussain

SPEAKER
 BracU alumni
 Postdoctorate Researcher
 Technological University Dublin

Webinar on
Thermophotovoltaic for Industrial Waste Heat Recovery: Technology Innovation and Commercialization

PLATFORM
 ZOOM
 Scan the QR Code for the zoom link

ABSTRACT
 Many industries reject up to 50% of their thermal energy into the environment as waste heat because it is difficult to recover due to cost and the complexity of installing conventional heat-recovery systems. There is a need for a system that can be easily and cost-effectively retrofitted or integrated to recover this industrial waste heat. The thermophotovoltaic (TPV) can generate electricity with no moving parts; significantly reducing maintenance and replacement costs. A TPV system can convert heat into electricity using solid-state materials, enabling an easy integration process. The exploitation of the TPV system through the spinning out of a start-up aimed at technology commercialisation will be discussed in this webinar.

SCHEDULE
 April 11, 2021 9:00 PM

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Accordingly, Dr. C.M. Iftekhar Hussain illustrated the commercialization of TPV and the bridge between traditional economic view with research prospectus. The speaker also amplified his research with respect to our country altitude and intends to implement his extraordinary accomplishment in his motherland, Bangladesh.

The webinar was an integrated success with the participation of one hundred people approximately including students, faculties, and professionals. Additionally, the interactive session beamed an overall intellectual discussion session with a dynamic constructive outcome.

Webinar on 6G and Beyond: The Future of Wireless Communications Systems

04

On August 13th, 2021, the Electrical and Electronics Club of BRAC University, in collaboration with the IEEE BRACU Student Branch Chapter, organized an invigorating session. The speaker was Dr. Ian F. Akyildiz, Professor Emeritus, Georgia Institute of Technology. This session focused on the future of communication and engaging bright minds to be able to work on cutting-edge technology.

Why 6G? The 4G/LTE standard, released in 2009, redefined mobile internet speeds by allowing users to stream HD movies, play games, and transmit enormous amounts of data at speeds of up to 33 Mbps. It provided higher bandwidth, low cost per bit, and overall higher efficiency over the 3G connectivity. 5G uses microwave and mm Wave technology to boost speed to roughly 900 Mbps or higher, well exceeding the capabilities of 4G. This has opened the door for not only better media streaming but also, cloud computing, remote-controlled vehicles, IoT based applications where real-time sensor data is needed. It is capable of providing nearly 25 times the speed of 4G and nearly 5 times less latency than 4G. But higher bandwidth comes with the cost of range and obstacle penetration capabilities. With the improvement of mobile devices and as more and more technology is getting connected with the internet, the demand for more bandwidth and lower latencies is growing by a huge margin. For example, electric cars feed their neural networks with real-time data that it uses to run fully autonomously. If the connectivity is unstable, it becomes impossible for self-driving cars to be able to operate with full functionality. Many sensors collect real-time data and send it to the host. For example, medical devices, wearables like smartwatches. With the world achieving autonomy, it is no better time to get excited for the future of communication. As history suggests, the generational leap in communication technology takes nearly

Webinar on

6G and Beyond:

The Future of Wireless Communications Systems

Organized by

BRAC University Electrical & Electronic Club

IIEEE BRACU Student Branch

Hosted By

Department of Electrical & Electronic Engineering, BRAC University

Schedule

 13th August
2021

 8:00 PM
GMT +6

 Zoom

Dr. Ian F. AKYILDIZ

Professor Emeritus
Georgia Institute of Technology, USA

President & CTO
Truva Inc., Atlanta, GA, USA



SPEAKER

About

The Speaker

Ian F. Akyildiz received his BS, MS, and PhD degrees in Electrical and Computer Engineering from the University of Erlangen-Nürnberg, Germany, in 1978, 1981 and 1984, respectively. He is the Ken Byers Chair Professor Emeritus in Telecommunications, Past Chair of the Telecom group at the ECE and the Director of the Broadband Wireless Networking Laboratory between 1985-2020 at the Georgia Institute of Technology. Since 1989, he is the President and CTO of the Truva Inc. He also serves on the Advisory Board of the Technology Innovation Institute (TII) in Abu Dhabi, United Arab Emirates since June 1, 2020. Dr. Akyildiz is the Megagrant Research Leader and Advisor to the Director of the Institute for Information Transmission Problems at the Russian Academy of Sciences, in Moscow, Russia, since May 2018. Dr. Akyildiz is also an Adjunct Professor with University of Helsinki, Finland since May 2021. He is also a Visiting Professor with Department of Electrical Engineering at University of Iceland since September 2020.

Webinar Abstract

6G and beyond will fulfill the requirements of a fully connected world and provide ubiquitous wireless connectivity for all. Transformative solutions are expected to drive the surge for accommodating a rapidly growing number of intelligent devices and services. Major technological breakthroughs to achieve connectivity goals within 6G include: (i) a network operating at the THz band with much wider spectrum resources, (ii) intelligent communication environments that enable a wireless propagation environment with active signal transmission and reception, (iii) pervasive artificial intelligence, (iv) large-scale network automation, (v) an all-spectrum reconfigurable front-end for dynamic spectrum access, (vi) ambient backscatter communications for energy savings, (vii) the Internet of Space Things enabled by CubeSats and UAVs, and (viii) cell-free massive MIMO communication networks. In this roadmap paper, use cases for these enabling techniques as well as recent advancements on related topics are highlighted, and open problems with possible solutions are discussed, followed by a development timeline outlining the worldwide efforts in the realization of 6G. Going beyond 6G, promising early-stage technologies such as the Internet of NanoThings, the Internet of BioNanoThings, and quantum communications, which are expected to have a far-reaching impact on wireless communications, have also been discussed at length in this talk.







10 years or so to develop, the 6G is on the radar to become a major technological advancement in the 2030s. 6G is capable of integrating more robotics and autonomous systems, wireless brain-computer interactions, blockchain technologies, and more. There is also an emerging concept of IoE (Internet of Everything), Internet of NanoThings, Internet of BioNanoThings, and 6G can play a significant role to enable these. The raw speed of 6G has been theorized to be 1 Tbps and it will use terahertz waves with higher reliability. As the range falls with increased bandwidth, smart surfaces are being studied to increase the range of the network. If collaborative-AI takes

Webinar on 6G and Beyond: The Future of Wireless Communications Systems

04

place, 6G will ensure the communication between multiple entities. This will be particularly important for self-driving cars. If they can communicate in real-time with other cars nearby, they might be able to predict positions and speed better. Virtual reality services will improve drastically as well.

The speaker, Dr. Ian F. Akyildiz earned his BS, MS, and Ph.D. in Computer Engineering from the University of Erlangen-Nuernberg in Germany In 1978, 1981, and 1984 respectively. He is currently the Ken Byers Distinguished Chair Professor and Director of the Broadband Wireless Networking Laboratory at Georgia Institute of Technology's School of Electrical and Computer Engineering. He is also the President & CTO, Truva Inc., Atlanta, GA, USA.

The speaker discussed the 6G implementation sectors. Remote healthcare, industrial automation, precision agriculture, intelligent environments in smart cities, space connectivity, networked vehicles and UAVs, and holographic teleportation are just a few examples. He discussed how data traffic is growing and why terahertz bands are required to operate the next generation of connectivity. He then went on to discuss the viability of graphene-based EM communications (It is the first 2D crystal, thinnest, lightest, strongest, bendable, better Conductivity, nanoscale goes big: processors, memories, batteries, antennas, sensors). He expressed his concerns about the distance issue and demonstrated how multipath for short transmission distances and reflected and dispersed paths for longer transmission distances might function. He briefly discussed reconfigurable intelligent surfaces (RIS), which, in his words, "The secret sauce of these surfaces lies on the materials that are used onto creating these surfaces." Beamforming, wireless power transmission, security, and multiuser communications can all benefit from the

utilization of surfaces. He discussed how the infrastructure will be constructed. For instance, consider how a ground station might connect to a constellation of CubeSats, direct and indirect access segments, and eventually the consumer side of the network. He provided an insight into the research field from the time he became interested in CubeSats. He said, "This is a good lesson for you. You cannot say I am taking the Ravishankar's solutions for CubeSats, I will do here and there a little bit. That's not research." He concluded his speech by saying "Believe in yourself, continue your work. Do not waste time with old problems."

The webinar took place on the Zoom platform which was hosted by the Department of Electrical and Electronics Engineering, BRAC University. It was moderated by Dr. Md. Mosaddequr Rahman (Professor and Chairperson of EEE department). It started at 8:00 AM and went on for an hour and a half. Dr. Md. Mosaddequr Rahman concluded by saying, "The depth and breadth of your talk are really breathtaking. It must be beneficial for our students. There are many things to take away, ponder away, reflect away. They can have good guidance and help them to prepare and make better planning for their future academic and professional careers."

The speaker took several questions from the audience and provided valuable insights from his experience. Pleasantries were exchanged and thus concluded a lively session on 6G technologies.



DATACON 1.0

A Series Workshop



The banner for the IEEE BRACU Student Branch's DataCON 1.0 module 1, titled "Basics of Python and Data Science". It features a green and black design with the IEEE logo at the top. The main title is "DATACON 1.0 MODULE 1" with "Basics of Python and Data Science" underneath. A large circular graphic says "ONLY 12 HOURS LEFT". Below this, there are five sections for "DAY 1" through "DAY 5", each listing topics and descriptions. On the right, there is a profile picture of Mr. Shahriar Hossain, described as an intern at Arther Limited. The banner also includes registration fees (50 BDT for IEEE Member, 100 BDT for Non-IEEE Member, 40 BDT for PES Member), time (7:30 - 9:00 pm GMT+6), and software requirements (Google colab, jupyter).

The IEEE Brac University Student Branch, in collaboration with its four chapters, organized DataCON 1.0, a series of workshops on data science. The inaugural module, entitled "Basics of Python and Data Science", was organized on by the IEEE Brac University Student Branch and the IEEE Power & Energy Society BRAC University Student Branch Chapter from July 2nd to July 12th, 2021, with five online sessions. This module focused on the fundamental concepts of data science and its applications.

This event was instructed by Mr. Shahriar Hossain, an intern at Arther Limited working on computer vision, machine learning, and embedded systems. Recently, he graduated from BRAC University in the Department of Computer Science and Engineering. Mr. Hossain also served IEEE BRACU CS as Treasurer in 2020, as well as Research and Documentation team lead and Science team lead for the Mars Rover team of BRACU, known as BRACU Mongol Tori.

DataCon 1.0 Module 1 Basics of Python and Data Science

01

In this workshop, there were five different sessions. On Day 1, July 2nd, 2021, the fundamentals of data science and its applications were covered, and also, by writing basic blocks of python code in Google Colab, students were introduced to Anaconda, Jupyter Notebook, and the basics of python. In the July 4th, Day 2 session, he talked about data structures and the Numpy library.

Day 3's workshop continued numpy learning through hands-on coding and included a discussion of the Pandas library held on July 9th. On July 11th, Day 4 focused on learning Matplotlib through writing codes in Google Colab, as well as the Scikit learn library. Learning scikit-learn was continued in the last session by writing codes in Google Colab on July 12th. Each session covered a variety of topics that were beneficial to the participants, and the sessions were highly engaging. At the end of the workshop's final session, Shoeb Shahrear Khan, Chair of the IEEE Power & Energy Society BRAC University Student Branch Chapter, expressed his appreciation and gratitude to the instructor and registrant.

The sessions were open to anyone with an institutional or professional background. There were 135 registered participants from over 15 universities across Bangladesh during this workshop. E-certificates were given to all of the active participants. Aside from that, there were some volunteers who helped make this event a success, and some of them were chosen to receive the best volunteer award for their efforts.

DataCon 1.0 Module 2 Fundamentals of Statistics and Exploratory Data Analysis

02

During the month of August 2021, IEEE BRACU SB in association with IEEE AESS BRACU SBC organized the second module of the DataCon 1.0, the maiden annual workshop on Machine Learning (ML) and Artificial Intelligence (AI) related fields. The workshop took place over the course of 5 days, with the first one taking place on 7th August. The primary speakers for this event were Mahmudul Haque, who is currently working as a research assistant at BRAC University and Aditya Soukarjya Saha, former SQA engineer at Bit Mascot. The 5 days of the event were titled Descriptive Statistics, Inferential Statistics, Data Visualization by Matplotlib, Exploratory Data Analysis (I), and Exploratory Data Analysis (II) respectively. The first 2 days of workshop were taken by Aditya Soukarjya Saha, while the rest of them were taken by Mahmudul Haque.

Following the brief introduction of the speakers and the event by Samiu Mostafa Ishan, Vice-Chair of IEEE AESS BRACU SB, the workshop commenced with the first day of the workshop focusing on the descriptive aspect of statistics, such as mean, median and mode, variance, covariance and standard deviation, correlation, variable types etc. The speaker also talked about the classification of data into types and categories. There were in-depth insights of the topics discussed on the first day. The workshop on the second day moved towards inferential statistics, with the speaker giving insights on different types of probability distributions, central limit theorem, errors and estimates. The speaker also went on to elaborately discuss the confidence interval, one of the most important aspects of inferential statistics.



The image shows a digital flyer for the IEEE BRACU Student Branch Presents DATACON 1.0 MODULE 2. The title is "Fundamentals of Statistics and Exploratory Data Analysis". The flyer features two instructors: Mahmudul Haque (Research Assistant, BRAC University) and Aditya Soukarjya Saha (Former SQA Engineer, Bit Mascot). It details the five-day workshop schedule: DAY 1 (Descriptive Statistics) covers Mean, Mode, Median, Variance, Standard Deviation, Covariance, Correlation, and Variable Types; DAY 2 (Inferential Statistics) covers Standard Error, Estimators and Estimates, Probability Distributions, and Confidence intervals; DAY 3 (Data Visualization by Matplotlib) covers Basic 2D Plotting (Legends, Titles), Bar Chart, Pie Chart, Scatter Plots, Subplotting, and Basic 3D Plotting; DAY 4 (Exploratory Data Analysis (I)) covers Overview of Pandas, Numpy library, Reading different types of Data, Dataset Analysis through pandas, and Usage of numpy library; DAY 5 (Exploratory Data Analysis (II)) covers Implementation of Day 1-Day 4 knowledges in DataAnalysis. Registration fees are listed as IEEE Member: 50 BDT, Non-IEEE Member: 100 BDT, and AEES Member: 40 BDT. The starting date is 7th August, 2021.

From the third day onwards, the workshop shifted focus towards the applications of the topics discussed on the first two days. On the third day, the speaker talked about Data Visualization using Matplotlib, a library in the Python programming language. Basic 2D and 3D plotting, bar chart, pie chart, scatter diagram and subplotting were the contents covered on the third day. On the fourth day, different libraries of python were discussed in detail, such as pandas and numpy, while also focusing on reading different types of data in python. The final day of the workshop primarily focused on the implementation of all the ideas discussed in the first 4 days. The speakers showed in-depth data analysis using pandas and numpy, while using the ideas learnt on the first day.



IEEE BRACU STUDENT BRANCH
Presents

DATACON 1.0 MODULE 3

Machine Learning Fundamentals

About
The Workshop

DAY 1 05-09-2021

- Defining Machine Learning and its types
- Machine learning Workflow and Pipelines
- Machine Learning Algorithms
- Feature engineering, Model Evaluation and Improvement
- Supervised Learning example with a real-life dataset

DAY 2 07-09-2021

- Defining Deep Learning
- Deep Neural Networks and deep learning algorithms
- Optimizers and hyperparameters
- Overfitting, Underfitting and Regularization
- Classification example from a real-life dataset.

DAY 3 09-09-2021

- Defining unsupervised learning with examples and its purpose
- Types of unsupervised learning algorithms and use cases
- Unsupervised Deep Learning
- An example of unsupervised learning with real-life datasets

Registration Fee

RAS Member	30 BDT
IEEE Member	50 BDT
Non-IEEE Member	100 BDT

Time 8:00 pm - 9:30 pm

The Instructor

Salman Ibne Eunus
Machine Learning Trainee Engineer
Expert Consortium Limited

Salman Ibne Eunus is working as an AI Trainee Engineer at Expert Consortium Limited on Machine Learning and Robotics. He has served Brac Mongoltori in various roles and has experience in working at various robotics and AI startups. His passion in robotics has gradually led him towards participating data science competitions at Kaggle and AI research over the years while studying in Computer Science at Brac University.

DAY 4 12-09-2021

- Defining natural language processing and its types with examples
- Limitations of NLP
- Syntactic and Semantic Analysis
- Techniques to understand text
- Coding example with real-life dataset

DAY 5 14-09-2021

- Defining Reinforcement Learning with terminologies and real-life examples
- Types of RL and types of RL algorithms and Implementation example of RL
- Reinforcement learning workflow and its characteristics
- Supervised and Unsupervised Learning

Softwares



This year, the IEEE BRACU SB and IEEE RAS BRACU SBC successfully organized and conducted its much-anticipated five-day workshop on the fundamentals of machine learning. The goal of the training program was to prepare tech-savvy students in their chosen sector of innovation, with a concentration on Machine Learning Fundamentals. Salman Ibne Eunus was invited as an instructor to this module. He is presently working as an AI Trainee Engineer on Machine Learning & Robotics at Expert Consortium Ltd. He earned his bachelor's degree in computer science and engineering from BRAC University. He has worked on many Robotics and AI businesses in addition to being a previous Sub-team Lead of AI at BRACU Mongol-Tori.

