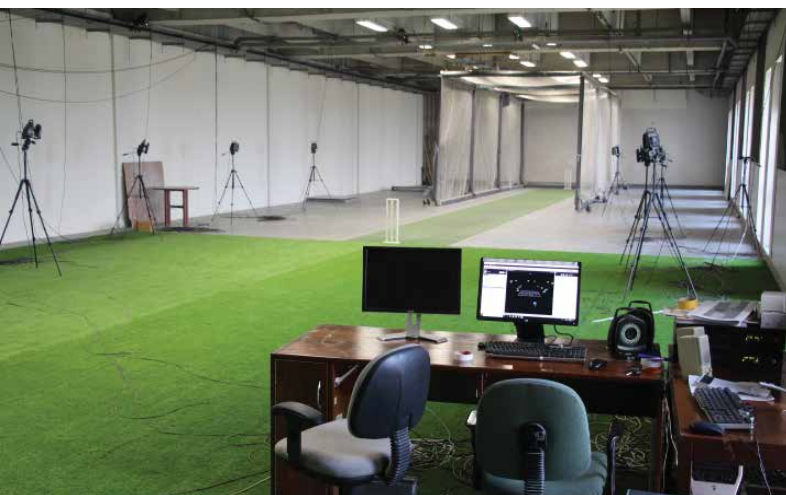


# Newsletter



## BIOMECHANICS LAB EARN'S COVETED ACCREDITATION FROM ICC

SBASSE PARTNERS WITH PITC

ORIENTATION WEEK 2019

SCANNING ELECTRON MICROSCOPY  
FACILITY AT SBASSE CENTRAL LABS

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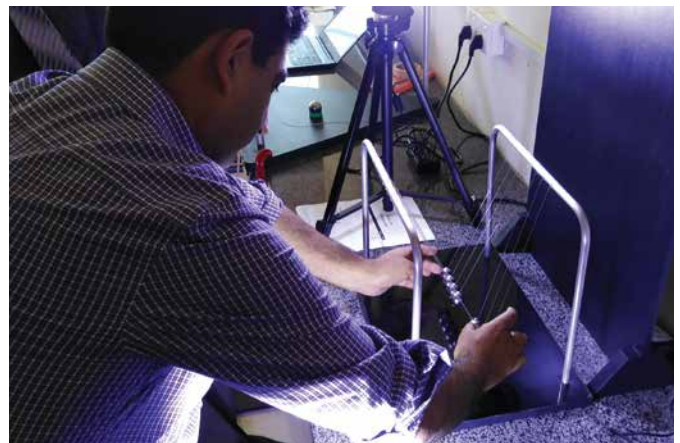
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## SBASSE PARTNERS WITH PITC FOR WORK ON INNOVATIVE DEVELOPMENTS IN THE ENERGY SECTOR

Syed Babar Ali School of Science and Engineering (SBASSE) and the Power Information Technology Company (PITC) came together to sign a Memorandum of Understanding (MoU) at the University, which marked the start of a partnership for research and development on smart grid technologies designed to improve energy consumption.

Utilising the Smart Grid IT Laboratory established at PITC with US government support, LUMS and PITC will test smart grid technologies and showcase their benefits to distribution and transmission companies. This will provide opportunities for researchers at the University to exchange information on new developments with the Pakistani government.



US Consul General Colleen Crenwelge, present at the MoU signing ceremony, said, “Advanced technologies are making electricity more affordable, reliable, and sustainable.” She further added, “We are proud to work with Pakistan as it builds technological capacity and improves the energy sector, and we hope to see growing private sector participation and investment in this endeavour.”

“Partnering with LUMS will stimulate research and

development collaboration between the Pakistani government and local universities while enhancing local learning and technology transfer,” said Mr. Waseem Mukhtar, Managing Director, Potomac Electric Power Company (PEPCO) and Chairman of the Board of Directors at PITC.

Talking about the impact of the MoU, Prof. Shahid Masud, Dean of the Syed Babar Ali School of Science and Engineering said, “The Smart Grid IT Laboratory will help us achieve the University’s mission of effectively addressing power sector needs and contributing directly to Pakistan’s economic development.”

The signing ceremony was organised by the Sustainable Energy for Pakistan (SEP) Project, a four-year United States Agency for International Development (USAID) technical assistance initiative to support the Pakistani government’s efforts to deliver financially sustainable energy services. USAID provides technical and financial assistance to Pakistan’s 10 government-owned electricity distribution companies to help them reduce losses, streamline business processes, and improve financial viability.



