

# RESEARCH at LUMS



2013



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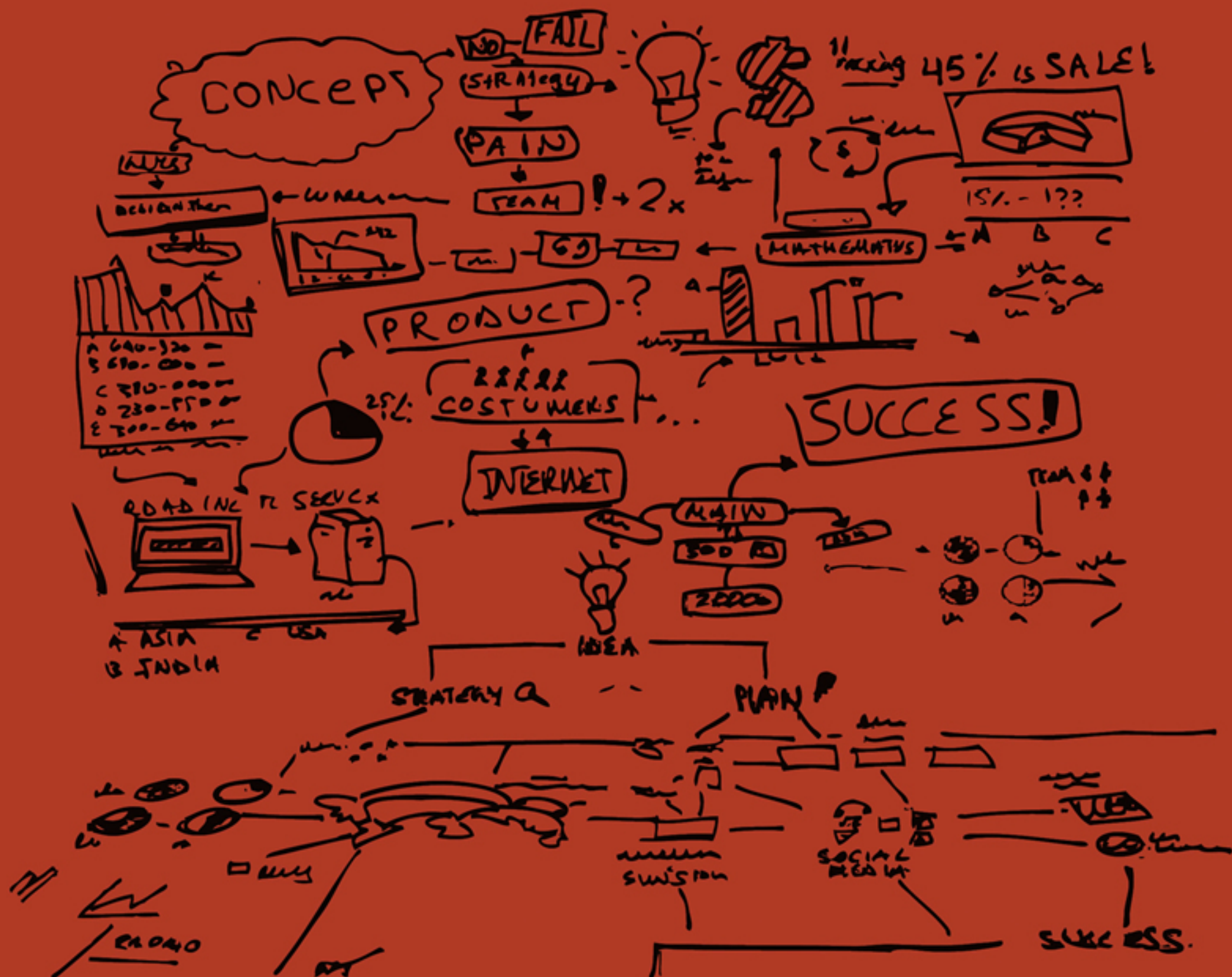
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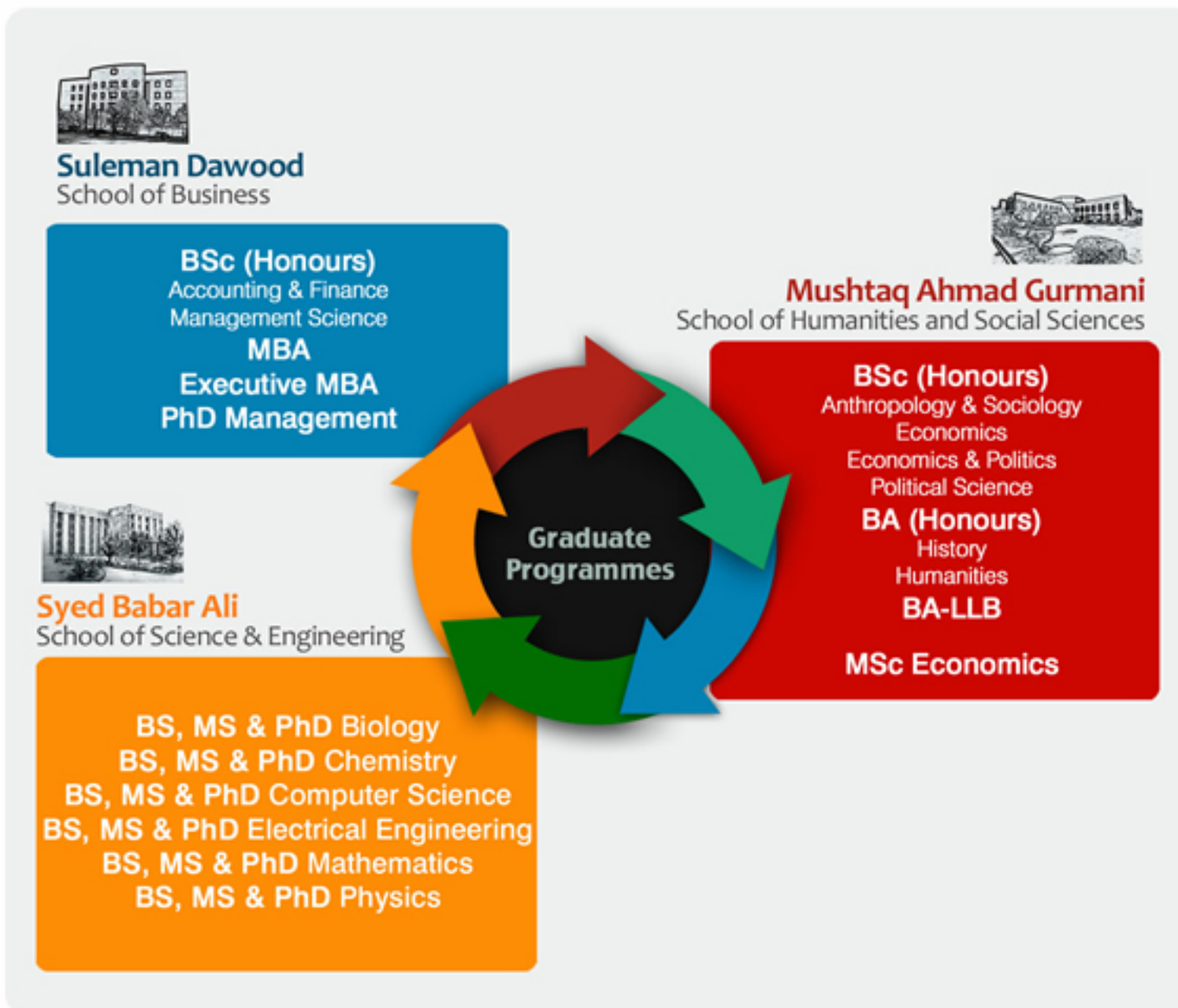
# Message from the Vice Chancellor

Dr. Adil Najam



**R**esearch is the lifeblood of a university just as much as teaching is. The two complement each other and each is strengthened and seeks nourishment from the other. As a research university, Lahore University of Management Sciences (LUMS) is committed to fostering faculty and student research in all its variants and on all its dimensions: from business case studies that have been a hallmark of this university from its very inception, to the increasing quantum of empirical lab-based research in the sciences, to policy research on the most pressing social and human problems in our society, to theory-building research in all disciplines.

Knowledge creation – but especially the creation of knowledge that is relevant to one's society and is the result of research that is methodologically robust and rigorous in the parameters of its own disciplinary domain – is what all universities, including LUMS, aim for. Indeed, the relevance, robustness and rigor of research have played a key role in establishing LUMS as a centre of excellence in Pakistan, and in our region. Faculty from all disciplines has been actively engaged in research for knowledge creation and discovering new understandings of the world around them, and increasingly so are our students. A testament to the quality of research produced at LUMS is that we have consistently attracted national as well as international support for the research conducted at LUMS from academic, policy-related, as well as industry sources. But more than that the university has, and will continue to invest, very significant amounts of its own resources on supporting research at LUMS.



The purpose of this report is to highlight a sampling of research at LUMS. This is not – and cannot be – a comprehensive compendium of all the research this is happening at LUMS. We invite the reader to explore the websites of the university and of our faculty to get a full view of the breadth, depth and diversity of the individual and disciplinary research that keeps the university abuzz. With the university having grown as it has, it would be difficult to capture a comprehensive picture of all of this research.

The goal of this publication, instead, is to provide a glimpse of just some of the research happening at LUMS. We hope that this publication will become an annual series and each year we will be able to highlight a particular aspect or particular dimensions of research at LUMS. This year, we showcase cross-disciplinary research at LUMS from 2011-12 and 2012-13 and we seek to highlight a few exemplars of research happening at LUMS on three important policy-relevant topics that cut across disciplinary boundaries: health, energy and institutions. While there is much exciting research happening at LUMS on many other topics too, these have been chosen for this year's report because they are not only of key relevance to Pakistan but also because all three require insights from different disciplines. Indeed, research on these (as on other cross-cutting issues) is happening in all three schools at LUMS. Different scholars and different disciplines bring different insights, different methodologies and different points of enquiry to these issues and in doing so add to our knowledge and make our understanding of these pressing issues that much more relevant, robust and rigorous. And that, ultimately, is why research is such an exciting and important enterprise at any university.



# Research at LUMS

## An Overview

Dr. Shafay Shamail

### Vision

To become an internationally acclaimed research university that serves society through excellence in education and research.

### Mission

LUMS aspires to achieve excellence and national and international leadership through unparalleled teaching and research, holistic undergraduate education, and civic engagement to serve the critical needs of society.

It seeks to accomplish this mission as a unified institution with cutting-edge research, a modern and rigorous curriculum and socially responsible outreach to the nation and region.

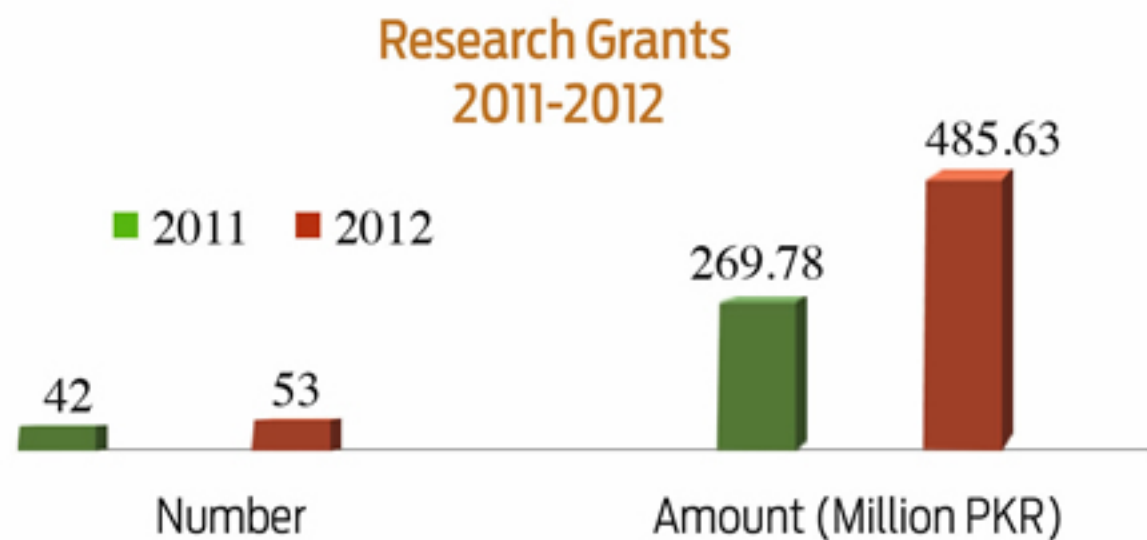




LUMS is dedicated to creating and disseminating knowledge through research. In 2010, the university established a new and dedicated office, named the Office of Graduate Studies and Sponsored Research (GSSR) for providing comprehensive support to faculty and staff in the administration of external and internal sponsored research. Primarily the focus of this department was the pre-award and contract administration of the sponsored research. Later on, it was entrusted to the acquisition, performance and administration of all sponsored programmes of the university. The name of the department has since been changed from GSSR to the Office of Sponsored Programmes (OSP). The main responsibilities include providing support in research proposals, consulting arrangements, sponsored conferences/workshops/seminars, contracts; agreements, and arrangements related to sponsored and externally funded activities. The objective is to assure that submitted proposals conform to sponsor guidelines and university policies, and, if funded, that projects comply with sponsor requirements and applicable university policies and procedures.

The university offers various categories of internal funding opportunities to the faculty, such as the Faculty Initiative Fund (FIF), Faculty Travel Grants (FTG) and start-up grants.

