Office of Sponsored Programmes and Research (OSPR)

The Office of Sponsored Programmes and Research (OSPR) was established on August 16, 2010 and has the responsibility to manage all sponsored research related activities of academic and research units and act as a bridge between LUMS faculty and national/international donors/sponsors. This includes, but is not limited to externally funded research projects; unrestricted grants; travel grants; sponsored conferences/workshops/seminars; consulting services; memorandum of understanding (MoU), Non-disclosure Agreements (NDA); and contracts/agreements related to externally funded projects. The OSPR was officially approved as the Office of Research, Innovation and Commercialization (ORIC) by the HEC on December 28, 2011.

OSPR has set up a support mechanism to provide help in filing copyright and patent applications, setting up its Technology Transfer Wing (TTW) so that formal support mechanisms are established to provide legal, administrative and financial support required in the patent and commercialization process to LUMS faculty in order to ensure that their focus remains on the research and innovation aspect, leaving the legal and administrative hurdles for the TTW team.
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Message from the Vice Chancellor

This report presents the significant research achievements of the faculty at LUMS, in terms of external & internal grants won, research work carried out, scholarly papers published, and provision of consultancy services.

The LUMS vision of becoming an “internationally acclaimed research university that serves society through excellence in education and research” underpins the work of students and faculty actively engaged in research to push the boundaries of knowledge and make new discoveries that continue to provide us new insights and understandings of various disciplines.

Research carried out by faculty members at LUMS is both fundamental and applied in nature, with the innovative works having significant commercialization prospects as well as creation of intellectual property that has substantial value in the market place. The entire focus of research work carried out at LUMS is on quality. The faculty aim to collaborate with top institutions and publish in the best journals. It is no wonder then that undergraduate projects are being written up for publication such as “Nature Scientific Reports” as a consequence of which, these students are obtaining fully funded offers for PhD study at many of the premier institutions of the world. LUMS standing in research today is a recognition of the effort over multiple decades put in by the distinguished faculty of LUMS who have always achieved excellence and national and international leadership through groundbreaking research.

It is heartening to see the diversification of research areas at LUMS and growth of research work in management and business studies, economics, humanities and social sciences and law, in additional to the excellent work being carried out in the science and engineering fields. The establishment of different interdisciplinary research centers at LUMS also bodes well for the future. With continued investment in research, LUMS aims to become a regional academic leader in the near future.

Prof. Dr. S. Sohail H. Naqvi
Vice Chancellor
Message from the Director

I am extremely delighted to present to you the LUMS Research Portfolio 2014-2016, a compilation of the funded research endeavours of the faculty at Lahore University of Management Sciences (LUMS) in the past 2 years. With more than 30 years of academic excellence, LUMS has earned a reputation of being an outstanding academic institution, by imparting knowledge to its students to excel in their chosen fields and engage in various research-related activities.

Being dedicated to strengthening its reputation as a centre of excellence, LUMS strives to make research a fundamental part of the university’s culture, encouraging faculty and students to reach out and make ground-breaking discoveries in the areas of social sciences, humanities, law, business, natural sciences, technology and engineering and to undertake entrepreneurial ventures to apply the knowledge gained for the betterment of the society and the overall development of Pakistan. The research activities of the faculty have opened many doors for them, giving them the opportunity to present and publish their works nationally as well as internationally while simultaneously allowing the university to establish strong ties with several national and international donor agencies and industries.

Since January 2014 till June 2016, research accomplishments of the faculty have won 186 external grants of PKR 719,203,015. Apart from that, one hundred and twenty three (123) faculty members have won 294 research projects worth PKR 189,125,748 from the LUMS internal funding. The objective of presenting this report is to highlight the pioneering accomplishments and innovative achievements of the LUMS faculty that have made LUMS a regional centre of excellence today, evident from its international rankings, and also to provide an opportunity to further develop research collaboration activities for LUMS.

Looking forward to your feedback.

Dr. Shafay Shamail
Director
Office of Sponsored Programmes and Research (OSPR)
LUMS is one of the nation’s top research universities, not only generating important new knowledge in the fields of medicine, technology, business, science, and beyond, but applying this knowledge to improve the lives of individuals and communities at home and around the world. As a result of constant focus on research support, around 36.2% increase has been observed in the faculty research proposals seeking funding during the last three (3) fiscal years (2013-2014 to 2015-2016). The proposals that were approved during the current year also experienced a 31.6% rise.

At LUMS, the biggest challenges of the day are being addressed to create a better world. The range of research activities at LUMS is broad and profound. The graph below is a reflection of the increase in the total unique publications authored by LUMS Faculty in last three (3) calendar years (2013 to 2015). The research publications saw a growth of 40.8%, demonstrating a healthy trend which is a reflection of extensive research endeavours by LUMS faculty over the years.
Sponsors:
1) Adam Smith International (ASI)
2) Aga Khan Cultural Service - Pakistan (AKCS-P)
3) American University
4) Assessment and Strengthening Program (ASP)
5) Association of Management Development Institution in South Asia (AMDISA)
6) Barclays Bank, Karachi
7) British Council
8) Campaign for Quality Education
9) Center for Economic Policy Research
10) Center for Economic Research in Pakistan (CERP)
11) Cleaner Production Institute (CPI)
12) Coca Cola Beverages Pakistan Ltd. (CCBPL)
13) Comstech-Twas
14) Department for International Development (DFID)
15) Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
16) Disney Research, Pittsburg
17) Economic and Social Research Council (ESRC)
18) Erasmus Mundus
19) German Pakistani Research Cooperation Programme (DAAD)
20) Ghulam Ishaq Khan Institute of Engineering Sciences and Technology (GIKI)
21) Global Development Network (GDN)
22) Global Development Services International (GDSI)
23) Google Asia Pacific Pte. Ltd.
24) Habib University
25) Health and Nutrition Innovation Fund (HANIF)
26) Higher Education Commission (HEC)
27) HomeNet
28) HTSPE International Programme Management
29) IGI Insurance Limited
30) Indian Council for Research on International Economic Relations (ICRIER)
31) Indus Motor Company (IMC)
32) Institute of Development and Economic Alternatives (IDEAS)
33) Institute of Space Technology (IST)
34) International Food Policy Research Institute (IFPRI)
35) International Growth Centre (IGC)
36) International Water Management Institute (IWMI)
37) Japan International Cooperation Agency (JICA)
38) K Legal Solicitors
39) Kalam Research and Media
40) Lahore Electric Supply Company (LESCO)
41) London School of Economics and Political Science (LSE)
42) London School of Economics and Political Sciences (LSE)
43) LUMS Faculty Initiative Fund (FIF)
44) McGill University
45) MicroTech Industries (Private) Ltd.
46) Microtech Industries Pvt. Ltd
47) National Engineering Services Pakistan (NESPAK)
48) National ICT R&D Fund
49) National University of Sciences and Technology (NUST)
50) Nestle
51) Nusrat Jahan College, Rabwah
52) Open Society Institute (OSI)
53) Oxfam International, Pakistan
54) Packages Limited
55) Pakistan Centre for Philanthropy (PCP)
56) Pakistan Institute of Corporate Governance (PICC)
57) Pakistan Microfinance Network (PMN)
58) Pakistan Strategy Support Program (PSSP)
59) PakShine
60) Preston University
61) Punjab Skills Development Fund (PSDF)
62) Qadri Group
63) Re-engineering With Research (RWR) Private Ltd
64) RS Corporate Advisory (Pvt.) Ltd
65) Society for Advancement of Higher Education (SAHE)
66) SONY
67) South Asia Center for Policy Studies (SACEPS)
68) South Asia Network of Economic Research Institutes (SANEI)
69) State Bank of Pakistan (SBP)
70) Techlogix
71) Tetra Pak
72) The Global Fund to End Slavery
73) UET, Peshawar
74) U.S. Agency for International Development (USAID)
75) U.S. Agency for International Development (USAID) Ambassador’s Fund Program
76) UN Women
77) United Nations International Children’s Emergency Fund (UNICEF)
78) United Nations University (UNU)
79) United States Institute of Peace (USIP)
80) University of California, San Diego
81) University of Queensland, Australian Centre for International Agricultural Research (ACIAR)
82) World Bank
83) World Wide Fund (WWF)
84) Zameen Media (Pvt) Ltd.
85) Zarai Taraqiati Bank Limited (ZTBL)

Categories:
1. Agriculture
2. Behavioural Studies
3. Business & Innovation
4. Computer Vision
5. Development Management
6. Economic Development
7. Education
8. Energy
9. Environment
10. GIS
11. Health
12. Law & Policy
13. Operations Management
14. Political Science
15. Robotics
16. Natural Sciences
17. Technology
18. Telecommunications
19. Trade
20. Water
21. History & Art
About LUMS

The Lahore University of Management Sciences was granted University Charter in 1985 and is a leading academic institution with a history of excellence and achievements and a vision of carrying out quality research work and to train its students to excel in their personal and professional lives.

The university initially started off with one school and successfully expanded to four schools: Suleman Dawood School of Business (SDSB), Syed Babar Ali School of Science and Engineering (SBASSE), Mushtaq Ahmad Gurmani School of Humanities & Social Sciences (MGSHSS) and Shaikh Ahmad Hassan School of Law (SAHSOL).

LUMS offers 15 programmes at the undergraduate level, 9 programmes at graduate levels and 7 PhD programmes. It has always endeavoured to provide first-class education to students while encouraging research and intellectual growth concurrently. As a result, it has played a key role in setting high standards of academic excellence and producing high calibre professionals.
Schools at LUMS
Suleman Dawood School of Business (SDSB)

Established in 1986, the Suleman Dawood School of Business (SDSB) was the first of the schools at Lahore University of Management Sciences. Its unique pedagogies, such as the case method of teaching and the meticulous personal and professional development of students prepare them to become successful entrepreneurs and global leaders. With more than 2,000 graduates now, SDSB is currently ranked as one the leading business schools in the region and is recognised for its excellent teaching methods and research-oriented environment.