# ORIENTATION WEEK 2019 ORGANISED FOR NEWLY ADMITTED STUDENTS

An Orientation Week for the newly admitted students of 2019 was organised from Aug 26-31, 2019. Over the course of the week, students got to know information about the School, its various departments and the facilities available to the newly inducted students.

## ***Undergraduate Student Orientation 2019***

The week kicked off with registration of the new students and the student Smart Cards were issued by the SBASSE team. In his address to the new batch, Prof. Shahid Masud, the Dean SBASSE, briefed the students about the different academic programmes, centres and research opportunities. A campus tour was organised for the new students followed by an information session by the IST team. The new students also got a chance to meet their instructors and were introduced to their departments.

## ***Graduate Student Orientation 2019***

On August 30, 2019, SBASSE arranged an orientation session for the newly admitted graduate (MS and PhD) students admitted in 2019, to introduce new students with the school, its academic programmes and the opportunities that would be available for them during their academic stay at LUMS.

After a welcome session with the Dean of SBASSE, Prof. Shahid Masud and Dr. Basit Shafiq, Convener, Graduate Programmes, students interacted with the faculty members and staff of their respective departments. This was followed by consecutive sessions with the teams of Library, IST and Office of Registrar in SBASSE labs. A quick campus tour was also arranged by the members of Student

Council, followed by an interactive session with the students. At the end, a welcome dinner was held for the new students in PDC.



## EE STUDENTS WIN VARIOUS CATEGORIES AT THE NATIONAL ENGINEERING ROBOTICS COMPETITION 2019

Electrical Engineering (EE) students made their mark at the National Engineering Robotics Contest (NERC) this year. NERC is considered to be one of the most challenging competitions of the country, where each year over 100 universities and institutes compete against each other.

This competition, which is almost two decades old, is a joint project of National University of Science and Technology (NUST), STEM Careers Programme and Pakistan Science Foundation, it aims to promote research in robotics and its related fields in Pakistan.

This year the largest group to date, of about 27 enthusiastic and hard-working students from SBASSE took part in the competition.

The various categories at the NERC include, *Game of Drones*, *Drone Aero* and *Robo Wars*.

Sharing his sentiments at the achievement of the SBASSE team, Associate Professor Electrical Engineering, Dr. Jahangir Ikram said, "I am very happy to announce that the our team won first position in the category, *Game of Drones* and stood second and third in *Drone Aero* category."



## PHYSLAB DEVELOPS FIRST SINGLE PHOTON QUANTUM MECHANICS LAB IN PAKISTAN

Physlab team, led by Dr. Mohammad Sabieh Anwar, Associate Professor in the Department of Physics, has recently developed a single photon quantum mechanics laboratory. This lab is the first of its kind in Pakistan.

This initiative was taken in an effort to develop a laboratory that could incorporate modern, cost-effective versions of some of the experiments that have shaped the modern understanding of quantum physics. Students at Physlab were already working with Superconducting Quantum Interference Devices (SQUIDS), Franck-Hertz tubes and lasers, but the team wanted ideas that could directly relate to quantum interference, entangle-

ment, density matrices, nonlocality and reveal the different aspects of quantum physics.

The task was challenging but after a year and a half of dedicated effort, the team managed to complete the project.



## **SBASSE FACULTY COLLABORATES WITH SOE STUDENTS TO CONDUCT ROBOTICS CAMP**

SBASSE faculty member, Dr. Suleman Shahid, collaborated with Syed Ahsan Ali and Syed Maratib Ali School of Education (SOE) MPhil students to conduct a robotics camp. These camps were held at SOE, consisting of 12 primary and secondary year students, where they cultivated their robotics and computational thinking skills.

The MPhil students designed a summer camp for defining, cultivating and assessing these skills and to introduce a directed and research-backed approach towards robotics education.

They incorporated activities such as visits to Oculus, the Facebook-run Virtual Reality (VR) Lab at the Syed Babar Ali School of Science and Engi-

neering, where the students used the VR system to do exciting activities such as city exploration and skiing in Virtual Reality.



