Research at LUMS
2015-16
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Research at LUMS
An Overview
Message from the Director, Office of Sponsored Programmes and Research (OSPR), Dr. Shafay Shamail

The Lahore University of Management Sciences (LUMS) is a centre of academic and research excellence with highly qualified and diligent faculty, state-of-the-art research facilities and well-equipped laboratories. Being an integral part of the university’s culture, research has allowed LUMS faculty and students to engage in ground-breaking discoveries in the fields of social sciences, humanities, technology, business and law.

To facilitate research at LUMS, the Office of Sponsored Programmes and Research (OSPR) has acted as a bridge between LUMS faculty and national and international donors since August 2010. OSPR facilitates sponsored research activities including but not limited to externally funded research projects, unrestricted grants, travel grants, sponsored conferences, workshops, seminars, consultancy assignments, MoUs, non-disclosure agreements (NDAs) and contracts/agreements related to externally funded projects.

OSPR has hence undertaken a comprehensive approach in managing the award lifecycle from the moment when a funding opportunity is identified to the final closure of the grant award.

In terms of research, 2015-16 has been a remarkable year for LUMS. Faculty members succeeded in winning 106 external grants amounting to PKR 431 Million (92 per cent increase in number and 60 per cent increase in terms of award amount). LUMS also provided 35 grants through the Faculty Initiative Fund (FIF) amounting to PKR 32 Million. In addition to this, 82 Faculty Travel Grants (FTG) were awarded in 2015 amounting to PKR 22 Million.

With a mission of supporting LUMS faculty members in their research endeavours, OSPR provides administrative support, financial monitoring and gives expert opinion on budgeting to enhance efficiency in all sponsored research activities in order to ensure that research remains a fundamental part of the culture at LUMS.
Canal Drones: Precise 3D Profiling of Siltation in Waterways

Dr. Abubakr Muhammad, Associate Professor at the Department of Electrical Engineering at the Syed Babar Ali School of Science and Engineering (SBASSE), in collaboration with Prof. Dr. Karsten Berns, University of Kaiserslautern, Germany, has been working on a project that proposes an aerial robotics system to increase the efficiency of the silt removal process of irrigation canals in Pakistan. The team has developed a laser sensor based system on board an aerial drone which can help the human operator in gauging canal siltation. The acquired terrain profiles will help discover defects in canal linings, locate and estimate silt accumulations and help in monitoring the excavation operation.
It is a well-known fact that agriculture is the backbone of the economy of Pakistan, and the irrigation system is vital to its productivity. The water supply to the agricultural base in the Indus River basin is dispersed through a vast network of irrigation canals that runs thousands of kilometres in length.

A lesser known fact is that most of the canals have mud banks and beds which undergo deterioration over time due to accumulation of silt and sediment transported by the rivers. What this results in is an annual closing of canals for a cleaning operation, which is both difficult and costly. This silt removal operation is prone to inefficiencies due to subjective decision making in the cleaning process, shortage of time and lack of verification.

Dr. Abubakr Muhammad, in collaboration with Prof. Karsten Berns, University of Kaiserslautern, Germany, has been working on a project that proposes an aerial robotics system to increase the efficiency of this process. Together, they have developed a framework in which a laser sensor system on board an aerial drone can assist the human operator in surveying the siltation of canals during annual closure. “The proposed system envisages efficient cost effective cleaning, reduced water discharge variability and enhanced agricultural productivity,” explains Dr. Muhammad.

There are a number of challenges in this project that can only be overcome by pushing the state-of-the-art techniques in robotics and 3D vision technologies. Before building an actual system, Dr. Muhammad and his student Hamza Anwar (now a PhD student at New York University) analytically examined the feasibility, keeping in mind if it is even possible to build such a system using current drone and sensor technology. In a paper published at a top robotics conference, they identified the limits of localisation errors and sensor uncertainties under which correct siltation profiles can be recovered. Based on their work, Dr. Muhammad’s PhD student Syed Muhammad Abbas has been pushing the limits on outdoor localisation technologies, using a suite of sensors including GPS, cameras, gyros and accelerometers with sophisticated algorithms.

In another related research work, two of Dr. Muhammad’s MS students have completed their theses on autonomous navigation along the canal channels. Using techniques from self-driving cars, they are building a system that navigates the canals without much help from a human operator. This is critical for field deployment of this system over long ranges.

The funding for this ambitious undertaking comes from the German Academic Exchange Service (DAAD) Award for Project RoPWat (2014-15) along with internal funding from the LUMS Faculty Initiative Fund (FIF 2014).

For Dr. Muhammad, the motivation for this work comes from a desire to map the large irrigation canal network in the Indus River basin for studying siltation. His objective is to develop a semi-autonomous robotic profiling system to increase the efficiency of canal profiling and to develop a 3D perception system, which can be deployed on a commercial agricultural machine (excavator or a tractor) or on board a micro aerial vehicle to assist the human operator in cleaning the canal effectively. Dr. Muhammad explains, “The profiles will help identify defects in canal linings, locate and estimate silt accumulations and help the human operator continuously monitor the excavation operation.”

In order to achieve the research goals of the project, a number of collaborative activities have been performed. These activities provided platforms for scientific discussions and generating new ideas for future collaborative research projects. The project has been presented at international and national conferences and has also resulted in faculty and student exchange programmes, with Prof. Dr. Karsten Berns and his students, Alexander Koepper, Viktor Leonhardt, Massimo Tosa and Daniel Schmidt, visiting LUMS and Dr. Abubakr Muhammad visiting the University of Kaiserslautern (TUKL). This project has in fact, set the stage for developing a long-term collaboration between LUMS and TUKL.

This project has the scope to revolutionise Pakistan’s irrigational system, which will greatly benefit the country’s economy in the long run.
Coordinating Farmers with Cell Phones: Technology Innovation in Livestock Extension Services in Pakistan

In 2011, Dr. Syed Ali Hasanain, Assistant Professor at the Department of Economics, Mushtaq Ahmad Gurmank School of Humanities and Social Sciences (MGSHSS) along with Michael Callen, Assistant Professor, John F. Kennedy School of Government at Harvard University collaborated with former DCO Zubair Bhatti to evaluate a novel project Bhatti was then implementing with the Punjab Government: the Punjab Citizen Feedback Model (CFMP). The project entailed proactively contacting citizens after they had been provided a government service, and requesting feedback focused primarily on corruption. In the course of evaluating CFMP, the researchers realised that a modified version of the programme could be productively applied to the livestock sector.

The livestock sector is of immense importance to Pakistan and especially to Punjab. It contributes 9 percent of the province’s GDP, and two in every three rural farmers in Punjab own either cows or buffaloes. Although large in size, the livestock sector operates at a very low capacity level. The farmers face large challenges in the nourishment, health and breeding of animals. Some of these challenges arise because farmers have poor information and cannot distinguish between good and bad quality supplies. Does this fodder have high or low caloric content? Was the injection the vet gave my animal genuine or fake? How good is this technician at artificially inseminating my animals? The researchers realised that increasing information about quality could be the first step to improving it.

Dr. Hasanain’s team expanded to include Aman Rezaee, a graduate student at UC, San Diego and LUMS alum Yasir Khan, then an in-country economist at the IGC (International Growth Centre). They were aided by research assistants, Zia Mehmoood, Khwaja Umair, Amanullah Haneef and Zarak Sohail. Rezaee suggested that instead of providing the information collected to government managers, as was done by the CFMP programme, the new project provides it directly to farmers.

When these AITs visited small scale farmers to provide services, they entered the farmers’ phone numbers into the app designed for the project. The app then automatically sent these phone numbers and other details to a call centre the researchers had contracted. The call centre called the farmers at a later time, and inquired about the success of the AIT’s service. The farmers’ responses were tabulated, and aggregate success/quality metrics derived for each AIT. Then the call centre contacted farmers and offered them information about the AITs in their area who had proven most successful in providing the service. This allowed farmers to make more educated decisions when selecting their service providers in future.

To evaluate outcomes, the researchers used three types of data: first, they conducted a survey before the project started in 90 of Sahiwal district’s 500 villages, gathering information in ten households per village. They repeated this survey after the end of the project. Second, they surveyed all the AITs in Sahiwal, before and after the project. Finally, they collected data generated by the call centre operation over the time the project was conducted.

With this data, the team was able to provide evidence that the project increased animal pregnancy success rates by 27 percent and created an estimated 300 percent return on the cost of the project.

The project focused on information, not livestock. As such, the lessons learned could also be applied to various other sectors: from seed or pesticide quality purchased by a farm, to malaria medicine procured from the local pharmacy, projects similar to this one could plausibly improve the quality of products and services.

Theoretically, economists have long understood that gaps in information can cause efficiency losses in markets. They also know of examples where technological improvements that have increased information in a market have made it more efficient. However, there is very little empirical work in this area, and practically none in a setting where market participants have relatively low education levels.

