



# LUMS

A Not-for-Profit University

Learning *Without* Borders

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IMAGINE  
YOUR  
FUTURE

# MS & PhD COMPUTER SCIENCE

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Syed Babar Ali School of Science and Engineering



# CREATING IMPACT THROUGH RESEARCH



**6**  
**Disciplines**  
Biology  
Chemistry  
Computer Science  
Electrical Engineering  
Mathematics  
Physics

The Syed Babar Ali School of Science and Engineering (SBASSE) at LUMS is taking strides in improving teaching and learning, while celebrating the novelty of research. SBASSE, through innovative and impactful contributions to science and technology, is nurturing future leaders with the potential to impact society.

SBASSE offers undergraduate, graduate and doctoral degrees in a wide range of disciplines. The MS programmes at SBASSE are rigorous and designed to impart specialised professional and research-oriented training to students. To graduate, students must accumulate a total of 30 credit hours either entirely from coursework, or by completing 24 credit hours from coursework and 6 from research work/thesis. Thus all SBASSE departments offer two options to choose from: MS-by-Coursework or MS-by-Thesis.

The SBASSE PhD programmes prepare students to think scientifically and conduct high-quality research independently. Major milestones that must be achieved for the successful completion of the PhD degree include the Coursework, Comprehensive (Qualifying) Examination, Thesis Proposal Defense, at least one peer-reviewed journal article and PhD Thesis Defense.

During the course of study, student learning takes place through lectures, tutorials, laboratories, problem-solving exercises, research projects and frequent interaction with experienced, world-class faculty members.

## WHY CHOOSE SBASSE

### QS World University Rankings by Subject

#251	Computer Science and Information Systems
#351	Engineering – Electrical and Electronics
#382	Engineering and Technology
#501	Physics and Astronomy

### KEY INITIATIVES

#### THE ONLY 600 MHZ NMR SPECTROMETER IN THE REGION

SBASSE's 600 MHz nuclear magnetic resonance (NMR) spectrometer can be accessed for molecular analysis. Researchers can send their samples and obtain high resolution spectra, both in one and two dimensions.

#### WEB PORTAL TO ACCESS ONLINE COURSES

The School's website hosts a portal that provides access to diverse online courses produced by its faculty. The offered courses range from introductory to advanced levels.

#### MATLAB ACCESS FOR EVERYONE

A MATLAB license for everyone working at the School including faculty, staff, researchers and students provides complete access to all of its toolboxes.

#### HIGH VOLTAGE ENGINEERING LABORATORY

This lab has been established to become a nursery for important work in the field of high voltage and power systems.

#### CLOUD CLASSROOMS

SBASSE is combining virtual classrooms with real learning by introducing a blended learning solution. Roving cameras, instructor-controlled zoom,

full wall projection of participants for maximum immersiveness, ability to record and display multiple views are some of the technical capabilities.

#### CENTRAL LAB

The Lab aims at becoming the go-to place for high-end characterisation and analysis for academia and industry within the country. Student apprenticeships, restructuring of the Central Lab committee, efforts to add new equipment and a brochure to disseminate information about the Lab, all speak to this.

#### PLACEMENTS

SBASSE has top academic placements (Massachusetts Institute of Technology, Harvard University, University of Warwick, London School of Economics, University of Oxford, University of Cambridge etc.). Its graduates are hired by top local and international organisations (Engro Corporation, Nestle Pakistan, Systems Ltd., Microsoft, Google, Facebook etc.)

### LEARNING WITHOUT BORDERS

Research and teaching at LUMS truly offer its community 'Learning Without Borders' by breaking academic, geographic and socio-economic barriers to make education accessible to all. The University continues to be an intellectual hub, rich with varying perspectives and transformative ideas. With an environment brimming with inclusion, unity, and boundless knowledge, learning continues in and beyond the campus walls with the aim to develop innovators, leaders and change-makers who can contribute to the community and build strong borderless networks.

### TOP QUALITY PUBLICATIONS

SBASSE faculty have produced around 300 articles, all published in international venues of prestigious ranking.

### RECOGNITION OF TOP RESEARCH THROUGH SYED BABAR ALI RESEARCH AWARDS (SBARA)

These Awards recognise PhD students. The winners, called the Syed Babar Ali Fellows, are selected for the novelty of their research work, and the potential for lasting impact to their disciplines and the society.





# MS | PhD COMPUTER SCIENCE

## How will you launch your new world?

The Department of Computer Science will help you stay on top of the growing trends of information and technology. It will equip you with first-hand experience of the quality work being done in the areas of Computer Vision, Data Mining, Networks, Information Security, Privacy and Distributed Systems, Software Engineering, Human Computer Interaction, Big Data, Artificial Intelligence, and Robotics.