The workshop took place on September 5th, 7th, 9th, 12th, and 14th on an online platform 'Google meet'. The focus of such a session is to provide students

DataCon 1.0 Module 3

Machine Learning Fundamentals

03

with a basic understanding of machine learning. On the inauguration day, Salman Ibne Eunus gave a brief idea on machine learning.

Instructions from a professional. Inspire you to improve your talents. Instructions on how to utilize TensorFlow, Scikit-learn, Keras, and other programming languages. On an introductory day, Salman Ibne Eunus talked about machine learning. What is it? It is an area of artificial intelligence (AI) and computer science that focuses on using data and algorithms to mimic the way people learn, intending to steadily improve accuracy. Then he elaborately spoke about the types of machine learning. There are also some types of machine learning algorithms that are used in very specific use-cases, but three main methods are used today. He also mentioned all this. On day two the instructor highlighted Supervised Deep Learning and Neural Networks and emphasize Methods of Hyperparameter optimization, Overfitting, Underfitting, and Regularisation. On the 3rd day of this workshop, he defined Unsupervised Learning with examples. As the name suggests, unsupervised learning is a machine learning technique in which models are not supervised using a training dataset. Instead, the models themselves find the hidden patterns and insights from the given data. It can be compared to learning which takes place in the human brain while learning new things. It can be defined as Unsupervised learning is a type of machine learning in which models are trained using an unlabeled dataset and are allowed to act on that data without any supervision. After that, he moved to the main topic, starting with the idea of Unsupervised Learning with a real-life dataset.

DataCon 1.0 Module 3
Machine Learning Fundamentals

03

Day-4 was covered by highlighting some topics like the limitation of NLP, syntactic and semantic analysis, techniques and understanding text, coding examples with real-life datasets. He stated that while NLP is a strong technology with several advantages, there are still several limits and issues with Natural Language Processing. These limitations and problems are words and phrases that are used in context, as well as homonyms, synonyms, sarcasm and irony, ambiguity, errors in the written or spoken word, slang and colloquialisms, language that is specialized to a certain domain, languages with limited resources. Syntactic analysis (syntax) and semantic analysis (semantic) are the two primary techniques that lead to the understanding of natural language. Salman Ibne Eunus also spoke about it. He gave coding examples with a real-life dataset which was effective to understand and visualize.

Finally, on the last day of this workshop, our speaker took his session on Reinforcement learning. He described that Reinforcement learning is a machine learning training strategy that rewards desirable actions while penalizing undesirable ones.

A reinforcement learning agent can sense and comprehend its surroundings, act, and learn via trial and error in general. Our instructor talked about key terminologies of RL (Reinforcement learning), application of RL (Reinforcement learning), and so on.

Workshops are frequently utilized to improve professional abilities and keep up with current advances in the area. The major goal of this workshop was to know about machine learning fundamentals. Machine learning's objective was to achieve patterns in your data and then generate predictions based on those patterns, which were typically complicated, to answer business questions, detect and analyze trends, and solve issues.

All of the participants received certificates, and IEEE BRACU SB regards this event as a success because it fulfilled the inquiring minds.

DataCon 1.0 Module 4 Sneak peek into Deep Learning with Pytorch

04

IEEE BRACU Student Branch in collaboration with IEEE Computer Society BRACU Student Branch Chapter had successfully organized the last module of DataCon1.0 entitled "Sneak Peek into Deep Learning with Pytorch" from 3rd November to 12th November, 2021 projecting 5 individual online sessions. This workshop was organized to introduce the basics of deep learning. No prior knowledge on deep learning was needed to attend the workshop.

This event was instructed by two instructors. One of them was Razin Bin Issa, who has completed his graduation in CSE from BRAC University in 2020 and is currently working as a freelancer in the field of robotics & machine learning. He was the team lead of the BRACU MARS Rover project known as BRACU Mongol-Tori in 2019. Apart from that

NASA Space Apps Challenge-2018(Secured top 4 position in the world Final), Kibo Robot Programming Challenge-2(Secured Runners up & CREW AWARD) are the most notable competitions where I participated. The other instructor was S.M. Masrur Ahmed, who is a CS graduate from BRAC University. He has worked on the autonomous system of Mongol Tori V2. He also has experience working on IoT systems and Quantum Computing. He has also worked on Internet of Things (IoT) systems and Quantum Computing. In the Mujib Borsho IT Carnival 2020, DIU, he came in second place in the Datathon event. He is an Udacity graduate in deep learning and machine learning. He is an independent researcher and deep learning project freelancer.

In this workshop, there were five different sessions. In Day-1, basics of neural networks, implementation of gradient descent using Numpy, training a neural network were introduced and



The screenshot shows the IEEE BRACU Student Branch website for DataCon 1.0. The header includes the IEEE logo and the Computer Society logo. The main title is "DATACON 1.0" and "MODULE 4". Below it is the subtitle "Sneak Peek into Deep Learning with Pytorch". The page is divided into sections for "About The Workshop" and "About The Instructor". The workshop schedule is listed in five days:

- DAY 1: 03-11-2021**
 - Introduction to Neural Networks
 - Implementation of gradient descent using Numpy
 - Training a neural network
 - Class Project:** Classifying Pokemons
 - Home Task:** Bike Sharing Problem
- DAY 2: 06-11-2021**
 - Introduction to Neural Networks
 - Hyper Parameters and Convolutional NN Layers
 - Project:** Cifar CNN
 - Bonus:** Style Transfer
 - Home Task:** Dog Breed Classification
- DAY 3: 08-11-2021**
 - RNN, LSTM
 - Implementing RNN + LSTM
 - Class Project:** TV Script Generation
 - Home Task:** A recurrent neural network that performs sentiment analysis
- DAY 4: 10-11-2021**
 - Generative adversarial network
 - Cycle GAN
 - Class Project:** New Face Generation using Celebrity Images (CelebA)
 - Home Task:** Image to Image
- DAY 5: 12-11-2021**
 - Introduction to Reinforcement Learning
 - Class Project:** A simple game using Reinforcement Learning

Below the schedule, there are profiles for the instructors: Razin Bin Issa and S. M. Masrur Ahmed, each with a photo, bio, and "About The Instructor" section. At the bottom, there is a "Registration Fee" table:

IEEE Member	50 BDT
Non-IEEE Member	100 BDT
IEEE BRACU CS MEMBER	40 BDT

class project along with home tasks were also given to the participants. Any computing or meditative endeavor could be practically automated using neural networks, and we might even be able to outperform the human brain in terms of processing capacity. Day-2 was also about Neural networks, Hyper Parameters and Convolutional NN Layers along with home tasks. In Day-3 and Day-4, RNN, LSTM and GAN were introduced. LSTM and GAN are popular nowadays and the works related to these are huge now. Both sessions included the home tasks along with class project. In the last session reinforcement learning were introduced along with a class project. All these topics are trending and have many successful works. Every session was full of different topics which were helpful to the participants, especially the students of final year who are going through their thesis. Therefore, the sessions were very interactive.



CREATING LONG-TERM IMPACT FOR SUSTAINABLE DEVELOPMENT THROUGH IEEE VOLUNTEERING

Real-Life Experience from

Prof. Saifur Rahman

IEEE PRESIDENT-ELECT 2022

VENUE
BRAC UNIVERSITY GDLN CENTER
 UB21803, 66 Mohakhali, Dhaka-1212, Bangladesh

DATE
27 DECEMBER
 2021

TIME
10 - 11:30 AM
 GMT+6

PARTNERS

**JOINTLY
ORGANIZED BY**

**IN ASSOCIATION
WITH**


Creating Long-Term Impact for Sustainable Development Through IEEE Volunteering Real-Life Experience from Prof. Saifur Rahman, IEEE President-Elect 2022

Prof. Saifur Rahman, IEEE President-Elect 2022, spoke as the keynote speaker in a hybrid seminar hosted by the IEEE BRACU SB.

IEEE Power and Energy Society (PES) Bangladesh Chapter in association with the Department of Electrical & Electronic Engineering (EEE), Brac University organized the most awaited hybrid seminar entitled "Creating Long-Term Impact for Sustainable Development Through IEEE Volunteering: Real-Life Experience from Prof. Saifur Rahman, IEEE President-Elect 2022" at the BRAC University Global Development Learning Network (GDLN) on 27 December, 2021. The webinar was broadcast live on Facebook Live and Zoom. The meeting was set to begin at 10:00 AM. The gathering began at 10:30 AM and ended at noon. Light refreshments were supplied for the visitors and volunteers, as well as lunch.

The vibrant event had seen many distinguished faculties from the Department of Electrical and Electronic Engineering (EEE) and the School of Data & Sciences as well. These eminent faculties' valuable presence added an additional height to this event and thus the event was made enlivening. The core essence of the session was to


Former Chair, IEEE Power and Energy Society
Former Chair, US National Science Foundation Advisory Committee
Founder, BEM Controls, LLC
Former Vice President, Publications, IEEE Board of Directors
Director, Center for Energy and the Global Environment
Founding Director, Advanced Research Institute Virginia Tech, USA
Director, Center for Energy and the Global Environment
**Founding Editor-in-chief, IEEE Electrification Magazine
IEEE Transactions on Sustainable Energy**

PROF. SAIFUR RAHMAN

IEEE PRESIDENT-ELECT 2022

congratulate the chief guest, Prof. Saifur Rahman on becoming the President-Elect 2022 of IEEE, to tell him about current IEEE BRACU SBC statistics, and also to discuss on how IEEE assisted the chief guest in reaching his present position.

The seminar was hosted by the IEEE BRACU SB partnering with IEEE CS (Computer Society) BRACU SBC, IEEE RAS (Robotics and Automation Society) BRACU SBC, IEEE AESS (Aerospace and Electronics Systems Society) BRACU SBC. Dr. AKM Abdul Malek Azad, distinguished professor, founder, and counselor of IEEE BRACU SBC was present throughout the seminar. Some of the other prestigious faculties who were present throughout the whole session were Professor Arshad M. Chowdhury, who is currently serving as the Dean of the school of Engineering (SoE), Dr. Md. Mosaddequr Rahman (Professor and honorable Chairperson of the EEE department), Prof. Shahidul Islam Khan (Professor and the Previous Chair of IEEE PES Bangladesh Section Chair and Advisor of the IEEE PES BRACU SBC), Dr. Md. Khalilur Rahman (Associate Professor of the School of Data & Sciences and Advisor of the IEEE RAS BRACU SBC), Prof. Celia Shahnaz (Professor, EEE, BUET and IEEE WIE Committee Chair-Elect 2022), Prof. Dr.

Creating Long-Term Impact for Sustainable Development Through IEEE Volunteering Real-Life Experience from Prof. Saifur Rahman, IEEE President-Elect 2022

Shaikh Anowarul Fattah (Professor, EEE, BUET and Vice Chair, IEEE PES Bangladesh section), Mr. Annajiat Alim Rasel (Senior Lecturer and Advisor to the IEEE CS BRACU SBC), Mr. Abdulla Hil Kafi (Advisor to the IEEE AEES BRACU SBC) and to name a few. As a spokesperson from the industry, Mr. Asad Zzaman, CEO of Reverie was also present in the event. Among all the prominent guests' appearance, the light was on the chief guest, Prof. Saifur Rahman, IEEE President-Elect 2022. Prof. Saifur Rahman, has been recently elected as the first-ever Bangladeshi IEEE President Elect-2022 of the IEEE Global. He was the former chair of the IEEE PES, US National Science Foundation Advisory Committee. He also founded the BEM Controls (BEM Controls, LLC—founded in 2015), an IOT based software firm that was developed at Virginia Tech's Advanced Research Institute. Prof. Saifur Rahman was the Founding Director of the Virginia Tech's Advanced Research Institute. He was also the Director at the Center for Energy and the Global Environment. Prof. Saifur Rahman spoke at the seminar on his IEEE journey through the years, his life lessons, and his volunteer experiences. He also provided some fresh perspectives on the IEEE Life Membership to the of younger generations.

To commemorate and celebrate this special milestone, Prof. Md. Mosaddequr Rahman presented the welcoming address, in which he fervently conveyed his gratitude and thanks to the visitors and the audience. Next, Prof. AKM Abdul Malek Azad's wonderful presentation was focused on the summary of the IEEE BRACU Student Branch Chapter's activities and recognitions from its origin to the present. Dr. Azad's bold approach complements BRAC University's globalization efforts and global partnerships. Dr. Azad is extremely hopeful about creating a platform with exceptional opportunity for undergraduate students to learn about the latest technological developments and attain significant milestones with their knowledge and make the best out of the IEEE Membership.



Next, the floor was honored with Prof. Celia Shahnaz's appearance. She emphasized the technical assistance, commitment, and hard effort that went into IEEE's achievement, as well as Prof. Saifur Rahman's involvement in showing the way and methods to a bright future for IEEE. Following her kind comments, Prof. Arshad M. Chowdhury, Dean of the School of Engineering, warmly invited Prof. Saifur Rahman, the event's primary speaker, to share his knowledge and experiences.

Creating Long-Term Impact for Sustainable Development Through IEEE Volunteering Real-Life Experience from Prof. Saifur Rahman, IEEE President-Elect 2022



Prof. Rahman started the speech by sharing his journey throughout all these years, his life lessons and volunteering stories. Everyone inside the house was captivated with his intriguing speech. He then talked about the motto that he obeyed leading to his simple yet successful life. Furthermore, he recommended that the young generation should follow the motto not only to become successful in their life but also to become more humane. The motto consists of three steps which are—to always aim high, work very hard and achieve your goal. In the following phase, Prof. Rahman pointed out a very crucial issue regarding social media platforms which is—how most of the time people post or share anything that is being heard from different sources. He suggested that the young generation should be completely aware of an event or a news and must fact-check before sharing their point of views on social media.

Prof. Rahman had introduced IEEE PES Chapters' Councils in Africa, China, India, and Latin America. These councils have empowered local leaders to initiate local programs. He also spearheaded the establishment of the PES University, which provides IEEE members with courses, tutorials, and webinars.

Talking about what IEEE ethics committee has to offer, Prof. Rahman stressed on ethical concerns for

Engineers in different fields and urged the younger generation to do what is legally correct for the organization's growth. Furthermore, Prof. Rahman proposed that IEEE Bangladesh Section should have more IEEE life memberships. He thinks that IEEE Life members are exposed to a broader network. Prof. Rahman added that IEEE Life members can motivate and encourage young avid learners so that they can ask questions fearlessly and voice their concerns confidently. Lastly, Prof. Rahman ended his speech with this exquisite tone "If you are working hard, sooner or later your hard work will be talking about yourself, then you will not need anyone to introduce yourself to others. Your work and your effort will tell everyone about you."



After an insightful Q&A session from the audience with Prof. Rahman, the department chair of BRACU Prof. Md. Mosaddequr Rahman honored Prof. Rahman and Prof. Shahnaz with the special recognition crest. Prof. Rahman expressed his firm gratitude and appreciation to the organizers for managing this spectacular event and maintaining protocol and safety in this challenging time. Pleasantries were exchanged among leaving guests and thus ended a lively session.

IEEE POWER & ENERGY SOCIETY

BRAC University Student Branch Chapter





IEEE PES BRACU STUDENT BRANCH CHAPTER

PRESENTS

Webinar on
Biomedical Engineering
Application and Career
Research Scope in Human Bond Communication,
Analyzing Cancer Cell Invasion through Advanced
Imaging & Algorithms

13 TH MARCH | 07 PM

PLATFORM
Google Meet

SPEAKERS



Dr. Ehsanul Haque Apu

*Postdoctoral Research Associate
& Faculty,
Department of Biomedical Engineering
Michigan State University, USA.*



Dr. Saifur Rahman Sabuj

*Postdoctoral Research Fellow
Department of Electronics & Control Engineering
Hanbat National University, South Korea*



MD. Saiful Islam Milon

*Executive Sales & Service Engineer
Technoworth Associates Ltd*

A webinar on “**Biomedical Engineering: Application & Career, Research Scope in Human Bond Communication, Analyzing Cancer Cell Invasion Through Advanced Imaging & Algorithms**”

01

The IEEE PES BRACU SBC hosted an engrossing webinar on March 13, 2021. The title of the webinar reads, "Biomedical Engineering: Application & Career, Research Scope in Human Bond Communication, Analyzing Cancer Cell Invasion Through Advanced Imaging & Algorithms."

Biomedical engineering is an interdisciplinary field that acts as a bridge between Medical and Engineering science. It is a vast field that involves expertise from a variety of engineering disciplines, yet just a few universities in Bangladesh provide bachelor's degrees in the field. In this webinar, our honorable speakers, Dr. Ehsanul Haque Apu, Dr. Saifur Rahman Sabuj, and Mr. Saiful Islam Milon, discussed these concerns about the biomedical engineering field distinctly.

Farin Ahmed, The Treasurer of the IEEE PES BRACU SBC, commenced

the session with a short introduction to the topic. Then she offered the floor to the guest speakers. From the beginning to the end of the webinar, honorable faculty members and professors from the Department of Electrical and Electronic Engineering (EEE) as well as the governing body of the IEEE PES BRACU SBC were present. The entire webinar was moderated by Maliha Binte Mohsin, secretary of the IEEE PES BRACU SBC.