SDSB offers various programmes at the undergraduate and graduate levels, with BSc (Honours) in Accounting & Finance and Management Science as part of the undergraduate courses as well as MBA Programme, Executive MBA Programme and PhD Management Programme.

Research at SDSB

The school is involved in several research areas related to management. Following research centres are a part of SDSB:

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. It has a collection of over 450 Pakistan specific cases/industry notes drawn from real life issues in organisations experienced first-hand by the faculty as the result of their research or consultation activities. The CRC disseminates the offers the contextually and academically rich teaching material to business schools and the corporate sector worldwide. Scholarly output of LUMS faculty through its international case research journal "Asian Journal of Management Cases" and also offers the contextually and academically rich teaching material to business schools and the corporate sector worldwide.

Social Enterprise Development Centre (SEDC)
The Social Enterprise Development Centre (SEDC) serves as a scholarship-based research centre working towards the capacity building of the social sector 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. To date, SEDC has published more than 170 case studies and notes written by the LUMS faculty for the social sector and has published 6 casebooks.

Strategic Sectors Research Centre (SSRC)
The Strategic Sectors Research Centre (SSRC) is a new initiative in institutionalising research and knowledge generation at SDSB. It focuses on 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).

Rausing Executive Development Centre (REDC)
The Rausing Executive Development Centre (REDC) imparts executive education with the excellence and rigor that is directed at making every executive's experience a valuable one. It is modelled on the structure of some of the leading executive education centres from around the globe. It offers over 70 programmes every year inclusive of open enrolment and customised programmes backed by in-depth research and a solid grasp on the needs of the modern businesses.
Mushtaq Ahmad Gurmani School of Humanities & Social Sciences (MGSHSS)

The Mushtaq Ahmad Gurmani School of Humanities & Social Sciences (MGSHSS) (formerly School of Arts and Sciences) is the largest school at LUMS with a maximum share of the student body. It has made a great contribution towards the country’s repertoire of superior multidisciplinary education in humanities, social sciences and liberal arts.

Exposure to studies at the MGSHSS has led many students to develop a deep interest in the social sciences and several have opted to pursue their PhDs in liberal arts. Some graduates have gone on to serve as faculty members at LUMS and other credible universities in different parts of the world after completing their doctoral degrees.

At present, the school offers several undergraduate programmes such as BSc Economics, BSc (Honours) Economics & Politics, BSc (Honours) Political Science, BSc (Honours) Anthropology & Sociology, BA (Honours) English and BA (Honours) History. The school also offers a competitive MS programme in Economics. The curriculum has been carefully designed and developed over the years by the faculty at LUMS, in conjunction with feedback from distinguished faculty from international universities.

Research at MGSHSS
Following are the research centres at MGSHSS:

Development Policy Research Centre (DPRC)
The Development Policy Research Centre (DPRC) at LUMS is structured around interdisciplinary research in areas including economics, econometrics, sociology, development studies, political science, anthropology, regionalism and globalisation, environmental and natural resources, culture, heritage, policy and democracy, as well as social movements and civil society. It provides a platform to channel expertise in these areas towards sustained, thematic research work and also contributes to evidence based policy making and public discussion.

Gurmani Centre for Languages and Literature (GCLL)
The Gurmani Centre for Languages and Literature (GCLL) at the Lahore University of Management Sciences was initiated by the Gurmani Foundation on Friday April 09, 2010, for the advancement of national and regional languages including Arabic, Persian, Urdu and several other languages. The Centre is part of the Department of Humanities & Social Sciences (HSS) and promotes languages and their literature through teaching, research/publication and its outreach programme.
Syed Babar Ali School of Science and Engineering (SBASSE)

The Syed Babar Ali School of Science and Engineering (SBASSE) is known for its world-class science and engineering students, faculty and high quality and industrially relevant research. Established in 2008, SBASSE is the first private research school for science and engineering in Pakistan.

SBASSE offers a four-year undergraduate programme of Bachelor of Science (BS) degree in Biology, Chemistry, Computer Science, Electrical Engineering, Mathematics and Physics. In addition, it offers MS programmes in Computer Science and Electrical Engineering. The school also offers PhD programmes in Biology, Chemistry, Computer Science, Electrical Engineering, Mathematics and Physics.

Research at SBASSE
In the “no boundaries spirit” of the school, the faculty at the SBASSEs involved in multidisciplinary research, working on various interfaces between biology, chemistry, physics, mathematics and engineering.

Centre for Water Informatics & Technology (WIT)
The Centre for Water Informatics & Technology (WIT) was established at the Lahore University of Management Sciences (LUMS) in October 2015. WIT aims to serve as a hub with a disciplinary focus on hydro-informatics and systems analysis but touching multidisciplinary research themes in water by engaging faculty and students from all departments of SBASSE; and by forging collaborations among the different schools within LUMS to provide the much needed, interdisciplinary perspective to water issues, under the guidance of a world-class advisory group.

Centre for High Performance Computing (CHPC)
The Centre for High Performance Computing (CHPC) provides scientific computing facilities for the LUMS research community. The goals of the centre are to engender and facilitate science and engineering research efforts; assist researchers with specialised computational needs and provide research and development exposure to our students.

Centre for Advanced Studies in Mathematics (CASM)
The Centre for Advanced Studies in Mathematics (CASM) runs workshops/conference and seminars on selected topics in Mathematics with applications every year. It also attracts research scholars from Overseas and Pakistan to interact with faculty.

Technology for People Initiative (TPI)
Technology for People Initiative (TPI) is an applied research centre at LUMS. It is focused on designing innovative, low-cost, practical technology solutions for problems in the public sector. Formally founded in April 2012 and housed in the SBASSE at LUMS, TPI brings together a host of talent in inter-disciplinary faculty, fellows and students to work on practical problems having widespread impact.

The school has a number of research clusters, groups and labs in the following areas:
Shaikh Ahmad Hassan School of Law (SAHSOL)

LUMS has launched an independent School of Law, the Shaikh Ahmad Hassan School of Law (SAHSOL), as its fourth School, and a stand-alone building for the School has been established.

The SAHSOL has grown out of the Department of Law & Policy, which had been functioning since 2004, offering a 5-year joint B.A.-LL.B. undergraduate programme, which is accredited by the Pakistan Bar Council. This unique five-year programme provides rigorous interdisciplinary exposure to Law and its related disciplines. The first two pre-LL.B. years lay down foundation principles in social sciences. Students undergo extensive academic training in core and specialised subjects in Law over the next three years. Other advanced degrees will be offered as the SAHSOL evolves further.

The school plays a productive and significant role in catalysing reform in the legal system, in promoting both corporate and social responsibility strengthening the legal profession and judicial institutions for the promotion of justice and the rule of law.

The housing of such a law and policy programme at LUMS is a vital step towards the creation of a centre of excellence where academics working in the increasingly inter-related areas of economics, finance, politics and law can collectively take on the challenges being posed by the transformation of the Pakistani economic and legal system.

Research at SAHSOL

Continuous and on-going research is a fundamental value and corner stone of the Law and Policy Programme initiative as apart from other impacts, such research directly translates into better teaching. Law is a dynamic subject with very frequent changes of text, approach and issues. The introduction of the research dimension is, therefore, a vital contribution by the Law and Policy Programme to the broader society.
Institutional Bodies

Office of Sponsored Programmes and Research (OSPR)
The Office of Sponsored Programmes and Research (OSPR) focuses on sponsored research and programmes. It is responsible for managing all sponsored research related activities of academic and research units and act as a bridge between LUMS faculty and national/international donors. This includes, but is not limited to, externally funded research proposals; unrestricted grants; travel grants; sponsored conferences / workshops / seminars; consulting assignments; chair funds; instructional and service activities; contracts; agreements and arrangements related to sponsored and externally funded activities. Moreover, the OSPR also manages internal grants, which are provided by LUMS including Faculty Initiative Fund (FIF), Faculty Travel Grant (FTG) and Start-up Grants. The OSPR has set up a support mechanism to provide help in filing copyright and patent applications through its Technology Transfer Wing (TTW) so that formal support mechanisms are established to provide legal, administrative and financial support required in the patent and commercialization process to LUMS faculty in order to ensure that their focus remains on the research and innovation aspect, leaving the legal and administrative hurdles for the TTW team.

Institutional Review Board (IRB)
Institutional Review Board (IRB) is responsible for overseeing all projects that involve the use of human and animal subjects. All issues related to the bio-safety are also under the review of the IRB. More information can be viewed on the following link:

University Research Council (URC)
The University Research Council (URC) is a standing committee of the University Faculty Council (FC) that promotes and advocates research environment in LUMS. It is involved in developing policies and acting as an advisory group to the Vice Chancellor and Deans in matters related to research.

URC Charter
The purpose of the Research Council is to identify and recommend those baseline policies that will be applicable to research endeavours of the faculty. Specifically it will be addressing the following:

1. To advocate for and to promote research culture at LUMS.
2. To develop standardised policies and guidelines to promote quality research.
3. To serve as an advisory group to the Vice Chancellor and other members of the administration including Deans.
4. To act as a University Standing Committee in reviewing and recommending new research policies and changes in existing ones.
5. To prepare a brief, written report on the year’s activities of the Council at the end of each academic year and to submit copies of the reports to the Vice Chancellor of the University and to the Faculty Council.

Terms of Reference for the Operations of the Research Council
The following are the Terms of Reference for URC:

- Members are decided by the University Faculty Council (FC) in consultation with the convener.
- Faculty is asked for choice of membership and based on the faculty's feedback, the convener selects members and sends recommendation to the Vice Chancellor for final nomination.
- Vice Chancellor finalises the membership of URC based on recommendations of the URC convener.
- Membership for URC is divided in the following manner:
  - 5 Members from SBASSE (including one from Department of Biology)
  - 5 Members from SAHSOL (including one from Department of Law and Policy)
  - 3 Members from SDSB
- 50 percent of the URC members are rotated every year using the same formula.
- URC convener is elected through voting by members
- Convener is re-elected from the house after every 2 years.
- The quorum of URC Meetings consist of a minimum of 60 percent of the members.
- Decisions are based on consensus among all present members. If disagreement persists between members, the issue is moved to the next meeting for debate and efforts are then made to build consensus. Issues that remain unresolved are then decided upon by the Council through a resolution method.
- URC meets at least once a quarter every year and more meetings are scheduled when required.
Research Council Members List 2015-16
The following is the list of the Research Council members for 2015-16. These members were appointed on July 1, 2015 to June 30, 2016.