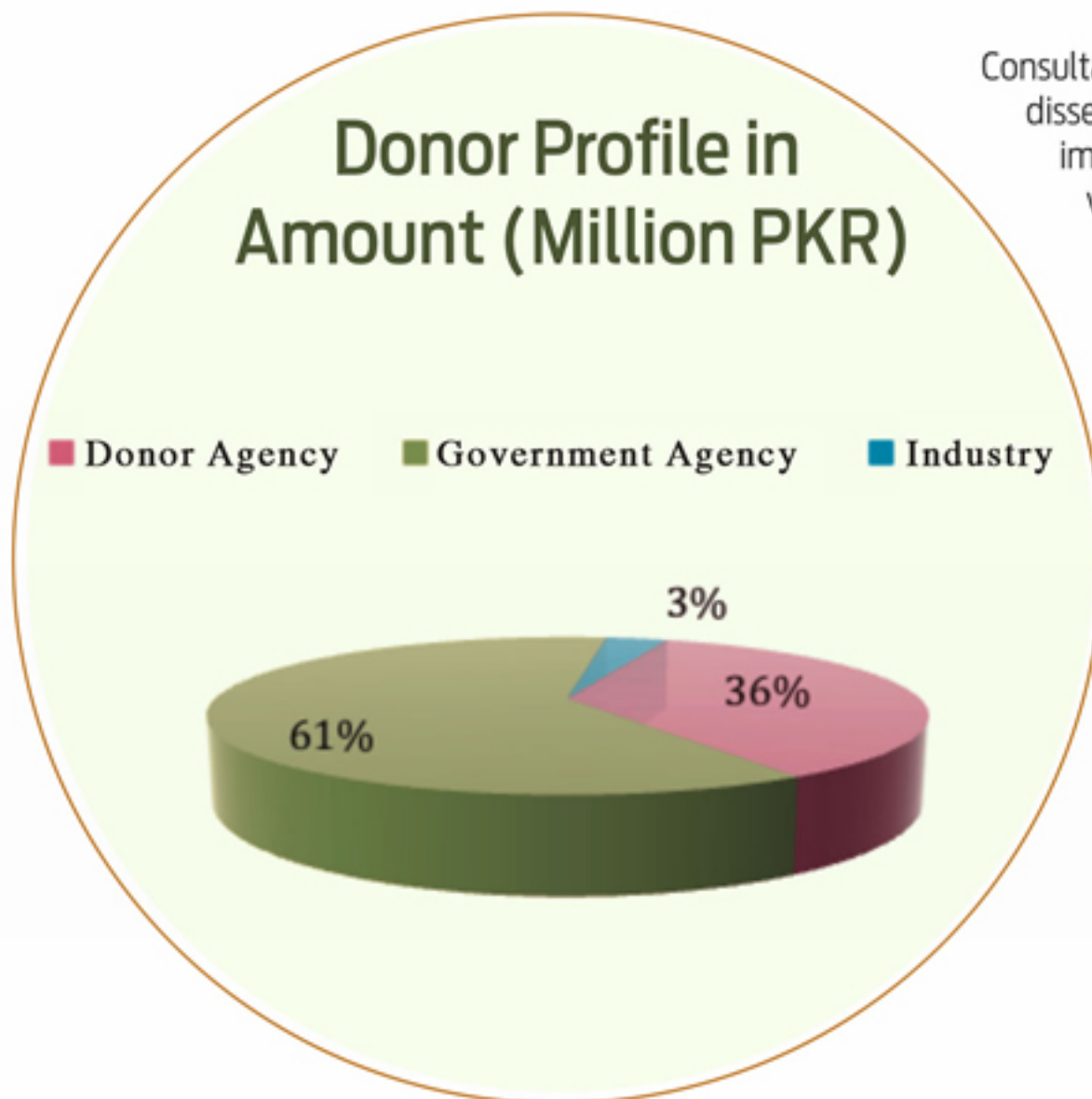
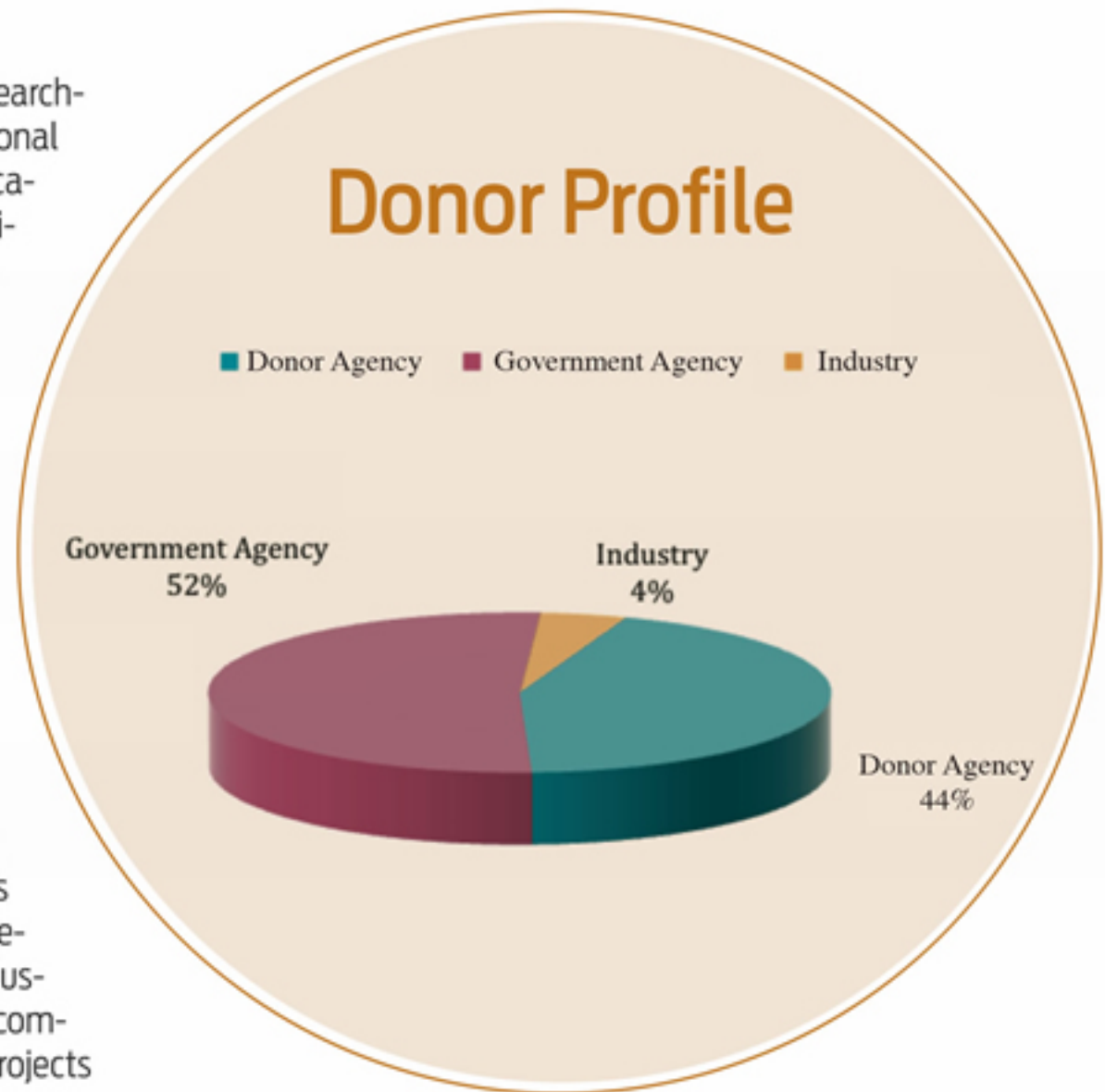
The FIF and FTG were introduced as a university-wide mechanism for promoting and investing the research culture for the full-time faculty at various stages of their academic careers from university internal resources. More than two and half years have passed since these opportunities were announced and executed. At present, a total of 17 FIF grants amounting to PKR 9.2M and 45 FTG amounting to PKR 8.9M have been awarded to various faculty members at all three schools.



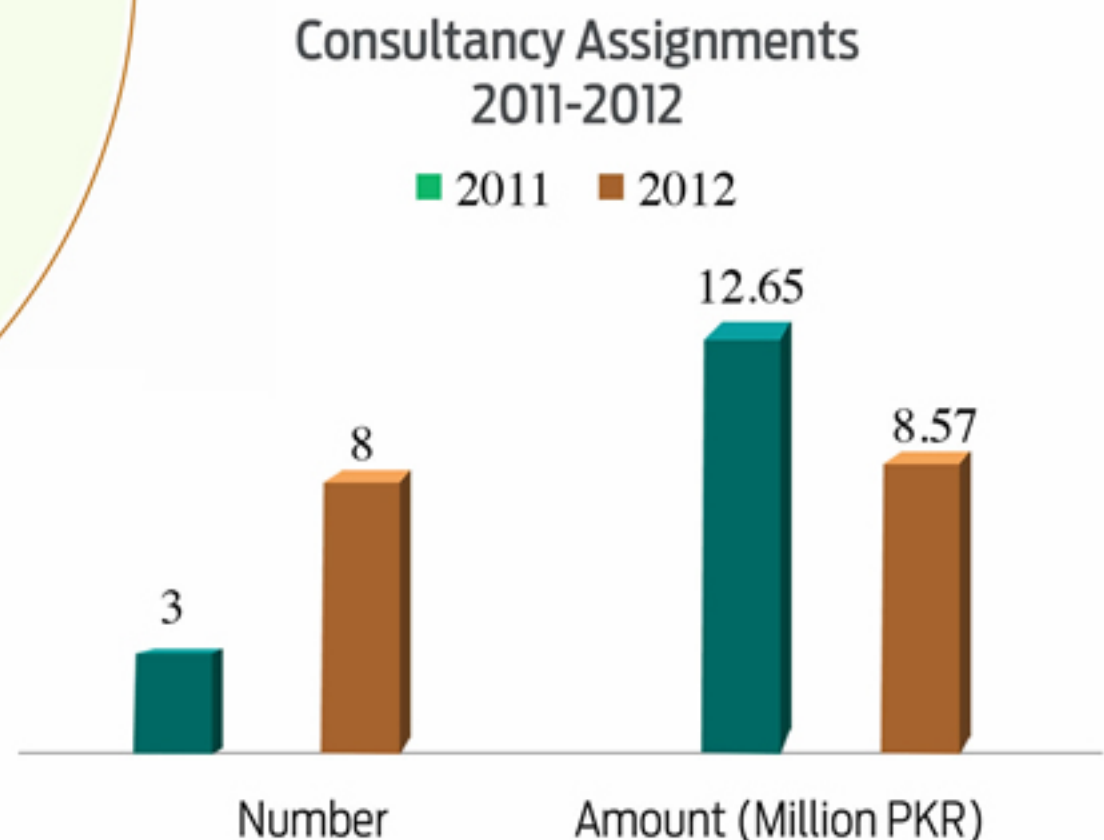
LUMS provides the opportunity of start-up grants to newly hired faculty for setting up their research labs. These grants are usually endowed on a tenure track or a tenured position of the faculty. In addition to faculty members, the university provides research opportunities to scholars and students through postdoctoral fellowships, and research and teaching assistantships.

Several kinds of external funding are also available to the researchers. Funding agencies include various national and international donors. Major sponsors at the national level are Higher Education Commission (HEC), National ICT R&D Fund, Pakistan Science Foundation, Pakistan Strategy Support Program, SUPARCO and the Environment Protection Agency. Major international donors include Centre for Earthquake Studies (CES), Cleaner Production Institute (CPI), World Wildlife Fund (WWF), The Asia Foundation, International Water Management Institute (IWMI), UNICEF, International Growth Centre (IGC), Department for International Development (DFID), USAID, Citi Foundation and DAAD Germany.

In today's world, extensive collaboration between universities and industry and the ensuing transfer of scientific knowledge has been viewed as one of the main contributors to the successful technological innovation and economic growth of countries. Therefore, another prime focus of this office is to support and advise the academic community in securing external support for sponsored projects and seeking industrial collaborations, where the research output could have commercial value. The frequency and volume of such sponsored projects has increased tremendously in the last two years.

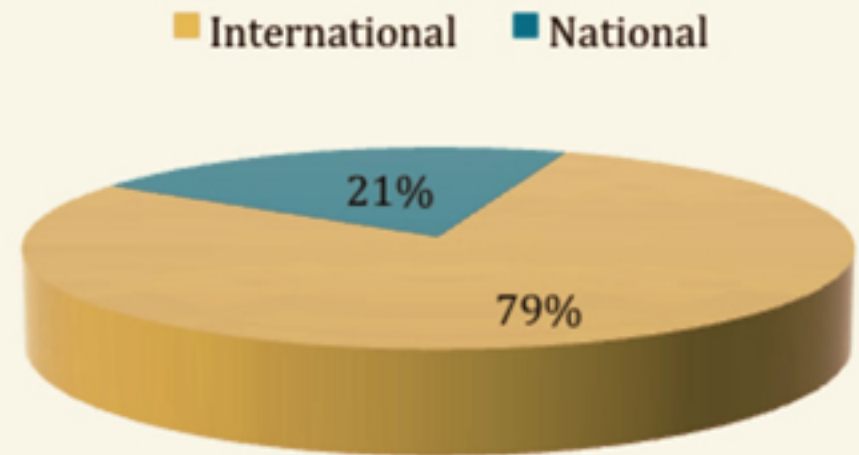


Consultancy is also well recognised as an effective way for universities to disseminate their knowledge and expertise. LUMS faculty offers an important and effective consultancy service that enables the university to share its knowledge with government, industry and social sector and make a direct impact on society. The major clients for the consultancy services are Barclays, GIKI, British Council, Abacus, Toyota, Descon, Marvell, Mentor Graphics, Packages, Nestle, Google and Disney.

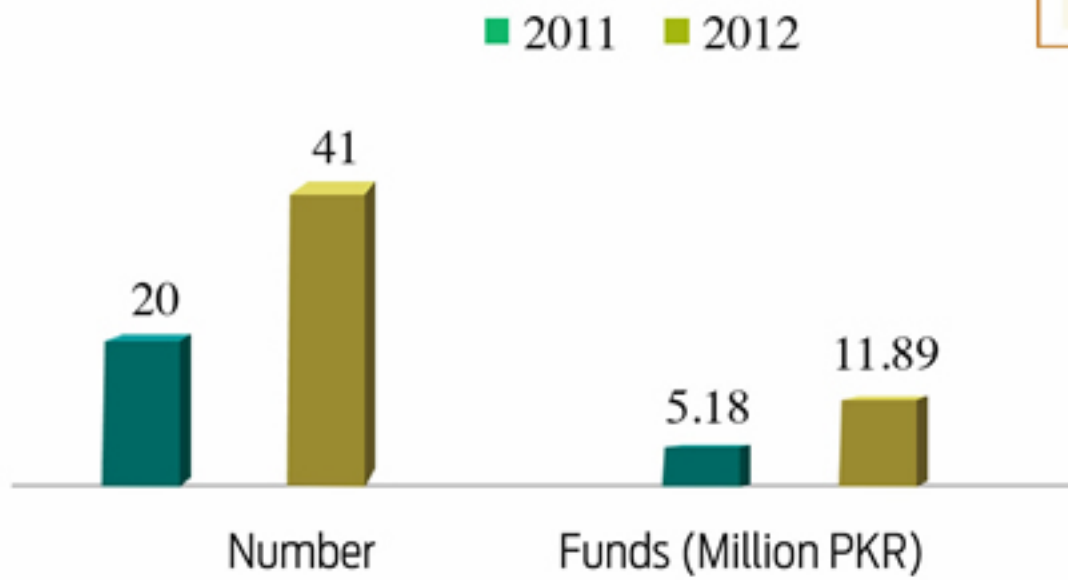




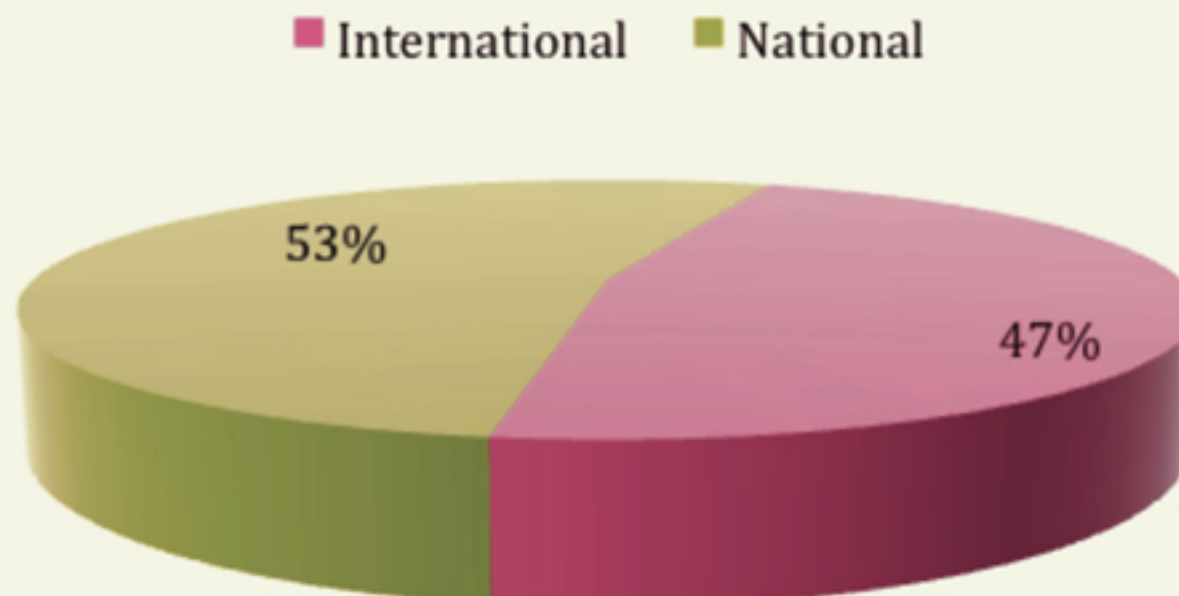
### Number of Research Proposals National vs. International



### External Travel Grants 2011-2012



### Research Proposals (Million PKR) National vs. International



## LUMS Faculty Initiative Fund (FIF) Grants 2012-13

- **Assistant Professor Ghayoor Abbas Chotana (SBASSE)**  
Novel Functionalized Polycyclic Aromatics in Organic Electronics
- **Assistant Professor Salman Khan (SDSB)**  
Access to Finance and the Growth of SME's in Pakistan
- **Assistant Professor Waqas Majeed (SBASSE)**  
Automatic Detection of Epileptic Events in Clinical Data
- **Assistant Professor Ihsan Ayyub Qazi (SBASSE)**  
Cloud Data Centers Using Software-defined Networks
- **Assistant Professor Rahman Shah Zaib Saleem (SBASSE)**  
New Aromatically Decorated Chemotype Targeting MDM2-p53 Interaction
- **Assistant Professor Choudhry Tanveer Shehzad (SDSB)**  
Sovereign Ratings Changes and KSE Sentiment
- **Assistant Professor Misbah Tanveer (SDSB)**  
Gender in Labor Market Participation in Pakistan
- **Associate Professor Zakir Ullah (SBASSE)**  
Induced Pluripotent Stem Cells from Patient Biopsies

## LUMS Faculty Initiative Fund (FIF) Grants 2011-12

- **Assistant Professor M. Ghufuran Ahmad (SDSB)**  
Cultural Influences Organisational Leadership in Pakistan
- **Associate Professor Kamran Ali Chatha (SDSB)**  
Dairy Sector Supply Chain in Pakistan
- **Dr. Kamran Haider (SBASSE)**  
Hepatitis-C Virus
- **Professor Syed Zahoor Hassan (SDSB)**  
Impact of Innovation on Performance in Pakistan
- **Associate Professor Livia Holden (MGSHSS)**  
Women Judges of Pakistan
- **Assistant Professor Nida Kirmani (MGSHSS)**  
Role of Religion in Women's Rights Advocacy in Punjab & Sindh
- **Assistant Professor Abubakr Muhammad (SBASSE)**  
Canal Automation in Smart Water Grids
- **Assistant Professor Hammad Siddiqui (MGSHSS)**  
Investment Risk in Options
- **Assistant Professor Momin Uppal (SBASSE)**  
EEG-based Noninvasive Brain-Computer Interface