Dr. Sabuj gave an instructive presentation regarding the core terminology of biomedical engineering as well as applications and research perspectives in the Human Bond Communication field (HBC). Dr. Sabuj is currently a Postdoctoral Research Fellow in the Department of Electronics and Control Engineering at Hanbat National University in South Korea. Later in his talk, he discussed how someone with an EEE background can work in the field of biomedical engineering, saying,

A webinar on “Biomedical Engineering: Application & Career, Research Scope in Human Bond Communication, Analyzing Cancer Cell Invasion Through Advanced Imaging & Algorithms”

01

"The Department of EEE is closely related to the field of biomedical engineering, so you can easily do your MSc or PhD in the field of biomedical engineering, and the biomedical engineering field has huge research scope."

Dr. Apu, who was the next speaker in the webinar and is currently working as a Postdoctoral Research Associate and Faculty in the Department of Biomedical Engineering at Michigan State University, USA, presented the audience some fascinating insights into Analyzing Cancer Cell Invasion Through Advanced Imaging & Algorithms. He discussed the importance of image analysis tools and algorithms in biomedical engineering research. Dr. Apu also gave the audience some intriguing insights about Analyzing Cancer Cell Invasion through Advanced Imaging & Algorithms. He is currently working as a Postdoctoral Research Associate and Faculty in the Department of Biomedical Engineering at the Michigan State University, USA.

MD. Saiful Islam Milon, a BRAC EEE alumnus who now works as an Executive Sales & Service Engineer at Technoworth Associates Ltd, was the webinar's final speaker. Mr. Milon spoke to the audience about the growing demand for biomedical engineers and how the government and other regional or multinational companies are looking for experts from other disciplines, particularly those with an EEE background, for biomedical engineering work in Bangladesh. Mr. Milon added that "About 90% of Engineers who are working in Biomedical Engineering fields are from EEE background. As Biomedical Engineering is quite new in Bangladesh".

The webinar ended with the speakers answering several questions from the audience. All the speakers expressed their generous gestures towards the organizers and assured to do more future collaborations with BRAC University.



SPEAKER



Dr. Tareq Aziz

Professor

Department of Electrical and Electronic Engineering
Ahsanullah University of Science & Technology (AUST)

**IEEE PES BRACU STUDENT BRANCH CHAPTER
PRESENTS**

Webinar on

DISTRIBUTED ENERGY RESOURCES: PROSPECTS, CHALLENGES AND SOLUTIONS

10 | 7:00 PM
APRIL (GMT +06:00)

Platform: Google Meet



PES Day 2021 – Webinar on Distributed Energy Resources

02

IEEE PES BRAC University Student Branch Chapter hosted a webinar on "Distributed Energy Resources: Prospects, Challenges, and Solutions" on April 10th, 2021, to celebrate IEEE Power and Energy Society (PES) Day 2021. The theme of this year's PES Day was "Clean Energy Revolution." In keeping with this ethos, the IEEE PES BRAC University SBC invited Professor Dr. Tareq Aziz to speak as the keynote speaker and share his profound insights on the topic.

Many faculty members and students from different universities, as well as executive body members and general members of IEEE PES BRAC University Student Branch Chapter, IEEE PES Bangladesh Chapter, and IEEE BRAC University Student Branch were present throughout the webinar. Professor Dr. Shahidul Islam Khan was also present among them. The discussion began with a brief

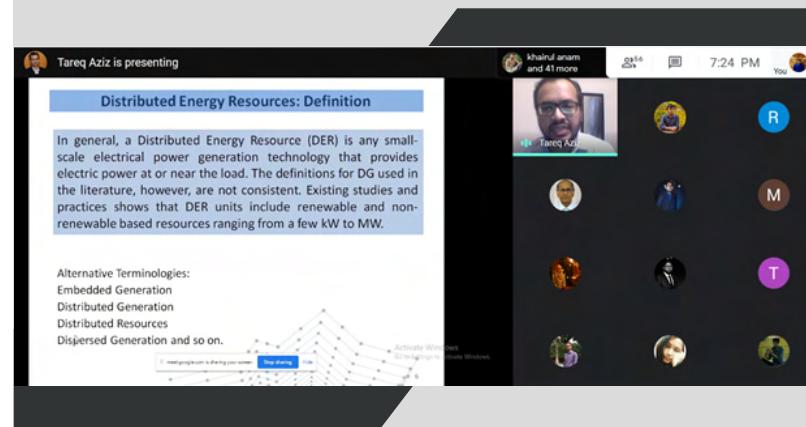
On behalf of the IEEE PES Bangladesh Chapter, the Chair of the 2020 – 2021 IEEE PES Bangladesh Chapter and Advisor to the IEEE PES BRACU SBC, Dr. Shahidul Islam Khan, welcomed the guests, organizers, and participants on behalf of the IEEE PES Bangladesh Chapter. Professor Khan spoke about the IEEE PES's outstanding activities in Bangladesh as well as the importance of the power engineering industry. "PES enriches and enhances our engineering courses," Professor Khan remarked. It is extremely useful for anyone interested in pursuing a career in power engineering. We held a meeting with the industry panel of our department, BRAC University's EEE department, today. They also emphasized that we should send our students to various organizations involved in power, electronics, and software development, and that we

PES Day 2021 – Webinar on Distributed Energy Resources

will soon have the infrastructure in place to allow you to design very large chip VLSI circuits. So, who wants to study or work in the field of power engineering? which is in high demand all over the world but also in short supply. Any small-scale electrical power generation system that supplies electrical power at or near its end is referred to as Distributed Energy Resources (DER), Embedded Generation, or Dispersed Generation. The language may differ, but the meaning in the power energy industry is essentially the same.

Dr. Tareq Aziz, the keynote speaker, presented the basics of Distributed Energy Resources, how Distributed Energy Resources technology works, how reliable, economical, and clean energy it is, as well as the challenges and potential solutions of DER integration in this webinar. Dr. Tareq Aziz is currently serving as a Professor in the Department of Electrical and Electronic Engineering at the Ahsanullah University of Science and Technology (AUST). He is a senior member of IEEE and is also the Vice-Chair of the 2020 – 2021 EEE PES Bangladesh. Before joining AUST, he served as an Assistant Professor at American International University-Bangladesh and as a lecturer at Khulna University of Engineering and Technology. Dr. Tareq earned his Ph.D. in Electrical Engineering from the University of Queensland, Australia. He earned both his Master of Science and Bachelor of Science in Electrical and Electronic Engineering from Bangladesh University of Engineering and Technology (BUET). His areas of interest include Smart Grid Applications, Power System Stability and Control, Renewable Integration into Power Grids, and Signal Processing.

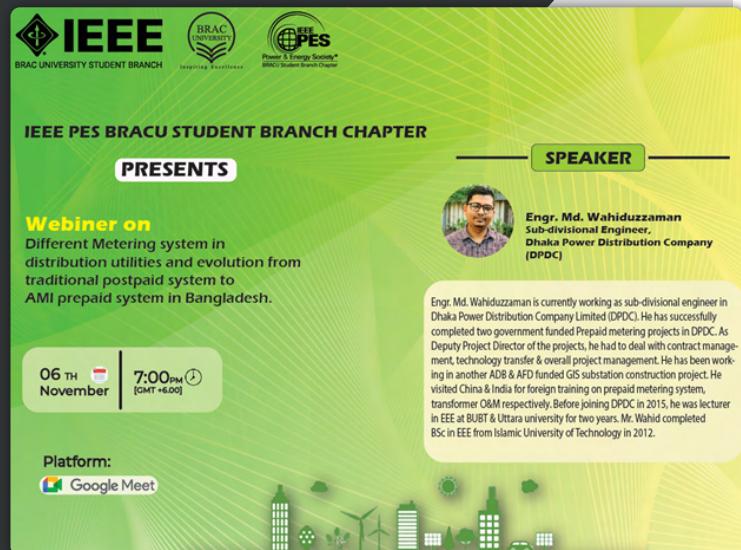
Throughout the presentation, Dr. Aziz emphasized the need for distributed energy resource integration. By introducing distributed energy resources (DER) into the system, you are enhancing distribution reliability. "Because you know, we actually started with the necessity of distributed energy resources, where we discovered that if something happens between the generating station and the customer, your power is lost." But this time, your electricity isn't lost because you're generating it yourself, so you've got a more stable source. " In his presentation, he also discussed the challenges and ways of solving them. Dr. Aziz received several questions from the audience and expounded on Distributed Energy Resources integration towards the end of his incredible presentation.



At the end of the webinar, Shoeb Shahrear Khan, the current Chair of IEEE PES BRAC University SBC, expressed his appreciation and gratitude to the speaker and the audience.

Different metering systems in distribution utilities and evolution from traditional postpaid systems to AMI prepaid systems in Bangladesh

03



IEEE PES BRACU STUDENT BRANCH CHAPTER

Presents

Webinar on
Different Metering system in distribution utilities and evolution from traditional postpaid system to AMI prepaid system in Bangladesh.

06 TH November | 7:00pm (GMT +6:00)

Platform:
Google Meet

SPEAKER

Engr. Md. Wahiduzzaman
Sub-divisional Engineer,
Dhaka Power Distribution Company
(DPDC)

Engr. Md. Wahiduzzaman is currently working as sub-divisional engineer in Dhaka Power Distribution Company Limited (DPDC). He has successfully completed two government funded Prepaid metering projects in DPDC. As Deputy Project Director of the projects, he had to deal with contract management, technology transfer & overall project management. He has been working in another ADB & AFD funded GIS substation construction project. He visited China & India for foreign training on prepaid metering system, transformer O&M respectively. Before joining DPDC in 2015, he was lecturer in EEE at BUBT & Uttara university for two years. Mr. Wahid completed BSc in EEE from Islamic University of Technology in 2012.

IEEE PES BRAC University Student Branch Chapter hosted a webinar on "Different metering systems in distribution utilities and evolution from traditional postpaid systems to AMI prepaid systems in Bangladesh" on November 6, 2021. It was for curious minds who wanted to learn more about Bangladesh's AMI prepaid system from experts in this field.

An electric meter is a gadget that keeps track of how much energy has been used. The meter serves as a vital link between the electricity consumer and the electricity provider. It's an electronic device that is used to track how much electricity is consumed by a consumer. Several factors have contributed to the emergence of the prepayment metering concept in Bangladesh, with the benefits to all involved groups in the concept and its acceptability in mind. The prepaid system is gaining popularity around the world as utilities explore new ways to improve customer service, increase cash flow, and reduce risk. The prepaid principle will remain the same, but the application will undergo a paradigm shift. It's a whole new world in metering Bangladesh,

and it's going to be crucial for revenue and energy management. This will allow for new avenues for infrastructure investment and implementation in the coming days, allowing for enhanced customer service. In this webinar, our honorable speaker, Engr. Md. Wahiduzzaman, discussed these concerns about the distribution utilities and the evolution to the advanced metering infrastructure prepaid system in Bangladesh distinctly.

Engr. Md. Wahiduzzaman is currently working as a sub-divisional engineer for Dhaka Power Distribution Company Limited (DPDC). He has successfully completed two government-funded prepaid metering projects in DPDC. As Deputy Project Director of the projects, he had to deal with contract management, technology transfer and overall project management. He has been working on another ADB and AFD-funded GIS substation construction project. He visited China and India for foreign training on prepaid metering systems and transformer O & M, respectively. Before joining DPDC in 2015, he was a lecturer in EEE at BUBT and Uttara University for two years. Mr. Wahid completed BSc in EEE from the Islamic University of Technology in 2012. The discussion began with a brief introduction to the topic by Farin Ahmed, Treasurer of the IEEE PES BRACU SBC. Then she gave the floor to the speaker and also served as the session's moderator.

The keynote speaker, Engr. Md. Wahiduzzaman, presented the basics of metering systems, how they work and do proper measurement, how reliable they are for the economy, as well as the benefits and challenges of advanced metering infrastructure prepaid systems in this webinar. Before starting the session, he discussed with the audience their interests and mindsets for government jobs in the power

Different metering systems in distribution utilities and evolution from traditional postpaid systems to AMI prepaid systems in Bangladesh

03

industry. He also points out the benefits, procedures and opportunities of working in the government-controlled power industry.



Throughout the presentation, Md. Wahiduzzaman emphasized the need for an advanced metering infrastructure prepaid system. By introducing the advanced metering infrastructure prepaid system, you are enhancing distribution reliability and reducing consumer suffering. It is also reducing the extra fine which was faced by consumers when the system was manual and postpaid. He discussed the running principle of this system. He also informed the

audience about their upcoming metering plans, which is going to be a totally IoT-based system, where the meter can automatically communicate with the provider. It will be beneficial for the large industrial customer. After that, he discussed the challenges of this new system. Finally, there was an interlocutory question and answer session with the audience.

At the end of the webinar, Md. Abrar Hossen Faiyaz, the current Vice-Chair of IEEE PES BRAC University SBC, expressed his gratitude to the speaker and the audience. There were more than 40 participants from different universities who were mostly interested in power specialization.

IEEE POWER & ENERGY SOCIETY

BRAC University Student Branch Chapter



JOINT WEBINARS

PES BDC LYL SERIES

Lead the Young Leaders for Technology Beyond the Border



Speaker
Dr. Shay Bahramirad
 IEEE-PES Vice President, New Initiative and Outreach
 Vice President, Climate and Resilience, Quanta Technology, USA
 Adjunct Professor at Illinois Institute of Technology, USA;

TOPIC : POWER THE PLANET WITH SUSTAINABLE ENERGY

 29th September 2021  8:30 pm BDT (GMT +6)

 Platform : Zoom
 Meeting ID: 630 5694 1227

Organized and/or Supported by









IEEE Power and Energy Society (PES) Bangladesh Chapter has recently launched a new event series: Lead the Young Leader (LYL) with Technology Beyond the Border. The IEEE PES Bangladesh Chapter, in collaboration with IEEE SSIT Bangladesh Chapter, IEEE International Islamic University Chittagong PES SBC, IEEE BUET PES Student Branch Chapter, IEEE PES BRAC University Student Branch Chapter, IEEE Green University PES Student Branch Chapter, IEEE Power and Energy Society Rajshahi University Student Branch Chapter, IEEE East West University Student Branch, IEEE Stamford University Student Branch, and IEEE University of Rajshahi Student Branch, successfully organized the 3rd LYL series webinar titled "POWER THE PLANET WITH SUSTAINABLE ENERGY", which started on September 29th, 2021 at 8:30 pm (GMT+6). The webinar speaker, Dr. Shay Bahramirad, is the Vice-President of IEEE PES, New Initiative & Outreach. She is also Vice President of Climate and

Power the Planet with Sustainable Energy

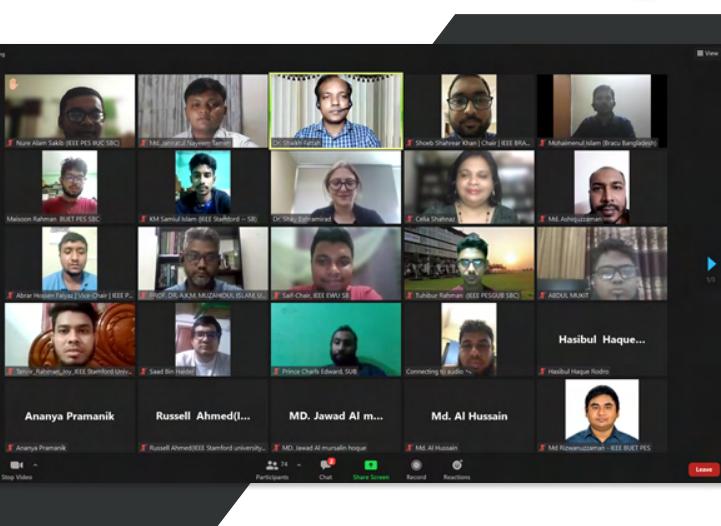
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Resilience at Quanta Technology, USA, as well as an Adjunct Professor at Illinois Institute of Technology, USA. The webinar was moderated by Dr. Shaikh Fattah, Vice-Chair, IEEE PES Bangladesh Chapter (BDC) and Professor, Department of EEE, BUET. ASM Jannatul Nayeem Tamim, Member, IEEE PES BRACU SBC, welcomed participants and discussed the rules and regulations, as well as the etiquette that should be observed throughout the webinar.

Shay Bahramirad is the Vice President of Climate and Resilience at Quanta Technology. She is in charge of supporting cities and utilities with climate change risk assessments of their assets, operations, and services, as well as establishing climate change mitigation and investment programs. Her work helps to power the planet by reducing carbon emissions, improving air quality for everyone, and strengthening communities. Her work powers the planet by reducing carbon emissions, creating cleaner air for everyone, and making communities resilient. Dr. Bahramirad has held several positions in the energy sector, including Vice President of Engineering and Smart Grid at ComEd, the electric utility in IL. She has managed and/or implemented "grid of the future" visions, technology roadmaps, analytical frameworks, and investment strategies in these roles. She has also been responsible for system reliability, DER integration, grid strategy and analytics, standards, emerging technologies, STEM programming, and reimagining the power grid to mitigate and adapt to climate change. She has also developed talent strategies,

Power the Planet with Sustainable Energy

01



industry engagement plans, and advocacy programs to support business objectives.