1. Dr. Abid Aman Burki (Department of Humanities & Social Sciences, MGSHSS) — Convener
2. Dr. Ali Usman Qasmi (Department of Humanities & Social Sciences, MGSHSS)
3. Dr. Atif Saeed Chaudry (Suleman Dawood School of Business, SDSB)
4. Dr. Ayaz Qureshi (Department of Humanities & Social Sciences, MGSHSS)
5. Dr. Syed Azer Reza (Department Of Electrical Engineering, SBASSE)
6. Dr. Choudhry Tanveer Shehzad (Suleman Dawood School of Business, SDSB)
7. Dr. Fahd Rehman (Suleman Dawood School of Business, SDSB)
8. Dr. Husnain Fateh Ahmed (Department of Humanities & Social Sciences, MGSHSS)
9. Dr. Irshad Hussain (Department of Chemistry, SBASSE)
10. Dr. Mian Muhammad Awais (Department Of Computer Science, SBASSE)
11. Dr. Mohammad Waseem (Department of Humanities & Social Sciences, MGSHSS)
12. Dr. Uzair Kayani (Department of Law and Policy, SAHSOL)
13. Dr. Shafay Shamail - Ex-Officio (Department Of Computer Science, SBASSE)- Director OSPR

Research Council Members List 2014-15
The following is the list of the URC members for 2014-15, who were appointed on July 1, 2014 till June 30, 2015:

1. Dr. Abid Aman Burki (Department of Economics, MGSHSS) — Convener
2. Dr. Abubakr Muhammad (Department of Electrical Engineering, SBASSE)
3. Dr. Hasan H. Karrar (Department of Humanities & Social Sciences, MGSHSS)
4. Dr. Irshad Hussain (Department of Chemistry, SBASSE)
5. Dr. Laila Bushra (Department of Humanities & Social Sciences, MGSHSS)
6. Dr. Misbah Tanveer Chaudhry (SDSB)
7. Dr. Syed Muhammad Hussain (Department of Economics, MGSHSS)
8. Dr. Syed Muhammad Azeem (Department of Law and Policy, SAHSOL)
9. Dr. Naveed Arshad (Department of Computer Science, SBASSE)
10. Dr. Muhammad Naiman Jalil (SDSB)
11. Dr. Shafay Shamail — Ex-Officio (Department Of Computer Science, SBASSE) — Director OSPR

More information can be viewed on the following link: http://lums.edu.pk/osp/page.php/research-council-osp
LUMS Funding Sources
LUMS provides extensive funding opportunities to pursue research at LUMS. These opportunities also help faculty members to prepare for and seek larger international grants.

Faculty Initiative Fund (FIF)
The LUMS Faculty Initiatives Fund (FIF) is an internal funding mechanism that awards competitive grants of between PKR 500,000 to Rs. 1,000,000 to the LUMS faculty. These grants are intended to help faculty members develop innovative projects and benefit from new research initiative opportunities in order to enhance the research endeavours of the university. All full-time and research faculty members at LUMS are eligible to apply for this grant. Proposals are submitted individually or by a group of faculty within or across schools to the Office of Sponsored Programmes and Research (OSPR).

Faculty Travel Grant (FTG)
Faculty Travel Grants (FTG) provided by LUMS assist in the research activities of the university’s full-time regular faculty at various stages of their academic careers. The purpose of FTG is to encourage research-related international travels and collaborations by full-time LUMS faculty. Full-time, regular faculty members applying for FTG have their applications reviewed for funding by the FTG review committee.

Start-up Grants
Start-up Grants are the first grants given to full-time regular faculty newly recruited on tenure track or as tenured faculty. These grants are awarded by the Deans of the respective schools. In case the School decides not to award start-up grants to new faculty at the beginning of their stay at the university, the school may institute any scheme for the promotion of research using these funds. Mechanism for award of the start-up grants in such a case may be documented and forwarded to the Vice Chancellor by the Dean.
National Funding Opportunities

Here are some funding opportunities available at National level:

Higher Education Commission (HEC)
The Higher Education Commission of Pakistan (HEC) is an autonomous and constitutionally established institution of primary funding, overseeing, regulating and accrediting the higher education efforts of Pakistan. HEC has, since its establishment, been responsible for formulating higher education policy and has adopted a proactive policy of encouraging the institutions to enhance the quality of education in Pakistan. Grants provided by HEC include National Research Programme for Universities, Travel Grant opportunities, Interim Placement of Fresh PhDs Programme (IPFP), Post Doctoral fellowship, Pakistan Program for Collaborative Research (PPCR), Thematic Research Grant programme as well as HEC Grant to Organise Seminar, Conference and Training Workshop.

National ICT R&D Fund
National ICT R&D Fund was created to assist the phenomenal growth that Pakistan’s telecom industry has seen in the recent years. It holds a vision to transform the country’s economy into a knowledge-based economy by increasing sustainable and effective ICT initiatives through synergic development of industrial and academic resources. Among its goals is the goal to cultivate industry-academia partnership by funding concrete development and research initiatives and to promote ICT related educational programmes and activities. The National ICT R&D Fund facilitates a large number of projects by providing funds for the successful execution of these projects.

Pakistan Science Foundation (PSF)
Pakistan Science Foundation (PSF) is a body which promotes and funds scientific and technological research as well as science popularisation in the country. With an objective of promoting scientific research and related activities, PSF provides funding in research areas including Agricultural Sciences, Biological Sciences, Bio-technology, Genetic Engineering, Chemical Science, Information Technology as well as Medical Sciences and Physics. Through the provision of grants to universities such as the Pakistan Science Foundation (PSF) Research Support Programme, PSF assists them in undertaking individual and group research activities.

Best IT Innovation Awards (BITA)
Best IT Innovation Awards (BITA) recognises and encourages creativity in the field of IT. It is a platform to identify individuals, organisations and companies whose innovations are valuable to build a knowledge-based economy. The key players of BITA encourage serendipity through the sharing ideas and by building relationships and connections. This platform also serves as a council to discuss the possible applications and likely implications of the latest technologies in the context of the Pakistan’s national needs. To assist high quality innovative ideas in the field of IT by Pakistan’s brightest mind, BITA provides competitive funding through call for proposals.

President’s Programme for Care of Highly Qualified Overseas Pakistanis (PPQP)
President’s Programme for Care of Highly Qualified Overseas Pakistanis (PPQP) is a programme which facilitates organisations/ institutions including production units to meet their deficient areas in various fields of specialisation. The purpose is to facilitate high level Pakistani professionals abroad for their placement in Pakistan through short to long term technical assistance to avail benefits of their expertise for specific inputs in their areas of specialisation, for public and private sector within the country. These areas include Engineering Medicine/surgery, Physical sciences, Energy, Nano-Technology, Bio-Science/ Biotechnology, Genetic Engineering, Environment, Agriculture as well as Economics.
Profile: Dr. Atif Saeed Chaudry is an Assistant Professor in the SDSB at LUMS where he teaches in the fields of Economics and Finance. Prior to joining LUMS in 2013, he completed his PhD in Economics from the University of Wisconsin-Madison under the supervision of Prof. Randall Wright. His research interests include Finance, Banking, Monetary Economics and Economic Growth. Currently, Dr. Atif is doing some research work on understanding differences between different modes of financing, bank stability and competition, banks and business cycles, the impact of access to finance to the poor (in initial stages), the impact of foreign aid on transport networks and understanding the microstructure and regulation of energy sector in Pakistan. Before starting his PhD, he completed his MBA from LUMS and worked in Investment Banks in Hong Kong and Karachi. He likes to spend his free time playing golf and racket sports.

Selected Publications:

Title: Bank Competition and Business Cycles
PI: Dr. Atif Saeed Chaudry
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2014
Duration: 12 Months
Category: Business & Innovation
Description: This project seeks to answer research questions about bank competition and the financial stability associated with bank competition. There are two opposing forces at play here. Bank competition favours the depositors and the entrepreneurs. However, too much bank competition may cause banks to indulge in excessive risk taking, resulting in financial stability issues. It seeks to quantify the Welfare associated with different levels of competition and suggest the optimal policy in this regard. Both the US banking environment and the Pakistani banking environment will be studied in this regard.
Profile: Dr. Choudhry Tanveer Shehzad holds a PhD from University of Groningen, the Netherlands and is a Certified Financial Risk Manager from GARP (USA). He specialises in the area of Banking and Finance. His current research topics include banking and financial crises, empirical analysis of corporate finance theories, market concentration and competition, supervision and regulation of banks, credit ratings and stock market perception of financial reform. He has published in reputed journals like Journal of Banking and Finance, Applied Economics and North American Journal of Economics and Finance and has presented his research in a number of international conferences in recent years. Additionally, he is a referee for international journals like Journal of Banking and Finance, Applied Economics and European Journal of Political Economy. Before joining LUMS, he was working at the Central Bank of Pakistan as Deputy Director.