## **BIOMECHANICS LAB EARNS COVETED ACCREDITATION FROM ICC**

The Biomechanics Lab, a centre to test bowling actions, was set up in 2016 at the Syed Babar Ali School of Science and Engineering (SBASSE). The lab has now been accredited by the International Cricket Council (ICC), making it the fifth in the world to earn this accolade.

With this prestigious accreditation, the lab joins the ranks of those based in Brisbane, Chennai, Loughborough and Pretoria. It will be used to carry out official bowling tests of international and domestic bowlers.

The idea of hosting the lab at SBASSE was conceived in December 2015, which led to an MoU being signed in April 2016 between LUMS & Pakistan Cricket Board (PCB) to start the project.

ICC General Manager, Geoff Allardice also shared his excitement at the development and said, "I want to congratulate the PCB, which worked in conjunction with LUMS to fulfil the criteria required for an ICC accredited testing centre."



## EE FACULTY MEMBER AWARDED PRESTIGIOUS CHARLES WALLACE FELLOWSHIP

Dr. Hassan Mohy-ud-Din, Assistant Professor of Electrical Engineering, has been awarded the 2019 Charles Wallace Fellowship by the British Council in Pakistan. The fellowship aims to enable mid-career academics to widen their professional knowledge, skills and international linkages, particularly with UK universities.

Dr. Mohy-ud-Din is the Director of the Clinical and Translational Imaging Lab at SBASSE. The lab was set up in 2018 with the help of a research grant of PKR 20 million from the Higher Education Commission and Planning Commission Pakistan. It is one of the 12 labs funded under the umbrella of Big Data and Cloud Computing in Pakistan. At present, two PhD students, a Masters student and



**CHARLES WALLACE FELLOWSHIP**

two Research Assistants are working on various projects at the intersection of machine learning, optimisation theory, and medical imaging. Research areas focus on brain, cardiac, and whole-body imaging using multi-parametric, multimodality data.

## CHEMISTRY FACULTY MEMBER AWARDED PRESTIGIOUS DAAD FELLOWSHIP

Dr. Rahman Shah Zaib Saleem, Assistant Professor in the Department of Chemistry and Chemical Engineering, has been honoured with the German Academic Exchange Service (DAAD) fellowship for Research Stays for University Academics and Scientists. This is a particularly noteworthy achievement, as this award marks Dr. Saleem's second fellowship from DAAD within four years.

The fellowship will cover an academic visit to Saarland University in Germany, where he has been collaborating with Professor Claus Jacob at the Institute of Bioorganic Chemistry for nearly three years.

Their project will utilise novel small organic compounds to target drug resistant pathogens. The collaboration of Dr. Saleem and Professor

Jacob has resulted in an article in *Current Organic Synthesis*, and a chapter in a book published by *Royal Society of Chemistry*.



**DAAD**  
Deutscher Akademischer Austauschdienst  
German Academic Exchange Service

## INTERNATIONAL RESEARCH COLLABORATION ON MOBILE PHONE BATTERY RESEARCH

Dr. Hassan Abbas Khan, Assistant Professor in the Department of Electrical Engineering and The Center for Advanced Life Cycle Engineering (CALCE), University of Maryland, have recently started collaboration on the research of battery discharge profiles of in-service mobile phones.

The performance of Lithium-based batteries in mobile phones is highly dependent on their usage profiles, among other factors such as aging, operating temperature, and internal defects. Since many applications and processes draw power from phone batteries in varied patterns, the usage patterns affect the life and performance of mobile phones. This study will be collecting and evaluating battery discharge profiles under active phone operations to estimate the effects on the remaining charge and the life cycle of phone batteries. The focus will start with the discharge profiles of Android phones to estimate the aging process by using application programme interfaces(API) software and an Android Package (APK).



*Dr. Hassan Abbas Khan*



*Prof. Michael Pecht*

SBASSE and CALCE practice a no-boundaries philosophy, which encourages cross-disciplinary collaborations. The school's impressive scholars and its global collaborations make it a great partner in furthering battery research.



**calce**

CENTER FOR ADVANCED  
LIFE CYCLE ENGINEERING

## MATH FACULTY PRESENTED RESEARCH AT MULTIGRID CONFERENCE, CHINA

Dr. Mudassar Razzaq, Assistant Professor in the Department of Mathematics, presented a research paper at the International Multigrid Conference that was held in Kunming, China from August 11-17, 2019.