In this project and future work, Dr. Hasanain and his team hope to provide evidence of how sellers decide to share information about the quality of their products or services, and buyers decide to choose a seller to purchase from. This information would be valuable not only to academics, but to policy makers interested in supporting market-based outcomes in contexts where information is sparse.
Ethnic Violence & Labour Unrest in Pakistan

Dr. Rashid Memon, Assistant Professor at the Department of Economics, Mushtaq Ahmad Gurmani School of Humanities and Social Sciences (MGSHSS) through his research has been exploring how identity works in the particular context of the labour market in Pakistan. He has studied how traditional, pre-capitalist social structures coexist with modern capitalist production and how these hierarchical structures are resisted.
Dr. Rashid Memon’s interest in the field of ethnic conflict within the labour market started quite early. In 1999, he was an intern at a large Karachi based firm which had its production facilities in rural Sindh. The firm took their interns on a trip to their factory and while the rest of the interns played football, Dr. Memon ventured out of the factory to talk to the local people. He found it remarkable that there was a village of low caste Christian Punjabis right outside the factory walls. People colloquially referred to as “chuhras” had moved here at the time the factory was constructed and were responsible for sweeping and other low-skilled jobs.

“I was interested in two aspects of this migration,” explains Dr. Memon, “firstly that the factory management, most of whom were ethnic Punjabis and Muhajirs, had in some ways managed to reproduce aspects of the caste structure of a traditional Punjabi village. Secondly, it appeared that local people were excluded from even low-skilled, low wage jobs.”

What also struck Dr. Memon was that such an employment distribution was resisted and contested, sometimes even violently. It appeared that there were regular strikes outside the factory by local people demanding jobs and protesting the allegedly discriminatory practices of the factory management.

This possibility of discrimination and the resistance towards it has inspired much of Dr. Memon’s work. His reasons for choosing this topic have much to do with his own identity – the same way Gary Becker, the renowned Jewish American economist wrote on race prejudice and Barbara Bergman, a feminist economist wrote on women in the labour market. Dr. Memon grew up in a household that was at the centre of the “Movement for the Restoration of Democracy” against General Zia, which was as much a movement for democracy as it was a movement for the rights of Sindh. Religious, Pakistani and Sindhi identity ideas were ideas that constructed the lens through which he began looking at society. As an economist, therefore, it was no surprise that he was inspired by wage distributions parameterised by identity.

The casual field observations he made as an undergraduate level student in 1999, were to later provide the impetus for his PhD dissertation on ethnic discrimination in Pakistan’s labour market. The dissertation was completed in 2012, over a span of two years. It included a paper that was a mathematical model which captured a specific aspect of this conflict. He returned to the field in the January of 2013 and wrote a SSPB (Social Science Policy Bulletin) article on the field notes.

Dr. Memon espoused multiple, interdisciplinary techniques during his research. His dissertation paper set up a dynamic optimisation problem that generated wage and unemployment inequality between two ethnic groups because one group was “docile and could be controlled easily,” as Dr. Memon describes it. His SSPB article was based purely on qualitative interviews with workers and union office bearers and suggested, among other things, that firms often used state power to coerce and intimidate workers who tried to bargain for better jobs and that the group bargaining for better jobs is placed under an ethnic label and categorised as ‘a historical accident.’

In February 2014, Dr. Memon presented an econometric paper titled ‘Stirring the Primordial Soup,’ where he tried to identify the impact of ethnic fractionalisation on the incidence of violence. The paper faced great hurdles in terms of data constraints, but his work was granted a Faculty Initiative Fund grant by LUMS through which he has been able to collect an enormous amount of data. While one of his motives is to share his studies in an academic journal for wider access; for the time being, it is a project that aims at understanding Sindh’s labour market.
Sharia and the Modern State

Dr. Muhammad Zubair Abbasi, Assistant Professor at the Shaikh Ahmad Hassan School of Law (SAHISOL), is examining the relationship between Sharia and the modern state in the larger context of the scholarship that explores the relationship between different legal systems and their impact on the economic and political development of a country.
The growing number of Muslims in the West have ignited a debate about the compatibility of Sharia with the state law. Dr. Muhammad Zubair Abbasi’s work explores the interaction between classical Islamic law and the modern state; one of the most contentious issues in Islamic jurisprudence today. Dr. Abbasi’s work examines this issue from a historical perspective.

“The incorporation of Sharia into the state law was facilitated through the transplantation of legislative and hierarchical judicial institutions, which provided venues for a legal discourse among various stakeholders,” explains Dr. Abbasi. “Historical evidence suggests the feasibility of incorporating Sharia into state law in Western democratic countries,” he adds.

Dr. Abbasi aims to highlight that classical Islamic law and modern state are not incompatible as is argued by a majority of Western scholars. He also wants to address the role of Islamic law in the legal and political system in Pakistan.

He hopes his work will provide a historical context to this debate and suggest ways to accommodate Islamic law in the structure of a modern state, while distilling misconceptions of the West about Islamic jurisprudence.

In a related project, Dr. Abbasi is examining the theory and practice of women’s right to divorce in Pakistan. Pakistani judges extended women’s right to divorce, without the consent of their husbands, under the doctrine of khula, by directly interpreting the Quran and Sunnah. The Lahore High Court recognised this right for the first time in the Balqis Fatima case in 1959. The Supreme Court of Pakistan endorsed this decision in the Fatima Bibi case in 1967. This development made Pakistan the first Muslim country to grant women the right to no-fault based unilateral divorce under Islamic law. The judges in Pakistan continue to play a key role in accommodating classical Islamic law with the changing circumstances. This study proposes to explore the process of the development in the right of women to dissolve their marriages without the consent of their husbands. It will also assess the impact of these legal changes on the institution of family based on empirical data collected from family courts and local councils.

Dr. Abbasi also examines the role of Islamic law in the legal system of Pakistan. Unlike common law and civil law, the Islamic legal system is pluralistic and discursive in the sense that there are various schools of thought and even within one school there is diversity of opinion. This feature of Islamic law vests judges with discretionary powers while deciding legal disputes. Since 1979, the Shariat Courts in Pakistan have been given powers to determine the validity of any law, with certain exceptions, on the basis of its repugnancy to the injunctions of Islam.

This project evaluates the contribution of the Shariat Courts in Pakistan in the application and development of Islamic law by analysing the judgments of the Federal Shariat Court and the Shariat Appellate Bench of the Supreme Court of Pakistan. The analysis will help understand the nature of problems faced by the judiciary in Pakistan while applying Islamic law in the modern day, by highlighting the type of sources judges used to reach their decisions. It will also reveal the legal methodologies and methodological tools employed by lawyers to argue their cases before courts.
Cognitive Determinants of Entrepreneurial Behaviour Amongst Students

Dr. Muhammad Shehryar Shahid is an Assistant Professor at the Suleman Dawood School of Business (SDSB), whose research interests lie in the areas of informal entrepreneurship, small business growth and entrepreneurial intentions. Dr. Shahid is investigating which institutional factors play a significant role in determining entrepreneurial intentions of university students in Lahore, Pakistan. He is particularly studying students from Lahore University of Management Sciences (LUMS), University of the Punjab (PU), and University of Central Punjab (UCP).
In recent times, there has been a growing realisation that entrepreneurs in Pakistan need to be nurtured since the country is experiencing an unprecedented ‘demographic dividend’. Almost 50 per cent of Pakistan’s population is below the age of 20, and over 60 per cent is below the age of 30, as a result of which the working-age population is swelling and the dependency ratio is declining. Hence, since this ‘youth bulge’ is expected to dominate the population for another 30 to 35 years according to current demographic forecasts and since jobs are not being created fast enough, the need to promote entrepreneurship in Pakistan cannot be overstated. In this regard, Dr. Muhammad Shehryar Shahid, in collaboration with Dr. Azam Roomi, Senior Lecturer, Cranfield University, UK, focused on investigating the entrepreneurial behaviour of students.

In recent years, the enthusiasm for entrepreneurship is being increasingly felt in developing countries since the benefits of entrepreneurship are manifold, ranging from job creation, economic growth, to innovation. A resourceful country like Pakistan, with a massive pool of talented youth, is no exception, witnessing a clear policy shift towards an economic growth model driven by new enterprise creation as opposed to its traditional focus on paid employment. In consonance with this, there is now a new unprecedented focus by LUMS on the development of entrepreneurship as a subject and skill set amongst its students. Therefore, determining the key drivers of entrepreneurial behaviour in students will be of phenomenal significance and will subsequently help to optimise entrepreneurship education and training programmes for students.

Furthermore, with entrepreneurship becoming an increasingly global phenomenon, the contexts in which it occurs have become more varied, including some where the business environment is often extremely challenging, such as in most developing economies. Therefore, the pursuit of greater rigour and relevance of scholarly research and the quest to capture the diversity of entrepreneurial activity demands greater care and creativity in contextualising entrepreneurship studies. Consequently, in order to effectively penetrate to the depths of entrepreneurial behaviour, acknowledging the institutional embeddedness of entrepreneurial behaviour is gaining widespread recognition among entrepreneurship scholars in recent years.

Therefore, the study by Dr. Shahid seeks to investigate which institutional factors play a significant role in determining entrepreneurial intentions of university students in the city of Lahore, Pakistan, particularly from Lahore University of Management Sciences (LUMS), University of the Punjab (PU) and University of Central Punjab (UCP).

Apart from academic publications, through this research initiative, Dr. Shahid seeks to actively support the University’s entrepreneurial agenda by gaining insights into students’ entrepreneurial ambitions and the kind of training and support they seek from the university.