Dr. Shay Bahramirad's speech was based on how to power up the planet with sustainable energy. She briefed them about the current scenario, challenges and solutions, as well as overall goals. She also gave a few examples related to distributed renewable energy solutions. She specifically stated the situation in Africa and described renewable energy as a means for sustainable development for the continent. In her speech, she addressed the idea of a smart village. Dr. Shay Bahramirad also highlighted some pathways and statistics so that we could overcome the challenges. She mentioned the initiatives and international support for this type of project. She concluded her talk by mentioning her desire to work on this kind of project and also motivated the listeners by saying that if anyone wants to work with her on this kind of project, they can directly communicate with her. Through this virtual webinar, the participants got a chance to learn about these topics

briefly and their aspects. Finally, the webinar came to an end with a question & answer session. Our keynote speaker, Dr. Shay Bahramirad answered our questions and cleared our doubts very nicely.

Some effective speeches were delivered by some of the honorable professors from different universities: Prof. Celia Shahanaz, WiP R10 Representative and immediate past Chair of IEEE Bangladesh Section, Prof. Moshiul Hoque, Chair, IEEE Bangladesh Section, on behalf of Dr. Md. Mosaddequr Rahman, Chair, IEEE PES BDC, Mohaimenul Islam, Secretary, IEEE PES BDC, Mr. Redwan Farhan, Treasurer, PES BDC, Dr. Bashudeb Chandra Ghosh, Prof. Dr. Muzahidul Islam, where they expressed their wholehearted gratitude towards the honorable speaker and all the participants for their valuable participation in the webinar. The hosts, ASM Tamim, concluded the session by thanking all the respected speakers, guests and audiences. There were more than 95 participants from more than 65 universities, and many honorable participants who joined this webinar from all over the country.

PES BDC LYL SERIES

Lead the Young Leaders for Technology Beyond the Border



Speaker
Dr. Lina Bertling Tjernberg
 Professor, KTH Royal Institute of Technology, Sweden
 Director, KTH Energy Platform
 Distinguished Lecturer of IEEE PES
 Secretary (2014-16) & Treasurer(2012-14) IEEE PES Governing Board

TOPIC : ELECTRICAL VEHICLES FOR A SUSTAINABLE SOCIETY

30th September 2021 7:00 pm - 8:00 pm BDT (GMT +6)

Platform : Zoom
 Meeting ID: 697 9295 9832

Organized and Supported by



The IEEE Power and Energy Society (PES) Bangladesh Chapter has recently launched a new event series: Lead the Young Leader (LYL) with Technology Beyond the Border. The IEEE PES Bangladesh Chapter, in collaboration with IEEE SSIT Bangladesh Chapter, IEEE International Islamic University Chittagong PES SBC, IEEE BUET PES Student Branch Chapter, IEEE BRAC University PES Student Branch Chapter, IEEE Green University PES Student Branch Chapter, IEEE Power and Energy Society Rajshahi University SBC, IEEE East West University Student Branch, IEEE Stamford University Student Branch, and IEEE University of Rajshahi Student Branch, successfully organized the 3rd LYL series webinar titled "Electrical Vehicles for a Sustainable Society", which started on September 30th, 2021 at 7 pm (GMT+6). The webinar speaker, Dr. Lina Bertling Tjernberg, has been a Full Professor in Power Grid Technology at KTH—the Royal Institute of Technology—since 2013. The webinar was

Electrical Vehicles for a Sustainable Energy

02

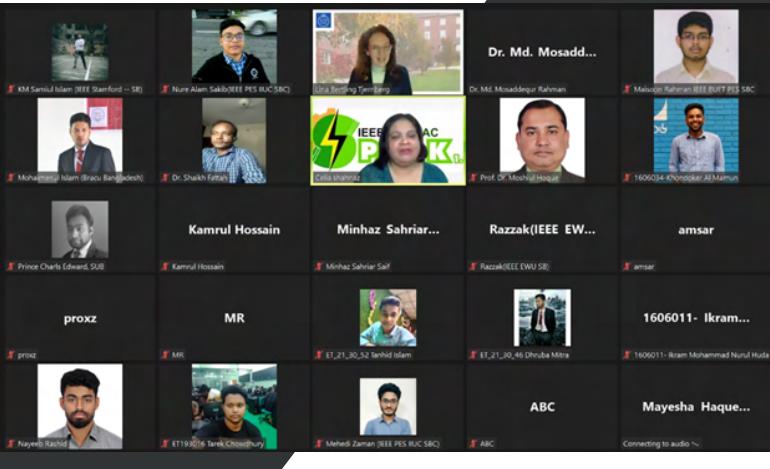
moderated by Dr. Shaikh Fattah, Vice-Chair, IEEE PES Bangladesh Chapter (BDC) and Professor, Department of EEE, BUET. Md. Maisoon, Chair of the IEEE BUET PES SBC, welcomed the participants and discussed the rules and regulations, as well as the etiquettes that should be observed throughout the webinar.

Lina Bertling Tjernberg (Docent, Ph.D., MSc.) is a Professor in Power Grid Technology at KTH—The Royal Institute of Technology, Stockholm, Sweden. She is Director of the Energy Platform, which coordinates and supports multidisciplinary research initiatives within the energy areas, and is the coordinator of lifelong learning at the school of Electrical Engineering and Computer Science (EECS) at KTH. She received the 2021 Power Woman of the Year award from Energy Minister Anders Ygeman for her work and a "strong force and guarantor of more equal skills provision in today's and future sustainable energy systems". Her research and teaching are focused on applying mathematics (e.g., statistics, optimization, life cycle assessment) to predict and model reliability and the impact of maintenance efforts for various electric power system applications. The research interests include future technologies (e.g. microgrids, battery storage, wind/solar), designs, and operation of the power grid, including electrified transportation.

Dr. Lina Bertling Tjernberg's speech was based on how electric vehicles (EVs) are helpful for a sustainable society. She briefed about EV challenges and solutions as well as overall goals. She also gave a few

Electrical Vehicles for a Sustainable Energy

02



examples related to EVs. She especially stated the situation in Europe and described the EV for sustainable development from a European perspective. Her speech also included plug-in electric vehicles (PEV). She addressed PEVs as a subset of electric vehicles. Dr. Lina Bertling Tjernberg also highlighted some statistics so that we could understand the current EV situation and its challenges. She also discussed why EVs are the leading technology for a sustainable society. European green deal calls and the European battery alliance were mentioned in her talk. She also gave examples of important projects and incentives like tax benefits for EVs in Europe. She mentioned the car race in 2011 where all the cars had environmental technology. She emphasized that investing in the R & D sector is needed for EV industry growth. From her talk, we came to know that the automotive industry is undergoing a massive electrification program and a new battery industry along the value chain is under development. She concluded her talk by mentioning the

"EU Fit for 55" program. Through this virtual webinar, the participants got a chance to learn about these topics briefly and their aspects. Finally, the webinar came to an end with a question & answer session. Our keynote speaker, Dr. Lina Bertling Tjernberg answered our questions and cleared our doubts very nicely.

Some effective speeches were delivered by some of the honorable professors from different universities: At the end of the webinar, Prof. Celia Shahana, WiP R10 Representative and immediate past Chair of the IEEE Bangladesh Section; Prof. Moshiul Hoque, Chair of the IEEE Bangladesh Section; Dr. Md. Mosaddequr Rahman, Chair of IEEE PES BDC; Mohaimenul Islam, Secretary of IEEE PES BDC; and Mr. Redwan Farhan, Treasurer of PES BDC, expressed their wholehearted gratitude towards the honorable speaker and all the participants for their valuable participation in the webinar. The hosts, Md. Maison, concluded the session by thanking all the respected speakers, guests and audiences. There were more than 80 participants from more than 50 universities and many honorable participants who joined this webinar from all over the country.

PES BDC LYL SERIES
 Lead the Young Leaders for Technology Beyond the Border



Speaker
Dr. Sri Niwas Singh ,Fellow of IEEE
 Professor, Dept of EE, IIT, Kanpur,
 India, Past-Chair, IEEE India Council
 Vice-chair, IEEE R10 Technical Activities (2019–20)

Topic : Digital Energy Transformation

 30th September 2021  8:00 pm - 9:00 pm BDT
 (GMT +6)

 Platform : Zoom
 Meeting ID: 697 9295 9832

Organized and Supported by



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Digital Energy Transformation

03

well as an Adjunct Professor at Illinois Institute of Technology, USA. The webinar was moderated by Dr. Shaikh Fattah, Vice-Chair, IEEE PES Bangladesh Chapter (BDC) and Professor, Department of EEE, BUET. ASM Jannatul Nayeem Tamim, Member, IEEE PES BRACU SBC, welcomed participants and discussed the rules and regulations, as well as the etiquette that should be observed throughout the webinar.

Shay Bahramirad is the Vice President of Climate and Resilience at Quanta Technology. She is in charge of supporting cities and utilities with climate change risk assessments of their assets, operations, and services, as well as establishing climate change mitigation and investment programs. Her work helps to power the planet by reducing carbon emissions, improving air quality for everyone, and strengthening communities. Her work powers the planet by reducing carbon emissions, creating cleaner air for everyone, and making communities resilient. Dr. Bahramirad has held several positions in the energy sector, including Vice President of Engineering and Smart Grid at ComEd, the electric utility in IL. She has managed and/or implemented "grid of the future" visions, technology roadmaps, analytical frameworks, and investment strategies in these roles. She has also been responsible for system reliability, DER integration, grid strategy and analytics, standards, emerging technologies, STEM programming, and reimagining the power grid to mitigate and adapt to climate change. She has also developed talent strategies, industry engagement plans, and advocacy programs to support business objectives.

Digital Energy Transformation

03

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Through this virtual webinar, the participants got a chance to learn about these topics briefly and their aspects. Finally, the webinar came to an end with a question & answer session. Our keynote speaker, Dr. Shay Bahramirad answered our questions and cleared our doubts very nicely. Some effective speeches were delivered by some of the honorable professors from different universities: Prof. Celia Shahanaz, WiP R10 Representative and immediate past Chair of IEEE Bangladesh Section, Prof. Moshiul Hoque, Chair, IEEE Bangladesh Section, on behalf of Dr. Md. Mosaddequr Rahman, Chair, IEEE PES BDC, Mohaimenul Islam, Secretary, IEEE PES BDC, Mr. Redwan Farhan, Treasurer, PES BDC,

Dr. Bashudeb Chandra Ghosh, Prof. Dr. Muzahidul Islam, where they expressed their wholehearted gratitude towards the honorable speaker and all the participants for their valuable participation in the webinar. The hosts, ASM Tamim, concluded the session by thanking all the respected speakers, guests and audiences.. There were more than 95 participants from more than 65 universities, and many honorable participants who joined this webinar from all over the country.

IEEE Computer Society

BRAC University Student Branch Chapter



WEBINAR ON QUANTUM COMPUTING

A Friendly Introduction to Quantum Computing

Webinar on 27th August, 2021

Time: (7:30 - 9)pm

Registration: 23 August - 26 August

Registration Open for ALL

Omar Shehab

Theoretical Quantum Computer Scientist at IBM Thomas J Watson Research Center, NY

IEEE COMPUTER SOCIETY
BRACU Student Branch Chapter

IEEE
BRAC UNIVERSITY STUDENT BRANCH

A webinar on “Quantum Computing”

01

IEEE CS BRACU SBC organized a remarkable webinar on the introduction to Quantum Computing called “A Friendly Introduction to Quantum Computing” for the students in the field of STEM (Science, Technology, Engineering, and Mathematics) in order to introduce them to the basic concepts of quantum computing followed by problem-solving approaches as a quantum computer scientist to typical computer science problems, which would lead the participants to the breakthroughs of advancements in Artificial Intelligence and Machine Learning applied in drug discovery, cybersecurity, cryptography, robotics, and banking through quantum computing.

Omar Shehab, Quantum Computing Applications Researcher at the IBM Thomas J Watson Research Center, New York was the speaker of this webinar. His works comprise of quantum and classical complexity

theory, quantum algorithms, quantum simulation and quantum machine learning. The webinar was conducted on 27th August, 2021 and 200 students from different institutional backgrounds participated in the event.

The event happened to be very interactive since the participants got valuable insights from Scientist Shehab on the importance of Quantum Computing as he described different Quantum algorithms from different timelines and how this technology promises to be an advanced version of the standard computers that we use today. The speaker also elaborated that unlike the binary encoding system of a conventional computer, Quantum Computers are powered by superposition and entanglement that focus on developing computer technology based on the principles of quantum theory. Furthermore, he marked out how molecular design, drug delivery in the field of pharma, chemical processes, material design in energy,

A webinar on “Quantum Computing”

01

navigation logistics in transportation and market models in finance are potential markets of Quantum Computing. In addition, our speaker discussed the principal applications of NISQ computers as well as the domains of application where quantum computing is well understood in the simulation of physics/chemistry but is still under investigation in hard optimization problems.

Lastly, our speaker gave his final touch by showing his statistics on the global message count in regard to quantum computing. He added that the scope of Quantum Computing in Bangladesh is increasing day by day, especially in academia. The webinar ended with fruitful discussions and question-answering sessions between the speaker and the participants, where students got to know more about the career opportunities, job sectors and institution offers, threats and prospects of using Quantum Computing in different fields.

WEBINAR ON

RICHARD E. MERWIN STUDENT SCHOLARSHIP

EVENT DATE & TIME: 23RD APRIL (3-4PM)

JAWARIL MUNSHAD ABEDIN
REM Scholar, Fall 2020
Former Vice Chair, IEEE CS BRACU SBC

AHMAD AZUAD YASEER
REM Scholar, Spring 2019
Former Chair, IEEE IUT SB
Former Chief, IEEE CS BDC Team SPARK

KAZI SAJEED MEHRAB
REM Scholar, Fall 2020
Former Program Coordinator,
IEEE BUET SB
Former Chair, IEEE CS BUET SBC

A webinar on “Richard E. Merwin Scholarship”

02

IEEE CS BRACU SBC organized a significant webinar regarding the IEEE Computer Society Richard E. Merwin Student Scholarship in order to pave the way for students to acknowledge the opportunity of one of the most prestigious recognitions available. This webinar allowed students to explore the sense of serving as a regional student ambassador of the IEEE Computer Society, as well as of recognizing the recipients of the scholarship with a cash prize of US \$1,000.

The webinar was conducted on 23rd April, 2021 and students from different institutional backgrounds attended the webinar with no registration fee. More than 150 students from different universities participated in the event and got valuable insights from the scholarship recipients on the requirements, application periods, evaluation criteria and benefits of attaining the scholarship.

Jawaril Munshad Abedin, REM Scholar (Fall 2020), former Vice Chair of IEEE CS BRACU SBC 2020; Kazi Sajeed Mehrab, REM Scholar, of Fall 2020, former Program Coordinator of IEEE BUET SB, former Chair of IEEE CS BUET SBC and Ahmad Azuad Yaseer, REM Scholar, of Spring 2019, former Chair of IEEE IUT SB, former Chair of IEEE CS BDC Team SPARK were the keynote speakers of the webinar.

The speakers enlightened the participants with the eligibility criteria to procure the award that included: being a volunteer of an IEEE SB or an IEEE CS SBC as an active IEEE CS student member having minimum CGPA of 2.5/4 or exam marks of at least 60% for undergraduate students who are in 3rd/4th year studying Electrical or Computer Engineering, Computer Science or a Computer Engineering

A webinar on “Richard E. Merwin Scholarship”

02

related field. Members must have at least 3 months of membership prior to submission of application and have a minimum of one-year studies left. It was also mentioned that REM winners of previous years cannot apply and a member can apply only once in a year either in the application period of April (Spring session) or in September (Fall session). In particular, official academic transcripts of all terms and letter of recommendations from SBC Advisor or SB Counselor are a must to apply. Moreover, evaluation criteria for the scholarship was highlighted and long-windedly discussed by the speakers.

Our honorable REM winner Jawaril Munshad Abedin from BRAC University shared her comprehension of receiving this scholarship by emphasizing on the IEEE activities, especially on the leadership roles. Scholar Jawaril shared about the leadership roles during her IEEE journey as an EB including her contributions of organizing some noteworthy events. She mentioned one of the remarkable events that she contributed to organize, which was a project-showcasing contest named “COVID-19 Combatants Unification Competition - CCUC” in which more than 72 students throughout Bangladesh participated. Also, she highlighted the importance of non-IEEE extracurricular activities. She illustrated a very crucial part for receiving the award—her unique vision statement that she would like to take initiatives to encourage more female students to participate in the field of STEM who face the lack of motivation in the field of engineering

in our country. Finally, further to-dos and submission details were discussed along with the benefits of this scholarship comprising Regional Ambassadorship of IEEE CS, membership of IEEE and IEEE CS for 2 years and receiving up to 1000 USD.

The webinar happened to be one of the most important and informative events for students and we hope it facilitated the learning ground for the participants to achieve the most out of their career paths through ambassadorship.