This conference provides a forum for researchers to present and discuss recent research in multigrid, multilevel and multiscale methods.

Conference topics were: multigrid and algebraic

multigrid methods, multilevel and multigraph methods, multiscale methods, domain decomposition methods, parallel and high-performance computing, deep neural networks, machine learning and computing software and tools.





## 11<sup>TH</sup> TEACHING THE TEACHERS WORKSHOP: BASIC CIRCUIT THEORY

The Department of Electrical Engineering held 11th Teaching the Teachers workshop on Basic Circuit Theory from August 19-23, 2019. The workshop was conducted by Prof. Asad Ali Abidi. Circuit Theory may rightfully claim to be the root of most electrical engineering. It underpins power engineering, signal processing, feedback controls, and electronic circuits. While classically it has spanned linear, time-invariant circuits very thoroughly, a modern presentation must introduce key ideas of nonlinearity, and even of periodic time variance, at the start of an undergraduate EE degree course.

The five-day workshop was designed for teachers of circuit theory courses who had some experience in teaching the subject. Starting with first principles, it covered selected important topics that, experience shows, are seldom taught

effectively. These weaknesses are difficult to remedy as students enter practice or go on to higher studies. The workshop was attended by 90 participants including faculty from different institutes all across the country.



*About the Speaker: Prof. Asad Abidi received his BSc degree in Electrical Engineering from Imperial College, London in 1976, and a PhD from the University of California, Berkeley in 1982. He worked at Bell Laboratories, Murray Hill until 1985, and then joined the faculty of the University of California, Los Angeles where he is Distinguished Chancellor's Professor of Electrical Engineering.*

## CASM HOLDS INTERNATIONAL CONFERENCE ON APPLIED MATHEMATICS

The Centre for Advanced Studies in Mathematics (CASM) presented a conference on Applied Mathematics from August 19-20, 2019. It aimed to provide a platform for researchers, scientists, engineers, academics and professionals to exchange their most recent ideas and to explore future trends in various areas of applied mathematics.

Alongside new methodology, there were application strands led by industry to showcase the power of mathematical approaches in practical applications. Participants found the various activities useful as they brought together a diverse group of academics and experts from across disci-

plines of applied mathematics. Together, they could generate new ideas and outline potential future collaboration opportunities.

The conference featured a variety of plenary speakers based both locally and internationally, including: Professor Dr. Volker John from WIAS, Germany; Dr. Piotr Skrzypacz from Nazarbayev University, Kazakhstan; Dr. Hafiz Abdul Wajid from Islamic University, KSA; Professor Dr. Muhammad Abid from COMSATS University, Islamabad; Dr. Khalid Saifullah Syed from BZU, Multan and Dr. Khalid Saifullah from Quaid-i-Azam University, Islamabad.

# WIT PARTICIPATED IN KNOWLEDGE SHARING AND STAKEHOLDER ENGAGEMENT IN THE INDUS BASIN WORKSHOP, KATHMANDU, NEPAL

The event was divided into two parts, a workshop and a forum.

A stakeholder workshop on developing water, energy and land nexus scenarios for the Indus Basin was held from August 21-22, 2019.

The meeting brought together approximately 30 stakeholders who represented different research, NGOs, donors and government organisations, working on cross-sectoral issues around water, energy, and land in the Indus Basin. The main goal of this workshop was to co-develop with stakeholders from the four riparian countries.

In this workshop, Dr. Abubakr Muhammad, Director of Centre for Water Informatics & Technology (WIT), and Dr. Afreen Siddiqi (WIT Advisory Group) shared the existing challenges and potential future options for the Indus River Basin.

Ansir Ilyas, PhD student at WIT, presented his work at the workshop, and highlighted the impact of implementation of smart irrigation technologies to reduce water use in the irrigation sector.



The fourth Indus Basin Knowledge Forum (IBKF): Pathways to impactful research, was held from August 23-24, 2019.

This Forum and the Indus Scenario Workshop, brought over 100 researchers and policymakers from the four basin countries, including Pakistan, India, China, Afghanistan and beyond to share knowledge and advance collaborative efforts for the sustainable resource management and policy-making. The IBKF aims to strengthen connections among those working in policymaking, research, and knowledge generation in the Indus basin (IB), which is a key resource shared by Afghanistan, China, India, and Pakistan.