He also feels that the ultimate beneficiaries of this research initiative will be both Pakistan’s society and industry. By investigating the impact of the multiple facets of institutional context on students’ intentions to pursue a career in entrepreneurship, the research will offer an empirical explanation for the prevailing entrepreneurial behaviour in the society at large, and can act as an important input for policy makers responsible for advancing entrepreneurship in the country.

“The aim of this research is to unearth the factors that can potentially maximise students’ intentions to start a business, which will help us design and optimise entrepreneurship education and training programmes at LUMS,” says Dr. Shahid.
Investigating the Effectiveness of Facebook as a Delivery Channel for Social Marketing Campaigns on Women’s Health in Pakistan

Dr. Zain-ul-Abdin Khawaja, Assistant Professor at the Suleman Dawood School of Business (SDSB), is working on a collaborative project that uses social media platforms to target women in Pakistan, to inform them of their sexual rights and to educate them on matters of sexual health. He hopes to establish academic research work on the subject in order to help support women’s health issues and to improve their access to relevant information, medical help and facilities. Dr. Khawaja chose to fund the project himself in order to ensure there would be no censorship on a topic that is considered taboo due to cultural sensibilities.
Dr. Zain-ul-Abdin Khawaja’s work titled ‘Investigating the Effectiveness of Facebook as a Delivery Channel for Social Marketing Campaigns on Women’s Health in Pakistan’ is a collaboration with Stephen McDowell, Academic Dean of Communications, Florida State University and Phil Grise, Emeritus Professor, Florida State University. Along with the help of Research Assistants, Khadija Ali and Shanze Khan, and with organisations such as Lahore Waste Management, Lahore General Hospital and a number of sexual health organisations, Dr. Khawaja has self-funded this project in an attempt to address the issues that plague women in Pakistan today.

“The reason for working on this topic is to assess the viability of Facebook and other social media platforms as alternative methods of reaching out to hard-to-reach audiences,” says Dr. Khawaja.

He further explains that raising awareness about products, which are difficult to market in traditional ways due to local laws or cultural sensibilities – in this case those to do with sexual health – was the primary objective here.

From an academic point of view, Dr. Khawaja’s project addresses learning needs and also serves as an exploratory study. In the field, he was exposed to harrowing accounts of the fates of hundreds of young girls and women, who had unplanned abortions, or suffered from other sexual diseases, such as breast or cervical cancer due to lack of information. These were eye-opening for him, even though he had lived in Pakistan his entire life.

The pilot study of the project was conducted while he was still enrolled in a PhD programme at Florida State University. He later worked on online apps, a website, and a synchronous online communication system that would connect volunteer doctors to those in need. Dr. Khawaja chose not to apply for grants or aid as the project is a sensitive one and susceptible to censorship or political and social pressures. “A lot of organisations such as DKT and Greenstar try their best to educate people on the matter, but the advertisements they produce get pulled off from television in a day or two,” explains Dr. Khawaja.

Dr. Khawaja’s project aims to approach people through alternative methods, when they are removed from group dynamics and group pressure. This situation makes them more inclined towards becoming acquainted with useful information. They are able to freely explore their options, as well as learn about their sexual rights while educating themselves on matters of sexual health.

Pakistan, unfortunately has a culture of silence on the matter of women’s sexual health, and is predisposed towards censorship. Dr. Khawaja is keen to establish academic research work on this pertinent issue, in order to help support women’s health issues and to help them discreetly and safely access relevant information and health facilities.
Growth of Islamic Religiosity in Pakistan: Manifestations and Impact

Dr. Ali Khan, Associate Professor of Anthropology at the Department of Humanities and Social Sciences at the Mushtaq Ahmad Gurmani School of Humanities and Social Sciences (MGS HSS) has been working with Dr. Laila Bushra, Assistant Professor of Sociology at MGS HSS on identifying reasons for the growth of religious extremism in Pakistan. Exploring the Joseph Colony incident in-depth, they have discovered that there can be various economic and political reasons behind the hatred and violence which initially appear to be based on religious grounds.
For Dr. Ali Khan, the research he does is a labour of love. Since completing his PhD, he has worked on diverse societal topics including, cinema and society as well as cricket and society in Pakistan. Currently, he is working on and exploring the reasons for the growth of extremism in Pakistan.

In collaboration with Dr. Laila Bushra, Dr. Ali Khan has been working on a research paper titled, *Growth of Islamic Religiosity in Pakistan: Manifestations and Impact*. “We both felt that this is a burning issue in Pakistan as there is increasing intolerance in this country,” says Dr. Khan.

“There has been so much written in the newspaper and in the media about the event that occurred at Joseph Colony but much of it was sensationalised. We felt that we should do an in-depth survey of the incident and investigate where the hatred comes from and why violence takes a particular path,” adds Dr. Khan.

There is very little academic research done in Pakistan in this field. This, although unfortunate, provides an unparalleled opportunity to carry out first-hand research regarding many issues that Pakistan faces today. According to Dr. Khan, it is these gaps in research that drive him. His work was conducted through fieldwork and ethnographic research. Using the Joseph Colony incident as a case study, where dozens of houses and two churches were torched, Dr. Khan and Dr. Bushra, along with their research assistants conducted a number of interviews. The interviewees included members of the community, policemen, businessmen and others in Joseph Colony.

The purpose of the research was to find out what actually happened. With conflicting views in the media, it aims to answer questions such as whether the violence was religiously motivated or were there ulterior motives, like the illegal occupation of land, or political motives that drove the violence.

However, the research found that while the news outlets concentrated solely on religious motivations, the real reasons lay elsewhere.

Dr. Khan hopes that through this research he can personally learn why people behave in the way that they do. Where does this hatred come from in the first place? He says, “I want to explain the reasons for this violence. A better understanding of complex societal issues is needed. This will help people move the discourse beyond mere rumours and stimulate more academic research on the matter.”
The Walton Refugee Camp Project

Dr. Furrukh A. Khan, Associate Professor, Department of Humanities and Social Sciences at the Mushtaq Ahmad Gurmani School of Humanities and Social Sciences (MGSHSS) is compiling the oral histories of the people who experienced partition and were at the Walton Refugee Camp, which was the biggest refugee camp at the time. In a discourse about the 1947 partition of the Indian subcontinent, this camp, set up in Lahore, became a central place for the start of the formation of a national identity. The project includes collecting stories, experiences, mementos and pictures of the refugees of the Walton Camp.
The Walton Refugee Camp Project is a compilation of oral history narratives about the partition and the experiences, the people of the Walton Refugee Camp have undergone. Dr. Furrukh A. Khan, who has completed both his Master’s and PhD in Post-Colonial Studies from the University of Kent at Canterbury, finds this work to be both; an academic interest as well as a personal passion.

Dr. Khan’s Master’s dissertation on the works of Bapsi Sidhwa and his subsequent study of partition literature led him to be fascinated with the recording of experiences relating to the Indo-Pak partition. Since the majority of the population who experienced partition as a collective did not have formal education, their narratives were not written, and hence they are not part of the collective trauma suffered by those who were forced to migrate.

Partition was an event that has played an important role in the formation of a national identity. The state may have neglected this but as an academic, Dr. Khan feels the responsibility to document this highly significant experience and to disseminate it to a wider audience.

Dr. Khan strived to make sure that the narrative of those who experienced partition was not undermined. Therefore he started focusing on oral narratives and talking to people who had experienced the partition first-hand.

The aim of the project is to find out how and when, be it overtly or covertly, the state’s narrative was established.

The refugee camps were the first place where the state was in action. It was also the first point of contact with the migrants. The Walton Refugee Camp was the biggest refugee camp on either side of the border and yet, there is no documentation on it. In a discourse about the partition, one indirectly talks about what happened in Punjab because it was in this region that the largest exchange of populations took place. The camp, set up in Lahore was the largest of its kind and became a central place for the start of the formation of a national identity.

Currently, the project is researching people who experienced it first-hand. This includes collecting stories of the refugees of the Walton Camp, their experiences, mementos and pictures. Explaining the research methodology applied, Dr. Khan says, “Oral history has its own research methodology. It is not investigative journalism; it has all the biases written history has. One is not saying it is the absolute truth; it is a history that is according to those who experienced it. It has a different meaning for everyone, recollection of experience is very difficult and thus many different perspectives exist."

The main aim of the Walton Refugee Camp Project is to house this accumulated information into a single academic institution. “These experiences took a great toll on the people at the time of partition and shaped their beliefs and ideals about their national identity, and we have been socialised into those values and ideals. Our national identity has its roots in partition,” says Dr. Khan, “And we must understand or at least know the events that took place and the experiences of the people. It’s a project that is worth doing.”

MGSFSS faculty member, Dr. Anne Christine Habbard has also collaborated with Dr. Khan on this project.
Public Service in Pakistan: A Postcolonial Perspective

Dr. Mohsin Bashir, Assistant Professor at the Suleman Dawood School of Business (SDSB), has developed a case study of a situation in the field of Public Administration, where a provincial government took away some responsibilities from the district governments and handed them over to an NGO. Dr. Bashir intends to use this example to introduce students to the issue of efficiency versus democracy in government interventions.