## LUMS Faculty Travel Grants (FTG) Fall 2012

- **Assistant Professor Mujahid Abbas (SBASSE)**  
Finding Solution of Nonlinear Complementarity Problems  
Research Collaboration with University of Birmingham, United Kingdom
- **Associate Professor Mian Muhammad Awais (SBASSE)**  
Smart Energy Management Planning for Home Users  
International Conference on Neural Information Processing, Qatar
- **Assistant Professor Maryam Khan (MGSHSS)**  
The Law of Defamation in Pakistan: A Normative Window into the Freedom of Press  
Law and Social Sciences Conference, Sri Lanka
- **Assistant Professor Salman Khan (SDSB)**  
Are US REITS and S&P500 Capable of Invoking Shocks in Foreign REIT Markets?  
International Conference on Computational and Financial Econometrics, Spain
- **Professor Anwar Khurshid (SDSB)**  
Case: Telenor Pakistan – Culture and Competitive Advantage  
North American Case Research Association Conference, USA



- **Assistant Professor Khalid Mir (MGSHSS)**  
Do Engineers Need Ethics? : The Case of the Environment  
Engineering Ethics Conference at UIUC, USA
- **Assistant Professor Abubakr Muhammad (SBASSE)**  
Locating Leaks and Dumps in Open Channels with Minimal Sensing  
IEEE Conference on Systems and Control, Croatia
- **Associate Professor Arif Iqbal Rana (SDSB)**  
Case: The Shafi Group/Case: Non-Family Managers and Service Sales Corporation  
North American Case Research Association Conference, USA
- **Assistant Professor Shazib Shaikh (SDSB)**  
Driving Innovation in the Service Economy  
International Conference on Information System, USA
- **Associate Professor Osama Siddique (MGSHSS)**  
Approaches to Legal and Judicial Reform in Pakistan: A Post Mortem  
Law and Social Sciences Conference, Sri Lanka
- **Assistant Professor Murtaza Taj (SBASSE)**  
Interaction Recognition in Wide Areas Using Audiovisual Sensors  
IEEE International Conference on Image Processing, USA

## LUMS Faculty Travel Grants (FTG) Spring 2012

- **Assistant Professor M. Ghufan Ahmad (SDSB)**  
Harvard University, Boston, USA
- **Assistant Professor M. Junaid Ashraf (SDSB)**  
Military, Managers and Hegemonies of Management Control  
Interdisciplinary Perspectives on Accounting Conference 2012, Cardiff, UK
- **Associate Professor Shahab Baqai (SBASSE)**  
QoS Aware Path Selection in Content Centric  
IEEE International Conference on Communications (ICC) 2012, Ottawa, Canada
- **Associate Professor Livia Holden (MGSHSS)**  
Non-State Law and Governance in South Asia and in the Diasporas  
Law and Society Annual Meeting, Honolulu, Hawaii
- **Assistant Professor M. Naiman Jalil (SDSB)**  
Harvard University, Boston, USA
- **Associate Professor Asim Karim (SBASSE)**  
Self-Calibration Enabling Self-Management in Autonomous Systems by Preserving Model Fidelity  
17th IEEE International Conference on Engineering of Complex Computer System, Paris, France
- **Assistant Professor Hasan Karrar (MGSHSS)**  
Markets, Merchants and Crony Capitalism: Explaining the Frontier Economy in Chinese Central Asia Today  
Inter-Asian Connections III: Shifting Geopolitical Ecologies and New Spatial Imaginaries, Hong Kong
- **Assistant Professor Hammad Siddiqui (MGSHSS)**  
Thinking by Analogy and Option Prices  
Global Finance Conference 2012, Chicago, USA

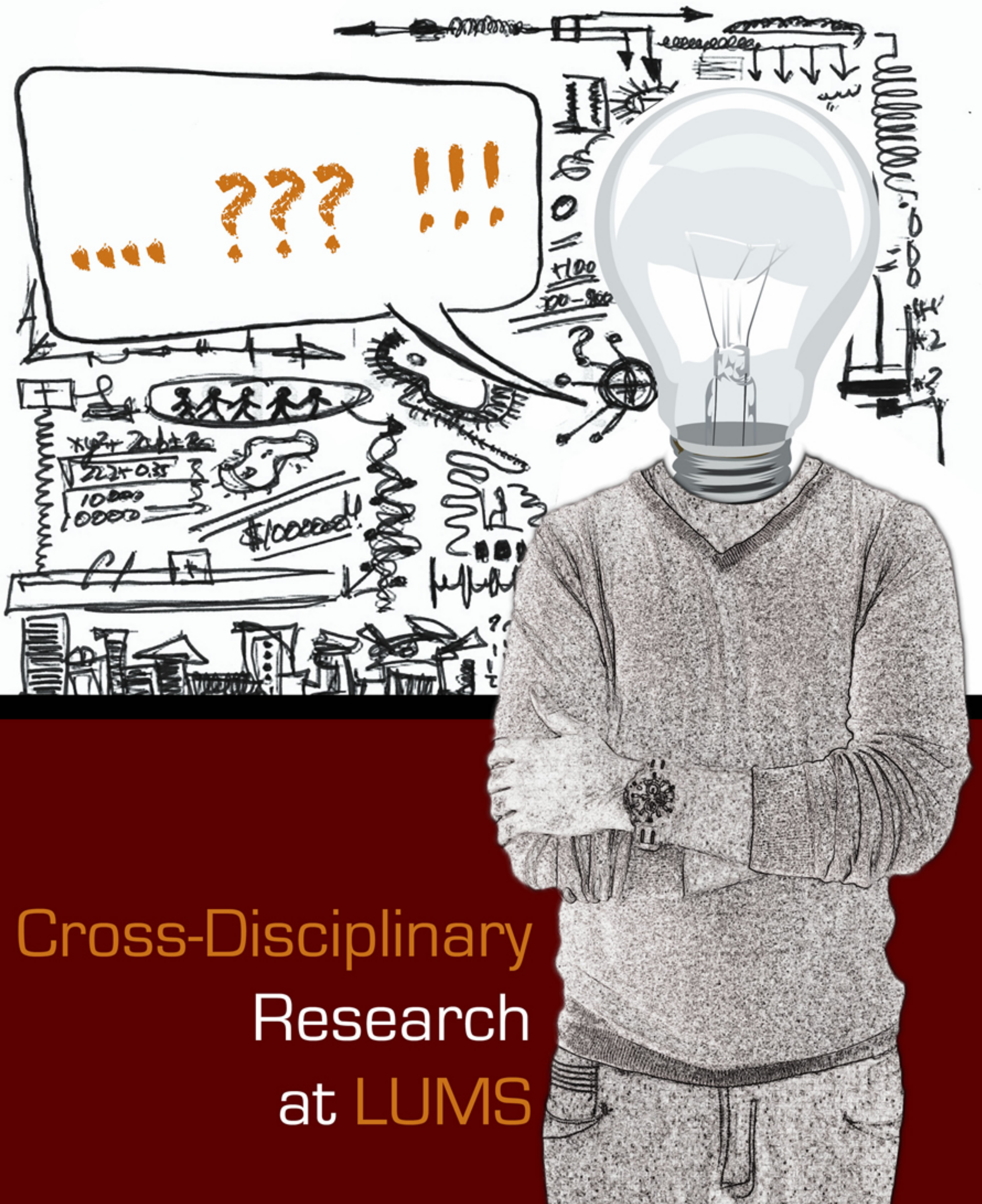
## LUMS Faculty Travel Grants (FTG) Fall 2011

- **Assistant Professor Emma Varley (MGSHSS)**  
Tidemarks in the Medical Anthropology of Conflict and Survival  
American Anthropological Association Annual Meeting, Montreal, Canada
- **Assistant Professor Sadaf Ahmed (MGSHSS)**  
Muslim Women and the Challenge of Authority, Boston, USA
- **Associate Professor Umar Saif (SBASSE)**  
BitTorrent for the Less Privileged  
HotNets 2011, Cambridge, USA
- **Associate Professor Zartash A. Uzmi (SBASSE)**  
Offline GC: Tracing Reachable Objects on Tiny Devices  
ACM Sensys 2011, Seattle, USA

- **Associate Professor Asim Karim (SBASSE)**  
Fast Supervised Feature Extraction by Term Discrimination Information Polling  
International ACM Conference on Information and Knowledge Management, Glasgow, UK
- **Associate Professor Nadeem Khan (SBASSE)**  
A Novel Video Coding Scheme for Lossy Networks with Scalable Bit-Stream  
Visual Communications and Image Processing, Tainan, Taiwan
- **Assistant Professor Anjum Fayyaz (SDSB)**  
Framework to Integrate Insights from GVC, Industrial Cluster  
Corporate Social Responsibility, and Competitiveness in Developing Countries: Towards a New Research Agenda, Copenhagen, Denmark
- **Assistant Professor Adnan Zahid (SDSB)**  
Harvard University, Boston, USA
- **Assistant Professor Abdul Karim Khan (SDSB)**  
Harvard University, Boston, USA
- **Assistant Professor Shazib Shaikh (SDSB)**  
Case: EasyPaisa  
North American Case Research Association (NACRA) Conference, Texas, USA

## LUMS Faculty Travel Grants (FTG) Spring 2011

- **Assistant Professor Ali Qazilbash (MGSHSS)**  
ASLI 8th Annual Conference, Fukuoka, Japan
- **Assistant Professor Muhammad Farooq Naseer (MGSHSS)**  
Using Data to Inform Quality-Based Reform in the Context of Pakistan  
55th Annual CIES Conference, Montreal, Canada
- **Associate Professor Ghazala Irfan (MGSHSS)**  
The Muslim Epistemological Tradition: Philosophy or Theosophy  
10th East West Philosopher's Conference at the University of Hawaii, Honolulu
- **Associate Professor Livia Holden (MGSHSS)**  
Divorce at the Woman's Initiative in South Asia  
Hawaii International Conference on Social Sciences, Honolulu/San Francisco, USA
- **Dr. Hassan Abbas Khan (SBASSE)**  
University of Manchester, UK
- **Assistant Professor Muhammad Fareed Zaffar (SBASSE)**  
Stanford Research Institute, California, USA
- **Associate Professor Umar Saif (SBASSE)**  
Knocking Down the MapReduce Brick Wall  
USENIX Annual Technical Conference 2011, Oregon, USA
- **Professor Usman Qazi (SBASSE)**  
University of Science and Technology, Hefei, China
- **Associate Professor Aamir Khan (SDSB)**  
2011 Annual Conference of China Marketing Science, Guangzhou, China
- **Assistant Professor Abdul Karim Khan (SDSB)**  
Why People Vary in Their Reaction to the Experience of Injustice  
119th Annual Convention of American Psychological Association, Texas, USA
- **Assistant Professor Anjum Fayyaz (SDSB)**  
Factors Influencing the Development of SME Clusters: Evidence from Pakistan  
2011 World Conference of the International Council for Small Business, Stockholm, Sweden
- **Assistant Professor Kamran Ali Chatha (SDSB)**  
Methodological Developments in Manufacturing Strategy: A Content Analysis  
54th Annual Conference of the Administrative Sciences Association Canada, Montreal, Canada
- **Assistant Professor Muhammad Junaid Ashraf (SDSB)**  
Management Accounting Change and Structuration Theory: A Realist Critique  
14th International Association of Critical Realism, Oslo, Norway
- **Assistant Professor Shazib Ehsan Sheikh (SDSB)**  
12th International Conference on Electronic Commerce & Web Technologies, Toulouse, France



Cross-Disciplinary  
Research  
at LUMS



# Energy

Pakistan is going through the darkest patch of the energy crisis to date. The year 2008 marked the beginning of this downhill ride, when the demand and supply gap pertaining to electricity increased by 15%. The same year saw power outages extending up to 16 hours a day across the country. So far, the situation has not improved much.

The researchers at Lahore University of Management Sciences are working out efficient and economical solutions for transmission, distribution and conservation of power to overcome this chronic adversity. At the same time, Pakistan's dependence on its capacity to adapt to the changing climate is also being explored through faculty research projects.

# POWER STRUGGLE

By Ayesha Aslam



A large amount of electricity in Pakistan is lost due to transmission and distribution losses, which results in a huge monetary loss. Dr. Jamshed H. Khan, Associate Professor at the Suleman Dawood School of Business, is working with Yousaf Hashim Khan, an Executive MBA graduate, on a project that will reduce these losses through the implementation of an automated monitoring system.

Yousaf Hashim Khan, a graduate of the LUMS Executive MBA Class of 2012 and an Assistant Manager at LESCO, and Dr. Jamshed H. Khan, Associate Professor, Suleman Dawood School of Business, are currently working on a project with the Lahore Electric Supply Company (LESCO) with the aim of improving power distribution efficiency, which if successful can lead to electricity and monetary savings.

LESCO is the largest among ten distribution companies in terms of sales of electricity and the third largest in terms of number of consumers. It distributes electricity to 2.9 million consumers across five districts of Punjab. LESCO purchased 16.9 billion energy units during 2010-2011 and sold 14.7 billion units of electricity, which accounted for sales of approximately PKR 138 billion. The loss of 2.2 billion units was primarily due to transmission and distribution losses and the monetary loss amounted to PKR 20 billion (13.26%). These huge losses are growing over the years.



"Pilferage and theft is a common trend when it comes to electricity. This cannot be curtailed if the parent company, in this case, LESCO, doesn't have a record of how much is lost and at which point. The main objective of this project is to firstly track down where exactly the losses are being incurred," said Dr. Jamshed Khan.



The power distribution network of LESCO consists of 1,237 feeders originating from various grid stations. 387 of these are dedicated to supplying energy to single independent bulk customers. The remaining 850 feeders distribute energy to consumers that include

domestic, commercial, industrial and agricultural users. The length of a feeder varies between 3 to 80 kilometers. Each feeder in turn has 50 to 100 transformers supplying 150 to 200 customers each. Line loss is currently calculated by looking at the difference between the energy units received from the grid through the feeder and the energy recorded from the consumer meters.

Mr. Yousaf Khan continued, "The idea is to install automated meters, at the very outset, on the transformer cluster level, from where electricity is distributed to end users. Eventually automated meters would be installed at the end user level too through an incremental approach."

The advantages of these smart meters are numerous. Firstly, no humans will be involved in meter reading, which will minimise error and personal biases. Secondly, the smart transmission can be monitored at any given time by access through an online system. Thirdly, any tampering will be directly reported to the main hub and action can be taken immediately.

"Currently, it is difficult to identify the exact area where pilferage is taking place, as there are only about 8 to 10 personnel monitoring about 6,000 consumers. By installing meters at the transformer level, it would be possible to quickly and efficiently monitor where precisely loss is taking place and to then implement corrective measures," Yousaf explained.

Installing GSM enabled meters on distribution transformers would help to identify those transformer clusters where theft of energy is rampant. A task force would then eliminate the ongoing theft of energy in high loss transformer clusters and the wireless communication would enable LESCO to keep the reoccurrence of theft under strict monitoring control.

The first phase of the project has been to identify 12 feeders out of the total of 1,237, which are a maximum of 12 kilometers in length, providing electricity to mostly commercial and industrial consumers. If approved, automated meters will then be installed on all transformers on these feeders.

"We hope that the money we save there can be used to replace the manual meters at the end user level with automated GSM meters as well," said Yousaf. Also proposed is the establishment of a Network Operations Centre where a huge video wall would be installed to view and monitor the traffic density at each cluster.

"This kind of system will help not only to identify the highest loss contributing transformers but also to prioritise and channelise theft detection efforts and rehabilitation works. The potential savings that can be made are huge," concluded Yousaf.



# SMART ENERGY SOLUTIONS

By Amn Rahman



*Pakistan is in the midst of a severe energy crisis resulting in multifarious impacts on industry, economy and living standards. The need for renewable energy resources has driven many people to research for ways to cure Pakistan's need for alternative power resources. Dr. Naveed Arshad, Assistant Professor at the Department of Computer Science at LUMS, is working with his team on self-managing systems for efficient power consumption and conservation.*

In an effort to conserve power and integrate renewable energy resources such as solar and wind, Dr. Naveed Arshad and his team are working on a new initiative in power systems termed as the 'smart grid.' The smart grid is an electrical grid that employs the use of information and communications technology to achieve efficient and economical transmission, distribution, and conservation of power.

Dr. Arshad claims that the traditional electric grid relied heavily on the realm of electrical engineering but this is not the case with the smart grid. The smart grid requires extensive use of computer science in the development of software for the optimised functioning of the grid. Presently, Dr. Arshad and his team are involved in the development of algorithms and software to help in the conservation of power in the smart grid.



According to Dr. Arshad, the smart grid is a large concept that encompasses "efficient power generation, transmission and distribution to customers." His research covers smart grids at the level of buildings sometimes called a 'microgrid.' This research endeavor is termed as a 'self-managing microgrid.' A self-managing microgrid uses special algorithms and software to learn about the power consumption in a particular area. It looks for answers to the three fundamental questions: How much power is needed? At what times would the power be required? What power source should be used to provide power to the device?