As an integral element of a graduate education, the Department of Computer Science provides unmatched research possibilities, opportunities and resources. The Department not only encourages students to get involved in rigorous research alongside coursework but also provides fully equipped clusters, groups and labs.

## What will your new world invent?

The Computer Science faculty has years of experience exhibited not only through their taught courses and curriculum, but also through their rigorous research work and publications in renowned journals.

### Systems/Security

Dr. Basit Shafiq  
Dr. Muhammad Fareed Zaffar  
Dr. Mobin Javed

### Human Computer Interaction/Information and Communication Technology for Development

Dr. Suleman Shahid  
Dr. Maryam Mustafa

### Computer Vision/Algorithms

Dr. Murtaza Taj  
Dr. Imdad Ullah Khan

### Software Engineering

Dr. Naveed Arshad  
Dr. Junaid Siddiqui  
Dr. Shafay Shamail

### Artificial Intelligence/Machine Learning

Dr. Agha Ali Raza  
Dr. Mian Muhammad Awais  
Dr. Asim Karim

### Networks/Internet of Things

Dr. Muhammad Hamad Alizai  
Dr. Zafar Ayyub Qazi  
Dr. Zartash Afzal Uzmi  
Dr. Ihsan Ayyub Qazi

## How will Computer Science help you learn hands-on skills?

The Department offers numerous research opportunities through the following state-of-the-art facilities:

- Computer Vision Lab
- Robotics and Intelligent Computing Lab (RICE)
- Knowledge and Data Engineering Lab (KADE)
- Software Engineering Research Lab (SERL)
- Networks and Systems Group (NSG)
- Programme Analysis Group (PAG)
- Computer Human Interaction and Social Experience Lab (CHISEL)
- Embedded Systems & Networks Lab (SYSNET)
- 4G/5G Wireless Research Lab

## Embrace the Computer Science experience

- For his outstanding contributions in the field of Computer Networks from 2011-20, Dr. Zafar Ayyub Qazi has been recognised as the AI 2000 Most Influential Scholar (Honorable Mention). He ranks 17 in the list that includes researchers from Stanford, MIT, UC Berkeley, CMU, Google and Microsoft Research.
- Dr. Hamad Alizai, Dr. Junaid Haroon Siddiqui and students' paper, 'Intermittent Computing with Dynamic Voltage and Frequency' was published in the International Conference on Embedded Wireless Systems and Networks (EWSN) in February 2020 and was nominated for the best paper award.
- Dr. Agha Ali Raza and co-authors from LUMS, University of Michigan, University of Maryland, and NYU, Abu Dhabi published a paper, 'An Empirical Comparison of Technologically Mediated Advertising in Under-connected Populations' in ACM CHI in April 2020; the paper received an Honorable Mention Award at CHI 2020.
- Dr. Agha Ali Raza is running a COVID-19 information hotline in Pakistan, Baang. This initiative is helping disseminate reliable information to under-connected and inaccessible population segments and trying to understand how to control the spread of misinformation on voice-based social media platforms. He also gave a talk, 'The Viral Spread of COVID-19: Information Using An IVR Social Platform', at Google, USA in July 2020.
- Dr. Mobin Javed and co-authors from MIT, Berkeley, Stanford, Cambridge and UCL received the Applied Networking Research Prize 2020 for their work published in CCR 2018.
- Dr. Maryam Mustafa was awarded a USD 35,000 grant by IDRC for a project on Gendered Design in STEAM, which will span over 36 months. She also organised the first CHI workshop on Islamic Computing, 'IslamicHCI: Designing With-and-Within Muslim Populations' in July 2020.
- Dr. Ihsan Ayyub Qazi and Dr. Agha Ali Raza from the CS Department, along with Dr. Ayesha Ali from the Economics Department, won the prestigious Facebook Research Award in August 2020 for their proposal, 'Countering Deepfake Misinformation Among Low Digital-literacy Populations'. This is the second time in a row that the faculty has won this highly selective award and funding worth USD 90,000.



### DR. MUHAMMAD SABIEH ANWAR

Dean and Professor, Syed Babar Ali School of Science and Engineering

"The graduate programmes in science and engineering at SBASSE are poised to make an impact. Our deepest impact as an institution would truly be made by the research that emanates from our graduate education and the research that it propels. We are committed to providing a collegial, rigorous and progressive research milieu that triggers the thirst for knowing more and seeking the truth, and in the process, creating tools, gadgets, machines and ideas that address the human condition and global issues. We promise that our graduate programmes will make you ride through the two extremes of the microcosm and the macrocosm, the ideal and the practical, the abstract and the tangible. Welcome to the Syed Babar Ali School of Science and Engineering!"