Dr. Afreen Siddiqi (WIT Advisory Group) also presented her recently published work co-authored by Dr. Abubakr Muhammad, entitled, *'Socio-hydrological assessment of water security in canal irrigation systems: A conjoint quantitative analysis of equity and reliability.'*

## INNOVATIVE IDEAS PUT FORWARD AT WORKSHOP ORGANISED BY THE LUMS ENERGY INSTITUTE

The LUMS Energy Institute recently organised a consultative workshop on 'Alternative and Renewable Energy (ARE) Policy 2019', held on July 11, 2019, in collaboration with the Energy Think Tank, a consultant agency.

The work was organised with the aim to take an initiative and convene consultative workshops and gather stakeholders for their comments and input. The co-chairs of the workshop were LUMS faculty, Dr. Naveed Arshad (Computer Science) and Prof. Nauman Ahmad Zaffar (Electrical Engineering).

The workshop attracted a large number of participants from notable organisations of the sector,

including officials from the Government of Punjab's Energy division, officials from DESCON, NEPRA, NTSC, LESCO, MEPCO, PPDB, PEECA, CPPA, PPIB, FESCO, US-Aid, Nishat Power, VESTAS Wind, Siemens, Hadron Solar, Shams Power and AEDB.



## SPIE STUDENT CHAPTER EXPLORED LAHORE FOR STUDY TOUR

The student chapter of the Society of Photo-Optical Instrumentation Engineers (SPIE) at LUMS, arranged an educational trip on July 4, 2019 to the National Museum of Science and Technology, Lahore, Masjid Wazir Khan and the Shahi Hammam. SPIE, the international society for optics and photonics, partners with researchers, educators, and industry to advance light-based research and technologies for the betterment of the human condition and is based in Washington, USA.

This visit to historical places gave students the opportunity to learn how people lived in the past

and what local culture looked like at the time. The students gave very positive feedback at the end of the visit and requested similar excursions in the future.



## FACULTY NEWS:

### NEW APPOINTMENT:



Dr. Abubakr Muhammad has been appointed as the Department Chair of Electrical Engineering for a three-year term beginning from Sep 1, 2019.

### FAREWELL:



Dr. Imran Qureshi, Assistant Professor in Department of Mathematics, has left SBASSE. We wish him the very best in his future endeavours.

### WELCOME ON BOARD:



Dr. Shoaib Muhammad has joined as Assistant Professor in the Department of Chemistry and Chemical Engineering.



Dr. Maryam Mustafa has joined as Assistant Professor in the Department of Computer Science.



Dr. Zahra Lakdawala has joined as Assistant Professor in the Department of Mathematics.



Ms. Anoushe S. Hassan has joined as Teaching Fellow in Mathematics.

## PHD THESIS DEFENCE:

We are glad to share the news of successful PhD defence of the following students and wish them all the best in their future endeavours.

• **Aqsa Naeem**, PhD in Electrical Engineering  
*Title: Mitigation of renewable energy source intermittency in microgrid using complementary renewable energy source.*

• **Faran Awais Butt**, PhD in Electrical Engineering  
*Title: Next Generation Phased-MIMO Radar, From Theory to Practice.*

## STAFF NEWS:

### WELCOME ON BOARD:

- Mr. Rashid Mehmood has joined as Lab Engineer in the Department of Chemistry and Chemical Engineering.
- Ms. Maria Komal has joined as Lab Instructor in the Department of Chemistry and Chemical Engineering.
- Ms. Rida Ibrahim has joined as Lab Engineer in the Department of Chemistry and Chemical Engineering.
- Mr. Muhammad Hassan Fatimi has joined as Lab Instructor in the Department of Electrical Engineering.

### PROMOTIONS:

We are glad to share the news of successful promotions of the following staff members in the year 2019.