Recent Publications:

Most Cited Publications:

Title: Foreign Speculation and Pakistan’s Equity Markets: Innocence at Large
Pt: Dr. Choudhry Tanveer Shehzad
Co-Pt: Prof. Dr. L.J.R. Scholtens, University of Groningen, Netherlands
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 930,000
Project Initiated in: 2014
Duration: 12 Months
Category: Economic Development
Description: The objective of this study is to gauge the effect of foreign individual and institutional inflows and outflows in Karachi Stock Exchange (KSE) on a daily basis. Another important element is to differentiate local and foreign portfolio investment (FPI) patterns. A simple advantage of this study is to find out how independent our stock market is from foreign speculation, a pre-condition for flourishing financial markets.
Profile: Dr. Farrah Arif is the Assistant Professor of Marketing in the Suleman Dawood School of Business at the Lahore University of Management Sciences. As a Commonwealth scholar, she obtained a PhD from the University of Cambridge Judge Business School. She is also a certified Associate Fellow of the Higher Education Academy (AFHEA), UK. Dr. Farrah has been teaching in business schools (Pakistan and abroad) since 1999. Currently, she teaches Consumer Behaviour and Marketing Research to MBA and Marketing Management, Business Strategy, and New Product Development to EMBA. She has also designed and delivered executive programmes for MNCs and local companies including Telenor Pakistan, Packages Limited, Bulleh Shah Packaging Limited and Coffey International Limited.

Recent Publications:

Most Cited Publications:

Title: Evaluating the PICG Brand Positioning and PICG Training and Education Programs - Consumer Insights Research Project
Pt: Dr. Farrah Arif
Sponsor: Pakistan Institute of Corporate Governance (PICG)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 2 Months
Category: Economic Development
Description: The Pakistan Institute of Corporate Governance (PICG) aims to bring about national economic and social transformations by improving the quality of corporate governance in Pakistan. With this vision, PICG started its services offering, membership, training programs and other related services. The research project headed by Dr. Farrah Arif will help PICG in developing and executing its three-year strategic plan, which focuses on increasing the number of members and effectiveness of its services to members and non-members.
Title: Understanding of Financial Inclusion through M-banking in Pakistan – A Perspective of Consumer Innovativeness
PI: Dr. Farrah Arif
Co-PI: Dr. Zartash Afzal Uzmi, Dr. Muhammad Adeel Zaffar
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 756,000
Project Initiated in: 2014
Duration: 12 Months
Category: Economic Development
Description: This research focuses on understanding of innovation diffusion amongst low-income group consumers in a context of m-banking. M-banking has been considered one of the catalysts for economic growth due to various reasons, including m-banking helps masses to come into the folds of financial inclusion; increases penetration of microfinance as it makes the process of microfinance easy for the borrowers; it helps the government in documenting the unbanked segment (low-income as well as medium income groups); it is a high-growth segment for cellular companies and banks. Currently, a few mobile phone companies and banks are operating their m-banking based services in Pakistan. However, the service did not pick up as anticipated. It is suspected that one of its major reasons is the failure of understanding of the target market (the unbanked segment, mainly the low-income segment.) The aim of the project is to understand the phenomenon so that the positive implications of m-banking could be utilized in Pakistan.
Profile: Dr Ferhana Ahmad is an Assistant Professor at SDSB at LUMS. She holds a PhD degree from University of Oxford in Mathematical and Computational Finance as well as an MSc (Mathematical and Computational Finance) from University of Oxford. Her research interests include Mathematical and Computational Finance, Credit Derivatives, Mortgage backed securities, Numerical simulations.

Recent Publication:

Most Cited Publications:
- A Stochastic Partial Differential Equation Model For The Pricing Of Mortgage-Backed Securities F Ahmad, Bm Hambly, S Ledge.(2016)

Title: Mortgage Backed Securities, Evaluation and Modelling
PI: Dr. Ferhana Ahmad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 800,000
Project Initiated in: 2014
Duration: 12 Months
Category: Business & Innovation
Description: The market for Mortgage Backed Securities (MBS) was active and fast growing from the issuance of the first MBS in 1981. This enabled financial firms to transform risky individual mortgages into liquid and tradable market instruments. The subprime mortgage crisis of 2007 shows the need for a better understanding and development of mathematical models for these securities. The aim of this research is to develop models for MBS that are flexible enough to capture both regular and subprime MBS.
Profile: Dr. Hassan Rauf Chaudhry is an academic, researcher and consultant, working in the areas of operations and supply chain management with the leading multinational and national organisations. He attended the National Textile University and Lahore University of Management Sciences (LUMS) in Pakistan. Starting from shop floor production, he gained progressive experience in product development and process improvement. Later, he worked for a leading business house selling fabrics to apparel manufacturers across continents, routing sales via US based brands and retailers. At LUMS, he is involved in research on the competitiveness of apparel industry in Pakistan and documenting of industry best practices. Dr. Hassan Rauf obtained his PhD from North Carolina State University, specialising in Supply Chain Management.

Selected Publications:

Title: Operationalisation of stylistic innovation process for short life cycle product
PI: Dr. Hassan Rauf Chaudhry
Co-PI: Dr. Muhammad Shakeel Sadiq Jajja
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 935,000
Project Initiated in: 2015
Category: Business & Innovation
Duration: 12 Months
Category: Operations Management
Description: This research project seeks to capture the branded retail evolution in Pakistani fashion retail market, develop a framework for operationalising the stylistic innovation process for short life cycle products, and compare/contrast the stylistic innovation process with that of the user centred innovation process whether for tech driven products or for hybrid products. Furthermore, it also seeks to identify whether different categories within the fashion segment require idiosyncratic approaches and ascertain the role of process, people and policies within the process of stylistic innovation.
Dr. Kamran Ali Chatha
SDSB
kamranali@lums.edu.pk
+924235608050

Profile: Dr. Kamran Ali Chatha has research interests in the areas of Manufacturing Strategy, and Technology & Innovation Management. He was involved in a multi-country study that aimed at developing an Atlas of Science and Technology based Innovations in the Muslim World sponsored by The Royal Society and Organisation of the Islamic Countries. He has continuing interests in developing techniques for planning, formulating, implementing and evaluating manufacturing strategy in SME sector. Dr. Kamran is the director of the Factory Management Program that aims to develop know-how of contemporary manufacturing management practices among industry executives.

Recent Publications:

Most Cited Publications:

Title: Internationalisation of Manufacturing: The State of Pakistani Firms
PI: Dr. Kamran Ali Chatha
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 300,000
Project Initiated in: 2013
Duration: 12 Months
Category: Business & Innovation
Description: Increased globalisation of manufacturing indicated by off shoring of manufacturing and innovation to ‘low cost’ countries has shown increased production activity in the developing countries. Accordingly, the manufacturing capabilities and innovation potential in developing countries has improved. The purpose of this project is to assess readiness of manufacturing firms in developing countries like Pakistan to internationalise their manufacturing and innovation capabilities and the strategies deployed for this purpose.

Title: Determinants of Internationalization Performance of SMEs: Institutional, Cultural, and Capability Factors
PI: Dr. Kamran Ali Chatha
Sponsor: LUMS Faculty Initiative Fund (FIF)
Co-PI: Dr. Muhammad Shakeel Sadiq Jajja
Funding Amount: PKR 880,000
Project Initiated in: 2015
Duration: 12 Months
Category: Business & Innovation
Description: In this research project, the aim is to understand whether there is a relationship between technology innovation capability and internationalization performance (e.g. export performance) of SMEs in Pakistan, and if not, what conditions would influence the existence of this relationship. Specifically to prove that organizational culture and institutional pressures (e.g. pressures from competitors, customers, and government) may influence this relationship.
**Profile:** Dr. Misbah Tanveer Chaudhry holds a PhD in Development Economics. Her research is focused on labour markets and unemployment issues, labour productivity and economic growth, demographic transition, impact of European economic crises on labour markets and gender disparity in labour markets. Her research has been published in high-quality journals like The European Journal of Development Review, International Journal of Manpower and Economic Systems. Before joining the SDSB at LUMS, she worked for State Bank of Pakistan as Deputy Director in Research Department focusing on social sector issues.

**Recent Publication:**

**Most Cited Publications:**

**Title:** Women’s Economic Empowerment through Entrepreneurship  
**PI:** Dr. Misbah Tanveer Chaudhry  
**Co-PI:** Prof. Marcello Signorelli, University in Perugia, Italy  
**Sponsor:** LUMS Faculty Initiative Fund (FIF)  
**Funding Amount:** PKR 890,000  
**Project Initiated in:** 2014  
**Duration:** 12 Months  
**Category:** Economic Development  
**Description:** This project fundamentally aims to streamline the on-going research on gender-based Labour Force Participation (LFP) across various international platforms by investigating an important component of global labour markets in the context of Pakistan: women entrepreneurship. It consolidates primary and secondary sources into measurable results, analysing those factors which theoretically and empirically affect women entrepreneurship and the impact of increasing women entrepreneurship on the overall economic development and social well-being of the country. This evidence on growth and labour markets is expected to help in advocating change in labour market policies for Pakistan. In addition, it is intended to provide valuable information to decision makers, researchers, planners and economists to deal with the issue of the dismal status of women entrepreneurship in the country.
Title: Women Entrepreneurship Program Phase 1  
PI: Dr. Misbah Tanveer Chaudhry  
Co-PI: Dr. Farrah Arif; Asad Alam; Dr. Muhammad Naiman Jalil; Dr. Choudhry Tanveer Shehzad  
Sponsor: American University  
Funding Amount: PKR 16,595,561  
Project Initiated in: 2015  
Duration: 18 Months  
Category: Economic Development  
Description: This project seeks to nurture, support and augment the capacity of women for pursuing entrepreneurial ventures in Pakistan. It is suitable for women who are either highly educated yet outside the labor pool OR currently operating a small business and have the potential to expand their business. As part of this project, LUMS faculty would conduct a Learning Need Analysis (focus groups, meetings, participation in relevant forums, screening interviews) to understand the development needs and challenges of women entrepreneurs and design an effective learning experience.