PAPER WRITING & EDITING: SOME POINTS

 DATE & TIME:

**27th March
6.30pm BST**

 Organized by:





SPEAKER

Md Atiqur Rahman Ahad

PhD, SMIEEE.
Professor, University of Dhaka
Specially Appointed Associate Professor, Osaka University
Editorial Board Member, Scientific Reports, Nature Publishing Group

 Meeting ID: 696 610 8797
Password: 1234

A webinar on “Scientific Paper Writing and Editing”

03

IEEE CS BRACU SBC successfully conducted its first webinar of this year regarding Paper Writing and Editing to create inspiration about research activities among young minds to bring them closer to research participation and development on 27th March, 2021. This webinar allowed many students to explore the great significance of achieving expertise on the writing process on a deeper level.

The webinar had satisfactory participation from students of different universities who registered to join by filling up a google form before the event. No registration fee was required to participate in the webinar. The speaker for this webinar was PhD SMIEEE, Professor of University of Dhaka, Md Atiqur Rahman Ahad, who is specially appointed as an Associate Professor at Osaka University Editorial board member, Scientific Reports, Nature

Publishing Group. The webinar was conducted online via Zoom platform.

Mr Rahman conveyed his valuable knowledge and insights with regard to Paper Writing and Editing. Moreover, the session was interactive as participants were able to ask them desirable questions concerning research or thesis paper writing and share their thoughts related to it. Thus, a lot of information, advice and suggestions for example, dos and don'ts, avoiding plagiarism, research techniques from the speaker made the event much worthwhile. The webinar was organized for students to learn the well-crafted steps to write papers which will serve them well throughout their career.

A BRIEF INTRODUCTION TO BLOCKCHAIN TECHNOLOGY



Dr. Md Sadek Ferdous

- ERCIM Alain Bensoussan Fellow
Fraunhofer Institute for Applied Information Technology, Sankt Augustin, Germany.
- Associate Professor
Department of Computer Science & Engineering, BRAC University, Dhaka, Bangladesh.
- Founder & Advisor
Shahjalal University Blockchain and Security Laboratory.
- Research Associate
Centre for Financial Technology, Imperial College Business School, London, UK.

29th September, 8pm

A Brief Introduction to Blockchain Technology

04

IEEE Computer Society (CS) Brac University Student Branch Chapter arranged a webinar on Blockchain technology, the title reads “A Brief Introduction to Blockchain Technology”—for the STEM students (Science, Technology, Engineering, and Mathematics) in order to introduce them with the decentralized and trustless nature of blockchain and how it can lead to new opportunities and enhance their professional careers through greater transparency, enhanced security, and easier traceability.

The webinar was conducted virtually on September 29, 2021 and it was open for all as any university students from any educational background could attend with no registration fee. More than 150 students from different institutional backgrounds registered to participate in the event.

Blockchain researcher and Principal Author of the book National Blockchain Strategy of Bangladesh, Dr. Md Sadek Ferdous, a RCIM Alain Bensoussan Fellow at Fraunhofer Institute for Applied Information Technology, Sankt Augustin, Germany and current Associate Professor at Department of CSE in BRAC University was the guest speaker of this event. Moreover, he is also the Founder and Advisor of Shahjalal University Blockchain and Security Laboratory and Research Associate at the Centre for Financial Technology, Imperial College Business School, London, UK as well.

The event was enlightening for the participants as the speaker motivated them emphasizing on how Blockchain technology has been adopted by more than one-third of the companies in the world and its sky-rocketing demand for blockchain developers is ever-increasing. He started his discussion by describing the background history of bitcoin and its introduction in the digital

A Brief Introduction to Blockchain Technology

04

currency timeline. Then he proceeded by talking about cryptography and how mathematical algorithms are important for deriving trust. In addition to this, profound researcher Mr. Ferdous stressed that blockchain technology is the example of distributed ledger and shares the similar pattern with centralized ledger in tackling decentralized trust issues. Our speaker also elaborated that once a block is part of the chain, transactions inside it are practically irreversible after a certain period of time. Furthermore, he also pointed out cryptographic hash functions and how distributed consensus ensures the changes in distributed ledger in a synchronized manner. He elaborated different components of blockchain. For instance, public and private keys of users, bitcoin address and bitcoin wallet, network, bitcoin blocks and transactions. Lastly, Mr. Ferdous placed his final touch on Ethereum and bitcoin mining and its applications. Finally, the webinar came to end with an interactive discussion and question-answering session among the participants and the speaker.

The event was incredibly beneficial to the participants as with the rapid progress of blockchain technology and its numerous benefits to different industries, students can expect to have an exposure in the field of blockchain technology, unleash their inner potential and explore the ubiquitous learning-tools and resources.

IEEE Computer Society

BRAC University Student Branch Chapter





PRESENTS

**BOOTCAMP ON
WEB DEVELOPMENT
USING ReactJS**



SCAN ME

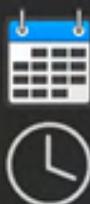
Registration Deadline



11:59 PM [GMT +6:00]

January 14, 2020

Event Details



January 15-16, 2021



8:00 PM- 9:30 PM [GMT +6:00]

Bootcamp on Web Development using React JS

01

IEEE CS BRACU SBC successfully organized an online Bootcamp session from 15 January to 16 January, 2021. It was the very first event of 2021. The event was successfully organized in two days. The main idea of this event was to introduce and teach undergraduate students about the world's most popular JavaScript framework and for the students who are keen to know the importance of React JS and how actually it works. No prior knowledge on React JS was needed to attend the Bootcamp. The Bootcamp was instructed by Md. Al Imran Sefat, experienced Full stack Developer and former Flutter and Lead IOS developer at Hishabee Business Manager.

In this Bootcamp, participants were introduced with the opportunities to learn basics of React JS, and why React ReactDOM & JSX are used. React functional components, components separation, and components child-parents interrelationship were explored in depth throughout the bootcamp. As the final exams were approaching, the rest of the sessions were decided to be conducted in January on request of the participants.

Styling React with CSS Class, inline styling, what are "props", mapping components, class-based components, React state of components, event functions, react lifecycle methods are planned to be introduced in the subsequent sessions. If time permits, conditional rendering, fetching data from an API, React Hooks, state-based component behavior will also be shown. The Bootcamp had a satisfactory number of participants from different universities and no registration fee was required to attend this Bootcamp. The Bootcamp seemed to be very informative and thus making the two-day event more effective. By the end of the Bootcamp, the participants were provided with E-certificates as a token of their effective participation along with the recording of the Bootcamp. By conducting this successful Bootcamp session, we hope that all the participants can kick-start their careers as web developers and start a reliable source of income.



COMPETITION

Project Tech Tussle 2021 Competition

01



IEEE CS BRACU SBC organized a competition titled as Project Tech Tussle 2021. The purpose of this competition was to showcase the skill of tech enthusiasts in their interested field of innovation.

The participants had the privilege to submit their project in individual or as a team addressing different categories such as Machine Learning (ML), Web-based projects, App Development, Software Based Project individually or in a team. The registration timeline was from 5th to 23rd February 2021. The provided timeline of submission was 10th to 28th February. We selected some of the most prominent faculty members as the judges of our competition. The mark distribution for the submitted project was 10% for innovation, 20% for user interface, 30% for impact, 10% for feasibility, 10% for scalability, 10% for sustainability and lastly 10% for originality.

simulation software will be used in the first and second rounds of the preliminary round. Teams will be required to create a Java application that will be executed in a simulation that will be nearly identical to the real Astrobee race. In the final round, however, all finalists would solve the problem and have their software uplinked from Earth to the International Space Station, where it would be run on the Astrobee robot.

Bangladesh has a gem named Mizanul Chowdury who works at MIT and NASA in the United States, but JAXA did not include Bangladesh in the first KIBO RPC in 2020. He persuaded JAXA to include Bangladesh in the KIBO RPC's initial edition. Bangladesh could not be added because the competition had already begun. Bangladesh, on the other hand, has been added as a competition observer by JAXA. Enigma Systems, a team from BRAC University's IEEE RAS BRACU SBC, competed in the observer program and finished third. Bangladesh was included in the second KIBO RPC.

Workshop and Hackathon “Web Tech Hackathon 2021”

02

IEEE CS BRACU SBC had successfully organized its first mega online workshop of 2021 on Web Development consisting of the highest number of participants till date followed by a Hackathon titled “Web Tech Hackathon 2021” for participants to distil their visionary concepts down to actionable solutions. The workshop sessions of Web Tech hackathon were held throughout the month of June, 2021 before the 3 days long Hackathon began on 2nd of July.

The first week of June, 2021 was the registration period for this hackathon with a certain amount of registration and a total of 114 teams registered online, making a history of attaining the highest number of participants for any event of IEEE BRACU SBC.

The workshop sessions were instructed by S M Shahriar Islam, Data Engineer at Pathao who groomed the participants to learn modern web development and how to approach to solutions for real life scenario-based problem

cases. Front end and backend development tools e.g. Basic JavaScripts, ReactJS, NodeJS, ExpressJS, mySql database, Rest API were one of those main focus concepts of the training sessions.

In the hackathon, two problem-based scenarios were given on 2nd July and contestants had to develop and submit a solution to one of their given problem statements within 4th July in their github repositories. Innovation, video presentation, originality, sustainability and feasibility, user interface, relevancy with the situation and problem-solving approach were the main assessment criterias. In addition, most prominent faculty members of BRAC University were in the judging panel for this hackathon. More than 20 teams participated in the hackathon after learning from the training sessions. For creating exquisite solutions to the given problem statements, Team Dynabyte was evaluated to be the champion of the hackathon and the 1st and 2nd runners up were team Sentinels and team Code Breakers respectively. Also, submissions from team Martians and team Purple Rain were exemplary enough for them

WEB TECH HACKATHON 2021

3 DAYS

Starts: 2nd July, 2021
Ends : 4th July, 2021

< Important_Info >
< Workshop >
Classes will be taken 3 days / week
< /Workshop >

< Hackathon >
A problem will be given on 1st July and participants have to submit a solution solving the situation
< /Hackathon >
< /Important_Info >

Hackathon Day

1ST PRIZE TK. 6000
2ND PRIZE TK. 4500
3rd PRIZE TK. 3000

Web Development Classes

Class Contents

- Review of Javascript ES6
- Frontend development with React JS
- Backend development with Node JS
- Github Crash Course

Training on Web Development for 11 days

Starts: 8th June, 2021
Ends : 28th June, 2021

Instructor:
S M Shahriar Islam
Data Engineer at Pathao

Registration & Fees

Registration Starts : 1st June, 2021
Ends : 7th June, 2021
Team Member 3 max

Fees
No IEEE members in team : Tk.300
Atleast 1 IEEE member in team : Tk.200

Only BRAC University Students are Eligible

COMPETITIONS

Workshop and Hackathon “Web Tech Hackathon 2021”

02

to attain 4th and 5th positions respectively. The rewards of the Hackathon were- prize money of 6000 BDT for the champion team, 4500 BDT for the 1st runner up and 3000 BDT for the 2nd runner up teams. Not to mention, the winning certificates and crests were given to each member of the top 5 teams. Besides, each member of the judging panel, instructor as well as the best two volunteers was given a crest as a token of appreciation.

Additionally, all the participants of the hackathon and all the volunteers were honored with participation certificates. We are hopeful that the completion of the sessions and the experience from the hackathon provided an opportunity for participants to be more aware of their own capabilities and facilitate the learning of creating innovative ideas and concepts.

Winners

 of
 Web Tech Hackathon
 2021

Champion

Team Dynabyte

 Md.Sakibur Rahman
 Tanjid Ahmed
 Tanvir Rahman

 1st
 Runners Up
 Team Sentinels

 Gazi Hasin Ishrak
 Arman Hossain
 Zarin Tahia Hossain

 2nd
 Runners Up
 Team Code Breakers

 Warsi Sarjeel Rahman
 Nafim Ahmed Bin Mohammad Noor
 Tasmia Azrine

 4th Place
 Team Martians

 Shijon Das
 Mohammad Sayeem Sadat Hossain
 Mushaidul Islam

 5th Place
 Team Purple Rain

 Maharab Kibria
 Ilmi Tabassum
 Moosfigur Hassan Mahmood

Congratulations to all the winner



IEEE Robotics & Automation Society

BRAC University Student Branch Chapter





WEBINAR ON

**SKILLS, APPROACHES & MINDSET
REQUIRED FOR THE FOURTH
INDUSTRIAL REVOLUTION**

DATE FEBRUARY 5TH, 2021

TIME 8:00 PM - 9:30 PM

PLATFORM GOOGLE MEET

SEATS LIMITED

SPEAKER

MOHAMMAD ZAHIRUL ISLAM
SOFTWARE ENGINEER,
EMBEDDED LOGIC OPERATIONS (ELO)
CO-FOUNDER & ROBOTICS ENGINEER,
TRAJECTORY TECHNOLOGY
FORMER TEAM LEAD, BRACU MONGOL-TORI

MD MOJAMMEL HAQUE SHOUROBH
MECHATRONICS ENGINEER,
TIGER IT BANGLADESH LTD.
FORMER PROJECT LEAD OF GROUND STATION AND
SATELLITE OPERATIONS ENGINEER,
BRAC ONNESHA.

A webinar on “Skills, Approaches, and Mindset required to the 4th Industrial Revolution”

01

On February 5, 2020, the IEEE RAS BRACU SBC and IEEE BRACU SB jointly organized a successful virtual tech talk as its very first event for the year 2021. The webinar title says “Skills, Approaches, and Mindset required to the 4th Industrial Revolution”, to focus on the far-reaching changes within our regular life that comes up with the concept of the 4th Industrial Revolution. It was indeed an insightful session that entirely addresses the artful approach of youths to get adapt to the status-quo, the coping strategies for youths to overcome their lacking with the spree of fast-pacing technological movement and finally yet importantly the basic awareness to deal with the technological transition.

Md Mojammel Haque Shourobh, Mechatronics Engineer, Tiger IT Bangladesh LTD and Mohammad Zahirul Islam, Software Engineer, Embedded Logic Operations (ELO),

Co-founder and Robotics Engineer of Trajectory Technology were invited to this webinar as principal guests to deliver their valuable speech and opinions. Shourobh is a BRAC EEE alumnus, who had distinguished undergraduate years. He was the Satellite Operations Engineer and the first Project Lead of the Ground Station for the BRAC Onnesha nanosatellite. Zahirul is another BRAC CSE alumnus and bright student, who once led the Mars-Rover team of Brac University in 2018. Honorable advisor to the IEEE RAS BRACU SBC, Dr. Md Khalilur Rahman began the session with his warm and generous gesture towards the guests and the audiences. He introduced the guests to the audience and reminded them of their fine contribution during their undergraduate years.

The chapter chair Md. Hasibul Islam commenced the session with a short introduction to the topic. Then he delivered the floor to the guests. Both Zahirul and Sourobh gave the audiences

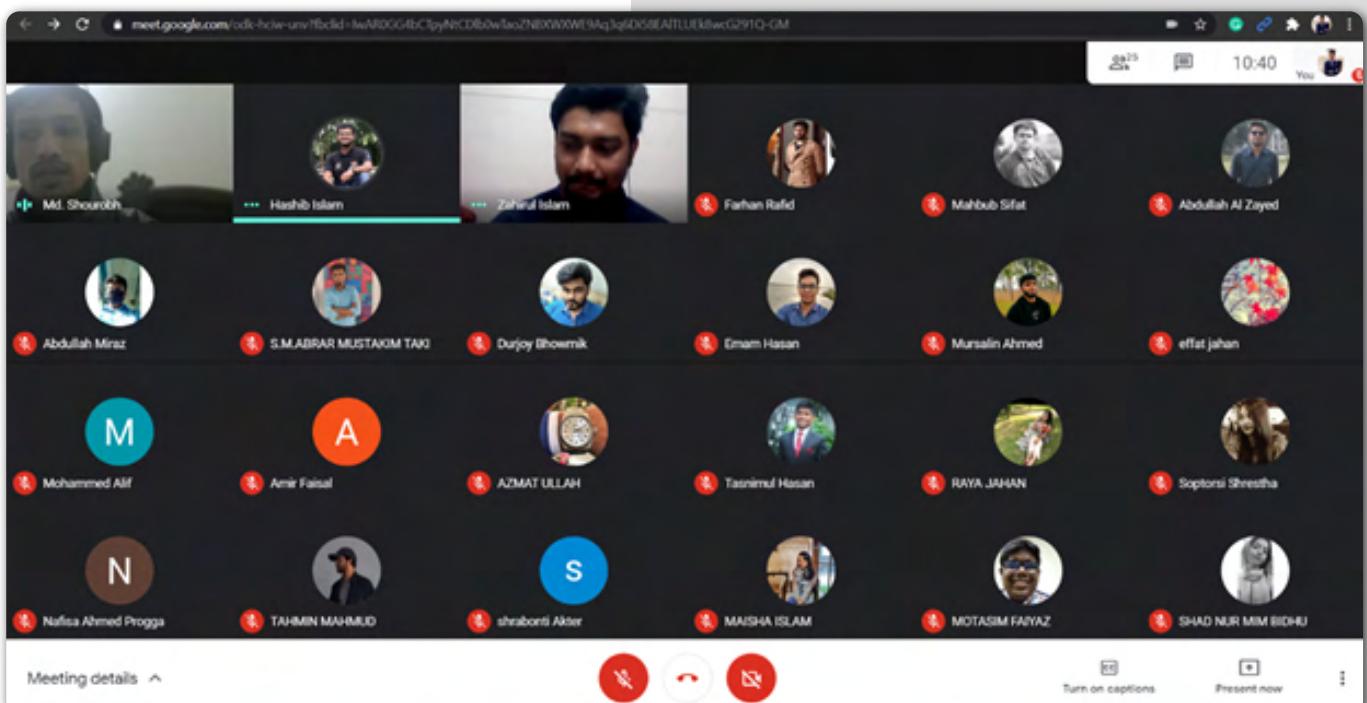
A webinar on “Skills, Approaches, and Mindset required to the 4th Industrial Revolution”

01

a brief introduction to what it means by the 4th Industrial Revolution, its transition period, how it's affecting big startups like Google, Apple, IBM, Tesla, etc., how third-world countries like Bangladesh can pace up with the transition.