# YOUR JOURNEY BEGINS HERE!

## Admission Criteria for Local and International Students

Admission is purely merit-based and rests on the following criteria:

### MS Programme

- Academic Record
- Performance in Admission Tests
- Application Review
- Submission of complete online application, application processing fee and supporting documents by the stipulated deadline
- Interview Performance (If needed)
- Letter of Recommendation

### PhD Programme

- Academic Record
- Performance in Admission Tests
- Application Review
- Research Statement
- Submission of complete online application, application processing fee and supporting documents by the stipulated deadline
- Letters of Recommendation and
- Interview Performance (If shortlisted)

**Note:** This is the minimum criteria that applicants need to fulfil in order to be eligible to apply. Fulfilment of this criteria does not guarantee admission to LUMS.

For further details, please visit  
<https://lums.edu.pk/graduate>

## Admission Criteria for Phd Programme for Foreign Nationals

SBASSE's PhD application for foreign nationals caters to applicants who currently reside outside Pakistan and have a foreign nationality.

All other applicants (i.e. those who have dual nationality, are Pakistani nationals, or are overseas Pakistanis) are required to apply through the regular admission application.

Admission is purely merit-based and rests on the following criteria:

- Academic Background
- Research Background
- Online Test and Interview (If shortlisted)

In order to study at LUMS, foreign nationals must obtain a 'Study Visa' from the Pakistani Embassy/Consulate working in their country. The Pakistani Embassy/Consulate will only issue a Study Visa for students' stay at LUMS upon receipt of Higher Education Commission (HEC), Pakistan's 'No Objection Certificate' and clearance from the Ministry of Interior, Pakistan.

For the issuance of Visa, students must submit relevant documents to the LUMS Admissions Office through postal mail/courier service by the stipulated deadline.

For details, please visit  
<https://international.lums.edu.pk>

# FINANCIAL SUPPORT FOR LOCAL AND INTERNATIONAL STUDENTS

Admission to all LUMS programmes is purely on merit and independent of students' ability to pay the related tuition fees. Once a student has been admitted to a programme, there are several mechanisms in place to provide financial support based on need and merit. All awards are reassessed each academic year based on performance, need, available resources and prevailing University policies. LUMS is committed to providing as much financial assistance as possible within the limits of its available resources. Nevertheless, the University may not be able to meet all requests for financial assistance, and it is strongly recommended that applicants secure as much of their own funding as possible. Several funding opportunities are available to deserving MS and PhD students. These include:

- Merit Scholarships
- Partial tuition fee waivers for MS Basic Sciences students
- LUMS Interest-free Loan that covers partial to full tuition fee expense (only for local applicants)
- External Scholarships (support and eligibility for these scholarships vary depending on the donor)
- Options to work as Research or Teaching Assistants (subject to availability)
- Full funding of the PhD, which covers tuition, registration, admission fee and a monthly stipend for four (4) years.

For details, please visit  
<https://financial-aid.lums.edu.pk/graduate-financial-aid>



## DR. BASIT SHAFIQ

Chair and Associate Professor, Department of Computer Science

"The CS Department aspires to take a lead role in building an ecosystem that fosters academic and research endeavours to address the challenges of our society. The mission of the CS graduate programmes is to produce researchers, scholars, and professionals who will advance the field through knowledge creation in their specialised disciplines as well as contribute to development of new technologies and infrastructure to support economic growth and social development."



## MUHAMMAD ABDULLAH

MS Computer Science 2019

"I joined the MS Computer Science programme without a bachelor's degree in the same field. However, the entire programme is so well-designed that I was able to transition seamlessly. I had some of the most inspiring and supportive professors as my research advisors who made my academic journey thoroughly satisfying and enjoyable."



**FOR FURTHER DETAILS, VISIT**

**MS PROGRAMME:**

**[HTTPS://LUMS.EDU.PK/PROGRAMMES/MS-COMPUTER-SCIENCE](https://lums.edu.pk/programmes/ms-computer-science)**

**PHD PROGRAMME:**

**[HTTPS://LUMS.EDU.PK/PROGRAMMES/PHD-COMPUTER-SCIENCE](https://lums.edu.pk/programmes/phd-computer-science)**

**PHD PROGRAMME (FOREIGN NATIONALS):**

**[HTTPS://LUMS.EDU.PK/PROGRAMMES/PHD-COMPUTER-SCIENCE-FOREIGN-NATIONALS](https://lums.edu.pk/programmes/phd-computer-science-foreign-nationals)**

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