Dr. Arshad presents the example of a household in which certain devices need to be run and each device has a priority. The user can specify what devices need to be run and at what hour of the day, e.g., an air conditioner may be run for a few specified hours during the day. The user will also give timings for other devices to be run and will not have to go through the inconvenience of switching the devices on and off. The self-managing microgrid will find the most optimum and economical route towards power consumption, e.g., if power from the main supply is expensive during the daytime for the air conditioner, the microgrid will draw power from cheaper alternative sources such as solar, wind or bio-gas. If there is insufficient power to run all the devices for the user, then only the high priority devices will be run. If the user specifies no timings, the microgrid will plan the most economical time period for the device to run. A great deal of data has been generously provided by Mälardalens University, Sweden to aid in this research project.

According to Dr. Arshad, there are many areas to work in the context of smart grids. One particular area is the forecasting of power usage in the next hour to 24 hours. For this purpose, the team is employing the use of a Short-Term Multiple Forecasting Model that predicts the amount of power that will be required. This is crucial as power cannot be stored and an insight into the future energy consumption can allow for better more efficient and economical consumption of power. In addition to this, the team is also working on simulators for electrical devices that can simulate realistic functioning of electrical devices given some basic inputs.

Future plans pertaining to the microgrid revolve around the expansion of the microgrid that spans entire neighborhoods and villages. The team intends to make the code open source so that it can help lead to greater development and deployment. Dr. Arshad stresses the fact, "We cannot provide complete alternative power generation from renewable sources. However, what we can do is to provide blueprints for as much energy conservation as possible and generate as much of our energy from renewable sources as possible. Our goal is to achieve these objectives in as little cost as possible so that a common household in Pakistan can benefit from our research."





# WHY BLUE IS THE NEW GREEN

By Zaib un Nisa Aziz



For a country such as Pakistan, which is built around a single river system, the vicissitudes of nature can affect everything from life expectancy to foreign relations, from how much people consume to what they wear. Indeed, Dr. Adil Najam, Vice Chancellor of LUMS, contends that the question of the survival of Pakistan depends on its capacity to adapt to changing climate conditions.

Dr. Najam is currently heading a project known as Climate Change Adaptation in Pakistan – a three-year collaborative research initiative between LUMS and World Wide Fund for Nature (WWF), Pakistan. Funded by the International Development Research Centre (IDRC) in Canada, the project is underpinned by the realisation that changing climatic patterns can affect the lives of millions living in Pakistan.

Popular discourse is not always cognisant of the significance of this idea. “We sometimes forget just how much of a weather-dependent species we are,” says Dr. Najam. “There was a time in the later part of the last century where technology made us forget our reliance on nature. But tragedies such as the tsunami in Thailand serve as a cruel reminder of the power and impact that nature has on humankind,” he continued.

Nowhere is this truer than in Pakistan, a country built around the mighty Indus River System. Originating in the Himalayas, the Indus has shaped the lives of the inhabitants of this area for centuries. “The fate of this country is not determined by who has political power now and who will get elected later. It is determined by that river. That river has defined the way we look, the way we live, where we live, what we eat, what the structure of our economy is, what fashion trends we follow, everything. And it is that river that is affected by climate change. This is why water is so important for us,” says Dr. Najam.

This forms the basis of the project – its unique focus on Pakistan. While there has been work on climate change around the world, this project orients the discussion towards Pakistan in particular. The aim of the research is to measure and understand the impact of changing climate patterns on the lives of people here and devising means of adapting to that change, particularly in the area of food security and therefore of water. WWF is undertaking primary research in Sindh, which will be used by the LUMS team to develop coping strategies specific to Pakistan. These policy recommendations range from microeconomic econometric analysis to an examination of macro-level structural constraints.

Since climate change affects practically all aspects of life, it is virtually impossible to fit such a project into any one academic discipline. Part of the research relies on the natural sciences while another part focuses on a study of the markets. Similarly, questions

of law are crucial to devise policy options for Pakistan as is an understanding of business management. Thus, climate change is an issue, which lends itself to cross-disciplinary research and this is how the project has been structured. This is reflected in the multi-disciplinary team being pulled together by LUMS to work on and contribute to the project. It is also reflected in a significant capacity-building component of the project, which aims at fostering a new generation of climate change scholars in Pakistan by seeding research grants to LUMS-based student-faculty research teams working on various aspects of climate change adaptation in Pakistan.

Ultimately, Dr. Najam hopes that his research makes policy and academic circles in the country consider climate change as Pakistan’s own problem and understand what it means to us as Pakistanis. This is both the key objective and the condition of success of this project.

In speaking about his research, Dr. Najam highlights how climate change – and water – are related to everything. Indeed, he argues that good research on these issues requires that we understand such relationships and also that we need to bring climate and water concerns into research on other topics.



As an example of these cross-linkages, Dr. Najam points towards his own recent publications over the last year and how they all have linkages to issues of climate, water, and ultimately of development. “Of my four major publications that came out in the last year, three have direct links to climate and water, and the fourth – which is on immigrants – indirectly touches on the theme since migration is itself sometimes forced by climatic and water stress.” As Dr. Najam puts it, “Climate is related to everything; so is water.”

These publications include two books – *The Future of South-South Economic Relations* (Zed Books, 2012) and *How Immigrants Impact their Homelands* (Duke University Press, 2012) – and two policy research reports – *The Future of Sustainable Development* (IISD, 2012) and *Connecting the Dots: Information Visualization and Text Analysis* (Pardee Centre, 2012).

# LUMS ENERGY CONSERVATION PROJECT

By Ayesha Shirazi

*The conservation of energy is the need of the hour in Pakistan. Three undergraduate students conducted their own research and found ways to reduce energy usage on campus at LUMS, by studying electricity tariff structures. They discovered a way for improved load management and a better utilisation of constrained energy resources.*



Three undergraduate students recently undertook a project titled "Analysis of Effective Tariff Rates for Electric Supply of Lahore University of Management Sciences," as part of a course conducted by Naiman Jalil, Assistant Professor, Suleman Dawood School of Business (SDSB). This project led to findings that have resulted in massive energy savings for LUMS. Energy saving at LUMS is also endorsed through the SarSubz LUMS initiative. Through this platform the university's long-standing and continuing commitment to environmental consciousness and sustainable development are pursued.

The undergraduate students, Mohammad Usman, Yasir Dewan and Shahzad Ali were interested in a project that could lead to energy savings. After careful search for the topic, they identified that alternative tariff rate structures can be investigated for improvements. They analysed the tariff rates currently applied to LUMS by WAPDA/LESCO and the possibility of cost savings by switching to an alternative tariff structure. The results were staggering since the project concluded that LUMS could save a very large amount every month by switching to an alternative tariff structure for electricity.

"While researching for our project we discovered that LUMS spends a great deal of resources to acquire energy. So through our research we started to find a solution to this issue. We found that to deal with the energy crises in the country, the government had taken several steps for better load management and in this regard one of their initiatives was the introduction of a TOU (Time of Use) tariff in which two different tariff rates are applied for peak hours..."



...consumption of evening (4 hours) and remaining 20 hours as off peak hours consumption. This enables better load management and leads to better utilisation of constrained energy resources."

The students discovered that tariff rates that could be applied to LUMS were C-2(a) and C-2(b) on the basis of the amount of power consumption. The rate of peak hours (Rs. 10.91/KWH) is high as compared to a plain rate (Rs. 8.65/KWH) to discourage use of electricity in peak hours to balance the load demand, whereas the rate during off-peak hours is considerably low (Rs. 6.25/KWH) to give the incentive to consumers to use electricity during off-peak hours.

"We based our analysis on sample data as well as historical consumption patterns of the university and analysed the consumption during peak hours and off-peak hours to perform a comparative calculation under both tariffs. A major hurdle was non-availability of peak vs. off-peak hours consumption data. For this purpose, we took readings from the LUMS meter for one week from 6 p.m. to 10 p.m. as these are considered 'peak hours.' After taking this sample we found that during that one week, total consumption was KWH 25,600.00; peak hour consumption was 17.02 % and off-peak hour consumption was 82.98 %. To improve the credibility of our analysis, we decided to examine another factor; we calculated the total units consumed since installation of this, TOU meter and we found that the total consumption was KWH 13,020,000; peak hour consumption was 17.2 % and off-peak hour consumption was calculated as 82.8 %. Although there is a difference in the findings of the consumption pattern, that difference is negligible," said Usman.

The team then went on to compare the application of flat rates and TOU tariff rates based on historical consumption. The students took actual consumption of electricity for six months extending from September 2011 to February 2012.



“We discovered that there would be a significant amount of reduction in the LUMS electricity bill each month if the current tariff rate would be changed to a TOU tariff rate. It was evident that the total savings in each month would be very high if the TOU tariff would be applied,” said Usman.

On the basis of their findings the student team proposed that the LUMS administration should opt to change its current tariff C-2(a) to TOU tariff C-2(b) as early as possible because it would result in a significant reduction in monthly electricity cost. They also suggested that LUMS should contact relevant authorities at LESCO to claim extra cost paid by LUMS for not applying the appropriate tariff as per policy of NEPRA/Government of Pakistan.

The LUMS administration applied the proposed changes and switched to the TOU tariff. This has resulted in substantial energy savings for the university. Professor Jalil recalls that when he and the students recommended these changes to the LUMS administration, the university Vice Chancellor Dr. Adil Najam reacted very pleasantly and said, “Everyone brings problems to me; you are one of the very few who has brought a solution to me!”

It is because of this policy of encouraging the spirit of research and innovation in students and faculty that LUMS continues to make practical and long-lasting contributions in all major areas of life, including the energy sector.



# Health



The health field is gaining greater importance on a global scale, as people become more aware of the dangers of disease and other disorders. At LUMS, various initiatives and projects are being carried out in original ways. These include research initiatives in the area of nanomaterials, which can help overcome numerous challenges, from easing the discovery of waterborne pathogens and early detection of various diseases to the development of new materials for the targeted delivery of drugs, among others. Hepatitis C and dengue, two of the deadliest diseases in Pakistan, are being researched and explored to discover ways in which the government can effectively confront and control their spread. Another area of research is the analysis of the effects of depressive disorders on the productivity of farmers to the impact of chronic disease on food poverty. The field of epigenetics is yet another area where significant research is being carried out.

# O

## PENING UP NEW AVENUES OF RESEARCH

By Zaib un Nisa Aziz and Abbas Shahid



*Biologists around the world are on the precipice of revolutionising the struggle against diseases through their research in the cutting-edge field of epigenetics – the main area of interest of Associate Professor Muhammad Tariq, Chair of the Biology Department at the Syed Babar Ali School of Science and Engineering (SBASSE), LUMS.*

We all start life from a single cell, a fertilised egg, in our mother's womb, which repeatedly divides to give rise to a multitude of cells forming a little clump much before different organs in the form of eyes, heart, lungs, and kidneys are formed. While all the cells originate from a single fertilised egg, which contains the set of genes we inherit from our father and mother, cells specialise and give rise to different organs.

This is achieved by selectively switching on (activation) or switching off (silencing) specific sets of genes called master regulator genes in response to different signals our cells are exposed to during our development. Gene activation or gene silencing, which is inherited from one cell to the next without any alteration in the DNA sequence, is referred to as epigenetics. Epigenetic research is instrumental in understanding how the fate or identity of different cell types (lung, heart, kidney, neurons, etc.) is established and how this identity is maintained throughout our development. Maintenance of cell identity from early development in our mother's womb until our death is referred to as cell memory, i.e., an eye cell remains an eye cell and a liver cell remains a liver cell, which ensures all our body organs work properly. Any loss or impairment in cell memory mechanism leads to diseases like cancer.

Epigenetics is an exciting and cutting-edge area of research. Scientists around the world are aiming to discover the epigenetic basis of diseases and to ascertain how disease cells lose cell memory. This is exactly what is being explored in the Epigenetics Research

Laboratory at LUMS led by Dr. Muhammad Tariq who is interested in understanding how cell memory is maintained and if we can change the fate of one cell type to another by modulating the environment. His lab is interested in finding the communication and signalling networks of a cell that may affect its identity and memory.

Dr. Tariq's epigenetic research laboratory at SBASSE uses the fruit fly. "We owe a lot to this little animal as everything we know about genes, inheritance of genes and development of multi-cellular organisms was discovered in these flies and they have been used as an excellent model system by scientists," says Dr. Tariq.

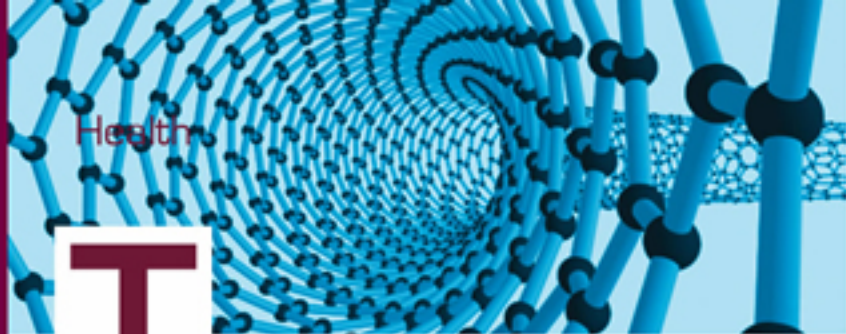
The establishment of the biology research labs has been a critical milestone in the development of the Biology Department at LUMS because undergraduates were exposed to the latest research related to everything they learned. Hitherto, there have been no research labs in Pakistan that use the traditional fruit fly model system. "It is very challenging to develop an environment for basic research in a country where this culture did not exist but I am grateful to LUMS for taking this initiative in Pakistan," says Dr. Tariq. Not only has it allowed Dr. Tariq to continue his research here in Pakistan but he is happier that he has found an excellent team of colleagues who are enthusiastic, motivated and hardworking to be in this exciting field. Currently, he is collaborating with Dr. Saima Anwar, another faculty in Biology at LUMS, to decipher a cell signalling network, which may affect maintenance of cell memory. This research aims to discover the factors that help and develop the identity of particular cells and to better understand the functioning of cells.

Dr. Tariq considers the establishment of the Biology Department and the research labs as being one of the best experiences of his professional life, and envisions many such research labs throughout the country, but he points out that, "It requires a lot of patience, good colleagues and an excellent team."



*The team that established the Epigenetics Research Lab and Biology Teaching Labs at LUMS. Left to right: Dr. Tariq, Dr. Saima Anwar, Ayisha Shabir, Noman bin Abid and Ali Mumtaz.*





## T HINKING SMALL, REAL SMALL

*From facilitating the detection of waterborne pathogens and early detection of various diseases including cancer to the development of new materials for the targeted delivery of drugs and thus the effective and timely treatment of developing tumors, and developing safe and economically viable processes of producing clean water, nano materials can help overcome some of the greatest challenges of the 21st century. It is one of the most crucial undertakings by the global scientific community and LUMS is playing a significant role in this endeavor thanks to Dr. Irshad Hussain, Chair of the Chemistry Department, who has initiated research initiatives at the Syed Babar Ali School of Science and Engineering, LUMS in this area.*

"We are using tiny metal particles that contain from a few to tens of thousands of individual metal atoms, each about a million times smaller than the width of a human hair. These tiny metal particles can behave as a metal or a semiconductor, or even metal molecules, and have thus very unique chemical and physical properties depending on their size, shape and surface chemistry," explains Dr. Hussain. His research team is also using these particles for applications in catalysis, solar cells and fuel cells. Moreover, their research is making important advances in the diagnosis and treatment of some of the world's most deadly diseases.

Dr. Hussain's team first began preparing functionalised nanomaterials in 2008 at LUMS. He then decided to explore their applications in disease diagnostics, sustainable energy production, and environmental remediation strategies to remove pollutants from contaminated water to make it safe for irrigation and drinking. Dr Hussain and his team, which consists of researchers (Sumaira Ashraf, Samia Saleemi and Syed Zajif Hussain) at LUMS, PhD students (Ayesha Ihsan and Asma Rehman) at National Institute for Biotechnology & Genetic Engineering (NIBGE) and undergraduate SSE students (M. Affawn Ashraf, Wardah Ejaz and Sikandar Abbas), are currently developing customised nanomaterials for the above-mentioned applications.