Title: Tracing Women in the Informal Sector of Pakistan-Labor Market Dynamics  
PI: Dr. Misbah Tanveer Chaudhry  
Co-PI: Dr. Enrico Marelli, Professor of Economic Policy, University of Brescia, Italy.  
Sponsor: LUMS Faculty Initiative Fund (FIF)  
Funding Amount: PKR 870,000  
Project Initiated in: 2015  
Duration: 12 Months  
Category: Economic Development  
Description: This project aims to streamline the ongoing research regarding the informal sector by determining the share and importance of women entrepreneurs in the informal economy. It will integrate primary and secondary sources into measurable results and analyze which factors theoretically and empirically affect women entrepreneurs in the informal economy. Moreover, it will identify the repercussions of augmenting women’s share in the informal economy on the overall economic development and social well-being of the country.
Profile: Dr. Mohsin Bashir is an Assistant Professor at the SDSB, LUMS. His areas of academic interest include Public Private Partnerships, Organisational Power and Politics, and Non-profit Leadership and Management. He holds a PhD in Public Administration and Policy from Arizona State University’s School of Public Affairs where he was a Fulbright Scholar. He also holds degrees in Business Administration (LUMS) and Computer Science (FAST). Among his recent publications was a chapter in the Taylor & Francis book “Public Administration in South Asia”. He has also published research articles on Public Administration, teaching cases on Non-profit Management and industry reports on Corporate Citizenship. His consulting assignments have been in the areas of Monitoring and Evaluation, Decentralisation/Devolution, Responsible Business Frameworks, Organisational Effectiveness and Information and Communication Technologies; for organisations such as Nike Inc., Engro Corp., Government of the Punjab, USAID, CIDA, GIZ, SDC, various RSPs and other for-profit and non-for-profit organisations.

Selected Publications:

Selected Projects:
1. **Title:** Monitoring and Evaluation framework for Punjab Vocational Training Council, Lahore  
   **PI:** Dr. Mohsin Bashir  
   **Sponsor:** Assessment and Strengthening Program (ASP)  
   **Funding Amount:** PKR 916,034  
   **Project Initiated in:** 2015  
   **Duration:** 4 Months  
   **Category:** Education  
   **Description:** This consultancy developed a comprehensive Monitoring, Evaluation and Reporting (MER) manual for the Punjab Vocational Training Council (PVTC) to design monitoring, evaluation and reporting systems for the organisation. The manual serves as a Performance Management Plan (PMP) as well as a complete guide to conduct M&E data collection, analysis, assessment and reporting. The organisation was also provided multiple instruments and data analysis databases as part of the MER manual.

2. **Title:** Public Service in Pakistan: A Post-Colonial Perspective  
   **PI:** Dr. Mohsin Bashir  
   **Sponsor:** LUMS Faculty Initiative Fund (FIF)  
   **Funding Amount:** PKR 413,000  
   **Project Initiated in:** 2014  
   **Duration:** 12 Months  
   **Category:** Development Management  
   **Description:** This project aims to understand the history of the civil service structure in Pakistan and analyse the various factors that currently make the civil service a deterrent in achieving democracy in the country. It also plans to study reforms made to the CSP and to suggest further reforms or actions that can help Pakistan progress in the modern world. This is intended to be carried out by examining the ICS in detail along with the civil service structures of India and Bangladesh to create a civil service framework that draws on both the positive and negative elements of these systems. Finally, using modern theory on the topic, a new kind of civil service structure is expected to be suggested that caters to the needs of Pakistan.
Profile: Muhammad Naiman Jalil received PhD in Management from Rotterdam School of Management, Erasmus University, and the Netherlands. His professional experiences and academic publications are in supply chain management and management science domains. Endorsing data driven decision making philosophy, he is interested in applying analytical modelling techniques to solve complex supply chain management issues. Such issues often have conflicting objectives of customer service and operational costs. He has also worked and published in environmentally conscious supply chain management and service parts supply chain management domains.

Recent Publications:

Most Cited Publications:

Title: Analysis of Real Estate Historical Demand and Price Data to Establish Price Prediction Model and Observe Historical Trends of Real Estate Market Prices
PI: Dr. Muhammad Naiman Jalil
Co-PI: Dr. Saad Azmat
Sponsor: Zameen Media (Pvt) Ltd.
Funding Amount: PKR 600,000
Project Initiated in: 2014
Duration: 1 Month
Category: Development Management
Description: The project involves analysis of real-estate historical demand and price data to establish price prediction model and observe historical trends of real estate market prices. In addition, ZAMEEN Media (Pvt) Limited approached LUMS to conduct a survey of target respondents at specified cities and locations, analyse results of the interviews using specific methods and software and to give results in shape of reports/presentations of the surveys.
Profile: Dr. Jajja did his PhD research in the area of supply chain and innovation management. He has presented several research papers at globally esteemed research platforms. During his PhD, he won the Best Student Paper Award at 43rd Annual Meeting of the Decision Sciences Institute (DSI) 2012 in San Francisco USA, Emerging Economy Doctoral Student Award at 23rd Annual Conference of Production and Operations Management Society (POMS) in 2012 in Chicago USA, and Best Graduate Student Paper Award at 40th Annual Meeting of Western Decision Sciences Institute in 2011 in Portland, USA. He received Doctoral Fellowship from Association of Management Development Institutions in South Asia (AMDISA). Dr. Jajja has taught graduate as well as under-graduate level courses in the area of operations management, supply chain management, problem solving and modelling, and quantitative research methods.

Selected Publications:
- Supply chain strategy and organisational performance: Role of core operational functions
- Chatha, K. A., & Jajja, M. S. S. Innovation capability and internationalisation performance of SMEs: The role of institutional pressures.

Title: Factors Affecting Adoption of Social and Environmental Compliance Practices in Suppliers of International Brands in the Developing Countries
PI: Dr. Muhammad Shakeel Sadiq Jajja
Co-PI: Dr. Kamran Ali Chatha
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 780,000
Project Initiated in: 2014
Duration: 12 Months
Category: Operations Management
Description: The purpose of this research is to identify factors (internal and external to a firm) and understand their impact on social and environmental compliance performance of the export firms in manufacturing sector of Pakistan. Review of relevant literature from the areas of organisation theory, buyer-supplier relationship and social and environmental compliance will lead to the development of a research framework and questionnaire. Research data is expected to be collected from exporting firms in the industrial sectors of textile, surgical and sports goods. Also, data is intended to be collected mainly from Pakistan but can be extended to other South Asian countries, contingent upon linkages identified in those countries. Analysis of data is expected to provide a basis to generate insights regarding factors affecting social and environmental compliance in Pakistan.

Title: Family Constitution of Qadri Group
PI: Dr. Muhammad Shakeel Sadiq Jajja
Sponsor: Qadri Group
Funding Amount: PKR 1000,000
Project Initiated in: 2015
Duration: 3 Months
Category: Development Management
Description: The aim of this consultancy is to provide consultancy in the development of the family constitution. In 2015, Qadri Group (QG), which started as a business concern of two brothers in 1896, is a more than hundred years old family business. QG family has expanded to a size of more than eighty family members owning eight companies dealing with foundry and steel products in the local and international markets. QG’s third generation male members who are currently leading the business want to develop a family constitution to manage QG’s family, business, and ownership matters. In this context QG has approached Dr. Shakeel Sadiq Jajja to constitute a family constitution.
Profile: Dr. Muhammad Shehryar Shahid is an Assistant Professor of Entrepreneurship at SDSB at LUMS and is also a leading member of the Entrepreneurship Working Group at the university. Dr. Shahid received his PhD from University of Sheffield in 2011, his MBA from Lahore University of Management Sciences in 2006, his bachelor’s degree from Ghulam Ishaq Khan Institute of Engineering and Technology in 2003, and his intermediate degree from Aitchison College in 1999. Prior to his appointment at LUMS, he served as the Head of Management and Organisation Division and the Director of Centre for Entrepreneurship and SMEs (CESME) at the University of Central Punjab from 2011 to 2013. He has taught courses like Entrepreneurship, Principles of Management, Business Model Development, Lean Launchpad and SME Management at both undergraduate and postgraduate level. He is also an Editorial Board Member of Journal of Small Business & Entrepreneurship (JSBE) and an Editorial Advisory Board Member of The Lahore Journal of Business (LJB). His research interests lie in the areas of informal entrepreneurship, small business growth and entrepreneurial intentions.

Selected Publications:
- Informal entrepreneurship and institutional theory: explaining the varying degrees of (in) formalization of entrepreneurs in Pakistan
  CC Williams, MS Shahid, Entrepreneurship & Regional Development 28 (1-2), 1-25 2016
- Determinants of the level of informality of informal micro-enterprises: some evidence from the city of Lahore, Pakistan
  CC Williams, MS Shahid, A Martinez, World Development 84, 312-325 2016

Title: Cognitive Determinants of Entrepreneurial Behaviour amongst Students
PI: Dr. Muhammad Shehryar Shahid
Co-PI: Dr. Muhammad Azam Roomi
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 483,000
Project Initiated in: 2014
Duration: 12 Months
Category: Behavioural Studies
Description: The goal of this study is to determine the personal and socio-cultural cognitive factors that have the largest impact on the entrepreneurial intentions of students in the three schools at LUMS. It also seeks to potentially maximise entrepreneurial behaviour amongst the students. Ultimately, besides academic publications, this study offers a very critical input towards designing and optimising the entrepreneurship education and training programmes at LUMS.

Title: Informal Sector Entrepreneurship: Evaluating the Degrees of (in) formalization of Entrepreneurs in the Automotive Sector of Pakistan
PI: Dr. Muhammad Shehryar Shahid
Co-PI: Prof. Colin Williams (University of Sheffield, UK)
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 500,000
Project Initiated in: 2015
Duration: 12 Months
Category: Behavioural Studies
Description: The aim of this project is to transcend the dualistic portrayal of entrepreneurs as either formal or informal and re-conceptualise entrepreneurs as existing on a continuum from wholly formal to wholly informal. Given that no known studies have evaluated the degree of formalization of entrepreneurs or the factors influencing their degree of (in)formalization, this project will begin to bridge that knowledge gap in an in-depth study of the automotive sector.
Profile: Dr. Saad Azmat did his BSc. (Hons) from the University of Hull on a full scholarship. From there, he went on to do MA (Economics) from University of British Columbia (Canada). Thereafter, he did a Ph.D in Accounting and Finance from Monash University (Australia). Dr. Azmat also works as an Assistant Professor at Lahore University of Management Sciences (LUMS) and has taught and trained at a number of institutions around the world as well. Dr Azmat is an active researcher and focuses primarily on fixed income securities, commercial banking, credit risk modeling, value investing and Islamic finance. He has a number of published research articles and conference papers to his credit. In 2011, he was invited as an Organisation of the Islamic Conference (OIC) research scholar to deliver Islamic finance seminars and workshops in Malaysia. In 2012, he was awarded a research grant by Institute of Chartered Accountants Australia (ICAA) for conducting Islamic finance research.