The idea of developing a case study on this previously unexplored area of Public Administration came to Dr. Mohsin Bashir while he was conducting a training that dealt with the various levels of government. According to him, he noticed that the relationship between provincial and local governments in Pakistan was not a very democratic one, as provincial governments often enforce their will on the local governments. “This control is often exercised in the name of efficiency. I thought it would be very interesting to explore this relationship using a case study,” he said.

Dr. Bashir’s research project was intended to yield a teaching case study rather than a research paper. Therefore, the research was more pedagogical in nature than theoretical.

In Pakistan, there is a dearth of quality reading material in the area of Public Administration. Since Dr. Bashir’s study has been published by the LUMS Case Research Centre (CRC), it is now available to a larger audience including universities in Pakistan. Instructors teaching Public Administration can greatly benefit from this case study. In addition to classrooms involving full-time students, the study can also be used in executive trainings for public service officials.

It describes a situation where a provincial government took away some public health related responsibilities from some district governments in Pakistan and handed them over to an NGO. Even though this resulted in a technically efficient partnership, it was considered to be against the spirit of democracy, as a higher level of government had imposed its decision on a smaller level of government. Using this example, Dr. Bashir hopes to introduce students to the problems and questions of efficiency versus democracy in government interventions. Other learning objectives of the project include the dynamics of inter-government relationships and public-private partnerships as well as the issues of legitimacy in government.
Digital Preservation of Pakistan’s Heritage

The Digital Preservation project, funded primarily by the US Agency for International Development (USAID) through the US Ambassador’s Fund Programme, aims at creating a digital archive of six of Pakistan’s iconic architectural sites. Dr. Murtaza Taj, Assistant Professor at the Department of Computer Science, Syed Babar Ali School of Science and Engineering (SBASSE), with his team employs an innovative approach to preservation of Pakistan’s cultural heritage by introducing the use of state-of-the-art 3D laser scanners to create virtual tours and 3D models of these sites.

https://culturalheritageimaging.wordpress.com/category/guest-blogger/
The cultural heritage of Pakistan is spread over centuries, starting from the pre-historic era to the present day, and can be summarised by the Indus Civilisation, Gandhara Civilisation, the Islamic period, Sikh period, British period and Post-independence period. Numerous historic sites are spread all across the country. However, these are not well known to the world and even to the people of Pakistan themselves. Moreover, as time passes the condition of many Pakistani historical areas is worsening due to weather effects, negligence, vandalism and terrorism.

With this backdrop, it is important to preserve these national treasures not only for historical and educational purposes but also for recreational and tourism activities. Several restoration efforts are going on presently. However, physical restoration is slow, expensive and lasts for only a limited number of years, while the deterioration is going on continuously at a much faster rate.

The project by Dr. Murtaza Taj and his team employs an innovative approach to preservation of Pakistan’s cultural heritage by introducing the use of state-of-the-art 3D laser scanners to create virtual tours and 3D models of these sites; a practice that has gained global recognition but remained unexplored in the context of Pakistan’s architectural heritage till June 2015.

To initiate this project, the team successfully applied for the USAID Small Grants and Ambassador’s Fund Programme in order to acquire a Leica P20 Terrestrial Laser Scanner. Partnering with CyArk, the technological partner for this project, they were able to commence the training of local students and documentation of sites of cultural and historical importance. To commence the execution of the project, the team identified six sites across three provinces, namely Masjid Wazir Khan and Derawar Fort in Punjab; Temple of Shiva Johi and Masjid Khudabad in Sindh and Takht-i-Bahi and Stupa at Julian in Khyber Pakhtunkhwa.

The documentation of all these sites is accessible on www.heritage360.pk. The website caters to a wide-ranging audience with virtual tour panoramas, pictures and videos to introduce tourists from the world over to these truly remarkable heritage sites.

The website also offers 2D elevation and floor plans for architects to study and recreate similar structures and 3D models for organisations and individuals involved in conserving heritage sites in Pakistan.

Apart from the digital conservation of these heritage sites, a team of LUMS students, led by Dr. Murtaza Taj, is also actively engaged in academic research aimed at developing cutting edge algorithms that will automate the process of detailed 3D modelling—a process that takes particularly long through the usual manual pipeline. The team is specifically studying how information from raw data obtained through a laser scanner can be used to extract geometric parameters and how rules of symmetry can be used to extract similar regions and regenerate data that has been lost through the years.

Moreover, the aim of the project is to train and empower the next generation of preservationists with technical skills and knowledge. Dr. Taj and his team partnered with CyArk to provide technical assistance for the project and organised a ten-day training workshop at LUMS. They invited students from Mehran University in Sindh, Islamia University of Bahawalpur and National College of Arts in Punjab and representatives of the Walled City of Lahore Authority and Aga Khan Cultural Service Pakistan, to understand the digital preservation process and document the first of the six sites of interest, starting with the Masjid Wazir Khan in Lahore, Punjab. Recently, the project team was invited to present their work at the CyArk 500 Summit 2015 where the project received great recognition and was presented with the Summit Award in Education for being the most innovative educational institute in the field of digital preservation.

The initiative holds the potential to trigger large scale preservation efforts that could significantly improve the conditions of heritage sites in Pakistan. The project aims to increase awareness among local communities regarding importance of our rich heritage the need to preserve it for generations to come, attracting more tourism and improving the social and economic conditions on ground.
Power Cuts: Is the Load Shared Equally? Evidence from the Slums of Lahore

Dr. Hadia Majid, an Assistant Professor at the Department of Economics, Mushtaq Ahmad Gunmani School of Humanities and Social Sciences (MGSHSS), is working on a project that focuses on exploring factors that impact the electricity supply to the slum settlements or ‘katchi abadis’ in Lahore and grid maintenance. Dr. Majid’s hypothesis is that the variation in load shedding duration is not even-handed and differs from area to area depending on a variety of social, political, economic and geographic reasons. She is exploring the pattern explaining the causes of variation and hopes that this will help in future policy planning and devising an equitable provision of utilities to the...
Unplanned rural to urban migration is a major problem being faced by all the important urban centres of Pakistan. Lahore being the second largest city of Pakistan and the economic hub of Punjab is especially hit by this phenomenon. Besides many other problems, this migration has led to the establishment of slum settlements or ‘katchi abadis’ in central Lahore as well as the periphery areas.

An important determinant of economic activity and development of these katchi abadis is the regular and uninterrupted supply of electricity. However, electricity shortages or load shedding has become a big impediment in these katchi abadis. In this regard, a research project funded by the LUMS Faculty Initiative Fund is being led by Dr. Hadia Majid, Dr. Lauge Poulsen and Dr. Mahvish Shami. Dr. Hadia Majid is an Assistant Professor of Economics at LUMS, Dr. Lauge Poulsen is a lecturer of International Political Development at University College London, while Dr. Mahvish Shami is a lecturer of Development Studies at London School of Economics.

Still in its pilot phase, the project is urban based and focuses on the city of Lahore. It explores factors that impact the electricity supply to the abadis and grid maintenance. It also looks at the adverse effects of load shedding on both household and commercial activities, and the coping mechanisms adopted by the residents of the abadis.

The sample has been drawn from the list of katchi abadis located in Lahore provided by the Katchi Abadi Directorate of Lahore Development Authority. Questionnaires were designed for gathering information regarding load shedding hours, major problems faced, frequency of power outages, response time of the LESCO team, and ways of coping with the load shedding. Door to door as well as community level surveys in each katchi abadi were carried out to collect the required data.

“Preliminary results show that while rates of electricity load shedding increase as we move from the core areas to the periphery areas of Lahore, the predominant factor that explains variation in hours of load shedding is whether the abadi is located in an influential area such as near an army colony or in a locality with government officials’ residences,” says Dr. Majid.

As the majority of the inhabitants of these abadis are small shopkeepers or daily wagers, the power shortages have adversely affected their income levels. “Their overall expenditures have increased as they have to make alternate arrangements such as investing in a UPS (Universal Power Supply) device,” adds Dr. Majid.

Dr. Majid’s hypothesis maintains that the variation in load shedding duration is not even-handed and differs from area to area depending on a variety of social, political, economic and geographic reasons.

She hopes that her study will help establish a pattern explaining the causes of variation. The results of this research work will be greatly helpful in future policy planning and devising an equitable provision of utilities to the general public.
Green Catalytic Conversion of Waste Paper to Fuels and Chemicals

Dr. Muhammad Zaheer, Assistant Professor, Department of Chemistry at the Syed Babar Ali School of Science and Engineering (SBASSE), on realising that waste paper represents biomass that is the only potential renewable source capable of providing both chemicals and fuels, has tried to find a one-step process by which waste paper could be directly converted to fuels/chemicals in the presence of a suitable substance (catalyst). Dr. Zaheer and his team have found a catalyst that converts waste paper directly into a substance that is a green solvent and a potential fuel.
The idea to convert waste paper to useful chemicals came to Dr. Muhammad Zaheer one day, literally out of a waste bin, the one underneath his working table which gets filled every day with wasted writing paper. He started observing that same was the case with all the bins in the Chemistry department and although this paper is collected and sent for recycling, it made him think that this was a lot of raw material which might be converted to some useful chemicals, especially those which are valuable as fuels, fuel additives or solvents (some of which were consumed in his own laboratories at the rate of several litres per week). In this way, he could not only reduce the amount of solid waste generated in the form of paper but also meet the demands for energy and commodity chemicals that sustain our everyday lives.