- **Mr. Nouman Baig**  
*Promoted to Manager Academic Affairs in the Office of the Dean SBASSE.*
- **Ms. Uzma Baig**  
*Promoted to Deputy Manager in the Office of the Dean SBASSE.*
- **Mr. Affan Anwar**  
*Promoted to Assistant Manager in the Department of Electrical Engineering.*
- **Mr. Abrar Hussain**  
*Promoted to Assistant Manager in the Department of Biology.*
- **Ms. Ayesha Ikram**  
*Promoted to Senior Officer Academic Affairs in the Office of the Dean SBASSE.*
- **Mr. Bilal Khalid**  
*Promoted to Senior Officer in the Office of the Dean SBASSE.*
- **Ms. Anam Aftab**  
*Promoted to Senior Officer in the Department of Electrical Engineering.*
- **Ms. Noreen Sohail**  
*Promoted to Senior Officer in the Department of Mathematics.*
- **Mr. Khalid Bashir**  
*Promoted to Senior IT Customer Support Engineer in the Office of the Dean SBASSE.*
- **Ms. Khalida Asif**  
*Promoted to Scientific Officer in the Department of Biology.*
- **Mr. Muhammad Naeem ur Rehman**  
*Promoted to Officer in the Department of Electrical Engineering.*
- **Mr. Hafiz Nouman**  
*Promoted to Senior Lab Engineer in the Central Labs of SBASSE.*
- **Mr. Robin Javed**  
*Promoted to Lab Technician in the Department of Biology.*
- **Mr. Muhammad Saghir Ahmed**  
*Promoted to Lab Technician in the Department of Biology.*
- **Mr. Johnson Bhatti**  
*Promoted to Senior Lab Assistant in the Department of Biology.*
- **Mr. Muhammad Abubakar**  
*Promoted to Senior Lab Instructor in the Department of Biology.*
- **Mr. Azeem Iqbal**  
*Promoted to Senior Lab Instructor in the Department of Physics.*
- **Mr. Khadim Mehmood**  
*Promoted to Lab Technician in the Department of Physics.*

# SCANNING ELECTRON MICROSCOPY FACILITY – SBASSE CENTRAL LAB

The mission of the SBASSE Central Lab is to enhance multidisciplinary research catering to the requirements of basic sciences and engineering core specialties. It houses cutting edge equipment to facilitate all LUMS faculty, students and researchers to meet their scientific goals. The current facilities include Scanning Electron Microscopy (SEM), 600 MHz Nuclear Magnetic Resonance (NMR), Physical Properties Measurement System (PPMS), a photolithography lab and thin film Magnetron Sputtering.

The Scanning Electron Microscope has been operational at LUMS since 2015 and has facilitated the basic and applied research of Chemistry and Chemical Engineering, Physics, Electrical Engineering and Biology departments in diverse areas of biomedical sciences, renewable energy

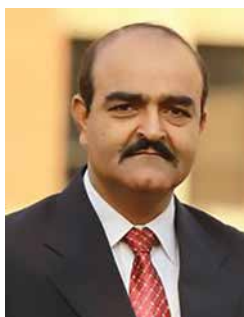
technologies, environmental remediation, optics and electronics and has contributed to numerous research publications from SBASSE. In addition, the facility provides an excellent opportunity to undergraduate and graduate students to get acquainted with the fundamental principles and get hands-on experience at the state-of-the-art facility. The SEM facility, along with NMR, are also available to external users from academia and industry. More details can be found at:

<https://centrallab.lums.edu.pk/>

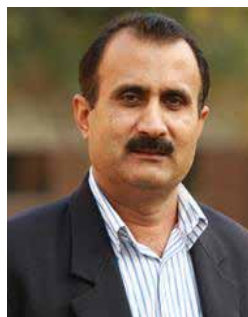
## ASSOCIATED FACULTY MEMBERS



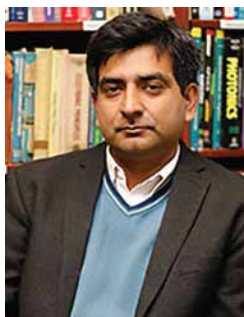
*Dr. Salman N. Arshad*



*Dr. Falak Sher*



*Dr. Irshad Hussain*



*Dr. Muhammad Sabieh Anwar*



SEM is used to study topography, morphology and local chemical and phase composition from millimetres to nanometres length scale. The facility at LUMS is one of the best in its class with an optimal resolution of 0.9 nanometre. It delivers best-in-class imaging and analytical performance in a single, easy-to-use instrument and enables the most comprehensive analysis in the least amount of time. The facility is also equipped with specialised detectors (EDS, LVD, STEM, CBS) and an e-beam lithography capability which are unmatched in Pakistan.

### ***Unique Features of SEM at LUMS***

- Surface sensitivity is delivered without sacrificing the resolution - low voltage [1kV] resolution is 1.4 nm in high vacuum mode, while for non-conduc-

tive materials, the Nova NanoSEM is unique in offering the highest resolution (1.8 nm) at low voltages (3kV). The ultimate resolution is 0.9 nm under ideal operating conditions.