Recent Publications:

Most Cited Publications:

Title: Persuasion by Islamic Banks  
PI: Dr. Saad Azmat  
Sponsor: LUMS Faculty Initiative Fund (FIF)  
Funding Amount: PKR 480,000  
Project Initiated in: 2015  
Duration: 12 Months  
Category: Economic Development  
Description: The last decade has seen Islamic banks grow at an impressive rate of 15% per annum. At the same time, there are claims that Islamic banks essentially mimic conventional banking products. It is argued that Islamic banks are employing persuasion techniques, such as renaming interest as profit, to convince their customer about their Shariah compliance. This study focuses on the different persuasion and marketing strategies of Islamic banks to see how a financial product with conventional features is sold as an Islamic instrument. Following Mullainathan, Schwartzstein, and Shleifer (2008) we build a model of co-categorisation that explains the essence of persuasion in finance. Then we extend this model to Islamic banks to analyse what constitutes a persuasive message. Particularly, the use of Arabic language, sale like attributes, and fatwas by Shariah scholars will be analysed and their impact on the customer’s categorisation of banking products as Shariah compliant will be evaluated. Using regression analysis, the effectiveness of these persuasion strategies on the profitability of Islamic banks will be tested.
Title: Establishment of Centre for Islamic Finance - Financial Innovation Challenge Fund (FICF)

PI: Dr. Saad Azmat
Co-PI: Dr. Kamran Ali Chatha, Dr. Muhammad Junaid Ashraf, Dr. Ayesha Bhatti, Mr. Abdul Rauf
Sponsor: State Bank of Pakistan (SBP)
Funding Amount: PKR 52,647,000
Project Initiated in: 2015
Duration: 12 Months
Category: Economic Development

Description: State Bank of Pakistan is managing Financial Innovation Challenge Fund (FICF) under UK-aid funded Financial Inclusion Program (FIP). FICF has been designed to help the financial sector reach the financially excluded with use of innovations. The core objective of the Challenge Round 3 is to promote Islamic Finance to meet the unmet demand for Shariah compliant financial services in Pakistan. This round aims to establish Islamic finance education and research infrastructure in partnership with Lahore University of Management Sciences to serve the Islamic finance industry by meeting its growing human resource and knowledge requirements through quality and value added services and knowledge products.
Profile: Dr. Samina Quratulain is an Assistant Professor of Organisational Behaviour at LUMS. She received her PhD in 2010 from Aix-Marseille University France. Prior to her appointment at LUMS, she was on the business studies faculty of Lahore College Women University (2001-2005) and University of Central Punjab (2011-2012). Her research interests include social exchange theory, public service motivation, individual cultural orientations, organisational citizenship behaviours and career oriented self-efficacy. Her work has been published in various academic journals including Journal of Organisational Behaviour, Journal of Business and Psychology, Review of Public Personnel Administration and Public Personnel Management. Dr. Quratulain is actively involved in several professional organisations including the Academy of Management and American Society of Public Administration.

Recent Publications:

Most Cited Publications:

Title: Cultural Frames for Negotiation
PI: Dr. Samina Quratulain
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 520,000
Project Initiated in: 2013
Duration: 12 Months
Category: Behavioural Studies
Description: The research addresses cultural differences by exploring the role of relationship domains and negotiation frames of members of an individualist culture, Canada, and a collectivist culture, Pakistan, in determining negotiation behaviour, preference for outcomes and performance. Specifically, this research explores the question of whether and under what circumstances members of collectivist cultures negotiate more competitively, prefer to maximise their own gains and even minimise the gains of others and ultimately achieve lower joint gains as compared to the members of individualist cultures.
Profile: Dr. Ali’s research interests include corporate finance, privatisation policy and regulation of utilities. He was working as a Teaching Assistant and a researcher for the International Banking Centre in Manchester. Case studies developed by him have been used at LUMS, Judge Institute of Management, University of Cambridge, and the Manchester Business School. He has published in the Journal of Economics and Business (1993), Financial Director (1993), and Research Newsletter (1995) and has also presented a paper at the EDAMBA Conference at Luven, Belgium, 1994. As part of the LUMS-Essex research collaboration, Dr Ali has worked on financial sector and new financial instrument development in Pakistan. He is also the co-editor of Corporate Finance in Pakistan: Case Studies from an Emerging Market, published by OUP.

Selected Publications:
- Ali, S. M., Rehabilitation of Women Prisoners in Peshawar Central Jail. LUMS Case Research Centre.

Title: Learning Need Assessment of Punjab Skills Development Fund (PSDF)
PI: Dr. Syed Mubashir Ali
Co-PI: Dr. Zehra Waheed
Sponsor: Punjab Skills Development Fund (PSDF)
Funding Amount: PKR 468,000
Project Initiated in: 2014
Duration: 2 Months
Category: Development Management
Description: The purpose is to identify performance requirement, knowledge, skills and abilities needed by PSDF’s workforce, both in Bahawalpur and Lahore offices in order to achieve organisational goals. This includes development and administration of survey questionnaire for training needs assessment; conduct meetings; focus group discussions; interviews and assess gaps in capacity for PSDF employees.
Profile: Dr. Hassan has more than two decades of extensive experience in the higher education sector. At LUMS, he has served in many capacities besides teaching and research, including Associate Dean, Dean, Pro-Vice Chancellor and Vice chancellor (VC) (2002-8). During his six year tenure as VC, LUMS expanded in all dimensions (academic programmes, faculty, schools and infrastructure) and formulated its vision to become a broad-based research university. Launch of the National Outreach Programme (NOP), through which bright students from the under privileged sections of our society are groomed and developed to join LUMS on full financial support, is a key highlight of Dr Hassan’s term as VC. Now almost 20% of students at joining BSc at LUMS are from NOP. Dr. Hassan’s current research interests include management of technology, innovation and entrepreneurship in the global world. Besides consulting for many leading local companies and international organisations, like UNDP and World Bank, he has also served on the boards of organisations like PTCL and NTDC. He is also actively involved in helping a number of Pakistani and Indian educational institutions improve their systems and processes as a mentor and accreditation peer reviewer.

Recent Publication:

- Pakistan: Facing the challenge of science and technology driven entrepreneurial take-off

Title: Understanding Technology Based Innovation Ecosystem of Pakistan and Impact of Innovation on Performance of Pakistani Organizations
PI: Dr. Syed Zahoor Hassan
Co-PI: Dr. Kamran Ali Chatha
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 3,497,187
Project Initiated in: 2015
Duration: 24 months
Category: Business & Innovation
Description: The first phase of this proposed research will focus on developing case studies of innovative organisations within the five industrial sectors (Engineering, Agriculture, Textile, Chemicals & Pharma as well as IT and Telecom) without constricted by business areas. The second phase of the proposed research will investigate the role of innovations in supply chain management on organizational performance within five industrial sectors. The outcomes of the proposed research will act as a stepping stone to propose future research studies in order to better understand the role of innovation in various other business areas (such as product development and business development) on organizational performance.

Title: Facilitation of the Strategic Plan formulation process at IGI
PI: Dr. Syed Zahoor Hassan
Sponsor: IGI Insurance Limited
Funding Amount: PKR 1,029,569
Project Initiated in: 2015
Duration: 2 Months
Category: Development Management
Description: This consultancy assignment took place in the following stages: all the related documents and reported prepared by IGI was analysed to prepare for the strategic planning sessions and interactions were carried out with the related staff of IGI. Moreover, analysis was carried out to develop preliminary ideas about possible discussion points during the strategic plan formulation meetings. Lastly, detailed assessment for the strategic plan was prepared by top management of IGI.
Title: Post Session Review and Preparation of short report on new strategic thrust areas for Zarai Taraqiati Bank Limited (ZTBL)

PI: Dr. Syed Zahoor Hassan

Sponsor: Zarai Taraqiati Bank Limited (ZTBL)

Funding Amount: PKR 1,482,000

Project Initiated in: 2015

Category: Development Management

Description: This consultancy assignment took place in the following stages:

- Moderation of the discussions, articulation of the key discussion points, decisions and their implications on the strategic plan of ZTBL, analysis of the overall situation will be carried out to develop preliminary ideas about the possible discussion points during the strategy sessions and synthesis of the main ideas presented during the strategy sessions to identify revised or new strategic thrust areas and the related implementation implications. Consequently Review and comment on the plan formulated as a result of the strategic planning meetings and detailed analysis of the strategic plan and related implementation approach prepared by the top management of ZTBL in light of the ideas and decisions generated during the strategy sessions.
Profile: Dr. Zaghum Umar is currently working as an Assistant Professor (Finance) at SDSB, Lahore University of Management Sciences, Pakistan. In addition, he is on the panel of HEC approved PhD supervisors and associated with Network for studies on Pension, Ageing and Retirement (Netspar), The Netherlands, as a research fellow. He received a Phd from School of Management (SOM), University of Groningen, The Netherlands and M.Sc from University of Twente, The Netherlands, with specialization in “Financial Engineering and Management”. His broad research interests include Financial Modeling, Empirical analysis, Project Finance, Corporate Finance, Infrastructure Financing, Public Finance, Public Private Partnership, Risk Management, Emerging markets and Strategic Asset Allocation.