According to Dr. Zaheer, keeping in view the rapid depletion of fossil resources that are currently driving our vehicles and chemicals that sustain our daily lives, attempts are being made to search for alternatives. “Waste paper represents biomass that is the only potential renewable source capable of providing both chemicals and fuels,” says Dr. Zaheer.

Waste paper also happens to be a long-chain compound made of glucose units held together very tightly, making the paper resistant to the attack of many reagents. Dr. Zaheer’s job was to find a catalyst that could possibly accelerate the breaking of strong links between the glucose units and in a sequence of processes, convert glucose thus obtained, into useful chemicals. Dr. Zaheer explained, “Such a catalyst must be cheap, highly active, reusable and robust. In order to be useful as fuels, the products of waste paper degradation must not contain much oxygen in them, which unfortunately isn’t the case.”

During the course of the project, Dr. Zaheer and his team have found a suitable substance (Ruthenium-Nickel) that, under acidic conditions, converts waste paper directly into gamma-valerolactone, a substance which finds applications as a green solvent and a potential fuel.

Quoting statistics, Dr. Zaheer elaborated that crude oil and its products constitute a major portion of the total annual imports of goods (38 per cent in fiscal year 2011-12) in Pakistan, playing a crucial role in the development of the economy. Additionally, import of chemicals and pharmaceutical products also contribute substantially to total imports (6 per cent and 1 per cent respectively in FY 2011-2012). On the other hand, Pakistan being an agriculture based economy produces almost 100,000 metric tonnes of agricultural residues (biomass) in the form of husks and straws left over from sugar cane, rice, cotton and drupe endocarp of many fruits (walnut, peanut, peach etc). Additionally 54,888 tonnes per day of solid waste is being generated in Pakistan which consists of 8.4-21 per cent food waste and 10.2-15.6 per cent biomass in the form of leaves, grasses and fodder. This biomass can potentially be utilised for the derivation of chemicals.

This research work on waste paper would open new horizons for the development of catalysts for the derivation of fuels and chemicals from all kinds of solid waste being generated and left either unattended or underutilised.

The outcomes of this project are expected to be communicated to the scientific community in the form of a research paper, and to help teach students inorganic chemistry and demonstrate to them the role of catalysts in solving issues relevant to society.

The University of Bayreuth, Germany has collaborated with LUMS in terms of the provision of some analytical tools. The idea was conceived and executed by Dr. Muhammad Zaheer, Maria Irum, Research Assistant and Ghazanfar Ali, BS, senior year student at SBASSE.
Green SMS:
A Low-cost and Non-invasive System to Reduce Load Shedding

Dr. Naveed Arshad, Associate Professor, Computer Science at the Syed Babar Ali School of Science and Engineering works in the area of smart (electrical) grids, and his research focuses on two important directions. The first is towards developing an energy transmission and distribution infrastructure that is capable of relying 100 per cent on renewable energy technologies such as hydro, solar and wind, while the other is to make buildings smarter regarding their energy usage.

At present, traditional electrical grids are a century old technology and not capable of managing the energy requirements of modern times sustainably. Therefore, smart grids are the new infrastructure of energy production, transmission, distribution and usage.

In traditional electrical grids, energy flows in one direction; from generation to usage. However, in smart grids, both energy and information travel together. Moreover, two-way energy flow is also possible. Integrating energy and information together brings new opportunities and challenges in both areas, Electrical Engineering and Computer Science.

Dr. Naveed Arshad works in the area of smart (electrical) grids, and his research focuses on two important directions. The first is towards developing an energy transmission and distribution infrastructure that is capable of relying 100 per cent on renewable energy technologies such as hydro, solar and wind. Renewable sources such as wind and hydro are intermittent in nature, and it is difficult to match their generation capacities with the myriad number of electrical loads. Therefore, fulfilling all energy requirements with 100 per cent renewables is an enormous challenge. To this end, Dr. Arshad and his team have developed scalable priority-based algorithms that use the elasticity in the electric loads and schedule such loads at times when sufficient energy is available from renewables. They have tested their work on one million electrical loads and have found their algorithms to be scalable for most renewable generation scenarios.

The second direction that Dr. Arshad is pursuing is making buildings smarter regarding their energy usage. In particular, he is interested in developing low-cost, scalable systems for energy efficiency and renewable energy generation for buildings of the developing world. To achieve this, he and his team have developed a new system of solar energy installations on buildings. This system called Smart Energy Switching Platform (SESP) is designed especially for places where energy bybuyback programmes are not available from utility companies.

“Unlike traditional hybrid solar energy systems, SESP couples the energy from the utility grid and solar at the device(s) level using a Smart Switch. With SESP, 97 per cent utilisation of the available solar energy in buildings can be achieved,” shared Dr. Arshad.

Dr. Arshad’s work has also won the Best Poster Paper Award at the premier Sensys 2015 conference in South Korea. Both of these research directions are destined towards a common goal - to promote clean energy utilisation in Pakistan by developing efficient and low-cost systems.

Studies have revealed that Pakistan is the third most vulnerable country because of climate change. “Of course, we are not entirely responsible for the climate changes of the world. This is the responsibility that the world shares, but we can be an example for the world in substantially mitigating our carbon emissions by widely using cleaner energy sources,” says Dr. Arshad.

This work is jointly carried out with Dr. Mohammad Jahangir Ikram, Associate Professor at SBASSE.
Internally Funded Grants

LUMS Faculty Initiative Fund (FIF)

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Abubakr Muhammad, Associate Professor, SBASSE
Safe Roadmaps: Vehicle-Specific Traversability & Safety Verification of Broken Roads and Off-Road Pathways

Sadaf Ahmad, Associate Professor, MGSNSS
Pakistani Police Women - An Ethnography

Naveed Arshad, Associate Professor, SBASSE
Attaining Maximum Solar Energy through Fine Grained Clustering in Home Area Networks

Naveed Ul Hassan, Assistant Professor, SBASSE
Experimental Validation of Smart Grid Technologies by Building a Test Bed at LUMS

Nida Yasmeen Kimani, Associate Professor, MGSNSS
Understanding the Causes and Consequences of Urban Conflict in Lyari, Karachi

Momin Ayub Uppal, Assistant Professor, SBASSE

Hassan Abbas Khan, Assistant Professor, SBASSE
Optimized Solar PV Energy Integration to Weak-Grids for Developing Countries

Ali Nobil Ahmad, Assistant Professor, MGSNSS
The Politics of Resources in Pakistan’s Peripheries

Farasat Munir, Assistant Professor, SBASSE
Development of an Ultrasonic Test Bed for Biomedical and Detection Applications

Nauman Ahmad Zaffar, Associate Professor, SBASSE
High Power Density Inverter for Intermittent Grid and Electrical Drives with Enhanced Efficiency and Low Switch Stresses

Muhammad Tariq, Associate Professor, SBASSE
Aberrant DNA Methylation as Signature for Breast Cancer Patients in Pakistani Population

Ali Raza, Assistant Professor, MGSNSS
Bards, Minstrels, and Outcastes: Oral Narratives and Subordinate Histories

Rahman Shah Zaib Saleem, Assistant Professor, SBASSE
Synthesis of Tethered Biaryls and their Evaluation to Selectively Kill the Cancer Cells with Supernumerary Centrosomes

Nauman Zafar Butt, Assistant Professor, SBASSE
Optimization of Contacts for Silicon Solar Cell Technology for Efficiency Enhancement

Muhammad Shehryar Shahid, Assistant Professor, SDSB
Informal Sector Entrepreneurship: Evaluating the Degrees of (in)formalization of Entrepreneurs in the Automotive Sector of Pakistan

Syed Shahzad ul Hussan, Associate Professor, SBASSE
Designing the Specific Antibody-Selecting Probes Consisting of the Conserved Regions of the Hepatitis C Envelope in the Native Conformation

Ijaz Haider Naqvi, Assistant Professor, SBASSE
Design and Development of an RF Coverage Optimization System using Spatio-Temporal Mobile User Densities and Autonomic Network Management Approach

Ahmed Jawaad Afzal, Associate Professor, SBASSE
Identifying the Role of the RIN4- NOI Domains in Plant Disease Resistance and Developmental Regulation

Hamid Abdul Basit, Assistant Professor, SBASSE
Research and Development of a Cloud-based Systematic Code Reuse Platform for Public Administration Web Services

Misbah Tanveer Chaudhry, Assistant Professor, SDSB
Tracing Women in the Informal Sector of Pakistan-Labor Market Dynamics

Zubair Abbasi, Assistant Professor, SAHSOL
Sharia and the Modern State: Judiciary and the Application of Islamic Jurisprudence in Pakistan

Ahmad Kamal Nasir, Assistant Professor, SBASSE
Development of a Low Cost High Resolution Aerial Mapping System for Carbon Sequestration
**LUMS Faculty Travel Grants (FTG)**

**LUMS Funded Travel Grants – Faculty Travel Grant (FTG)**

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<td>82</td>
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**Hamid Abdul Basit, Associate Professor, SBASSE**
IEEE Working Conference on Software Visualization, Germany