- One configuration for customized modes: both a high-current beam, which is essential for rapid analytical research, and high resolution at high- and low- voltage, which is essential for image quality across a wide range of sample types.
- Strong performance in low vacuum mode gives more analytical power.
- Analyse big, bulky samples with a large stage travel and large motorised Z travel.
- In-situ plasma cleaner reduces hydrocarbon contamination in the chamber and reduces the amount of carbon that is deposited on samples.

### Standard Imaging Detectors

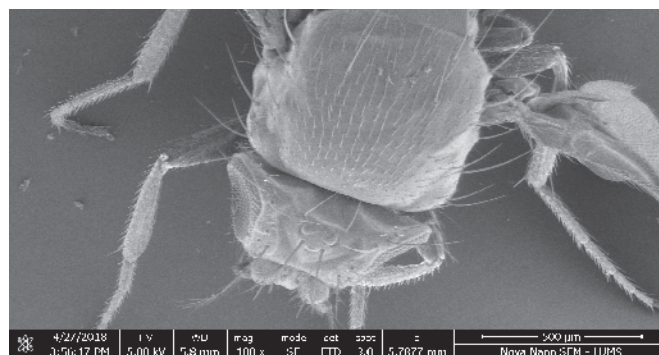
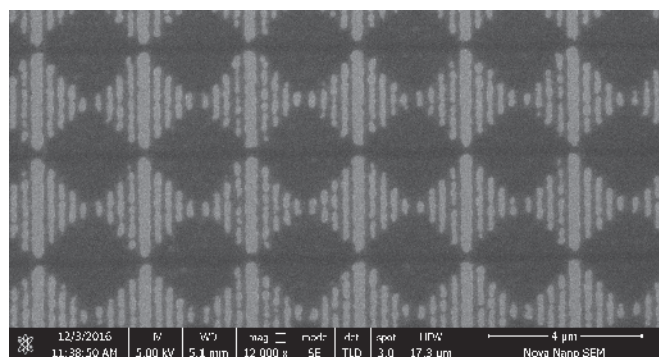
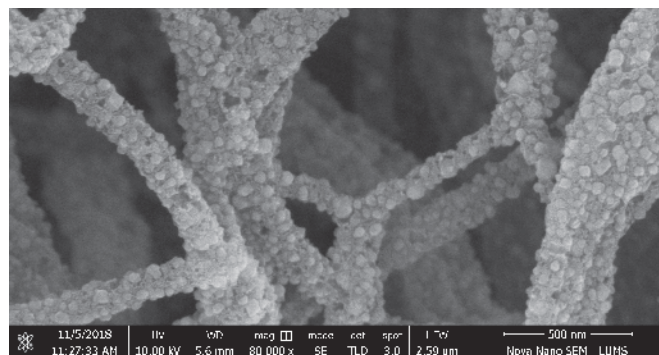
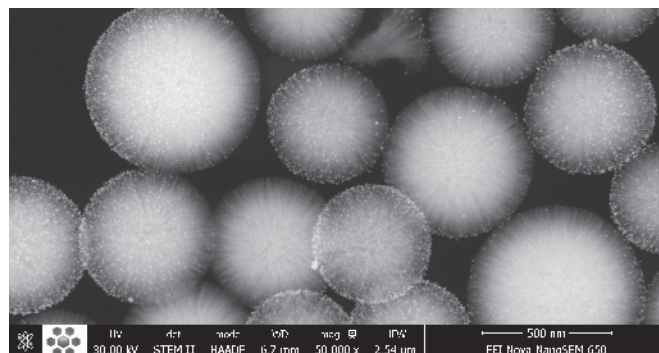
Everhart-Thornley Detector (ETD)  
Through Lens Detector (TLD)

### Advanced Imaging Detectors

Concentric Backscattered Detector (CBS)  
Scanning Transmission Electron Detector (STEM)  
Low Vacuum Detector (LVD)

### Additional Capabilities

Energy Dispersive X-ray Spectroscopy  
E-beam Lithography System  
In-situ Plasma Cleaner



The facility is managed by Dr. Murtaza Saleem (Senior Research Scientist, SBASSE) who holds a PhD in Solid State Physics and has been associated with LUMS since 2013.

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