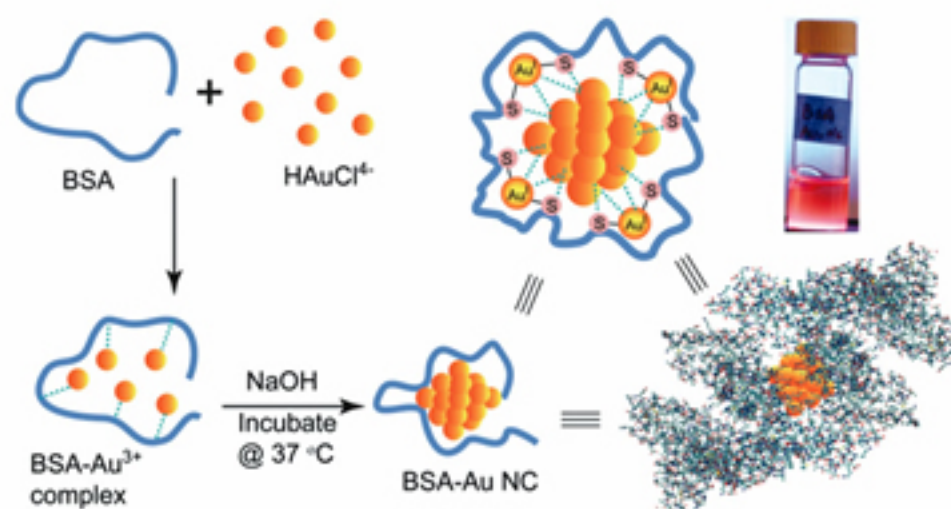
Dr. Hussain's team is also collaborating with various national and international groups especially Professor Vincent Rotello at University of Massachusetts, Amherst; Professor Francesco Stellacci at EPFL, Switzerland; Professor Wolfgang Parak at Phillips University, Marburg, Germany; Professor Bien Tan at Huazhong University of Science & Technology, Wuhan, China, and Professor Osman Bakr at King Abdullah University of Science & Technology (KAUST), Kingdom of Saudi Arabia, to explore interesting applications of functionalised metal nanoparticles and nanoclusters.

*By Zaib un Nisa Aziz*



Functionalised nanoparticles are being used to develop sensitive and economical assays for disease diagnostics, which can aid the early detection of diseases such as cancer and HCV. They can also facilitate targeted drug delivery, thereby increasing the efficacy of drugs while simultaneously reducing their side-effects. The team is also working on the development of intelligent nanoprobes that may be injected in the blood stream of healthy and diseased persons to derive valuable data and information about developing tumors, and have a potential for their on-site treatment.

Just a short walk from Dr. Hussain's office, in the labs of the Department of Chemistry at the Syed Babar Ali School of Science and Engineering, undergraduate students have developed a protein-mediated process to produce biocompatible fluorescent metal nanoclusters, which have the potential to replace traditional photo-bleachable fluorescent organic dyes and toxic semiconductor nanoparticles, usually known as quantum dots, as fluorescent labels for various bio-imaging techniques.



*A general scheme for the synthesis of protein-stabilised fluorescent metal nanoclusters*

The German Academic Exchange Programme (DAAD) has provided Dr. Hussain and his team with a research grant to explore the applications of metal nanoclusters in bio-imaging and catalysis, in collaboration with Professor Wolfgang Parak at Philipps University, Marburg, Germany.

Confident and excited, Dr. Irshad Hussain believes his research has the potential to make great advancements in the field of biomedical science and technology in the coming years.

# TAKING THE LEAD IN FAMILY PLANNING AND REPRODUCTIVE HEALTH

*By Ayesha Aslam*

*Sponsored by the David and Packard Lucile Foundation, the National Leadership for Reproductive Health and Development (NLRHD) Project aims to create a voice for women in family planning and reproductive health, through trainings, capacity building, strategy papers and more. Faculty from LUMS is working towards this goal in the textiles, sports goods and livestock sectors in particular.*

There are three different dimensions to the project. One of these is to hold 20 training sessions for NGOs, public sector, female leaders and other interest groups for creating awareness of the relevant issues. 14 of these sessions have already been held, while the remaining will take place during this year.



"The National Leadership for Reproductive Health and Development (NLRHD) Project aims to develop leadership for family planning and reproductive health," says Mr. Anjum Fayyaz, Assistant Professor, Suleman Dawood School of Business. "The goal is to build the capacity of NGOs and the public sector working in the area of reproductive health and to promote this theme at both the policy level and the field level," he continues.

The David and Packard Lucile Foundation has been working with LUMS since 2008 and has provided two half a million dollar grants. Under the first grant, the Health Enterprise Leadership Programme was undertaken from 2008-2010. The second grant is for the National Leadership for Reproductive Health and Development (NLRHD) Project, which aims to develop cross-sectoral linkages among women leaders to advocate and mobilise policy change for Family Planning and Reproductive Health (FPRH) initiatives.

Some of the outcomes of this project are the publication of strategy papers on FPRH, the formulation of recommendations for effective national FPRH policy, leadership capacity building of reproductive health organisations, the formation of a National Women's Leadership Network for advocacy of family planning and reproductive health and public awareness on these issues.

The second area of the project is to develop six strategy papers focusing on three different sectors, namely, textiles, livestock and sports goods (football). Two papers will be developed for each of these identified sectors, by a strategic working group consisting of reproductive health specialists, sector specialists and LUMS faculty. The final dimension of the project is to establish a network of females for leadership in the field of reproductive health.

On why the textiles, livestock and sports goods (football) sectors were chosen for intervention for this project, Mr. Fayyaz said, "The success indicator of this project will be to access sectors and industries that had been inaccessible for reproductive health practitioners with a large number of women as employees and/or high reproductive health problems."

The textiles, livestock and sports goods (football) sectors were identified as having a large number of women employees, where female health was directly impacted. These were sectors where the LUMS platform can provide expertise to support the programme and where women leaders have vertical and horizontal influence.

## Health

Asad Alam, Assistant Professor, Suleman Dawood School of Business, working in the sports goods (football) sector, explained that the geographical area his team is working in is Sialkot and the surrounding area: "There are over 300 football manufacturing factories in the area. We are working with an NGO called Bedari for help in establishing contact with the women working in this cluster."

"Living conditions in this area have never been documented. As more and more women are entering the workforce, it is important to identify what women's issues are and whether employers at these factories are taking these problems into account. Other aspects that are being explored are how women are adding to the economy and the balance of power at home, between males and females. The reproductive health of these women and their children will be studied and recommendations will be given for minimum safety requirements in these football factories, as well as how to provide better access to health resources," explained Mr. Alam.

Questions related to women's health problems were also asked of both the male and female residents of the area.

"Initially we conducted interviews in larger groups, asking open-ended questions. We then followed up with more focused questions with pre-selected groups," explained Dr. Khan. "There is a lot of potential in the research we have conducted. There were also some surprises. For example, it was learnt that about 20-25 women in the village have a Master's degree from places like the Allama Iqbal Open University," he continued.

Mr. Rauf explained how the research they are carrying out is qualitative. "Outside collection agencies collect milk from many similar areas for their products. We are trying to identify the problems being faced by the women working with livestock. Recommendations will be suggested for the improvement of the working conditions of these women and for the provision of subsidised health services," said Mr. Rauf.

## Sector Strategy Paper Teams

	Sports Goods (Football)	Textile	Livestock
Faculty Writer	Asad Alam/Dr. Sara Hussain	Dr. Misbah Tanveer	Dr. Furrukh Khan/Abdul Rauf
Reproductive Health Expert	Dr. Yasmin Zaidi	Dr. Neelofar Sami	Ms. Khawar Mumtaz
Sector Specialist	Dr. Peter Thomsen	Mr. Azhar Bilal	Dr. Raja Razaqat

Dr. Misbah Tanveer, Assistant Professor, Suleman Dawood School of Business is studying the textiles sector of the project. Providing details, she said, "Our team is looking at two factories in the area of Lahore, one of which is near Pindi Bhattian. We are carrying out survey based research among the women working at these textile factories with a sample size of 250."

"As more than 80% of the women working here are unmarried, the project has a lot of potential, as these women can be educated and informed of reproductive health issues beforehand," said Dr. Tanveer. She also highlighted that the team hoped to discover the health issues facing these women and suggest ways to improve their situation. At the same time the aim is to select female leaders and train them, while also suggesting policy implications for textile employers, as well as at the government and NGO level.

Dr. Furrukh A. Khan, Assistant Professor, Mushtaq Ahmad Gurmani School of Humanities and Social Sciences and Abdul Rauf, Teaching Fellow, Suleman Dawood School of Business, are part of the team working in the livestock sector. The geographical area being studied is a village called Pull Shah Daula. "We have carried out a social mapping of the village to start with," said Dr. Khan, "All sorts of questions were asked about population, education, religion, ethnicities, transportation links and much more."

According to villagers, the price offered by these outside collection agencies is less than that being offered in the open market. Dr. Khan further expanded, "There is the potential to increase the number of lady health workers, provide better health facilities and to conduct sessions on reproductive health and women's health, as well as educating women about the safe techniques for handling livestock related products."

"Through the National Leadership for Reproductive Health and Development (NLRHD) project, we hope to get access to data, identify and mobilise women leaders at all levels and carry out capacity building exercises. The aim is to have a long-term impact and to create a voice for women in family planning and reproductive health," concluded Mr. Fayyaz.



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## HE HIGH COST OF DEPRESSION IN DAIRY FARMERS

By Abbas Shahid

*Professor Abid Burki has been involved in multiple research projects related to health aspects. His research ranges from documenting and analysing the effects of depressive disorders on the productivity of farmers to the impact of chronic disease on food poverty. He has attempted to document and dissect data that has not been studied before with the hope that it leads to further research and development in Pakistan.*



Professor Abid Burki investigates the prevalence of depression in dairy farmers, its effects on dairy farm efficiency, and imputes the cost of inefficiency by collecting data from a large representative sample of smallholder dairy producers in 2005 in Pakistan's rural Punjab. Psychiatric symptoms were recorded using the World Health Organization's Self Reporting Questionnaire (SRQ-20) specifically designed for use in developing countries. SRQ measures psychological and somatic symptoms in the past 30 days requiring from the respondents a yes or no answer. Dr. Burki used frontier efficiency measure to construct efficiency indexes for 800 smallholder dairy producers, and evaluate the impact of long term depressive disorders on technical efficiency.

His results suggest that 12% of smallholder dairy farms suffered from major depression while 31% respondents had mild depressive disorders. Those with mild depression were almost equally efficient as those who had no depressive disorders. However, major depression was significantly related to decrements in technical efficiency. For example, overall technical efficiency of those with major depression was in the range of 30 to 40% as compared with 40 to 50% efficiency for those without major depression. His analysis shows that the output of farmers who were depressed dropped by 6.5% due to overall technical inefficiency and 7% due to scale inefficiency. The expected loss to Pakistan's economy is estimated at almost PKR 6 billion per annum or about 0.8% of the livestock GDP in 2005-06.

This research was presented at the 10th European Workshop on Efficiency and Productivity Analysis, which was held in Pisa, Italy. Dr. Burki plans to continue the research, and reach out to the same dairy farmers in order to carry out a follow-up survey so as to establish greater credibility for the research carried out, and to help overcome research biases and collect data over time so as to better understand this phenomena.

Dr. Abid Burki has also been involved in studying the impact of chronic disease on food poverty. He explained that chronic diseases were taken as what is generally understood by the term around the globe. These diseases include diabetes, arthritis, heart disease, AIDS, cancer and asthma. This research was done using two rounds of household-level panel data. A regression analysis was carried out to understand the effects. The regression results show that on average the effect of chronic disease on food poverty significantly varies by income groups categorised by three non-income based classifications. The incidence of chronic disease is significantly higher among non-poor when permanent income of the household is incorporated into the model, most notably among individuals coming from low and middle income backgrounds. He concludes that health policies that seek awareness, prevention and treatment of chronic diseases have the potential of poverty alleviation in a high poverty environment.

Dr. Burki hopes that his research on health economics will provide a basis to develop further research in Pakistan. Indeed, he says that he entered into research in these areas because he felt these were original academic contributions, which would highlight the importance of government spending on health in specific areas, as well as help with government policy regulation in order to play a preventative role to avoid depressive disorders and chronic diseases. He said that he hoped that not only would this data be helpful to the government in making policies, but also that his research would help students understand research in these areas in a better way.



# MATHS ATTACKS DENGUE

By Zaib un Nisa Aziz

Hepatitis C and dengue are two of the deadliest diseases in Pakistan. Almost ten million people are infected by Hepatitis C and over 12,000 cases of dengue were reported in the last year alone. Being serious epidemics, these diseases are considered one of the gravest threats challenging the people of Pakistan. Dr. Adnan Khan, an Assistant Professor of Mathematics at the Syed Babar Ali School of Science and Engineering (SBASSE), LUMS contends that math can allow our government to confront this seemingly insurmountable task.



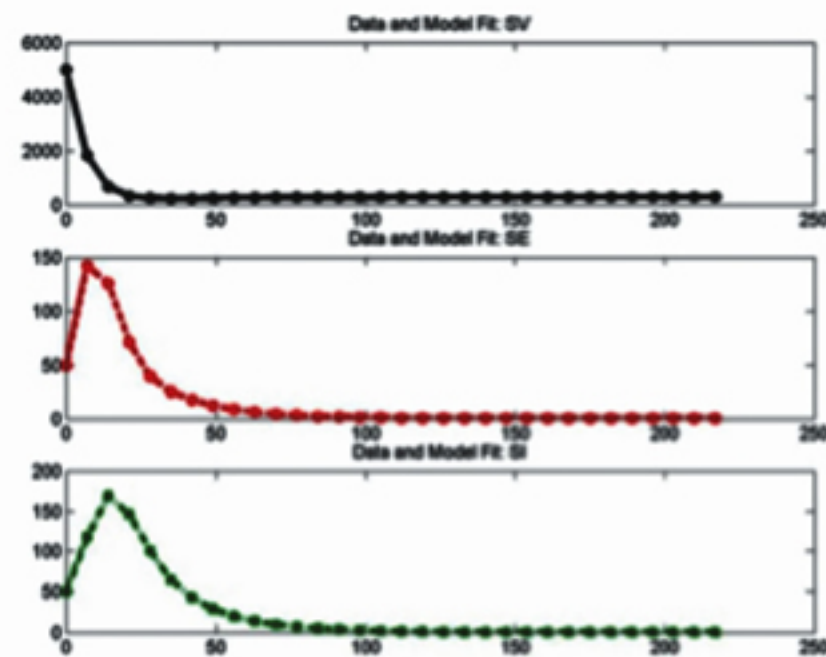
Dr. Adnan Khan's current research involves studying epidemics using mathematical models. "An epidemic begins when an infected person enters a population and interacts with them resulting in a rise in the number of infected," explains Dr. Khan. The project aims at developing a mathematical model for the transmission and spread of epidemics. Within the Mathematical Biology Research Group at LUMS, Dr. Mudassar Imran and Dr. Khan have been working with students to model the spread of Hep-C and dengue fever. The goal of modelling is to come up with effective control strategies, such as putting people in quarantine or vaccinating a proportion of the susceptible population. Any such control strategy leads to an important question – How many people should be quarantined or what percentage of the population should be vaccinated?



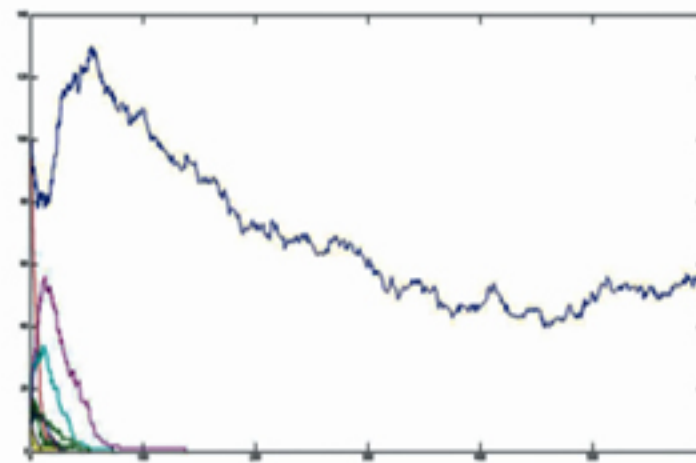
"Turns out that you don't have to vaccinate (or quarantine) the entire population," says Dr. Khan. He added further, "We only need to determine how many people once infected pass on the disease. This fundamental quantity is called the basic reproductive ratio ( $R_0$ ). If, on the average, this is less than one, the disease will not spread – there will be no epidemic." Dr. Khan's research allows him to determine, using previous years' data, the basic reproductive ratio  $R_0$ . This can allow him to establish how many people need to

be quarantined (or vaccinated) in order to ensure that  $R_0$  remains less than one, causing the disease to die out.

However, Dr. Khan and his team are faced with several challenges, the most important being the paucity of data. The accuracy of the research and thus effectiveness of the proposed strategies depend on the availability of historical data. Unfortunately, unlike in most of the developing world, there is no central reporting authority for epidemics in Pakistan. Although it has been one of the worst killers in Pakistan for several years, data about Hep-C is hard to come by. But things are slowly improving. After being urged by World Health Organisation, the Punjab Disaster Management Authority (PDMA) and the Punjab Centre of Disease Control (PCDC) did collect data regarding dengue last year. The two organisations were very forthcoming in providing information to Dr. Khan and his team and were also very keen on using the results of their research.



Data Fitting for 2011 Dengue Epidemic



Stochastic Model for Hep-C

But implementing research may not always be politically feasible. "Last year, the instance of dengue in Defence Housing Authority (DHA), Lahore was particularly high. Scientifically, it may be most beneficial to implement control strategies there. But this may not be a popular decision," says Dr. Khan. Such political considerations have prevented epidemic control in the past such as in Vaio, Haiti during a disastrous cholera epidemic in 2010. "But then those are questions beyond science," concludes Dr. Khan, "Scientifically, we can propose solutions, and are doing so."