**Hassan Haider Karrar, Associate Professor, MGSHESS**
Central Eurasian Studies Society Annual Conference, USA

**Hassan Javid, Assistant Professor, MGSHESS**
Annual Conference of Japanese Association for South Asian Studies, Japan

**Ihsan Ayyub Qazi, Assistant Professor, SBASSE**
ACM Special Interest Group on Data Communication (SIGCOMM), UK

**Imdadullah Khan, Assistant Professor, SBASSE**
Mid Summer Combinatorial Workshop XXI, Czech Republic

**Imran Naeem, Associate Professor, SBASSE**
The International Conference “Mathematical and Computational Modelling in Science and Technology,” Turkey

**Irshad Hussain, Associate Professor, SBASSE**
Third International Conference on Nanotechnology for Biological and Biomedical Applications, India

**Mian Muhammad Awais, Professor, SBASSE**
International Conference on Neural Information Processing, Turkey

**Muhammad Abdur Rahman Malik, Assistant Professor, SDSB**
Australian and New Zealand Academy of Management (ANZAM), New Zealand

**Muhammad Fareed Zaffar, Assistant Professor, SBASSE**
Pacific Asia Conference on Information Systems, Singapore

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**Irshad Hussain, Associate Professor, SBASSE**
Development of Nanoparticles-based Sensitive Method for the Detection of Bacteria in Drinking Water

**Zartash Afzal Uzmi, Associate Professor, SBASSE**
A Scalable Platform for Internet Censorship Measurements

**Ghayoor Abbas Chotana, Assistant Professor, SBASSE**
Design and Synthesis of New Bicalaf Analogues

**Zehra Waheed, Assistant Professor, SDSB**
Building Inclusive and Sustainable Urban Waste Management Systems in Large Urban Centers of the Developing World: A Case of the City of Lahore

**Amir Faisal, Associate Professor, SBASSE**
Cellular Characterization of Aurora A Kinase Inhibitors for Cancer Therapeutics and Identification of Resistance Mechanisms

**Muhammad Saeed, Associate Professor, SBASSE**
Antiviral Drug Design by Targeting Viral Specific Proteases

**Saifee Ullah Chaudhary, Assistant Professor, SBASSE**
Design and Development of a Multi-User Web Platform for Integrative Modelling and Simulation of Cancer Systems Biology

**Kashif Zaheer Malik, Assistant Professor, MGSHESS**
Equity-based Financing for Microenterprise in Pakistan

**Muhammad Hamad Alizai, Assistant Professor, SBASSE**
Intermittent Computing for the Intermittently Powered Internet of Things

**Wasif Tanveer Khan, Assistant Professor, SBASSE**
Design and Development of RF Front-end of a UHF Band Software Defined Radio

**Asim Karim, Professor, SBASSE**
Modeling and Normalizing Roman-Urdu Text for Automatic Processing

**Muhammad Adeel Pasha, Assistant Professor, SBASSE**
GreenComm: Toward Developing an Energy-Efficient Platform for Internet of Things (IoT)-enabled Devices

**Zaghum Umar, Assistant Professor, SDSB**
Real Asset and Real Returns: The Case of Islamic vs Conventional Equities
Muhammad Imran Qureshi, Assistant Professor, SBASSE
AMS Summer Institute on Algebraic Geometry, USA

Muhammad Sabieh Anwar, Associate Professor, SBASSE
Nano-Optics: Principles Enabling Basic Research and Applications, Italy

Muhammad Shakeel Sadiq Jajja, Assistant Professor, SDSB
Annual Meeting of Decision Sciences Institute, USA

Munmtaz Ali Sheik, Assistant Professor, SBASSE
Third International Conference on Optical Angular Momentum, USA

Nauman Ahmad Zaffar, Associate Professor, SBASSE
IEEE industrial Electronics Society Annual Conference, Japan

Syed Muhammad Hussain, Assistant Professor, MGSNSS
Singapore Economic Review Conference, Singapore

Waqar Zaidi, Assistant Professor, MGSNSS
Annual Meeting of the Society for the History of Technology, USA

Wasif Tanveer Khan, Assistant Professor, SBASSE
IEEE European Microwave Conference, France

Zaghum Umar, Assistant Professor, SDSB
International Conference on Business and Economic Research, Brazil
World Business, Finance and Management Conference, New Zealand

Zartash Afzal Uzmi, Associate Professor, SBASSE
IEEE Global Communications Conference, USA

Abubakr Muhammad, Associate Professor, SBASSE
IEEE International Conference on Intelligent Robots and Systems, Germany

Asim Karim, Professor, SBASSE
Empirical Methods on Natural Language Processing, Portugal

Raza Ali Rafique, Assistant Professor, SDSB
INFORMS Annual Meeting, USA

Misbah Tanveer Chaudhry, Assistant Professor, SDSB
Annual Conference of the North American Case Research Association (NACRA), USA

Choudhry Tanveer Shehzad, Associate Professor, SDSB
Annual Conference of the North American Case Research Association (NACRA), USA

Farrah Arif, Assistant Professor, SDSB
Annual Conference of the North American Case Research Association (NACRA), USA

Adnan Zahid, Assistant Professor, SDSB
Annual Conference of the North American Case Research Association (NACRA), USA

Waqar Zaidi, Assistant Professor, MGSNSS
Annual Meeting of the History of Science Society, USA

Hassan Haider Karrar, Associate Professor, MGSNSS
Cross Border Exchange and Shadow Economy, Netherlands

Rashid Memon, Assistant Professor, MGSNSS
Annual Meeting of the Southern Economic Association, USA

Imtiaz ul Haq, Assistant Professor, MGSNSS
Australasian Finance and Banking Conference, Australia

Aamna Khalid, Assistant Professor, MGSNSS
Tri-TOSEL Conference 2015, USA

Naveed Arshad, Associate Professor, SBASSE
ACM Conference on Embedded Networks Sensor Systems, South Korea

Momin Ayub Uppal, Assistant Professor, SBASSE
IEEE Global Communications Conference, USA

Saeed Ullah Chaudhry, Assistant Professor, SBASSE
International Conference on Health Informatics, Italy

Muhammad Saeed, Associate Professor, SBASSE
Tetrahedron Symposium, Asia Edition, China

Asim Karim, Professor, SBASSE
IEEE International Conference on Data Mining Series, USA

Zartash Afzal Uzmi, Associate Professor, SBASSE
Hot Topics in Networks Electrical Engineering, USA

Muhammad Tahir, Assistant Professor, SBASSE
IEEE International Conference on Signal and Image Processing Applications, Malaysia
Naveed Ul Hassan, Assistant Professor, SBASSE
IEEE ISGT-ASIA 2015, Thailand

Zain-ul-Abdin Khawaja, Assistant Professor, SDSB
Annual Conference of the North American Case Research Association (NACRA), USA

Hadia Majid, Assistant Professor, MGSHESS
British Associate for South Asian Studies Annual Conference, UK

Ali Raza, Assistant Professor, MGSHESS
Research Seminar and Conference on Reconsidering Democracy and the Nation State in a Global Perspective, Netherlands

Nida Yasmeen Kirmani, Associate Professor, MGSHESS
Rethinking Cities in the Global South: Urban Violence, Social Violence, Social Inequity and Spatial Justice, India

Kashif Zaheer Malik, Assistant Professor, MGSHESS
Annual Eastern Economics Association Conference, USA

Rashid Memon, Assistant Professor, MGSHESS
British Associate for South Asian Studies Annual Conference 2016, UK

Waqar Zaidi, Assistant Professor, MGSHESS
Debating the Cold War, UK

Ali Usman Qasmi, Assistant Professor, MGSHESS
An Intellectual History of Pakistan, UK

Nadhra Shahbaz Naeem Khan, Assistant Professor, MGSHESS
Kipling in India: India in Kipling, India

Ali Nobil Ahmad, Assistant Professor, MGSHESS
Book Launch - Panel Talk, Pakistan

Fahd Rehman, Assistant Professor, SDSB
Canadian Economic Association Conference, Canada

Kamran Ali Chatha, Associate Professor, SDSB
27th Annual Conference on Production & Operations Management Society (POMS), USA

Zehra Waheed, Assistant Professor, SDSB
CIB World Building Congress 2016, Finland

Ghazal Mir Zulfiqar, Assistant Professor, SDSB
British Associate for South Asian Studies Annual Conference, UK

Misbah Tanveer Chaudhry, Assistant Professor, SDSB
British Associate for South Asian Studies Annual Conference, UK

Zaghum Umar, Assistant Professor, SDSB
Annual Meeting of American Real Estate Society, USA

Muhammad Fareed Zaffar, Assistant Professor, SBASSE
IEEE Conference on Computer Communications, USA

Muhammad Tahir, Assistant Professor, SBASSE
37th IEEE Aerospace Conference 2016, USA

Junaid Haroon Siddiqui, Assistant Professor, SBASSE
Symposium on Principles and Practice of Parallel Programming, Spain

Salman Nosheer Arshad, Assistant Professor, SBASSE
TMS 2016: 145th Annual Meeting & Exhibition, USA

Nauman Ahmad Zaffar, Associate Professor, SBASSE
Annual Conference of the IEEE Power and Energy Society, USA