“Due to the massive technological emergence, not only big startups are changing their strategies but also small startups are fighting back to remain in the rat race. The booming advancement of technology can often be a qui vive for us if we do not respond according to its need. Like the company, Nokia had faced a downfall due to the rapid growth in iOS and Android. There might be a time shortly when we don't even need drivers for our vehicles. So, we can presume that some of the current jobs will get saturate within 10 years. But it is surely going to happen.” Zahirul adds.

“As Bangladesh is still a third-world country, we have to quickly adapt the hard skills as engineers,” says Shourobh. Shourobh then emphasizes the challenges that Bangladesh is facing to cope with the change. “As we are still adjusting with the impacts of the 3rd industrial revolution, the 4th Industrial Revolution is the newest addition to our plate. We are already lagging here. We have to focus on industry-academia affiliations. The undergraduate students should explore different fields during their first two years of university life. They should gather practical knowledge and be open to any opportunities that can help them grow as a skilled individual. Not everything that the university will teach you. You have to open your eyes and be aware of the soft/hard skills that are indeed valuable for your career. To avail such opportunities, you must have the taste into platforms like Bracu ROBU and IEEE BRACU SB.” Shourobh



A webinar on “Skills, Approaches, and Mindset required to the 4th Industrial Revolution”

01

further adds. Zahirul and Shourobh also talked about their working life, the transition from an undergraduate student to an engineer in the technical field, the culture and ethics of the technical field, etc. The audiences were captivated to know Zahirul and Shourobh's real-life experiences, motivations and inspirations. It encouraged them a lot. The whole webinar was conducted through Google Meet platform and there were more than 60 attendees on an average throughout the two-hour session. The guests adjourned the webinar by thanking each and every audience who were present to the very end of the session.

IEEE BRACU ROBOTICS AND AUTOMATION SOCIETY

PRESENTS

Webinar on

Prospects of STEM for Bangladesh in the international space station's systems using **STEMX365** platform

 **17th April, 2021**
SATURDAY

 **10:00 - 11:00 PM**
(GMT +6)

PLATFORM

 Google Meet

AUDIENCE

The webinar is free for all.
IEEE RAS members will get priority
in the registration process.

**REGISTRATION
LINK**

tinyurl.com/raswb2

OR

Scan the QR code below



**REGISTRATION
DEADLINE**

16
APRIL
2021

SPEAKER



MIZANUL CHOWDHURY

NASA's Astrobee/SPHERES scientist,
Massachusetts Institute of Technology(MIT).

System Administrator and Architect,
MIT Space Systems Lab, AeroAstro Department

Chief Architect of open Music project,
Massachusetts Institute of Technology(MIT).

Founder,
stem365.org

MODERATOR



DR. KHALILUR RHAMAN

Associate Professor,
CSE Department, BRAC University.
Advisor,
IEEE RAS BRACU SBC

A webinar on prospects of STEM for Bangladesh in the International Space Station's systems using **STEMX365** platform.

02

IEEE Robotics and Automation Society Brac University Student Branch arranged a webinar on the prospects of STEM for Bangladesh in the international space station's systems using STEMX365 platform. STEM stands for science, technology, engineering and mathematics and refers to any subjects that fall under these four disciplines. The webinar aired on 17th April, 2021.

STEM stands for science, technology, engineering, and mathematics and refers to any subjects that fall under these four disciplines. STEM education is the intentional integration of science, technology, engineering, and mathematics, and their associated practices to create a student-centered learning environment in which students investigate and engineer solutions to problems, and construct evidence-based explanations of

real-world phenomena with a focus on a student's social, emotional, physical, and academic needs through shared contributions of schools, families, and community partners. In these circumstances, IEEE Robotics and Automation Society Brac University Student Branch arranged a webinar on the prospects of STEM for Bangladesh in the international space station's systems using the STEMX365 platform.

Mizanul Chowdhury, (NASA's Astrobee, SPHERES Scientist, MIT) was the speaker of this wonderful webinar. At the very beginning of the webinar, Dr. Md. Khalilur Rahman, Advisor of IEEE RAS BracU SBC, welcomed Mizanul Chowdhury and thanked for giving his valuable time. After that, Dr. Rahman pass the floor to Mizanul Chowdhury and requested him to start the session. Mizanul

A webinar on prospects of STEM for Bangladesh in the International Space Station's systems using STEMX365 platform.

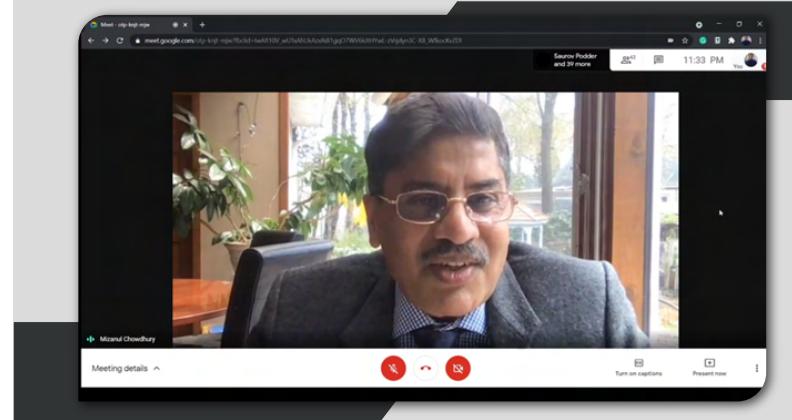
02

Chowdhury started the session with a presentation. At the very beginning of his presentation, he mentioned that, by the time of independence there were only 6 institutions and 20 research institution. But, by the change of time, the number increased and by 2000, it reached to 8 general universities, 54 private universities and 5 technical universities. Among all the universities, the practice of STEM seemed very low. Also, he focused that Bangladesh is highly depend on foreign technology rather depending on own technology, which is not a sustainable prospect for Bangladesh. As a result, STEMX365 is helping the Ministry of Science and Technology by providing help for the socio-economic development of Bangladesh through research, development, extension, and successful utilization of science and technology and working as a supporting hand of JAXA and NASA.

In addition, he said that STEMX365 was founded in 2019 with the vision and mission to train the students in developing nations to cultivate the technological literacy necessary to meet the demand of the digital global economy and become the leaders of tomorrow.

Also, he introduced the KIBO Robotics Programming Challenge and requested the students to participate in this competition. Additionally, he showed a video of STEMX365 First Student Meeting along with a student demo of how the competition works. After this video, he showed an Astronauts video, who mentioned South Asian Pacific region including Bangladesh and congratulate for a brilliant project. In the next to this presentation, Mizzanul Chowdhury drawn an overview of the STEMX365 website.

Although, he mentioned that the whole website was not fully ready and still this website was on the developing stage. So, there were many functionalities not ready yet to run the website to its full potential. At the end of his presentation, he shared some contact information from where the students could get help at any time they need. After that, Dr. Rahman thanked Mizzanul Chowdhury for this great revolutionary starting to introduce space technology to developing countries like Bangladesh. He said that most of the developed countries were not willing to share this technology with any other countries. But Mizzanul Chowdhury broke the chain and brought this platform for the students of developing countries who could not afford the cost of space research programs.



They could now simply start the research through this virtual platform and execute their programs in real-time simulation. After giving all these briefs, finally, Mizzanul Chowdhury started the question-answer session. One of the students from the audience asked about how Mizzanul Chowdhury chose the students to work with? Mizzanul

A webinar on prospects of STEM for Bangladesh in the International Space Station's systems using STEMX365 platform.

02

replied that he did not want to put any barrier to work with him. He also added that everyone has talent and just he needs to utilize it and Mizanul Chowdhury wanted to give these enthusiasts person a chance to utilize their brain.

Additionally, he suggested forming a team in a brains way that each team has at least one member from CSE Background. The members should have ideas on Java, Android Studio to continue work in this prestigious platform. He added that he could provide more information on Rocket Science and expected to create a dedicated platform of STEMX365 for Bangladesh to make it more sustainable and user-friendly. This

would be a similar website to the main STEMX365 website including journal paper, project help, information about astrobee, spheres, and so on. At the end of the webinar, Dr. Rahman thanked again Mizanul Chowdhury for giving his valuable time and Mizanul Chowdhury also thanked Dr. Rahman and IEEE Robotics and Automation Society for inviting him on the prospectus webinar on the STEMX365 platform and wished to meet again in future. And, along with that, the Chair of IEEE RAS BracU SBC, Md Hashibul Islam thanked all the participants and ended the webinar.

Different metering systems in distribution utilities and evolution from traditional postpaid systems to AMI prepaid systems in Bangladesh

03



From making line following robots to entrepreneurs

Idea **Skill** **Dream**

Niaz Sharif Shourov
Director & Chief Operating Officer
Aqualink Bangladesh Limited

Masnur Rahman
Director & CPDO
Aqualink Bangladesh Limited

30th August, 2021

LIVE Google Meet

7:30pm-9:00pm

Free registration click link here
<https://tinyurl.com/lfr2e>

Every big dream starts with a small initiative. With constant hard work and the willingness to learn, one develops himself and becomes skilled. IEEE Robotics and Automation Society (RAS) Brac University student branch brought two of the successful alumni who are living their dream. In the webinar, 'From making line following robots to entrepreneurs' the stage was overwhelmed with the presence of our Speakers, Niaz Sharif Shourov, Director & Chief Operating Officer at Aqualink Bangladesh Limited, and Masnur Rahman, Director & CPDO at Aqualink Bangladesh Limited. The event took place on Google Meet sharp at 7.30 pm on 30 August 2021. The session was hosted by the very own Chapter chair of RAS, Hashibul Islam. The program started with the presence of our respected Advisor, Khalilur Rhaman Sir.

The beginning seemed like a reunion. Mr. Khalil started reminiscing the memories of seeing his old students who are successfully managing a startup. A flashback of the initial start with Robotics of Mr. Masnur and Mr. Shourov was recalled and they expressed their gratitude towards our advisor. The rest of the session was full of insightful discussions from our speakers. Mr. Niaz Sharif Shourav started with the experience and journey of Brac University. He expressed the struggles and sleepless nights which were taken for the preparation of their first line following robot competition. Adding to this, Mr. Masnur Rahman recalled how their first failure took place. All these things never stopped them. They learned with interdepartmental knowledge of codings and mechanical works. In every step of failure, they always got support from seniors and also faculty. One thing they shared is not to be ashamed of asking for help. One can only learn from failures and with correct troubleshooting of the problems.

After that, they described how the journey continued and made way for their first startup Aqualink and some other associated projects. The session turned out to be more of an interaction period with active participation of all present audiences. The friendly approach from our speakers made it even easier for the participants to clear their doubts. The session though being scheduled up to 9.00 pm but with the kind of enthusiasm it lasted up to the extended time of an hour. At the end of the session, the host expressed his note of thanks towards the guests. Everyone was very much pleased to hear from them and with no doubt, a dream also started to get rooted in many. Our alumni speakers promised to maintain the connection and inspired the students to reach them whenever they feel so.



The logo features the word "WORKSHOPS" in a bold, black, sans-serif font. To the left of the "W", there is a red circular icon containing a stylized gear or circuit pattern with several small circles and lines radiating from it. To the right of the "S", a red horizontal line extends from a small circle to another small circle, suggesting a connection or a path.



Hashib Islam is presenting

On the occasion of golden jubilee of our liberation

Instructors :

- MD Hashibul Islam**
Chair, IEEE RAS BRACU SBC
Sub Team Lead, BRACU Mongol Tori
Undergraduate Student, BRAC University
- Salman Ibne Eunus**
Sub Team Lead, BRACU Mongol Tori
Kaggle Master
Undergraduate Student, BRAC University

Workshop on Linux!

Beginner level

Limited seats, Register NOW!

Certificates will be awarded!

Organized by

IEEE Robotics & Automation Society
BRACU Student Branch Chapter

Date:

- Thursday, 25th March
- Friday, 26th, March
- Saturday, 27th, March

Time:
8.00pm to 10.00pm

Platform:
Google Meet

Registration deadline:
23rd, March 2021

Registration link:
tinyurl.com/raslinux

This workshop aims to cover the basics of linux

IEEE BRAC UNIVERSITY STUDENT BRANCH

Hashib Islam

Salman Ibne Eu...

Md. Messal Mo...

TAHAZIBUL M...

Ahnaf Atif

Abdullah Al Zay...

Suhail Rafi

Abdul Mukit

RAKIBUL ALAM NAHIN

Workshop on Linux

01

The 3-day workshop titled 'Workshop on Linux' organized by IEEE Robotics and Automation Society (RAS) BRACU SBC took place on March 25, 27 and 28 of this year respectively. The main idea of the workshop was to introduce young minds with the importance of Linux in today's tech industry. The workshop was organized in Bangladesh region and we made it free for all IEEE Student members. The three-day workshop on Linux got a very positive response. All together about 70 participants registered for the workshop and majority were IEEE Student members. The workshop was conducted by Md Hashibul Islam, Chair of IEEE RAS BRACU SBC and Sub-Team Lead of Network and Vision, BRACU Mongol Tori. The workshop was also instructed by Salman Ibne Eunus, Kaggle Master and Sub-Team Lead of Artificial Intelligence, BRACU Mongol-Tori. Both of the instructors are current Senior year student at Brac University.

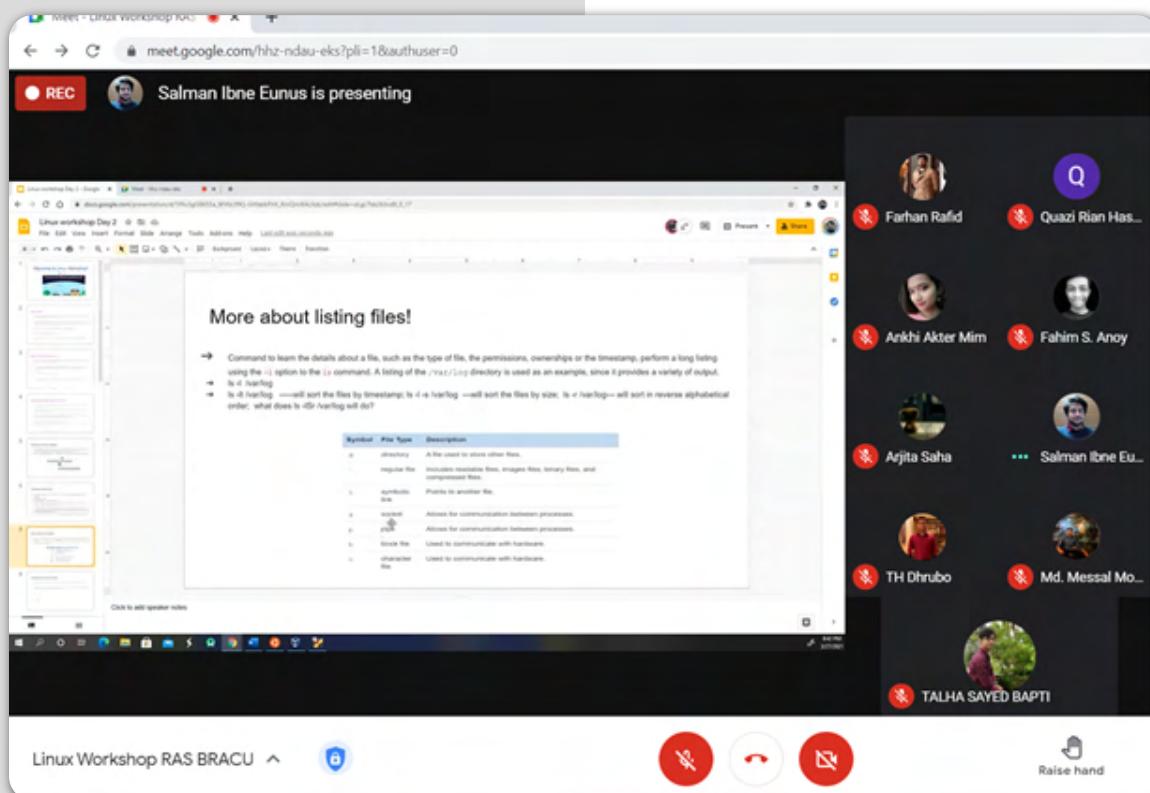
The workshop commenced at 8:00 pm in each of the three days and it lasted for 2 hours. On the first day of the workshop, a total number of 40 students actively joined and got introduced with Linux, a free-to-use, open-source operating system (OS) released under the GNU General Public License (GPL). Participants also received a brief introduction with this OS of Top 500 supercomputer which is used in computing, embedded systems and server installations. According to the schedule, the participants successfully installed Linux with the guidance of the instructor. The second day of the workshop included topics like Operating a Linux distro and Basic terminal commands. Due to the ongoing midterm examination, the second day had less participants than the ice-breaking session. Yet they were very much enthusiastic to learn and discover new opportunities. The final day of the workshop was designed with interesting

Workshop on Linux

01

topics of Linux file directories, Shell scripting and the crucial-Linux in robotics. As all participants were not available in each of the three days, RAS BRACU provided all necessary resources of recordings and slides to support their enthusiasm. At the final part of the workshop, participants were given with an assessment test based on their understanding of the topics. The test was appreciated by all participants. As COVID-19 keeps smoldering, young minds are becoming more concerned with the future. To offer them a different mode of interactive participation, RAS BRACU planned to initiate a series of

skill-based workshops. With that in mind, the first workshop of this year was successfully accomplished. The instructors were deeply determined and put forward their best input. RAS BRACU with its determination of student development ended the workshop with remarks from the Chair and Vice Chair of the student branch along with inspirations from the instructors.