# Institutions

Governance is an area that covers numerous aspects including structures of authority, laws and various processes. At LUMS, the faculty is involved in research projects related to a number of different governance aspects. The field of dispute resolution is diverse and one of the research projects aims to understand the workings of the trust networks that concern the forums chosen for dispute resolution, especially in relation to gender and power. Research is also being carried out in the Pakistani legal sector focusing on law reform under the British Raj and its influences with Pakistan's complex experiences with post-colonial reform of its justice sector. Another important project in the area of governance is the Technology for People Initiative (TPI), which is dedicated to using technology to create solutions relevant to the socio-economic context of Pakistan.

# D

## EMYSTIFYING THE LAW

By Zaib un Nisa Aziz

*Law is often surrounded with an aura, a mystique of superiority – an element of transcendence from the ordinary and the everyday. Through his work on the Pakistani legal sector, Dr. Osama Siddique seeks to disprove this myth.*

One of the key research areas of Dr. Osama Siddique, an Associate Professor at the LUMS Law and Policy Department, is law reform in Pakistan. “Legal doctrines have their limitations. There is a gulf between the law as it is present in the books and the law as it exists in reality. There is a need to demystify formal law,” says Dr. Siddique. The primary focus of his research is law reform under the British Raj and its connections with Pakistan’s diverse and complex experiences with post-colonial reform of its justice sector.

Dr. Siddique has undertaken the close study of an array of archival, political and anthropological literature in order to understand how colonial power transformed law – both discursively and in practice. According to Dr. Siddique, an understanding of the transformation of the law under the British is essential to an understanding of the law in the subcontinent as it stands today. The legacy of the colonial era looms large in our courts and in our constitutions. This research forms the crucial backdrop to the meta question that he tackles – explaining the differential access to justice of ordinary citizens in Pakistan.

“Justice is an understudied sector in Pakistan,” says Dr. Siddique. “There is a paucity of scholars working on this area and consequently a paucity of data.” This poses a significant challenge for Dr. Siddique. He maintains that the ordinary persons’ experience in the courts needs to be understood and thus studied. Dr. Siddique believes that the pursuit of such understanding underpins the vision of the Law and Policy Department at LUMS, which was started not just as an endeavour to better teach the law as it is, but as a forum to question, critique and ultimately transform bad law.

Currently, Dr. Siddique’s research on differential access to justice is focused on Pakistan’s special zones – the Federally Administered Tribal Areas (FATA) and the Provincially Administered Tribal Areas (PATA). In this context, he has analysed the Pakistani Constitution and its unique treatment of these areas as well as the consequential impact of such treatment on the citizens living there.

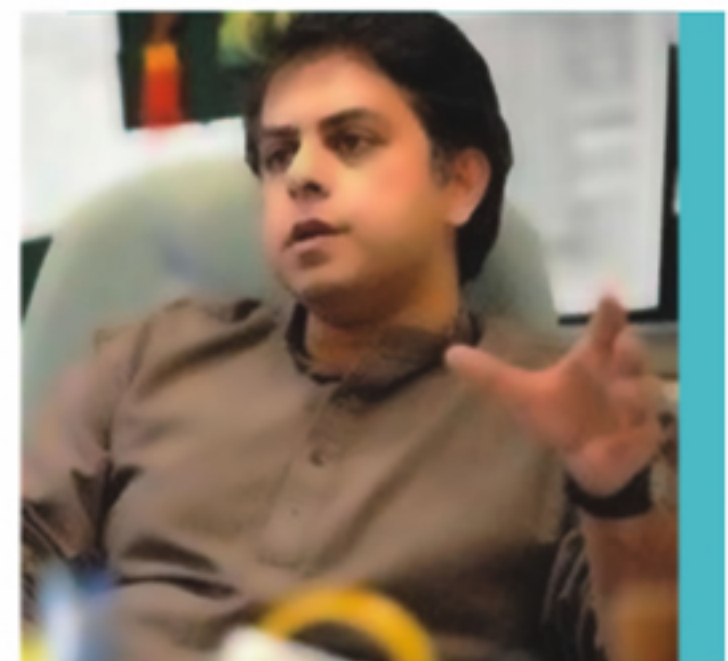
The theme of differential access to justice also resonates in Dr. Siddique’s work on the blasphemy laws in Pakistan. His first research article on the blasphemy laws in Pakistan was published in 2008 by the Minnesota Journal of International Law. Currently, he is engaged in his second take on the controversial laws. The ongoing research on this theme is both a legal as well as a socio-



logical one. Dr. Siddique scrutinises the language of the law arguing that it is the fundamental vagueness of the text and the lack of safety provisions that create the possibilities of and opportunities for abuse.

“Empirical evidence shows that the blasphemy laws have been all too frequently used to settle personal disputes and as a means of vigilantism. The disputes are usually not about blasphemy at all but about conflicts over property, marriage, local rivalries between families, endeavours at self-aggrandizement, contestations over the control of political, social and religious clout, and other such issues,” explains Dr. Siddique. His ongoing research will also cover the background to and imperatives behind the most recent and very prominent cases such as the murder of Governor Salman Taseer and Minorities Minister Shahbaz Bhatti, as well as the ongoing saga of the unfortunate teenaged Rimsha Masih.

Legal debate in Pakistan is often simplistic, unauthentic and marred by political rhetoric and propagandist narratives. Through his research, Dr. Siddique aims to bring historical accuracy and academic rigor to a field that has been hitherto neglected by academics and institutions alike. In doing so, he aims to make the debate about the law much more nuanced, informed and above all meaningful for an average citizen of Pakistan.



# TECHNOLOGICAL SOLUTIONS THAT MATTER

By Amn Rahman



The Technology for People Initiative (TPI) at LUMS is a research programme that is dedicated to using technology to create solutions relevant to the socio-economic context of Pakistan. Dr. Sohaib Khan, Chair of the Computer Science department at the Syed Babar Ali School of Science and Engineering (SBASSE) and principal investigator at TPI is optimistic that with the help of technology many difficult problems can be tackled.



TPI focuses on employing technology in the domains of policy and



because it measures success not by peer reviews, grants and publications but from deployment, number of lives impacted and the difference made to society. One of the primary reasons for the formation of TPI was that a number of people were already doing "interesting things for social welfare." Ultimately researchers want to impact society in some way or another and TPI provides a platform for those wishing to do so through technology to come together, exchange ideas and design and implement practical solutions. TPI in its initial days also piqued the interest of internet giant Google, which donated seed funds for the project.

Apart from Dr. Khan, the TPI team consists of the founding director, Asim Fayaz, members from the LUMS faculty, GIS experts, developers as well as interns from different educational fields. Some

of the major projects that the TPI team is currently involved in include work related to judiciary, police, governance, population density, crop estimation and distance learning.

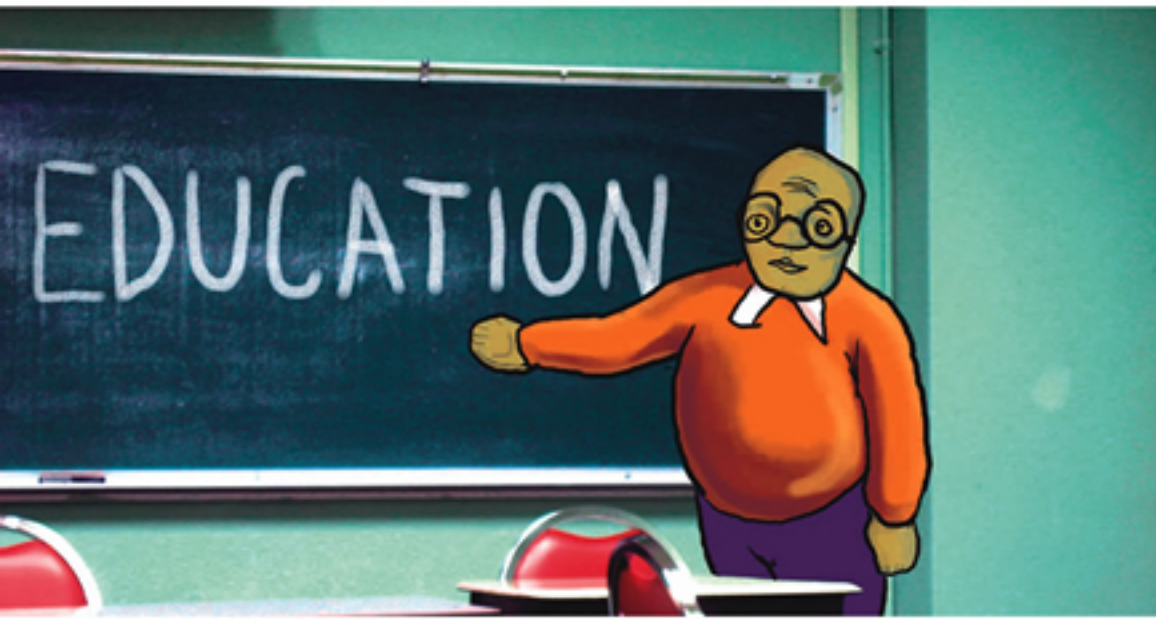
With regards to the projects concerning the government and other official bodies, Dr. Sohaib Khan believes that the "government has a huge potential for large impact and we can appeal to their goodwill." Giving an example of a former project involving the mapping of District Jhelum, Dr. Khan praised and emphasised the eagerness and willingness of *patwaris* to aid his team in its endeavours. He describes his reaction to the responses provided by the *patwaris* as "beyond expectation!"

Dr. Khan believes that some people do display apprehension but usually it is because they feel that "no one considers their opinion as important." If people are made to feel that their views are significant, a great deal of progress can be made and practical development can be attained. Referring to a project pertaining to the judiciary, Dr. Khan highlighted the supportive role of many individuals who were working in a court that provided assistance through problem evaluation and solution formation. The project is in its deployment stage and will provide various tools and diagnostics on judicial case loads, calendars as well as case logs for measuring the progress of each case. Dr. Khan describes this as a case of "minimum intervention to capture data and construct solutions."

TPI's quest for finding real solutions to tough problems led to another project that deals with improving governance. TPI is working on a solution for the government for data collection purposes. Relying on the ubiquity of mobile phones, TPI is constructing a kit that allows information retrievers to use mobile phones to write data and send it to servers using GPRS connectivity. Another ongoing project aims to assist students with exam preparation by sending them practice quizzes and tests via SMS. According to Dr. Khan this initiative is an effective use of technology since it is his belief that it is more fruitful to, "solve problems rather than create jazzy gizmos for enjoyment!"



# TOWARDS STRONGER ACADEMIA-INDUSTRY TIES



*Professor Syed Zahoor Hassan at the Suleman Dawood School of Business (SDSB) talked about the multi-staged LUMS-Citi Project under his lead on "The Role of Universities in Socio-Economic Development through Enhancing Employability of their Graduates." Supported by a \$50,000 grant from the Citi Foundation, the project aims to strengthen the linkages between higher education institutions and the industry in Pakistan. The project has been divided into six phases.*

In an effort to address one of the most urgent needs of present times, the LUMS-Citi Project advocates increased university-industry collaborations with benefits for both sides beyond the partnerships themselves. Dr. Hassan explained the rationale behind this unique education-industry initiative that will not only nourish the academic sector but will also prove beneficial for the industry. While laying down the basics of the LUMS-Citi project, he said, "The project investigates how academic institutions in Pakistan are currently connecting the industry and community at large. Through this initiative, ways will be identified in which the relevance of education being imparted at the institutions can be enhanced to develop young people who have a more positive socio-economic impact, especially in terms of an increased earning potential."

Considering this project in line with the most pressing "needs of the present times," Dr. Hassan explained that educational institutions should now focus on keeping curriculum compatible to the requirements of the industry that students have to step into soon thereafter.

Dr. Hassan detailed the various stages of the project starting from the Project Planning Phase in December 2011-January 2012. That was followed by the Data Collection Phase, where university-industry-community linkages were collected and examined, and the key best international and national practices against each sample academic institution were documented. The in-depth an-

*By Sara Anwar*

alysis of primary data collected then investigated the philosophy followed by each institution in terms of their strategic focus on academia-industry linkages, design and development of the curriculum, teaching and laboratory work, career counselling, guidance and placement of students.

After the second phase of the project, a two-day workshop on 'Making Higher Education More Relevant and Productive for all Stakeholders – Students, Industry and Society' took place in September 2012. While commenting on the significance of the workshop, Dr. Hassan shared, "The idea is to create best practices, share experiences and ensure there is cross-learning among participants. University representatives from Pakistani institutions will be able to discuss their own experiences and draft and define action plans for their own universities."

Dr. Hassan highlighted the wide-scope of project, which will help in bringing about the change in institutions across Pakistan. The participants of the workshop developed an agenda and action plan for their respective institutions to enhance relevance of programmes and to attain better socio-economic impact by their graduates.

A follow-up meeting with the participating institutions of the workshop will be held to share progress on the initiative and to exchange information on the challenges faced by institutions in implementing their action plan. This meeting will generate ideas on how to further sustain these efforts in the future.

Dr. Hassan discussed that the final stage of the project will document the findings in the form of a final report that will measure the progress achieved against each of the six phases of the project. The report will pen down all the lessons learnt and ideas for future work to enhance relevance of the education by higher education institutions in Pakistan.

While talking about the positive impact of this initiative, Dr. Hassan pointed out that the findings will not only leverage the higher educational landscape of Pakistan but will also strengthen academia-industry relationships, which will translate into a healthier national economy with improved employment opportunities in Pakistan.



# PUTTING HUMAN PSYCHOLOGY INTO ECONOMIC DECISIONS

By Amal Hamid



*Markets affect the lives of billions of people around the world. Conventional economic models that were built around the idea that people are emotionless geniuses with unlimited reasoning ability are unable to provide answers in today's world. Emotions affect people and their reasoning ability is often limited as they rely on various heuristics and shortcuts to make quick decisions. Dr. Hammad Siddiqi, an Associate Professor of Economics, Mushtaq Ahmed Gurmami School of Humanities and Social Sciences (MGSHSS) at LUMS, works on economic research demonstrating that human psychology is extremely important in how people make decisions.*

Dr. Hammad Siddiqi's research began during his PhD, when he felt that current economic theory did not make allowances for human psychological tendencies. He strongly believes that human behaviour with its immense richness could be better understood if such allowances are made. His ongoing research is a collaborative effort, where Syed Zahid Ali, a fellow faculty member at the Economics Department at LUMS, is his co-author in their upcoming papers. Hersh Shefrin, one of the founders of the field of behavioural finance, is highly interested in this research, and his comments have been incorporated in their research design.

"There are a number of puzzling phenomena in financial markets that require explanation. However, currently, no convincing explanation exists for them. Our research investigates the role of human psychology in generating such phenomena. One psychological bias called "thinking by analogy" has been isolated, and demonstrated experimentally and empirically to figure out that it plays a significant role in generating a number of key puzzling phenomena in financial markets. Everybody knows that people tend to think by analogies and comparisons. We take this fact seriously and build our models around it," says Dr. Siddiqi.

His research focuses on the idea of 'thinking by analogy.' He explains that if attention is given to the way people make decisions, it will be noted that people think via analogies and comparisons. "In fact, analogies provide us with the creative spark, which has led to so many inventions. So, we essentially owe all our progress to our ability to think via analogies and comparisons. However, there is always a danger of making a wrong analogy. So, in that sense, thinking by analogy is actually a double-edged sword," explains Dr. Siddiqi.

His research is based on the argument that investors in financial markets typically make a wrong analogy between two assets. The two assets are a call option and its underlying stock. This wrong analogy affects the way financial markets price these assets. Dr. Siddiqi explains the crux of his research by discussing how the heart of key puzzling phenomena in financial markets are analogy-based errors.

While highlighting why the topic of his research is so crucial, Dr. Siddiqi says, "Economists have been quite influential in the formulation of government policies, and often they have prescribed wrong policies with disastrous results." He believes incorporating insights from psychology into economic models leads to very different policy prescriptions and may result in much better outcomes. His ultimate objective is to make the entire practice of economics more realistic and powerful by making it more behavioural. He firmly believes that a day will come when the prefix of behavioural will no longer be needed as the entire field of economics will be behavioural.

Dr. Siddiqi believes that his research can benefit Pakistan immensely. He contends that the challenge facing Pakistan is the challenge of development, and behavioural economics holds the key to development. He says that in Pakistan, successive governments have made disastrous policy choices because they have often been listening to wrong advice. "Behavioural economics has a lot to offer in not only policy formulation but also policy implementation. In fact, without thinking about implementation, policy formulation is futile. So, the two have to go together," says Dr. Siddiqi.