Selected Publications:

- “Are commodities a good hedge against inflation?” Journal of Investment Strategies. 3.2 – 2014 with Laura Spierdijk

Title: Real Asset and Real returns: The case of Islamic vs conventional equities
Pf: Dr. Zaghum Umar
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 580,000
Project Initiated in: 2015
Duration: 12 Months
Category: Description: The objective of this project is to extend the existing literature by analyzing the portfolio choice problem of an emerging market investor. In particular, the implication of return predictability on the long run and short run asset demand will be documented.
Profile: Dr. Zain ul Abdin Khawaja is an Assistant Professor at the SDSB at LUMS. He holds a PhD in Media and Communication Studies (2013) and an MA from the FSU School of Communication (2009), attaining Fulbright scholarships for both degrees. He also completed his MBA in Marketing from the Lahore School of Economics in 2007. Dr. Khawaja’s research interests include the effects of social media marketing in the development sector in Pakistan.

Selected Publications:

Title: Investigating the Effectiveness of Facebook as a Delivery Channel for Social Marketing Campaigns on Women’s Health in Pakistan
Pl: Dr. Zain ul Abdin Khawaja
Co-Pl: Dr. Mariliis Vahe, Florida State University, United States
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 958,360
Project Initiated in: 2014
Duration: 12 Months
Category: Telecommunications
Description: This project seeks to determine whether or not Facebook is an effective and persuasive channel for delivering social marketing campaigns on women’s health issues in Pakistan and also aims at investigating whether the social pressures that intervene the success of traditional mass media social marketing campaigns continue to do so in the online realm.
Profile: Dr. Zehra Waheed is the co-ordinator of the BSc Management Science Program at SDSB. Prior to SDSB, Zehra has worked at Heriot-Watt University in Scotland; in Corporate and Institutional Banking and Textile sector in Pakistan; and Retail Banking in the UK. Dr. Zehra’s teaching experience spans undergraduate and postgraduate teaching in the areas of Construction Project Management, Facilities and Asset Management, Value and Risk Management and Construction Financial Management at Heriot-Watt University, Scotland. She has taught executive, undergraduate and postgraduate students at SDSB. Her primary teaching areas at SDSB and the Raising Executive Development Centre (REDC) are Project Management and Public Procurement.

Recent Publications:
- Capture and Reuse of Project Knowledge in Construction Z Waheed - Facilities, 2016
- Understanding Project Management: Skills and Insights for Successful Project Delivery Z Waheed, Z Waheed - Facilities, 2016

Most-Cited Publications:
- Building Methodological Bridges Waheed, Z Facilities, Volume 31, Number 3/4
- Facilities Change Management Waheed, Z 2013, Facilities, Volume 31, Number 3/4
- How to Write a Historic Structure Report Waheed, Z 2013, Facilities, Volume 31, Number ½
- Managing Complex Projects, Waheed, Z 2012, Facilities, Volume 30, Number 13/14

Title: Building Inclusive and Sustainable Urban Waste Management Systems in Large Urban Centers of the Developing World: A Case of the City of Lahore
PI: Dr. Zehra Waheed
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 675,000
Project Initiated in: 2015
Category: Environment
Description: This study is intended to be an exploratory case study of the city’s waste landscape: a lens through which the evolution of desired systems, governance processes and organizational development (in this case, the Lahore Waste Management Company) will be viewed. It is also meant to be a vehicle of culturally interpreting the city’s need for waste, its historical handling of its excrement and the various narratives that define the city’s inhabitants’, including the industry’s, approach towards waste. Whilst the results will map current waste management practice in the city, the development of its infrastructure and identify future challenges of solid waste management in Lahore, they will also unveil the implications of current practice on the sustainable development of the second largest city of the country and the role that local industry can play in waste reduction and disposal.
DEPARTMENT OF ECONOMICS
Profile: Dr. Abid Aman Burki is a Professor of Economics at the Lahore University of Management Sciences (LUMS). He was also the Director of the Centre for Management and Economic Research of LUMS from 2003 to 2010. Dr. Burki received his PhD in Economics from Kansas State University. Prior to his appointment at LUMS, he was on the economics faculty of Quaid-i-Azam University (1985-2002) and most recently as Professor and Head of the Economics Department. He serves on several high-level committees and taskforces of the government. His research interests lie in the areas of applied microeconomics; development economics; and production economics. He has also taught courses at Kansas State University and is a referee for numerous academic journals. He has authored or co-authored more than 70 articles, book chapters and professional reports and has supervised three PhD, 18 MPhil and 28 Master’s theses. In recognition of his services he was conferred the President of Pakistan’s academic distinction award Izaz-i-Fazeelat in 2001.

Recent Publications:

Most Cited Publications:

Title: Impact Assessment of Microfinance in Pakistan
Pf: Dr. Abid Aman Burki
Co-Pf: Dr. Syed Muhammad Hussain, Dr. Rashid Memon and Dr. Ghazal Mir Zulfiqar
Sponsor: Pakistan Microfinance Network (PMN)
Funding Amount: PKR 36,052,500
Project Initiated in: 2015
Duration: 36 Months
Category: Economic Development
Description: Microfinance in Pakistan has come of age as a financial industry, with three million active microcredit clients, nearly six million savers and more than three million micro insurance policy holders. This study on microfinance seeks to estimate the impact of microcredit on (1) consumption expenditure; (2) asset creation; (3) employment generation or number of jobs created; (4) schooling of children and (5) gender empowerment.
Title: Economics of Milk Production in Pakistan & the Role of UHT Milk Processing Industry  
PI: Dr. Abid Aman Burki  
Co-PI: Dr. Mushtaq Ahmad Khan  
Sponsor: Tetra Pak  
Funding Amount: PKR 9,545,000  
Project Initiated in: 2014  
Duration: 22 Months  
Category: Economic Development  
Description: In this project, Dr. Abid Aman Burki examines the statement of the problem method of analysis, data sources and structure of the report. The analysis in the study is based on published data, e.g. livestock census, Pakistan Economic Survey and Agricultural Statistics of Pakistan. Dr. Abid Aman Burki addresses various subjects in the study including Economics of Agriculture related to Dairy farming, Economics of Nutrition: Calcium and Milk, Milk Processing Industry and Productivity Growth in Non-Corporate Farms and Economics of Modern Dairy Farming. Conclusions and recommendations are provided for the future.

Title: Multiple Inequalities & Exclusion by Challenging Existing Development Paradigm  
PI: Dr. Abid Aman Burki  
Co-PI: Dr. Khalid Mir and Dr. Rashid Memon  
Sponsor: Oxfam International, Pakistan  
Funding Amount: PKR 2,000,000  
Project Initiated in: 2014  
Duration: 8 Months  
Category: Law & Policy  
Description: Oxfam Pakistan approached LUMS to prepare Pakistan country report on multiple inequalities and exclusion by challenging “existing development paradigm.” The main objective of this study is to highlight the nature and dimensions of inequality in Pakistan, to identify inequality traps that tend to exacerbate multi-dimensional inequality and to suggest policies that can help mitigate multidimensional inequality.

Title: Out of School-Children (OOSC) Survey and Study in Gilgit Baltistan (GB) and Azad Jammu Kashmir (AJK)  
PI: Dr. Abid Aman Burki  
Co-PI: Prof. Mohammad Usman Khan  
Funding Amount: PKR 19,229,100  
Project Initiated in: 2014  
External Collaboration: Pakistan Bureau of Statistic  
Duration: 22 Months  
Category: Education  
Description: The purpose of this assignment is to conduct OOSC study on AJK and GB, in partnership with the concerned education ministries/departments. The objectives of the survey include gathering relevant data on OOSC in GB and AJK. The survey also identifies pockets of OOSC at district level aimed at developing powerful and focused policy tools to address the issues.
Title: Pakistan Database & Productivity Measurement at the Industry Level
PI: Dr. Abid Aman Burki
Co-PI: Dr. Mushtaq Ahmad Khan and Dr. Syed Muhammad Hussain
Sponsor: International Growth Centre (IGC)
Funding Amount: PKR 3,386,422
Project Initiated in: 2014
Duration: 12 Months
Category: Economic Development
Description: The World KLEMS initiative promotes a gradual build-up of industry level database on outputs, inputs and productivity across countries. Based on a growth accounting framework, this new database is comparable across countries due to its consistent definitions, methodology, classifications and standards. This study has the objective of creating Pakistan KLEMS data at the national and industry level on the pattern of EU KLEMS database. It includes growth in output, growth in input and derived measures of total factor productivity.

Title: Pakistan KLEMS Database & Productivity Measurement at the Industry Level
PI: Dr. Abid Aman Burki
Co-PI: Dr. Mushtaq Ahmad Khan and Dr. Syed Muhammad Hussain
Sponsor: International Food Policy Research Institute (IFPRI)
Funding Amount: PKR 2,457,000
Project Initiated in: 2014
Duration: 20 Months
Category: Economic Development
Description: The study aims at creating an internationally comparable Pakistan KLEMS data at the national and industry level on the pattern of EU KLEMS database. It will include growth in output, growth in inputs and derived measures of total factor productivity. The data will be generated for 31 industries from 1980 to 2010. Also, combining this data with other sources will help in evaluating various policies such as tax policy, monetary policy, industrial policy, trade liberalisation policy and many more. The data will be useful to federal and provincial governments, the State Bank of Pakistan, Pakistan Statistical Bureau and the academic community in general.