Workshop on Industrial PCB and System Design

02

IEEE RAS BRAC University Student Branch Chapter came up with this workshop idea titled 'Workshop on Industrial PCB and System Design.' Walton PCB was a proud sponsor for this very event. For the first time in Bangladesh, Walton has started production of Printed Circuit Board (PCB) commercially. Single Layer, Double Layer, and Multi-Layer PCBs are being produced in their own factory in Bangladesh with state-of-the-art European machinery. It was a two-day workshop scheduled for October 15 and 16 of 2021. The convenient time for the workshop was set to 6 pm to 9 pm at Google meet and Google classroom as controlling platform. The main software used for carrying out the workshop was Circuit maker (Altium community edition) keeping in mind to give participants the best experience.

IEEE RAS BRACU was very much fortunate to have MD Mojammel Haque Shroubh and Redwan Hasan as the Instructors. Mr. Redwan is presently serving as the Team Lead, Mechatronics Team of Tiger IT Bangladesh Ltd. And our other instructor and also judge for PCB submission segment MD Mojammel Haque Shroubh is serving as Mechatronics Engineer at Tiger IT Bangladesh Ltd. Previously, he worked as the Project Lead of Ground Station and Satellite Operations Engineer of BRAC Onnesha.

In these two days, the participants learned about Electronics Fundamentals necessary for designing the Printed Circuit Board. Another important aspect that was very much prioritized whole through the workshop was Information extraction from datasheets. The self-learning spirit grows within learners through the

Workshop on Industrial PCB and System Design

Content:

- Electronics Fundamental
- Information extraction from datasheets
- Schematic design
- PCB design
- Industrial fabrication
- Complete design by students
- Introduction to IoT system design

Bonus content:

- Basics of underwater communication system
- Basics of long range radio communication
- Basics of Robot operating system



Instructor

MD Mojammel Haque Shroubh
Mechatronics Engineer,
Tiger IT Bangladesh Ltd;
Former Project Lead of Ground Station
and Satellite Operations Engineer,
BRAC Onnesha.

Register now!

Platform:
Google Meet
Google Classroom

Registration Link:
tinyurl.com/raspbc

Exclusive for BRAC University students!
No fees required.
Certificates will be provided.

Date:

Day 1 : Friday, 15th October
Day 2 : Saturday, 16th October

Time:

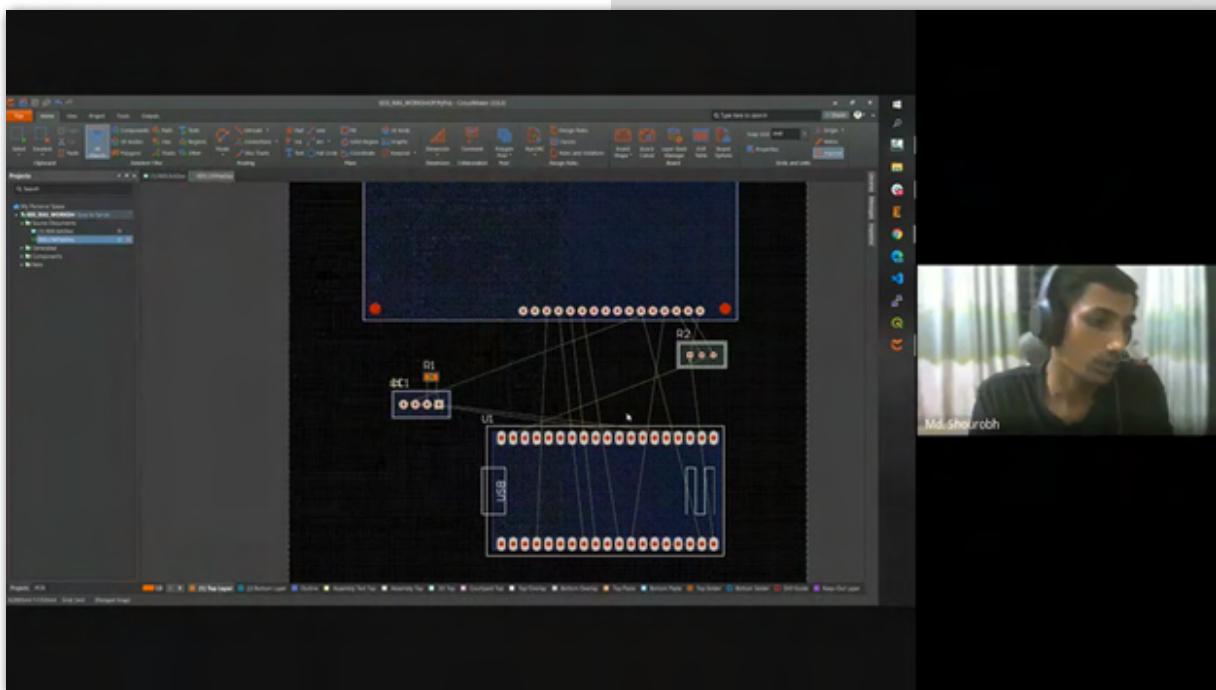
6.00 PM to 9.00 PM
with 10 min break between each hour

Software:  CIRCUITMAKER



BRACU Student Branch Chapter

successful study of the datasheet. Then, the instructor slowly dived into the start of Schematic design on the 2nd day. Consequently, they gave instructions on PCB design, PCB fabrication, and pretty much all basics for the complete design. The rest portion of the workshop included embarking on the industrial perspective through the Introduction to IoT system design. Thus, the learning phase of the workshop came to an end. But IEEE RAS BRACU with the support of our dear alumni instructor MD Mojammel Haque Shroubh successfully completed some more interactive sessions which mainly focused on how a participant is progressing with his design. The steps in the submission process include the first submission of the schematic. Our instructor cum judge reviewed the schematic designs with care and gave corrections. With all required improvements they were allowed to move forward. Then they submitted their PCB design and the



Workshop on Industrial PCB and System Design

02

best one was selected. Finally, our sponsor WALTON PCB managed to provide the printed version of the PCB.

The workshop had more than 60 active participants and 10 were nominated for better performance in the competition segment. After the intense screening and review from our judge, we selected the winner. Industrial PCB design not only stopped being a great successful event for the chapter, but also it proved to be the perfect direction for students who want to pursue their career further in the field of embedded systems.

PRESENTS

Learn Git & GitHub basics in one day!

24 HOURS LEFT

28TH JUNE, 2021(Monday)
8.30 PM - 10.30 PM

Seats Limited. Book your seat.
FREE for IEEE Members

<https://tinyurl.com/gitras>

Arnab Almazee
Software Engineer, ThemeXpert

<https://www.facebook.com/ieebracusb>

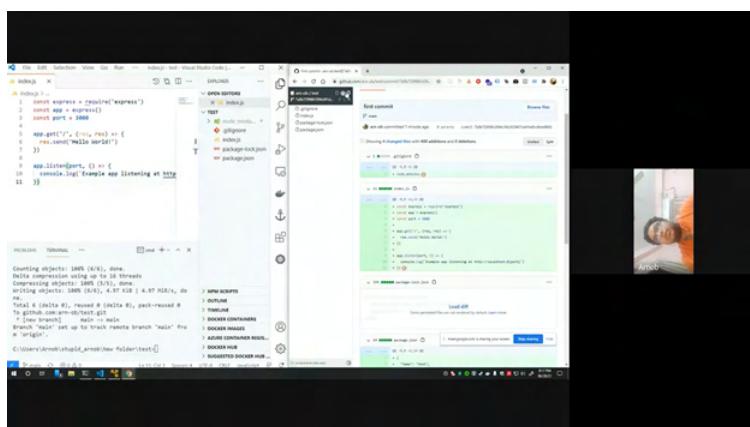
IEEE BRACU SB & IEEE RAS BRACU SBC conducted a workshop on "Learn Git & GitHub basics in one day." The objective of the training program was to prepare tech-savvy students in their chosen field of innovation, with a concentration on Git & GitHub basics. The workshop took place on the 28th of June and was coordinated by Arnab Almazee, the most capable Software Engineer of ThemeXpert. He aimed to provide a basic understanding of Git to the participants. GitHub is an open-source community where individuals from all over the world collaborate on and contribute to open-source projects. GitHub also allows us and our friends to collaborate on projects. GitHub also serves as a code hosting and version control platform.

He managed to provide the attendees hands-on experience on how Repositories, Branches, Commits, Pull Requests works. A development project can be stored in a GitHub repository. It can hold folders or files of any type (HTML, CSS, JavaScript, Documents, Data, Images). Participants learned

Learn GitHub Basics in one day

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about the distinctions between programming languages like Java, Python, C+, C++, and others. Meanwhile, the instructor tried to convey an understanding of how GitHub branches allow us to work on many versions of a repository at once. Separate from the master branch, new branches are used for bug repairs and feature development. These updates can be pulled in if we make modifications to the master while working on a new branch. Changes are referred to as commits on GitHub. A description of why a change was made is included in each commit. Students now understand that the heart of GitHub collaboration is Pull Requests. Pull requests use colors (green and red) to show content differences, modifications, additions, and subtractions, and they start a conversation before the code is finalized. The participants were quite enthusiastic and provided excellent feedback on the workshop. All of the participants received certificates, and IEEE BRACU SB regards this event as a success because it fulfilled the brilliant minds.



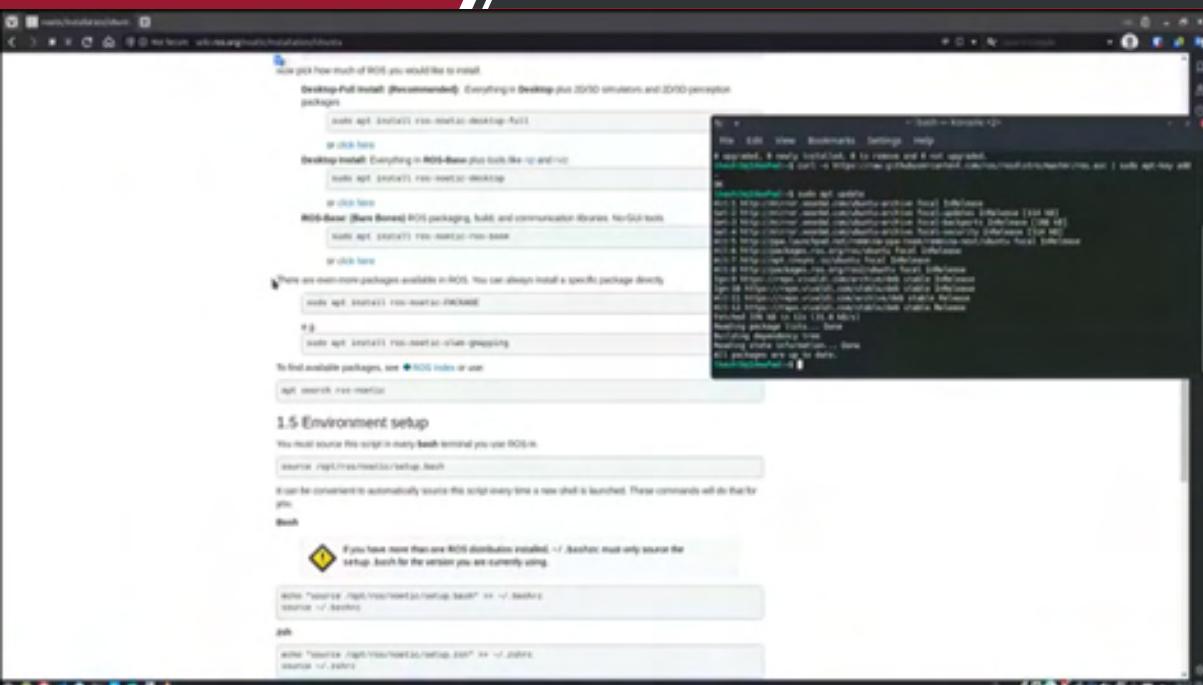
Workshop on Robot Operating System (ROS), a heads-up for the new technological revolution

04

- Sensing environment
- Sensing range
- Sensing resolution
- Temperature range
- Size
- voltage/current rating
- Output type
- Connection type
- Response speed
- Electrical connection
- Mounting type

From movies to cartoons to industry - robots are the new craze. Robots can be used where human extent ends, making them the Future of the industrial revolution. For that, we need to be able to know ROS. ROS is open-source software that is used so that we can better control our robots. The application of this is vast and this is an up-and-coming software. Hence, IEEE Robotics and Automation Society Brac University Student Chapter brought the workshop on 'Robot Operating System (ROS)', the full proof package operating system meant for programming any robots. The workshop was scheduled for 24th & 25th December 2021 from 7:00 pm to 10:00 pm. Afterward, the workshop also consisted of a task for testing the learnings of participants.

The workshop was being conducted by Md. Mojammel Haque Shourobh, Mechatronics Engineer at Tiger IT Bangladesh Ltd., and Md. Hashibul Islam, Firmware Engineer at Aqualink Bangladesh Limited. Mr. Shourobh is one of the valued alumni of the university who also served as the Project Lead of Ground Station and Satellite Operation Engineer at mega project BRAC Onnesha. On the other side, Mr. Hashib is the Chair of IEEE RAS for the panel 2021 and also the former sub-team lead of Network and Vision at the Mars rover team of Brac University Mongol Tori. There could be no better duo than these two for arranging such an important event. In the two-day session, they covered an array of topics which included but was not limited to Installation and environment setup, ROS Ecosystem, Topics, and much more. The whole system of the workshop was carried on through the combination of Google Meet and Google classroom.



Workshop on Robot Operating System (ROS), a heads-up for the new technological revolution

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On the first day, Mr. Hashib started with the pretty basics of robotics and slowly progressed towards the operating system scenario. He explained in detail all the theories of how a robot operates and how instructions can be implied through it. Later, Mr. Shourobh took the floor and explained the areas of work of this operating system and how broad is the world of opportunities with learning this operating system. Though the first day went with theoretical discussions, there was enough enthusiasm from the participants as most of them were new to the system and our instructors successfully quenched their thirst for knowledge. Moving to the second day, the implementation was being shown with the process of installation. Mr. Shourobh started the session and solved problems which students were facing the previous day after exploring at home. As usual, the later part was being conducted by Mr. Hashib where he showed every step hand by hand. This workshop was a continuation of our previous workshop on Linux and so the instructor kept the rhythm carried on the session. He showed use of different applications and how they react with different commands. Students were

amazed as they observed other virtual fields to test the workability of the robot through coding implementation. Our instructors showed the basics and introduced us to the secondary level which can only be achieved with the self enthusiasm of the present participants.

The workshop came to an end with a task and deadline for the participants. The complete execution and perfect submission proved the success of the workshop. IEEE RAS BracU student branch believes technical training is the primary necessity for future development and they will keep the journey ongoing with more interesting workshops.



ACHIEVEMENTS

Achievement 1: Team Enigma Systems of RAS BRACU

01



Enigma Systems is an IEEE RAS BRACU SBC-powered team. It is a team that participated in the Japan Aerospace Exploration Agency's Kibo Robot Programming Challenge (JAXA). The Kibo Robot Programming Challenge is an educational initiative in which college and university students' program free-flying robots (Astrobee and Int-Ball) in the International Space Station to solve various issues (ISS). KIBO is the International Space Station's Japanese experiment module. Inside the KIBO module, there is a robot named Astrobee. Teams would have to follow a series of instructions and program the Astrobee robot as exactly as possible in the second KIBO RPC, and the team that completed the mission with Astrobee as precisely as possible and in the shortest period would win. In KIBO RPC, there are three rounds of competition. ROS-based

simulation software will be used in the first and second rounds of the preliminary round. Teams will be required to create a Java application that will be executed in a simulation that will be nearly identical to the real Astrobee race. In the final round, however, all finalists would solve the problem and have their software uplinked from Earth to the International Space Station, where it would be run on the Astrobee robot.

Bangladesh has a gem named Mizanul Chowdury who works at MIT and NASA in the United States, but JAXA did not include Bangladesh in the first KIBO RPC in 2020. He persuaded JAXA to include Bangladesh in the KIBO RPC's initial edition. Bangladesh could not be added because the competition had already begun. Bangladesh, on the other hand, has been added as a competition observer by JAXA. Enigma Systems, a team from BRAC University's IEEE RAS BRACU SBC, competed in the observer program and finished third. Bangladesh was included in the second KIBO RPC.