# STRENGTHENING INSTITUTIONS

By Ayesha Shirazi

*The USAID Assessment and Strengthening Programme (ASP) and Lahore University of Management (LUMS) are working together to strengthen governmental and non-governmental organisations and develop their capacity by implementing comprehensive training programmes for all management levels in a multitude of critical areas.*



The Assessment and Strengthening Programme (ASP) funded by the United States Agency for International Development (USAID) for the Government of Pakistan and the Civil Society Organisations (CSO) was envisioned as a means to help local organisations develop their institutional capacities for handling US Government funds and to bring them to a higher level of managerial excellence, accountability, and transparency. The programme is led by former LUMS Provost Professor Zafar Iqbal Qureshi and builds on the collective expertise of the faculty of the Suleman Dawood School of Business (SDSB) including Dr. Ehsan Ul Haque, Dr. Anjum Fayyaz, Dr. Anwar Khurshid, Dr. Naiman Jalil, Dr. Jamshed Hassan, Dr. Abdul Karim, Dr. Junaid Ashraf and Dr. Mubashir Ali.

The first phase of the programme included an assessment of the capacity of the implementing partners of the USAID, i.e., both public and USAID-funded CSO organisations. Once the gaps and requirements had been identified, ASP then proceeded to extend the necessary technical assistance.

LUMS faculty has taken the lead within ASP for implementing a comprehensive training programme for all management levels, i.e. senior, mid and operational levels in the fields of Financial Management, Procurement Management, Monitoring & Evaluation and Human Resource Management & Administration to cater to government and civil society organisations' capacity requirements. A quarter century worth of research, case studies and expertise built up by the LUMS faculty is brought to bear on this rich and exhaustive capacity building initiative.

Dr. Zafar Iqbal Qureshi, who leads the ASP-LUMS initiative, points out, "For the year 2011-2012, the programme delivered 31 training programmes in key areas, training over 700 people." He adds that, "The content of the courses comprised of conceptual frameworks, best practices as well as local requirements. The degree of each training component varied depending upon the tier to which participants belonged. In addition to these, a course on 'Leadership and Cultural Change' for senior policy makers was also offered.

A key contribution of ASP-LUMS is to bring the lessons of research and scholarship to governance practices and to expand the community of knowledge by sharing this. ASP-LUMS has entered into partnerships with three prominent business schools of the country. These include IBA Karachi, IBA Sukkur and IMS Peshawar. The goal is to help build instructional capacity in the selected faculty of these institutions by offering them a Master Training Programme in multiple methodologies.

Another key element is to translate existing and emerging knowledge into useful teaching materials. Material development includes but is not limited to research studies, case studies, success stories, course of the training programmes, etc. A number of case studies have already been developed through this programme to build an inventory of material.

Dr. Qureshi explained that the material developed under the ASP-LUMS agreement follows a quality assurance process. "Part of the LUMS promise is that the training material provided meets national and international standards. The Case Research Centre (CRC) at LUMS provides quality assurance services for this purpose," said Dr. Qureshi.

Discussing the benefits of the ASP-LUMS partnership, Dr. Qureshi said, "This partnership will benefit the country in two major ways: firstly, through implementation of donor funded projects in a cost effective and efficient manner and secondly, it will lead to instilling in the participants of different programmes best practices, which are critical for effective project implementation."





# E

## XPLORING THE CLASS STRUCTURE OF PAKISTAN

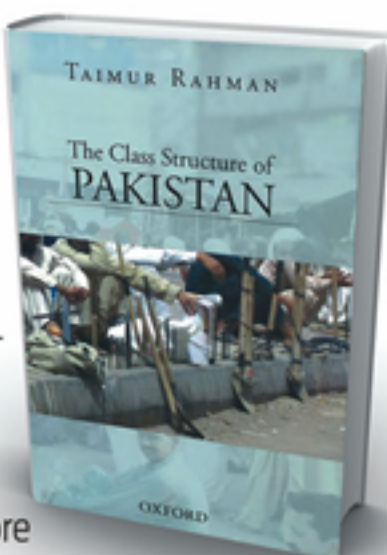
By Mehr Tiwana



*"The Class Structure of Pakistan" looks at the question with a wide historical sweep. It begins by examining the Mughal era, British colonialism and finally contemporary Pakistan. Dr. Taimur Rahman examines with painstaking detail the economic aspects of the question from a Marxist point of view.*

Dr. Taimur Rahman, Assistant Professor of Political Science at the Department of Humanities and Social Sciences, LUMS, discusses the class structure of Pakistan and explores the idea that it is characterised by Asiatic capitalism dominated by petty commodity production and small-scale capitalism.

Dr. Rahman's book is the first major scholarly work on the overall class structure of Pakistan. This study therefore fills a gap as it analyses the class structure from the time of the Mughal Empire through the distortions of the colonial era and the transition to capitalism to the class structure of present Pakistan. It avoids over-schematic arguments, attempting to proceed from facts rather than from any ideal forms.



Marx's notion of the Asiatic mode of production is more consistent with the pre-colonial historical evidence. Second, the colonial path of capitalist development of South Asia resulted in a socio-economic formation that combined features of the Asiatic and capitalist modes of production, which this study terms Asiatic capitalism. Empirical analysis of agrarian relations in Pakistan reveals the relative absence of wage labour and the continuing existence of various forms of pre-capitalist economic relations within the overall framework of a capitalist economy.

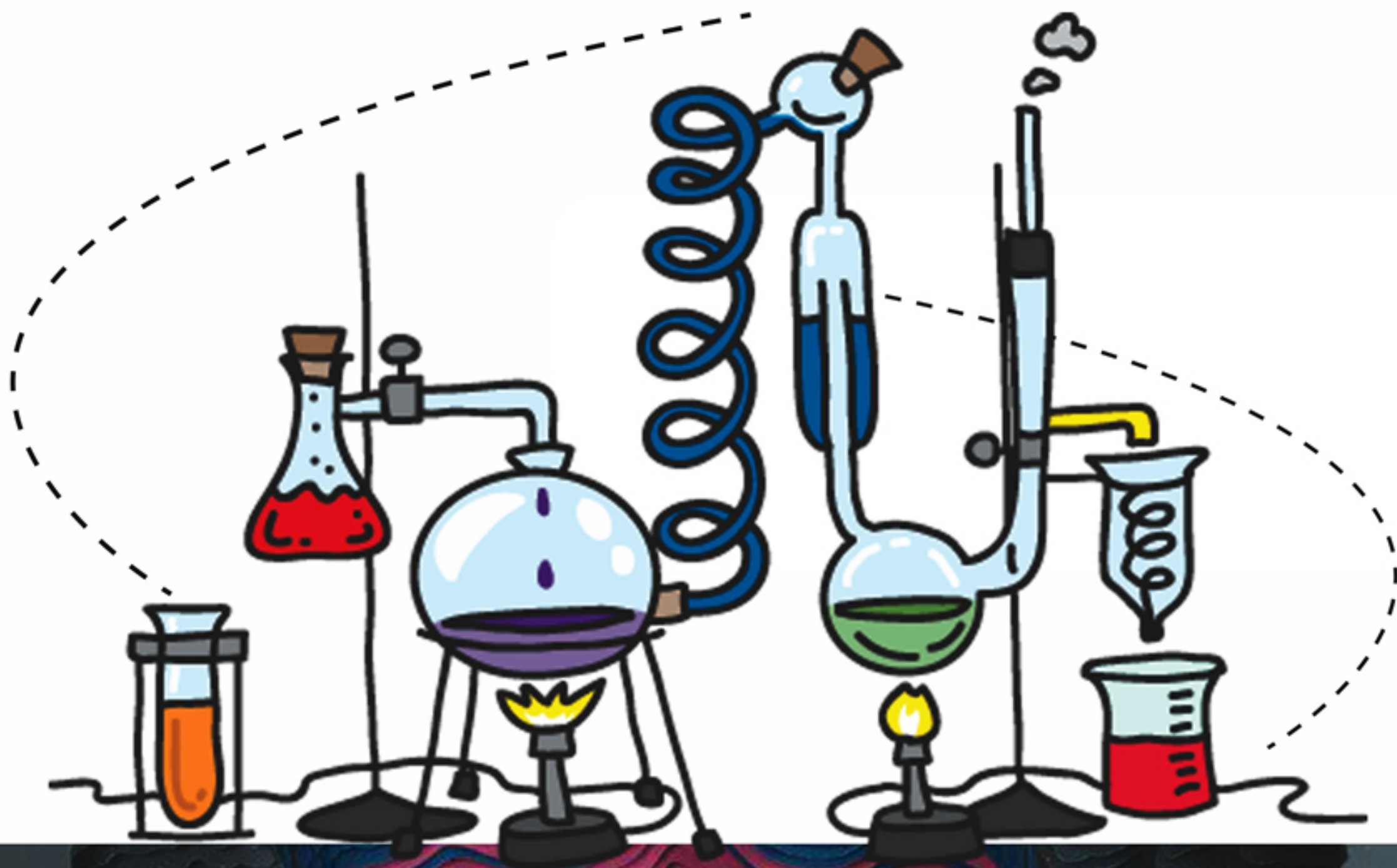
Third, the vast majority of the non-agricultural working population of Pakistan today is engaged in handicraft and manufacturing. However, manufacturing and services are dominated by petty commodity production and small-scale capitalism. Hence, while being significant in terms of output, the formal large-scale industrial sector, which was developed along the model of state-corporate capitalism, remains relatively small in terms of provision of employment.

Discussing his future plans, Dr. Rahman said, "Perhaps in a couple of years I would like to write the second part of this book, which would look at the politics of Pakistan from the angle of class struggle and would be called 'Class Struggles in Pakistan'."



First, the author establishes that the mode of production of pre-colonial South Asia was qualitatively distinct from European feu-





# Centres, Labs, Groups and Clusters

The research at LUMS plays an important role towards establishing it as a centre of excellence. The faculty is actively engaged in research for knowledge creation and discovering new understandings in the disciplines. Apart from faculty research, the three schools at LUMS have dedicated research centres, labs, groups and clusters, which are exploring new horizons in their respective areas.

# CENTRES

## SULEMAN DAWOOD SCHOOL OF BUSINESS (SDSB)



### Raising Executive Development Centre (REDC)

The Raising Executive Development Centre (REDC) of the Suleman Dawood School of Business (SDSB) offers a wide range of executive development and training programmes, effectively responding to the evolving development needs of managers and leaders around the globe.

### Strategic Sectors Research Centre (SSRC)

The Strategic Sectors Research Centre (SSRC) endeavours to generate scholarship in strategic sectors, including development (education management, health management, and entrepreneurship) and economic sectors (energy and water management, agribusiness, textiles, food, banking, sports goods and pharmaceuticals).

### Case Research Centre (CRC)

The Case Research Centre (CRC) plays a coordinating and editorial role in the development of well-researched case studies written by the SDSB faculty. The CRC also accesses teaching material produced by business schools in North America, Europe and the Asia Pacific region and manages an inventory of cases and other teaching material for the faculty. An international case research journal "Asian Journal of Management Cases" is published bi-annually from the CRC.

The CRC has a database of more than 600 cases/industry notes written by the SDSB faculty. Additionally, over a hundred cases/industry notes are in the process of being developed. These Pakistan-specific cases are drawn from real-life issues in organisations experienced first-hand by the faculty as the result of research or consultation activities.

### Social Enterprise Development Centre (SEDC)

The Social Enterprise Development Centre (SEDC) serves as a scholarship-based research centre working towards the capacity building of social enterprises in Pakistan. The centre has successfully developed linkages with more than 500 social sector organisations of Pakistan, which is a unique achievement for any academic institute. It has also formed geographic chapters in Lahore, Karachi, Multan, Peshawar, Rawalpindi, Islamabad and Quetta. This national outreach gives it the credibility to undertake operations nationwide.

## MUSHTAQ AHMAD GURMANI SCHOOL OF HUMANITIES AND SOCIAL SCIENCES (MGSHSS)



### Development Policy Research Centre (DPRC)

The Development Policy Research Centre (DPRC) envisions harnessing knowledge for change. DPRC aspires to provide a platform to channel this expertise towards sustained thematic research work and contribute to evidence-based policy making and public discussion.

### Gurmani Centre for Languages and Literature

The Gurmani Centre for Languages and Literature at LUMS was initiated by the Gurmani Foundation in 2010, for the advancement of Arabic, Persian, Urdu and other Pakistani languages. The centre promotes languages and their literatures through teaching, research/publication and their outreach programme.

## SYED BABAR ALI SCHOOL OF SCIENCE AND ENGINEERING (SBASSE)



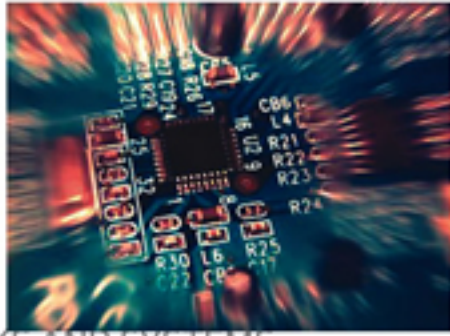
### Centre for Advanced Studies in Mathematics (CASM)

The Centre for Advanced Studies in Mathematics (CASM) aims to provide the best resource and learning place for mathematics. It serves as a platform for interaction with local industry and trading institutions. It aspires to promote interaction between mathematicians and experts of other disciplines, such as electrical and computer engineering, economics and social sciences.

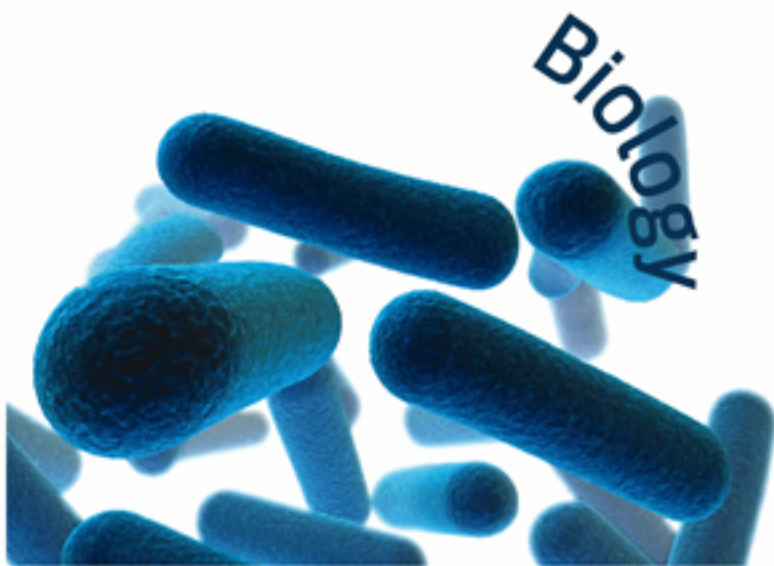
The centre is actively engaged in conducting research, organising workshops and conferences, arranging short courses and exploring linkages with other disciplines, among other activities. CASM provides funding for research activities in various ways depending upon the type and duration of the proposed activity.

# LABS, GROUPS & CLUSTERS

## Electrical Engineering



CYBER PHYSICAL NETWORKS AND SYSTEMS  
ADVANCED COMMUNICATIONS LAB  
ELECTRONICS AND EMBEDDED SYSTEMS  
DEVICES OPTICS AND ELECTROMAGNETICS  
ENERGY AND POWER SYSTEMS  
IMAGE AND VIDEO PROCESSING LABORATORY



BIOLOGY OF HEPATITIS C VIRUS (HCV)  
GENE REGULATION IN HYPERTHERMOPHILIC ARCHAEA  
COMPUTATIONAL STRUCTURAL BIOLOGY  
EXTRACELLULAR PROTEIN EXPORT IN BACTERIA  
NEUROSENSORY DISORDER  
EPIGENETICS  
COMPUTATIONAL SYSTEMS BIOLOGY  
OPTICAL MICROSCOPY SYSTEM FOR MEDICAL APPLICATIONS

## Chemistry

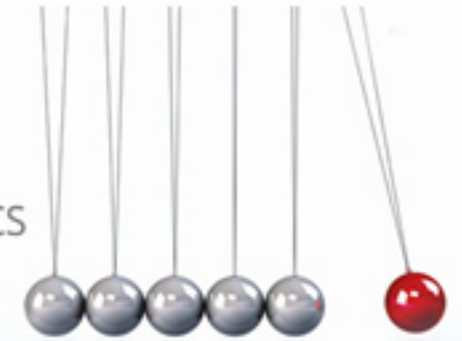


ADVANCED INTERDISCIPLINARY MOLECULES  
POLYMERS  
NANO MATERIALS

SOLID STATE CHEMISTRY  
CATALYSIS AND GREEN CHEMISTRY

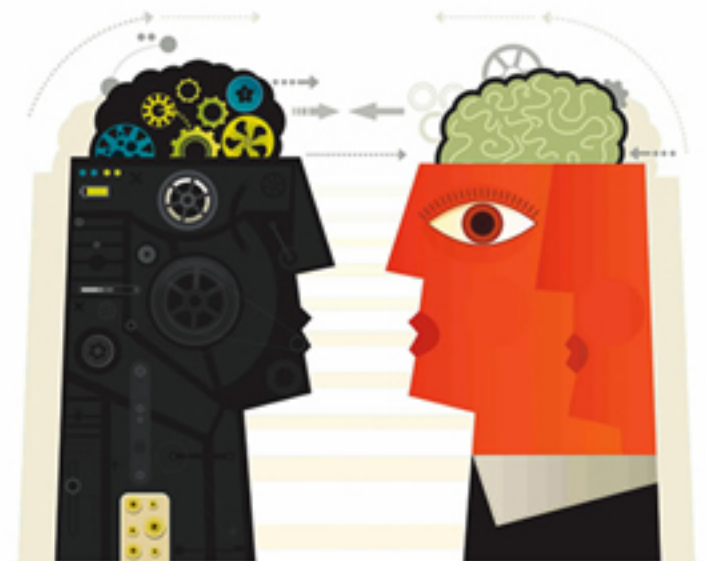
## Physics

COMPUTATIONAL MATERIALS  
PHYS LAB  
STRING THEORY  
EXPERIMENTAL PARTICLE PHYSICS  
FUNDAMENTAL THEORY  
LASER ENGINEERING  
NANO QUANTUM OPTICS  
PHOTONICS  
QUANTUM CHROMODYNAMICS  
SPIN AND PHOTON PHYSICS



**PHYS LAB** was set up in 2007, as a teaching lab at LUMS Syed Babar Ali School of Science and Engineering (SBASSE) to provide an institutional and national platform for student-driven experimental research in physics. The lab works to have indigenous development of experiments for the laboratory and demonstrations for the classroom environment. The lab also offers training opportunities for SBASSE students in world-class experimental physics through required and optional lab courses while sharing expertise, resources and training in physics education with sister institutions and organisations in the country and region.