Mian Muhammad Awaiz, Professor, SBASSE
International Conference on Brain-Computer Interface, Korea

Habib-ur-Rehman, Assistant Professor, SBASSE
Annual World Congress on Smart Materials, Singapore

Syed Muhammad Hussain, Assistant Professor, MGSHESS
Canadian Economics Association Annual Conference, Canada

Imtiaz ul Haq, Assistant Professor, MGSHESS
Economics and Finance Association - Summer Meeting, USA

Maryam Wasif Khan, Assistant Professor, MGSHESS
Society for Novel Studies Biennial Conference, USA

Hadia Majid, Assistant Professor, MGSHESS
Group Based Inequity: Pattern and Trends-UNU WIDER Project Workshop, Finland

Nida Yasmeen Kirmani, Assistant Professor, MGSHESS
AAS in Asia Conference, Japan

Mohammad Wasim, Visiting Faculty, MGSHESS
Research for Book – Politics of Pakistan in 21st Century, UK

Muhammad Azeem, Assistant Professor, SAHSOL
Law and Society Annual Conference, USA
Research at LUMS 2016

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Wasif Tanveer Khan, Assistant Professor, SBASSE
IEEE Microwave Symposium 2016, USA

Suleman Shahid, Assistant Professor, SBASSE
International Conference on Information & Communication Technologies and Development, USA

Naveed Ul Hassan, Assistant Professor, SBASSE
IEEE International Conference on Communication, Malaysia

Junaid Haroon Siddiqui, Assistant Professor, SBASSE
IEEE International Conference on Software Testing, Verification and Validation (ICST), USA

Imran Naeem, Assistant Professor, SBASSE
AIMS Conference on Dynical Systems, Differential Equations and Applications, USA

Adnan Khan, Assistant Professor, SBASSE
AIMS Conference on Dynical Systems, Differential Equations and Applications, USA

Nauman Zafar Butt, Assistant Professor, SBASSE
Photovoltaic Specialists Conference, USA

Azer Reza, Assistant Professor, SBASSE
SPIE Photonics Europe, Belgium

Ijaz Haider Naqvi, Assistant Professor, SBASSE
IEEE Wireless Communications and Networking Conference, Qatar

Saad Azmat, Associate Professor, SDSB
Malaysian Finance Association Annual Conference, Malaysia

Faculty Startup Grants

LUMS Funded Grants – Faculty Startup Grants

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Muhammad Shakeel Sadiq, Assistant Professor, SDSB

Zubair Khalid, Assistant Professor, SBASSE

Shaper Mirza, Associate Professor, SBASSE

Rasul Bakhsh Rais, Professor, MGSHESS

Muhammad Hamad Alizai, Assistant Professor, SBASSE

Muhammad Imran Cheema, Assistant Professor, SBASSE

Haniya Azam, Assistant Professor, SBASSE

Amen Jaffer, Assistant Professor, MGSHESS

Raza Ali Rafique, Assistant Professor, SDSB

Mohsin Nasir Jat, Assistant Professor, SDSB

Ali Ashher Zaidi, Assistant Professor, SBASSE
Externally Funded Grants

Externally Funded Research Grants

| Externally Sponsored Grants | 
|----------------------------|---|
| 40 Proposals Approved out of 134 | 960,119,397 Amount of Submitted Projects |
| 147,487,638 Total Funds Received |

Abid Aman Burki, Professor, MGS/HS
Access to Education and Social Cohesion in Conflict-Ridden Areas: End-line Study and Review of Outcome 4 Activities
Boosting FDI Inflows to Pakistan: What Can Policy Makers Do?
Farmer’s Capabilities, Productivity and Profitability: A Case Study of Smallholders in Selected Agro Zones in Pakistan

Basit Bilal Koshul, Associate Professor, MGS/HS
Islamic Analytic Theology Project Phase 1: Building Foundational Analytic Resources

Justice Jawwad S. Khawaja, Adjunct Faculty, MGS/HS
Getz Pharma Grant

Kamal Ahmed Munir, (Former) Professor, MGS/HS
Conference on Economics (SSHRC)

Saida Waheed Gender Studies Initiative

Yasmeen Hameed, Assistant Professor, MGS/HS
Clifton Say Ravi Tak

Hadia Majid, Assistant Professor, MGS/HS
Study on Individual Indigenous Philanthropy in Pakistan

Kashif Zaheer Malik, Assistant Professor, MGS/HS
Creating and Utilizing Comic Books to Bridge Knowledge Gaps in Child Health in Rural Okara, Punjab

Rasul Bakhsh Rais, Professor, MGS/HS
Junior Fellowship in Peace and Conflict Studies

Uzair Kayani, Assistant Professor, SAHSOL
International Human Rights Law Clinic For Law Students

Zubair Abbasi, Assistant Professor, SAHSOL
The Contribution of the Judiciary in the Application and Development of Islamic Jurisprudence in Pakistan
The Role of Judiciary in Protection of Women’s Rights: A Case Study of Divorce Law (Khula)

Abubakr Muhammed, Associate Professor, SBASSE
Water Informatics & Technology - Centre for Water Research at LUMS

Ahmad Kamal Nasir, Assistant Professor, SBASSE
Autonomous Control of Unmanned Ground Vehicle
Precision Forestry: GreenDrone - Deforestation and Forest Degradation Estimation using an Unmanned Aerial Vehicle

Asim Karim, Professor, SBASSE
An Open-Source Project for Accessible LaTeX-based Authoring and Presentation of Mathematical Documents

Basit Shafiq, Associate Professor, SBASSE
Codec: Composition and Management of e-Government Processes in the Cloud of Public Services
End-to-End Solution for Business Process Composition and Management (BP-Com)
Information Sharing and Integration and Framework for Emergency Management and Response

Basit Yameen, Associate Professor, SBASSE
Summer Internship in Science and Engineering (RISE) for Young Community – RISE Community

Habib-ur-Rehman, Assistant Professor, SBASSE
Development of Optically Clear Novel High Refractive Index Photo-polymerizable Nano-composites for Light Management Films and their Applications in Flat Panel Displays

Hamid Abdul Basit, Assistant Professor, SBASSE
Design and Implementation of a Language Independent Software Clone Management Tool Suite for Single and Multiple Systems

Hassan Abbas Khan, Assistant Professor, SBASSE
DC Microgrids for Rural Electrification
Decentralized Electric Power Delivery Model for Rural Electrification in Pakistan
Ihsan Ayyub Qazi, Assistant Professor, SBASSE
Joint Congestion Control and Load Balancing in Cloud Data Centers Using SON
RoWiFi: Long Distance WiFi with Rotating Antennas

Ijaz Haider Naqvi, Assistant Professor, SBASSE
Millimeter-wave Techniques for 5G Mobile Communications
Design and Development of an RF Coverage Optimization System using Spatio-Temporal Mobile User Densities and Autonomic Network Management Approach

Imran Naeem, Assistant Professor, SBASSE
Mathematics Workshop Grant

Irshad Hussain, Associate Professor, SBASSE
Synthesis and Characterization of Metal Nanoparticales Chemicals and Consumables

Muhammad Hamad Alizai, Assistant Professor, SBASSE
Extending the Cyberphysical Systems R&D Paradigm using Energy Transference iCompute

Muhammad Fareed Zaffar, Assistant Professor, SBASSE
Funding for Research Assistantship of Systems & Securities Laboratory
STATISTAN
Statistan and Moodistan

Muhammad Sabieh Anwar, Associate Professor, SBASSE
Development of Low-Field, Low Cost, Re-configurable NMR and MRI

Muhammad Zaheer, Assistant Professor, SBASSE
Catalytic Conversion of Agricultural Waste into Potential Fuels and Chemicals

Murtaza Taj, Assistant Professor, SBASSE
Augmented Reality Enabled by Scalable, Adaptive Projector Kinect Units
Enabling 3D Vision on Hand-held Devices

Nauman Ahmad Zaffar, Associate Professor, SBASSE
Solar Assisted Electric Vehicle with Single Phase Induction Motor and Re-generative Braking

Naveed Ul Hassan, Assistant Professor, SBASSE
Location Based Services (LBS) for Mobile Devices

Omar Naseer, Assistant Professor, SBASSE
Energy Optimization using Control Scheduling Codesign for Hybrid/Electric Vehicles

Rahman Shah Zaib Saleem, Assistant Professor, SBASSE
Synthesis of Novel Selenium Containing Redox Modulators

Saeed Ullah Chaudhary, Assistant Professor, SBASSE
Design and Development of a Next-Generation Modelling and Simulation Platform for Cancer Systems Biology
Design and Development of a Top-down Protein Sequence Search Engine for High Resolution Mass Spectra

Shafay Shamil, Associate Professor, SBASSE
Oracle Corporation

Suleman Shahid, Assistant Professor, SBASSE
PeaceTech Exchange (PTX) Workshops in Pakistan

Syed Sohail Hussain Naqvi, Professor, SBASSE
School of Education

Salman Nosheir Arshad, Assistant Professor, SBASSE
Surface Modulated Carbon Nanofibers for Enhanced Toughening in Nano-Composites

Shahid Masud, Professor, SBASSE
Automated Testbed for Spatially Distributed Wireless Real Time Monitoring System of Large Scale Waterways AutoTestWirelessWater (ATWW)