Achievement 1: Team Enigma Systems of RAS BRACU

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Dr. Md. Khalilur Rhaman advised Enigma Systems. The "BRACU Scrutineers," a BRAC University squad, also competed in the competition. In total, 17 teams from Bangladesh entered the competition. Mizanul Chowdhury founded STEMX365, an educational institution dedicated to promoting knowledge and wisdom, alongside his daughter Saba Jamin Chowdhury. They enlisted the help of Bangladeshi teams, who were given the task of testing the code and simulation for themselves.

We, Enigma Systems constructed the program following JAXA's requirements. Because Astrobee runs on Android and Linux, we had to employ the Android development environment and Java programming language. We programmed Astrobee to read a QR code and extract information about the next point using some initial data provided by JAXA for the contests. After that, Astrobee is directed to autonomously detect 4 AR tags, read them, and use image processing to find the target location on which Astrobee

will point a laser while avoiding 8 distinct random obstacle patterns. More points are earned by aiming the laser closer to the objective, avoiding more obstacles, reaching point B, and submitting mission completion notifications. The laser accuracy and time is taken to complete the task are elements in the scoring.

The preliminary round was held on June 21, and Enigma System took first place among the Bangladeshi teams with 58 points. Following that, on July 18th, the second phase, the Programming Skills Round (PSR), was held with nine competing countries: Bangladesh, Australia, Singapore, Taiwan, Thailand, New Zealand, Malaysia, Japan, and Indonesia. Indentation Error (Thailand) won with 88.22 points, GeminiPYTW (Taiwan) came in second with 71.77 points, and Enigma Systems (Bangladesh) came in third with 59.28 points. The finalists improved their application in the final round to make it more capable so that when it is placed on Astrobee, it can handle real-world scenarios in space aboard the ISS. The only two teams to complete the task were Bangladesh's Enigma Systems and Thailand's Indentation Error.



Achievement 1: Team Enigma Systems of RAS BRACU

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This is the first time Bangladeshis have uploaded a computer program to the ISS! Astrobee would broadcast a pre-recorded voice message from the teams after the mission. Astronauts on board the International Space Station chose the greatest message. "It is an honor to be operating Astrobee within the International Space Station," *Enigma Systems said in a statement.* A significant achievement for Bangladesh in the field of space exploration. This is a message for Bangladesh:

আমার সোনার বাংলা আমি তোমায় ভালোবাসি

Mission complete, take care. Over." The Astronauts were so taken with Enigma Systems' message that they were given the best "Crew Award." Bangladeshi people's mother tongue was also spoken aboard the International Space Station! This was the second time a team from the IEEE Robotics and Automation Society BRACU SBC participated in an international contest.

MD. Hashibul Islam and members of the IEEE RAS BRACU SBC lead Team Enigma Systems. All of the team members are also STEMX365 students. Our competitive experience was a steep learning curve.

Achievement 2: BRACU Kilo Flight from RAS achieving 16th position in IPAS 2021

We, the students of BRAC University's Kilo Flight team which is powered by IEEE RAS BRACUB SBC, have developed a UAS that is fully fitted and mission-ready to be used on Mars. In general, a drone is a flying robot that can be operated remotely or fly autonomously using software-controlled flight plans in their application framework & onboard sensors.

Our goal is to create a UAS that can perform specific functions and tasks, such as assisting astronauts and conducting specific scientific analyses on Mars. The team is divided into six functional sub-teams, which are the Mechanical team, Electronics team, Science team, Coding team, Design team, and Documentation team. Each team is dedicated to a particular functionality. The UAV is primarily designed to conduct atmospheric and environmental analyses on Mars.

We use a quadcopter design because quadcopters are by far the most mainstream multi-rotor drones. The UAV's total height is 630 mm, with four 320x50 mm arms connecting to the deck. We're using propellers that are 11x7 inches. Larger propellers with a high pitch will be more efficient in terms of floating stability on Mars. There are two straight pipes attached at the end of the landing gear for balancing the drone's total weight. During landing, the UAV can safely land with a 100gm payload along with its weight. The landing gear can be retracted to the side when performing tasks with the claw.

A step-down switching controller is a stiff integrated circuit with all of the active features of a step-down switching controller. An electronic circuit is used to reduce the speed, as well as the course, of an electric motor. This is a frequent feature on electrically powered radio-controlled models. The Pixhawk, rotors, and a few low-powered accessories are all powered by the Power Module. The Here+ RTK GPS is renowned for its centimeter-level precision, as well as its small size, low weight, and energy efficiency.



Figure: BRACU Kilo Flight

For drones, robotics, and other unmanned applications, the LIDAR-Lite v3HP is the ideal lens. Jetson Nano is a small but powerful computational device that is mostly utilized for AI activities. As a precaution, the Cube Flight Controller (formerly known as Pixhawk 2.1) includes failsafe coprocessor capability.

The LUMENERA LT545R camera has a 44 x 44 x 61 mm dimension, which makes it easier to fit in the UAV. The Raspberry Pi Camera Module v2 comes with a Sony IMX219 8-megapixel sensor. It is a beginner-friendly camera, but advanced users also find it useful. Lumenera LT525R Camera is a small-size camera with a decent enough resolution for object detection. It connects with the Jetson Nano port using a 15 cm Ribble cable. Modified C-Mount Zoom 50-300 mm Camera Lens (As reference): We are using M6Z1212-3S 2/3 as a reference.

Achievement 2: BRACU Kilo Flight from RAS achieving 16th position in IPAS 2021

For the communication system, we chose Yangda Video pass-N15. From the base station to the UAV, it works as a point-to-point communication system. It includes a 2.4GHz video and data transmitter, as well as two ethernet video channels. With the help of the 3-axis gimbal, the UAV has 360-degree vision using the Lumenera Camera. We used an Aomway 5.8GHz 1W 1000mW 32CH AV Audio Video Transmitter and Receiver to transfer the analog data from the FPV.

The Cube Flight Controller, NVIDIA Jetson Nano, and ESP32 based UAV are used. On both the UAV and the base station, the Ubuntu 18.04 Bionic Beaver operating system is employed. We made the subsystems communicate and share essential data using ROS Nodes and ROS Topics.

All camera distortion effects and relief displacements are erased in a digital orthophoto. The Digital Surface Model (DSM) is what we're utilizing, and it's ideal for surfaces with man-made items.

Our sensors provide us with nine different forms of data, including moisture, pressure, and temperature. To forecast the weather, we created a model based on linear regression. When we used an auto-generate sample dataset to train the model in Google Colab, it gave us 89 percent precision.

The team has developed a complex subsystem that can collect data on the relative abundance of various gases in the Martian atmosphere, relative humidity, and temperature at any given coordinate. An onboard atmospheric monitor with several sensors and software to evaluate the obtained data is part of our science subsystem.

We designed this UAV to complete a set of tasks following the IPAS 2021 competition. We placed 16th position among 26 teams in that competition.

IEEE Robotics & Automation Society

BRAC University Student Branch Chapter



**Webinar on
Cosmic X-Ray Background**

7th April, 2021 7:00 PM (GMT +6)

S P E A K E R



DR. TONIMA TASNIM ANANNA

POSTDOCTORAL RESEARCH ASSOCIATE
DEPARTMENT OF PHYSICS AND ASTRONOMY,
DARTMOUTH COLLEGE

**About
The Webinar**

As matter accretes onto the central supermassive black holes in active galactic nuclei (AGNs), X-rays are emitted. We present a population synthesis model that accounts for the summed X-ray emission from growing black holes; modulo the efficiency of converting mass to X-rays, this is effectively a record of the accreted mass. We need this population synthesis model to reproduce observed constraints from X-ray surveys: the X-ray number counts, the observed fraction of Compton-thick AGNs [$\log(N\text{ H/cm}^{-2}) > 24$], and the spectrum of the cosmic X-ray background (CXB), after accounting for selection biases. Over the past decade, X-ray surveys by XMM-Newton, Chandra, NuSTAR, and Swift-BAT have provided greatly improved observational constraints. We find that no existing X-ray luminosity function (XLF) consistently reproduces all these observations. We take the uncertainty in AGN spectra into account and use a neural network to compute an XLF that fits all observed constraints, including observed Compton-thick number counts and fractions. This new population synthesis model suggests that, intrinsically, $50\% \pm 9\%$ ($56\% \pm 7\%$) of all AGNs within $z \leq 0.1$ (1.0) are Compton-thick. As all population synthesis models are limited by the X-ray parameters assumed while producing these models, we further use the CXB to conclusively rule out regions of the X-ray parameter space that cannot produce the CXB for any population synthesis model, and present a web tool which can be used to interactively explore the AGN X-ray spectral parameter space.

Tonima Tasnim Ananna is a Postdoctoral Research Associate in Professor Ryan Hickox's group at Dartmouth College. She completed her Ph.D. at the Department of Physics, Yale University, under the supervision of Professor Meg Urry. She is interested in how supermassive black holes grow over time, especially in obscured environments. Her research has been featured in Science News in SN 10: 10 Scientists to Watch 2020. Her most recent project involves exploring the allowed range of AGN X-ray spectral parameter space given the shape of the Cosmic X-ray background (CXB). One of her projects involved constructing a neural network which derives an X-ray luminosity function (XLF) of active galactic nuclei (AGN). This XLF matches all current constraints on AGN in the X-ray waveband. She plan to extend this analysis in optical and IR wavelengths. She has also calculated photometric redshifts for AGN using multi-wavelength datasets for one of the largest volume X-ray surveys to date (Stripe 82X). She is currently working on a black hole mass function and on constraining the radiative efficiency of supermassive black holes.

Webinar on Cosmic X-Ray Background

01

IEEE AE²S BRACU SBC organized a brilliant webinar with Dr. Tonima Tasnim Ananna, who made it to the 2020 Science News' 10 emerging scientists list

The Aerospace & Electronic Systems Society (AE²S) of IEEE BRACU SB invited Dr. Tonima Tasnim to talk about her work on Cosmic X-Ray Background. As the very first event of this year, on 7th April 2021, a webinar titled "Cosmic X-Ray Background" was organized by this society. Afsana Rahman, the secretary of the society moderated the Google Meet meeting of 40+ attendants. Dr. Tonima started her presentation with primary explanations regarding black holes and cosmic rays in such a manner that undergrad students can comprehend this complex work. Galaxies, as a general rule, have a black hole at their core. These black holes can be billions of times heavier

than our sun. They can heat the materials around them until they glow brighter than every sun of that galaxy combinedly. However, these supermassive blackholes' pull can swallow the light around it; and light can also be blocked out by gas & dust. This event makes humans unable to observe and study black holes. In contrast; high-energy X-rays can pass through that layer of dust and gases. Dr. Tonima Tasnim Ananna, a Bangladeshi Astrophysicist; collected results from multiple X-ray telescopes, and sought to generate a model of how these supermassive black holes expand and change across cosmic history. To develop an understanding of those findings from observatories, she created a neural model which generated an illustration of the black hole population across space; and eventually, that model suggested there are more black holes than we ever knew. This outstanding research led her to top the Science News magazine's 'SN 10: Scientists to Watch' last year.

Webinar on Cosmic X-Ray Background

01

The webinar commenced with the formal introduction of the speaker, Tonima Tasnim Ananna by the General Secretary Afsana Rahman, followed by the brief introduction of the topic for the webinar by Tonima Tasnim Ananna. She discussed how the Sun in our Solar System is quite minute in comparison to other stars throughout the galaxy. By making this comparison, our speaker later showed that the density of a black hole is much higher compared to other celestial bodies throughout the universe. Afterwards, she elaborated on how the cosmic x-ray background helps explore the allowed range of AGN (Active Galactic Nuclei) X-ray spectral parameter space. In the next segment, she gave a detailed overview of how she constructed a neural network that derives an X-ray Luminosity Function (XLF) during one of her projects.

Dr. Tonima Tasnim Ananna majored in physics at Bryn Mawr and astronomy at Haverford. She is currently a postdoctoral research associate at Dartmouth. After Bryn Mawr, she earned her Ph.D. at the Department of Physics, Yale University. In addition to her research, she co-founded Wi-STEM, a mentorship network for girls and young women who are interested in science.

The event ended with a short Q&A discussion session with the participants. After the event, a few of the participants expressed their curiosities regarding the Black Hole, Space Engineering and the topic itself. They agreed upon that the speaker's far-sighted speech gave them valuable insights.

REC Tonima Tasnim Ananna is presenting

For a given observer's frame photon energy E:

$\int dz dLx d\log N_H$

We calculate the total contribution of all AGN to at that X-ray photon energy.

Tonima Tasnim Ananna
Afsana Rahman
anrika tanis
Zain Tasneem
ibrahim mousen
Tahmin Mahmud
Rutul Kanda
MALIHA BINTE MOHSEN
KALLOI SARKAR RAJESH



TECHNICAL WEBINAR & MECHA-WORKSHOP ON UNMANNED AIRCRAFT SYSTEMS (UAS): FROM ENGINEERING DYNAMICS, DESIGN, FABRICATION TO MANUFACTURING

28.10.2021 (Webinar)

Ice breaking session, Story of ANTS
Technical Brief & Prospects of UAS in Bangladesh
Future plans of ANTS

29.10.2021 (Workshop: Day I)

Overview & challenges
in designing and manufacturing UAS

30.10.2021 (Workshop: Day II)

Overview of developing autonomous system
in UA and mission capabilities of UAS

Registration Date
24 October to 28 October



From 07:00 PM
To 08:15 PM Each Day



This event is free and open for all
(No additional registration fee is needed)



Workshop 1: Technical Webinar & MechaWorkshop on Unmanned Aircraft Systems (UAS)

01

For the first time, IEEE AESS BRACU SB organized a joint webinar and workshop on Unmanned Aircraft Systems (UAS) in association with ANTS Aerial Systems, a pioneer in this field from the Islamic University of Technology (IUT.) The commencement of the event took place on October 28th, Thursday and lasted for 3 days. The event was moderated by Tahmin Mahmud, Editor of IEEE BRACU SB and Rubaiyat Alam Ruhin, Treasurer at IEEE AESS BRACU SB. The instructors team comprised of Tausifur Islam, Team Lead and Chief Operating Officer of ANTS, Jahiduzzaman Tanvin, Chairperson at iMechE IUT Student Chapter, Sk Tahmid Shahriar, General Secretary-Publications and Operations of ANTS, Aseer Nehalul Islam, Chief Marketing Officer of ANTS, Samin Hasan, Chief Research Officer of ANTS, Salim Sadman Bishal, Head-Autonomous Systems of ANTS, and Hasin Zafir, Executive-Design and Manufacturing of ANTS.

On the first day, after a brief introduction for Team ANTS by Rubaiyat Alam Ruhin, the ice-breaking session began with Tausifur Islam taking the centerstage of the webinar. He began by sharing their story of how they came this far with ANTS, and how it was their

dream to pioneer UAS in Bangladesh. He then handed the mic over to Aseer Nehalul Islam, who then gave a technical brief of their work on UAS till now and discussed about the prospects of UAS in Bangladesh. The webinar on day 1 came to an end after Sk Tahmid Shahriar discussed their future plans regarding ANTS. Hasin Zafir took the helm on day 2 and discussed in detail about the overview and challenges one might face while designing and manufacturing an UAS, how it has to be perfect and sublime from scratch to the very deployment of the UAS. The webinar ended on day 2 with a Q&A session with the participants.

On the third day of the event, the focus was shifted towards the workshop aspect of the event. Salim Sadman Bishal started off the workshop by giving an in-depth overview on designing an autonomous system for the UA. He also mentioned how an autonomous system can bring benefits while manufacturing the UA. With the integration of an autonomous system to the UA, the benefits an UAS can provide to the world is unanimous, with the mission capabilities skyrocketing past non-UAS.



Workshop 2: Workshop on Observational Cosmology

02

On 31st of October, IEEE AESS BRACU SB conducted a workshop on the topic of Observational Cosmology. The workshop was conducted in 2 days—October 31 and November 1 respectively. The event time on both days was 7:00 PM local time. The event was moderated by Samiu Mostafa Ishan, Vice-Chair at IEEE AESS BRACU SB and the speaker for this event was Syeda Tasnuva Jahan, Lecturer at the Department of Mathematics and Natural Sciences, BRAC University, who did her postgraduate studies in Relativistic Theoretical Physics from Aix-Marseille University in France. The workshop Day-1 commenced with a brief introduction of the speaker by Samiu Mostafa Ishan, after which Syeda Tasnuva Jahan took the helm with the introduction of observational cosmology. Her discussion started off with the essential pillars of the Big Bang model, major events that took place in the history of our universe and different cosmological parameters. In the second segment of the day, the discussion shifted towards certain detection techniques such as photometric systems, magnitudes and filters. The

workshop on Day-1 came to a conclusion after a brief Q&A session with the participants.

The implementation of the ideas discussed on Day-1 were the key aspects on Day-2. Distances in the FRW metric, such as redshift, angular distance and luminosity distance were the topics which were discussed in detail. After that, the second segment on day 2 was the evolution of the galaxy, where the ascend and the descent of galaxies in the universe were the major discussions.

The workshop ended with an engaging Q&A session by the speaker with the participants and with a brief farewell speech by Samiu Mostafa Ishan, the curtains were drawn to the event.



BRAC UNIVERSITY STUDENT BRANCH

IEEE BRACU STUDENT BRANCH
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