## Computer Science



SOFTWARE ENGINEERING  
NETWORKS AND COMMUNICATIONS LAB  
NEIGHBORHOOD OF EMERGING WORLD TECHNOLOGIES  
KNOWLEDGE AND DATA ENGINEERING LAB  
ARTIFICIAL INTELLIGENCE AND ROBOTICS



# Faculty Publications

LUMS research publications appear in multiple formats based on disciplinary and policy needs ranging from books to journal articles to conference papers to policy reports to business case studies and more.

*This list has been compiled based on the Annual Faculty Scholarly Reports (FSR) for the years 2011 and 2012. This is not necessarily a comprehensive list but it does give a good sampling of the menu of the research publications from LUMS in these years. Any inadvertent omission or mistake is regretted.*

# Suleman Dawood School of Business



**Abid, S., Khurshid, A. & Khan, A. K.** (2012) Capacity Building through Effective Training at Secretariat Training Institute (STI). Lahore University of Management Sciences Case No. (LUMS) 05-747-2012-1 TN No: 05-747-2012-3TN, CRC.

**Abraham, S. & Madani.** (2012) The Price Discovery Process and Volatility Linkages in a Resource Based Emerging Market: Evidence from the Saudi Stock Market. *International Journal of Accounting and Finance* (2012): Vol. 3, No. 3, pp 223-236.

**Abraham, S.** (2012) Deepening the GCC Debt Markets: The Saudi Arabian Experience. In *The GCC Economies: Stepping up to the Future Challenges*, edited by Dr. Mohammad Ramady, Springer, 2012.

**Ahmad, F. & Ehsan ul Haque.** (2011). Mobilink: Pricing Under Competition. *Asian Journal of Management Cases*, Vol 8, No. 1.

**Ahmed, Z. & Chaudhary, I.** (2011). Shariah Compliant Working Capital Finance at Shafi Texcel. LUMS Case Research Centre, LUMS Case No. 02-625-2011-1.

**Ahmed, Z.** (2011, February 8-9). Potential for Waqf for Socioeconomic Development and Poverty Alleviation. Presented at International Conference on Islamic Business and Finance, ICIB 2011, Islamabad, Pakistan.

**Ahmed, Z., Chaudhary, I. & Ashraf, J.** (2011). Jassar Farms Private Limited: The Predicament of Livestock Valuation. LUMS Case Research Centre, LUMS CRC No. 02-626-2011-1.

**Ahmed, Z., Iqbal, A. & Khan, I.** (2011, December 28-29). Earnings Management and Privatizations: Evidence from Pakistan. Presented at 3rd Saicon 2011, International Conference on Management, Business Ethics and Economics (ICMBEE), Lahore, Pakistan.

**Akram, A., & Akram, M.S.** (2011, August 5-7). Why do Non-Deceptive Counterfeits Allure Consumers in Emerging Markets: A Qualitative Study. Paper presented at American Marketing Association (AMA) Summer Marketing Educators Conference, San Francisco, California, USA.

**Akram, A., & Akram, M.S.** (2011, June 12-15). E-government: An Emerging Relationship Between Government and Citizens in Developing Countries. 12th Annual International Conference on Digital Government Research, University of Maryland, College Park, MD, USA.

**Akram, A., Merunka, D., & Akram, M.S.** (2011). Perceived Brand Globalness in Emerging Markets and the Moderating Role of Consumer Ethnocentrism. *International Journal of Emerging Markets*: 6(4), 291-303.

**Akram, M.S. & Malik, A.** (2012, June 4-7) Evaluating Citizens' Readiness to Embrace E-government Services. 13th Annual International Conference on Digital Government Research, University of Maryland, College Park, MD, USA.

**Alvi, S., Butt, A.N., Khurshid, A., & Siddiqui, M.A.** (2011). The Engro Zarkhez Challenge 2011 Teaching Note. LUMS Case Research Centre. LUMS Case No. 05-745-2012-3TN.

**Alvi, S., Butt, A.N., Khurshid, A., & Siddiqui, M.A.** (2011). The Engro Zarkhez Challenge 2011. LUMS Case Research Centre. LUMS Case No. 05-745-2012-1.

**Arif, F., Hoyer, W. D., & Merlo, O.** (2012, August 17-19). The Effect of Parent-Child Buying Communication Strategies on Self-brand Connections. AMA Summer Marketing Educators' Conference, Chicago, USA.

**Ashraf, J.** (2011). Jassar Farms: Accounting for Biological Assets. LUMS Case Research Centre. CRC No. 02-626-2011-1.

**Ashraf, J.** (2011). Management Control Changes in CAA (A). LUMS Case Research Centre. CRC No. 01-507-2011-1.

**Ashraf, J.** (2011). Management Control Changes in CAA (B). LUMS Case Research Centre. CRC No. 01-508-2011-1

**Ashraf, J., & Uddin, S.** (2011). Review of Management Accounting Change Research with Special Reference to the Public Sector and Less Developed Countries. *Review of Management Accounting Research*, edited by Magdy Abdel-Kader, Palgrave Macmillan.

**Ashraf, J., Konstantinos, S., & Uddin S.** (2011, July 10-12). The Role of Structure and Agency in Management Control Change of a Family Firm: A Greek Case Study. Presented at Critical Perspectives on Accounting Conference, Florida, USA.

**Aziz, O., & Chatha, K.A.** (2011). National Institute for Biotechnology and Genetic Engineering (NIBGE): Genetically Modified Spider-Cotton. LUMS Case Research Centre.

**Azmat, S., & Azad, S.** (2011). Efficiency, Cointegration and Contagion in Equity Markets: Evidence from China, Japan and South Korea. In *Financial Contagion: The Viral Threat to the Wealth of Nations*, edited by R. W. Kolb, John Wiley & Sons.

**Azmat, S., Skully, M., & Brown, K.** (2012, September 29). Determinants of Islamic Bond Ratings. *Journal of Economic Behavior and Organization Conference*, Aston Business School, Birmingham, UK.

**Azmat, S., Skully, M., & Brown, K.** (2012, September 29). Credit Risk in IJV Bonds. *Journal of Economic Behavior and Organization Conference*, Aston Business School, Birmingham, UK.

## Faculty Publications

**Boukenooghe, D., Raja, U., & Butt, A.N.** (2012). Combined Effects of Positive and Negative Affectivity and Job Satisfaction and Turnover Intentions. *Journal of Psychology: Interdisciplinary and Applied*.

**Butt, A. N.** (2011). Managerial Values in the Greater Middle East: Similarities and Differences Across Seven Countries. *International Business Review*.

**Butt, A. N.** (2011). Progressive Education Network (PEN): Choosing the Ideal Social Entrepreneurship Model. LUMS Case Research Centre. LUMS Case No. 05-743-2011-1.

**Butt, A. N., Khurshid, A., Siddiqui, A. N., & Alvi, S. A.** (2012). The Engro Zarkhez Challenge 2011. Lahore University of Management Sciences Case No. (LUMS) 05-745-2012-1. TN No: 05-745-2012-3TN, CRC.

**Butt, A. N., Ralston, D.A., & Egri, C.P. et al.** A Twenty-First Century Assessment of Values Across the Global Workforce. *Journal of Business Ethics*, 104(1), 2011:1-31.

**Butt, A.N., Khurshid, A., & Alvi, S.** (2013, January 18-19). Beacon House School System (BSS) Restructuring. AJMC Conference, LUMS, Lahore, Pakistan.

**Butt, A.N., Khurshid, A., & Siddiqui, M.A.** (2012). The Engro Zarkhez Challenge 2011. *Asian Journal of Management Cases (AJMC)*, Vol 9(1).

**Butt, A.N., Khurshid, A., & Siddiqui, M.A.** (2012). The Engro Zarkhez Challenge 2011. LUMS CRC No. 05-745-2012-1. LUMS Case Research Centre.

**Butt, M.** (2012). FlavorAdd: A Behind the Counter Mystery. LUMS CRC No. 04-2362-2012-1.

**Butt, M.** (2012). Sources of Secondary Data of Education and Healthcare Indicators in Pakistan. LUMS CRC No. 16-288-2012-2.

**Butt, U.L., & Chatha, K.A.** (2011). Champion's League and Beyond: Forward Sports, NPD and Footballs. LUMS Case Research Center.

**Chatha, K.A., & Butt, I.** (2011). Methodological Developments in Manufacturing Strategy: A Content Analysis. *Administrative Sciences Association of Canada*, Montreal, Canada.

**Choudhry M.T, Marelli, E., & Signorelli, M.** (2012). Youth Unemployment and Impact of Financial Crises. *International Journal of Manpower*, Vol 33, 1:76-93.

**Choudhry, M.T, Marelli, E., & Signorelli, M.** (2012). Financial Crises and Female Labor Force Participation. *The European Journal of Development Review*, Vol 24, 413-433.

**Dekker, R., Pince, C., Zuidwijk, R., & Jalil, M. N.** (2011). On the Use of Installed Base Information for Spare Parts Logistics: A Review of Ideas and Industry Practice. *International Journal of Production Economics*.

**Fayyaz, A.** (2011, June 16-18). Collective Success or Collective Failure? The Sialkot Football Manufacturing Industry's Response to International Labor Standards Pressures in the Early 21st Century. Paper presented at 56th ICSB World Conference, Stockholm, Sweden.

**Fayyaz, A., & Mian, S.** (2011, June 16-18). Factors Influencing the Development of SME Clusters: Evidence from Pakistan. Paper presented at 56th ICSB World Conference, Stockholm, Sweden.

**Ghani, W., Haroon, O., & Ashraf, J.** (2011). Business Groups' Financial Performance: Evidence from Pakistan. *Global Journal of Business Research*, 5(2).

**Hassan, S.Z. & Shakeel, K.** (2011). US Denim – The Dyeing Capacity Enhancement Dilemma (A&B). LUMS Case Research Centre, LUMS Case No. 18-435-2011-1.

**Hassan, S.Z.** (2011). Pakistan: Facing the Challenges of Science and Technology Driven Entrepreneurial Takeoff. *Science and Technology Based Regional Entrepreneurship: Global Experience in Policy and Programme Development*. pp. 416-442. S. Mian (Ed.), Edward Elgar, MA.

**Hassan, S.Z.** (2011). Preparing for a Global Future – Some Insights from Pakistan. *The Globalization : Future of Research*, London.

**Hassan, S.Z.** (2011, July). Building a Global IT Company in a Developing Country through Innovation: Case of Netsol from Pakistan. *Proceeding of 20th World Business Congress*, Poznan, Poland.

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# Mushtaq Ahmed Gurmani

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- Rais, R.B.** (2011, March 27). Bhagsar: A Village on the Indus-community, identity and Power. 6th LUMS Social Sciences Conference, Lahore.
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- Siddique, O.,** (2012, December 14-16). Approaches to Legal and Judicial Reform in Pakistan: Post-Colonial Inertia and the Paucity of Imagination in Times of Turmoil and Change. Third Law and Social Sciences Research Network (LASSNet) conference held at the University of Peradeniya, Kandy, Sri Lanka.
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- Siddique, O.,** (2012, May 6). Judicial Activism: The New Frontiers in Pakistan. Centre for the Study of Developing Societies (CSDS), Delhi, India.
- Siddique, O.,** (2012, November 24-25). The Other Pakistan: Special Laws, Diminished Citizenship and the Gathering Storm. CPG Third Annual International Conference titled 'Constitutional Jurisprudence – Function, Impact and Challenges, Bangkok, Thailand.
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- Varley, E.** (2011, March 26). Governance Gaps and Preventable Harms: The 2010 Flood's Impacts for Maternal Health Outcomes. Department of Humanities and Social Sciences annual conference, Lahore University of Management Sciences, Lahore, Pakistan.
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- Waseem, M.** (2011). Independence of Ombudsmen. Asian Development Bank, Strengthening the Ombudsman Institution in Asia: Im-



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## Syed Babar Ali School of Science and Engineering



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Ahmad, A., Noor, H. and Khan, N.A. (2011, November 6-9) A Novel Video Coding Scheme for Lossy Networks with Scalable Bit-stream. Visual Communications and Image Processing VCIP, Tainan, Taiwan.

Ahmad, D., Nicola, M. W., Campbell S. A., & Skinner F. (2012). Network Bursting Using Experimentally Constrained Single Compartment CA3 Hippocampal Neuron Models with Adaptation. *J Computational Neuroscience*, Vol. 33, pp. 21–40.

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Ali, M., Mushtaq, S. & Arshad, N. (2012, March). Priority-Based Automated Testing of Web Application: Proceedings of the First Taiba University Conference on Computing and Information Technology. Medina, Saudi Arabia.

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Asim, T., Ahmad, R. & Ansari, M.S. (2012, July 9-11). Preparation and Characterization of Nano-nickel Graphite and Evaluation of its Catalytic Properties by Immobilization of Cadmium, Copper and Zinc. Symposium on Hydrogen and Fuel Cells, Department of Chemistry, Quaid-i-Azam University, Islamabad.

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- Athar, S., Siddiqi, M. A., & Masud, S. (2012, March). Teaching and Research in FPGA-based Digital Signal Processing using Xilinx System Generator: Proceedings of 2012 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 2765-2768; 25-30. Kyoto, Japan.
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- Awan, M.S.K, & Awais, M.M. (2011). Predicting Weather Events Using Fuzzy Rule Based System. *Applied Soft Computing*. Vol. 11(1), pp. 56-63.
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- Badar, N., Vaidya, J., Atluri, V., & Shafiq, B. (2012, October 3-4). Risk based Access Control using Classification: Proceedings of the 5th Symposium on Configuration Analytics and Automation (SafeConfig), Baltimore, MD, USA.
- Baig, M., Awais, M. M. (2012, November 12-15). Global Reweighting and Weight Vector Based Strategy for Multiclass Boosting. 19th International Conference on Neural Information Processing (ICoNIP), Doha, Qatar.
- Basit, H. A., Ali, U., Haque, S. & Jarzabek, S. (2012, September 23-30). Things Structural Clones Tell that Simple Clones Don't. Presented at the 28th IEEE International Conference on Software Maintenance (ICSM) Riva del Garda, Trento, Italy.
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- Bhatti, F.M. (2012, June). Effective Use of Sage-Math In Visualization of Linear Algebra. Paper presented at the 12th International Congress of Mathematics Education, (ICME) COEX, Seoul, Republic of Korea. pp. 7072-7079
- Bhatti, F.M. (2012, September). Spectral Properties of He Matrix of Inner Dual Graph of Honeycomb Lattice. Paper presented at ICTP-IPM Workshop and Conference on Graph Theory and Combinatorics, ICTP. Italy.
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Hassan, N. U. & Assaad, M. (2012). Downlink Beamforming and Resource Allocation in Multi-Cell MISO-OFDMA Systems. Paper was presented at the Transactions on Emerging Telecommunications Technologies.

Hassan, N. U., & Assaad, M. (2012, August). Resource Optimization to achieve Hard Delay Constraints in OFDMA Systems. Paper presented at IEEE ICC.

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- Mithani, A. (2012, May 7-11). A Stochastic Model For The Evolution Of Metabolic Network Using Neighbor Dependence. *Workshop on Algebraic Methods in Systems and Evolutionary Biology*, Mathematical Bioscience Institute, Ohio State University, USA.
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