Syeda Kahkeshan Hijazi, Assistant Professor, SBASSE
Identifying Nasal Epithelial MicroRNA Regulators of the Gene-expression Response to Smoking Cessation

Wasif Tanveer Khan, Assistant Professor, SBASSE
MM-Wave Integration and Embedded Antennas in System-in-Package – Work Package 2
MM-Wave Integration and Embedded Antennas in System-in-Package – Work Package 3
Design a Miniaturized Spiral Antenna for Ultra-wideband (2-18 GHz) Applications

Zartash Afzal Uzmi, Associate Professor, SBASSE
Networking & Communication Lab

LUMS Center for Entrepreneurship (LCE)
Entrepreneurship Grant - Mobilink’s Make Your Mark Programme
Ilm Ideas 2 Grants Programme for Incubators
LUMS Global Startup Exchange Powered by Google

Saad Azzam, Associate Professor, SDSB
Establishment of Centre for Islamic Finance - Financial Innovation Challenge Fund (FICF)
Externally Funded Travel Grants

<table>
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<th>External Funded Travel Grants</th>
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<tr>
<td>Total Number of Applications Approved Out</td>
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<tr>
<td>Total Amount of Submitted Applications</td>
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<tr>
<td>PKR 8,302,769</td>
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<td>Total Funds Received</td>
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<td>PKR 2,188,898</td>
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Consultancy Projects

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<th>Consultancy Projects</th>
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<tbody>
<tr>
<td>Total Number of Proposals Approved Out</td>
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<td>25</td>
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<td>Total Amount of Submitted Proposals</td>
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<td>PKR 24,031,351</td>
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Adnan Khan, Assistant Professor, SBASSE
AIMS Conference on Dynamical Systems and Differential Equations, USA

Ihsan Ayyub Qazi, Assistant Professor, SBASSE
IEEE GLOBECOM, USA
Internet Measurement Conference 2015, Japan

Ijaz Haider Naqvi, Assistant Professor, SBASSE
IEEE Wireless Communications and Networking Conference 2016, Qatar

Junaid Haroon Siddiqui, Assistant Professor, SBASSE
IEEE International Conference on Software Testing, Verification and Validation 2016, USA

Muhammad Hamad Alizai, Assistant Professor, SBASSE
International Conference on Embedded Wireless Systems and Networks (EWSN 2016), Austria

Muhammad Tahir, Assistant Professor, SBASSE
IEEE International Conference of Signal and Image Processing Applications, Malaysia

Nauman Ahmad Zaffar, Associate Professor, SBASSE
Annual Conference of the IEEE Industrial Electronics Society, Japan

Naveed Ul Hassan, Assistant Professor, SBASSE
IEEE International Conference on Communications, Malaysia

Uzma Hira, PhD Scholar, SBASSE
British Council under UK Researcher Links Programme 2016, UK

Muhammad Abdur Rahman Malik, Assistant Professor, SDSB
53rd Annual Meeting of Eastern Academy of Management, USA

Raza Ali Rafique, Assistant Professor, SDSB
INFORMS Annual Meeting 2015, USA

Abid Aman Burki, Professor, MGSHE
Registration and Conduct of Written Test for Selection of Community Welfare Attaches to be posted at Pakistan Missions Abroad, 2016

Furrukha Khan, Associate Professor, MGSHE
Training for Capacity Building Under USAID

Husnain Fateh Ahmed, Assistant Professor, MGSHE
Urban Informal Livelihood Study

Nadhra Shahbaz Naeem Khan, Assistant Professor, MGSHE
Documentation, Presentation and Promotion of Picture Wall, Lahore Fort

Rashid Memon, Assistant Professor, MGSHE
UNU-WIDER Project on Disadvantaged Groups and Social Mobility

Ijaz Haider Naqvi, Assistant Professor, SBASSE
Indoor Localization: Improvements in Accuracy and Range

Muhammad Fareed Zaffar, Assistant Professor, SBASSE
Improve Efficiency, Reliability and Trenchancy of the School Education Department by Automating HR Processes
Re-development of Software (Prosecution Case Flow Management System) for Public Criminal Prosecution Services (PCPS) in Punjab

Muhammad Sabieh Anwar, Associate Professor, SBASSE
Determination of Planck’s Constant Apparatus
Fog Monitoring in the Indo-Ganges Plain


Research at LUMS 2016

36

Nauman Ahmad Zaffar, Associate Professor, SBASSE
Design and Development of a 1000W Solar Charge Controller
Measurement of Noise Levels in LT Distribution Network of LESCO To Assess Viability of Broadband Over Power Line Communication (BPL)
Strategic Consulting
Strategic Consulting Phase 2

Wasif Tanveer Khan, Assistant Professor, SDSB
Technical Consultancy Services to PAF

Farrah Arif, Assistant Professor, SDSB
Evaluating the PICG Brand Positioning and PICG Training and Education Programs - Consumer Insights Research Project

Jamshed Hasan Khan, Professor, SDSB
Summer Teaching at International Institute for Management Development (IMD)

Zain-ul-Abdin Khawaja, Assistant Professor, SDSB
SOP Formation and Research Agendas for USAID

Muhammad Shakeel Sadiq Jajja, Assistant Professor, SDSB
Family Constitution of Qadri Group

Syed Zahoor Hassan, Professor, SDSB
Consultancy Project for Maple Leaf Cement Limited
Facilitation of the Strategic Plan Formulation Process at IGI - 2
Moderation of the Strategic Discussion Sessions for Zarai Taraqiati Bank Limited (ZTBL)
Post Session Review and Preparation of Short Report on New Strategic Thrust Areas for Zarai Taraqiati Bank Limited (ZTBL)
Preparation for the Strategy Sessions for Zarai Taraqiati Bank Limited (ZTBL)

Externally Funded Events

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<th>Externally Funded Events (FWC)</th>
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<tr>
<td>09 PKR 10,081,201</td>
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<td>Applications Approved out of 13</td>
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<td>PKR 3,194,994</td>
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Nida Yasmeen Kimani, Assistant Professor, MGSBHSS
Changing Nature of Informal Settlements in Urban Centers of Pakistan at The Annual Humanities and Social Science Conference at LUMS titled ‘Urbanism, Exclusion and Change in South Asia’

Amer Rasheed, Assistant Professor, SBASSE
Differential Equations and Applications

Asim Karim, Professor, SBASSE
Policy Dialogue on Inclusive Higher Education

Hassan Abbas Khan, Assistant Professor, SBASSE
6th Workshop on Teaching the Teachers: Feedback and Control Systems

Ijaz Haider Naqvi, Assistant Professor, SBASSE
Opportunities for 5G Research and Development in Pakistan

Mian Muhammad Awais, Associate Professor, SBASSE
Role of ICT in Precision Agriculture and Forestry

Muhammad Sabieh Anwar, Associate Professor, SBASSE
Regional Lab Immersion Programme 2016

Naveed Arshad, Associate Professor, SBASSE
Opportunities and Challenges of Smart Grids in Pakistan

Shafay Shamail, Associate Professor, SBASSE
MoUs

<table>
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<th>MoUs</th>
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<td>Number of research MoUs/NDAs processed and signed</td>
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- RWTH Aachen University
- Institute of Development and Economic Alternatives (IDEAS)
- University of Siegen
- University of The Witwatersrand
- Bond University
- University of Melbourne
- Directorate of Archaeology & Museums (KPK)
- FundingLab (Scottish Charitable Organisation)
- University of Pretoria
- Power Information Technology Company (PITC)
- University of Michigan
- International Centre for Education in Islamic Finance
- University of Cambridge
- American Business Forum
- Pakistan Cricket Board
Research Grant Statistics

Externally funded grants

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<th>Grants Submitted</th>
<th>Submissions/Faculty</th>
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<td>144</td>
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<tr>
<td>2015-16</td>
<td>222</td>
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<td>Grants Approved</td>
<td>Approvals/Faculty</td>
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<td>2014-15</td>
<td>57</td>
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<tr>
<td>2015-16</td>
<td>110</td>
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<tr>
<td>Funds Requested (PKR Million)</td>
<td>Funds Requested/Faculty (PKR Million)</td>
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<tr>
<td>2014-15</td>
<td>1,479.7</td>
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<tr>
<td>2015-16</td>
<td>1,215.9</td>
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<tr>
<td>Funds Approved (PKR Million)</td>
<td>Funds Approved/Faculty (PKR Million)</td>
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<tr>
<td>2014-15</td>
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<td>2015-16</td>
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<tr>
<td>Funds Received (PKR Million)</td>
<td>Funds Received/Faculty (PKR Million)</td>
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Faculty Count

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<th>Category</th>
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<th>Count as of June 2016</th>
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<tr>
<td>1 Adjunct Faculty</td>
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<td>2 Assistant Professors</td>
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<tr>
<td>3 Associate Professors</td>
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<td>4 Professors</td>
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<td>5 Teaching Fellows</td>
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<tr>
<td>6 Visiting Faculty</td>
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<td><strong>Total</strong></td>
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<td><strong>211</strong></td>
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- 2014 Jan-Dec: 170
- 2015 Jan-Dec: 200
- 2016 Jan-Aug: 88