Title: Tax Compliance and Measures to Counter Tax Evasion in Pakistan: Sector Analysis for Cement, Sugar, Steel, Paper and Paper Board
PI: Dr. Abid Aman Burki
Co-PI: Dr. Mushtaq Ahmad Khan and Dr. Syed Muhammad Hussain
Sponsor: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
Funding Amount: 6,289,000
Project Initiated in: 2014
Duration: 5 Months
Category: Law & Policy
Description: The analysis helps in benchmarking ratios relevant for tax audit purposes, identification of loopholes in an intra-sector wise comparison and fine tuning of audit activities in this regard. Furthermore, the sector analysis helps in identifying the relative contributions of sectors to tax revenues compared to their share in Gross Domestic Product (GDP). This assignment is contributed to capacity development of FBR officer (for each sector) dedicated for this task.
Title: Consumer Preferences for Sales and Service Operations  
**PI:** Dr. Abid Aman Burki  
**Sponsor:** Indus Motor Company (IMC)  
**Funding Amount:** PKR 5,200,000  
**Project Initiated in:** 2013 - 2014 - 2015  
**Duration:** 6 Months  
**Category:** Operations Management  
**Description:** The Indus Motor Company (IMC) is the assembler, manufacturer and marketer of Toyota vehicles in all over Pakistan. Dr. Abid Aman Burki has been serving Indus Motor Company with his consultancy services in different phases from last four years. The objective of the initiative is to generate a primary data resource that could be used to analyse consumer behaviour for automobile demand in Pakistan and to construct a comprehensive ranking of its 3S dealership based on their sales and service operations. As IMC wanted to commission a customer satisfaction study based on the feedback and survey of new car buyers and owners, it approached LUMS to conduct the survey of target respondents at specified cities and locations and analyse the results of interviews using specific methods and software, giving results in the shape of reports/presentations of two surveys.

Title: Farmer’s capabilities, productivity, and profitability: A case study of smallholders in selected agro zones in Pakistan  
**PI:** Dr. Abid Aman Burki  
**Co-PI:** Prof. Shabbir Ahmad - University of Queensland  
**Sponsor:** University of Queensland, Australian Centre for International Agricultural Research (ACIAR)  
**Funding Amount:** PKR 1,047,150  
**Project Initiated in:** 2015  
**Duration:** 6 Months  
**Category:** Economic Development  
**Description:** The improvement in farmer’s capabilities to enhance farm productivity is part of a national priority to raise the living standard of the population and reduce poverty. This research project aims to influence policy by identifying intervention strategies that policy makers could use to support small farmers and create wealth in the agricultural sector.

Title: Access to Education and Social Cohesion in Conflict-Ridden Areas (SCR): End-line Study and Review of Outcome 4 Activities  
**PI:** Dr. Abid Aman Burki  
**Co-PI:** Syed Muhammad Hussain, Rashid Memon  
**Sponsor:** United Nations International Children’s Emergency Fund (UNICEF)  
**Funding Amount:** PKR 8,415,700  
**Project Initiated in:** 2015  
**Duration:** 6 Months  
**Category:** Economic Development  
**Description:** UNICEF Pakistan launched the four-year SCR Programme in 2012 in conflict-affected districts within the provinces of Balochistan, Punjab, Khyber Paktunkhwa (KP), and Sindh. SCR is a four-year initiative that aims to strengthen social cohesion and resilience through education in vulnerable contexts, including contexts at risk of or experiencing and recovering from instability. Towards this end, the programme will strengthen policies and practices in education for social cohesion and resilience. The programme builds on the theory of change that when delivered equitably and effectively, education can strengthen the resilience of children and communities, reduce risk of recruitment and indoctrination by armed actors, and limit the loss of human capital while sustaining longer-term opportunities for children and youth for civic engagement and entering the labour market. The UNICEF SCR program aims to contribute towards individual and community capacity building which is being achieved through helping students, parents, teachers and other community members to cope with instability and promoting social cohesion among them.
Title: Boosting FDI Inflows to Pakistan: What Can Policy Makers Do?
P: Dr. Abid Aman Burki
Co-P: Dr. Syed Muhammad Hussain
Sponsor: Japan International Cooperation Agency (JICA)
Funding Amount: PKR 2,835,000
Project Initiated in: 2015
Duration: 6 Months
Category: Economic Development
Description: The aim of this Project is to conduct a rigorous quantitative exercise to find out the most effective methodology to attract FDIs in Pakistan and will attempt to find out the optimal balance between investment incentives and tax revenue. We will explore the relationship between changes in corporate tax structure, FDI inflows, and corporate tax revenues in Pakistan. In the process, we will identify the key factors that influence these practices and will identify the barriers to implement them. Finally, we will also provide recommendations on how to implement these policies.
Profile: Hadia Majid joined LUMS as an Assistant Professor in August 2012. A Fulbright Scholar, she holds a PhD in Development Economics from The Ohio State University, an MA in Economics from The Ohio State University, an MSc in Economics from the University of Warwick, and a BSc in Economics from Lahore University of Management Sciences. Her research interests include aspects that relate to the economic characteristics of the household, including parental decision-making and human capital acquisition. Her previous work has looked at CCT evaluations at the intra-household level, factors that affect parental investment in child education, female bargaining power in rural Pakistan, and agricultural taxation in Pakistan. On-going research includes impact evaluation of climate change on health industry.

Recent Publications:
  Springer India.
- Cluster Based Industrialization and its Effect on Firm Productivity in Pakistan MA Khan, H Majid, A Riaz, MS Awan
- Drought and Farm Output: An Analysis of Common-Pool Water and the Role of Ethnic Fractionalization in Rural Pakistan H Majid

Title: Female labour supply and the escape from poverty: new evidence from household data
PI: Hadia Majid
Co-PI: Professor Andy McKay -University of Sussex
Sponsor: Economic and Social Research Council (ESRC)
Funding Amount: PKR 6,048,384
Project Initiated in: 2015
Duration: 24 Months
External Collaborator: University of Sussex
Category: Development Management
Description: The focus of this project is on different aspects of labour supply and how their evolution over a 20-30 year time period; This research study by Dr. Hadia Majid will consider participation, hours, nature of work (wage or self-employment, within or outside the household, sector, occupation etc.), and adoption of productivity enhancing measures. The project will disaggregate by household type according to many criteria (geographic, socioeconomic status, household size and composition etc.). The survey data will be examined in detail, using a cohort approach, the associations between increased or changing female labour supply and poverty reduction, which has taken place in all countries, controlling for many other correlates. The focus is on examining the transition of female work from a buffering role to a longer term income generating role. This can shed light on the institutional and policy factors that facilitate the transition.

Title: Electricity and Rural Development: Insights from a Natural Experiment in Punjab, Pakistan
PI: Dr. Hadia Majid
Co-PI: Dr. Lauge Skovgaard Poulsen, University College London and Dr. Mahvish Shami, London School of Economics and Political Science
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 780,963
Project Initiated in: 2015
Duration: 12 Months
Category: Economic Development
Description: The paper starts from the fact that load-shedding has made many farmers who were previously dependent on groundwater for their water supply shift to much more expensive diesel-powered tube wells. The analysis in this paper will assess the implications of this increase in input costs for agricultural production caused by the electricity crisis. For the dependent variables, the paper will focus not only on agricultural output, as earlier studies, but also crop choice, where it is expected that electricity shortages have reduced cultivation of water-intensive crops such as rice, sugarcane, and cotton - resulting in inefficient crop decisions.
Title: Urban Transportation, Labour Markets and Access to Economic Opportunity: Evidence from Lahore’s Bus Rapid Transit System  
**PI:** Dr. Hadia Majid  
**Co-PI:** Dr. Ammar Anees Malik  
**Sponsor:** International Food Policy Research Institute (IFPRI)  
**Funding Amount:** PKR 2,949,000  
**Project Initiated in:** 2014  
**Duration:** 20 Months  
**Category:** Development Management  
**Description:** This project assesses the impact of the Lahore Rapid Bus Transit system on labour market outcomes in Lahore metropolitan area. By using primary data-sources that detail the current Metrobus use based upon a quasi-experimental design as well as secondary data sources that detail public transport usage before the inauguration of the Metrobus, the researcher plans to use econometric techniques to isolate the causal impact of the Metrobus on labour market outcomes.

Title: Urban Transportation, Labour Markets and Access to Economic Opportunity: Evidence from Lahore’s Bus Rapid Transit System  
**PI:** Dr. Hadia Majid  
**Co-PI:** Dr. Ammar Anees Malik and Dr. Katherine Vyborny  
**Sponsor:** International Growth Centre (IGC)  
**Funding Amount:** PKR 11,731,198  
**Project Initiated in:** 2014  
**Duration:** 25 Months  
**External Collaboration:** Gallup PakistanDuke University  
**Category:** Development Management  
**Description:** This research seeks to quantify the causal impact of a reduction in transit cost and time due to an investment in public transport infrastructure on labour market outcomes and human capital acquisition. The study also identifies a more comparable control group than used in previous literature: areas which were slated for potential routes but have not yet received them yet. Using quasi-experimental difference-in-difference approach, in which the treatment group will be areas within a short distance of Metrobus stations, while the control group will be identified on the basis of lines which have been planned but have not yet been built. Answers to these questions will provide evidence-based insights for policymaking in Pakistan’s high priority policy area of urban transportation infrastructure.

Title: Study on Individual Indigenous Philanthropy in Pakistan  
**PI:** Dr. Hadia Majid  
**Co-PI:** Dr. Husnain Fateh Ahmed  
**Sponsor:** Pakistan Centre for Philanthropy (PCP)  
**Funding Amount:** PKR 1,500,000  
**Project Initiated in:** 2015  
**Duration:** 4 Months  
**Category:** Development Management  
**Description:** PCP works with a vision to increase the volume and effectiveness of indigenous philanthropy for social development in Pakistan. Instead of getting into direct service delivery mode or receiving grants, PCP seeks to promote altruistic efforts of national and international philanthropists by establishing effective linkages between the grant maker and non-profit organizations.
Profile: Husnain Fateh Ahmed is an Assistant Professor of Economics at the Lahore University of Management Sciences. His research interests fall under the umbrella of microeconomic theory and industrial organisation. Ahmad has applied behavioural game theory to study the phenomenon of over bidding in since joining LUMS, his interests have expanded, and he has been conducting exploratory work the areas of maternal health and the interaction of identity and economic behaviour. The common theme to his research, is his interest in identifying and rationalising seemingly irrational behaviour. Other than research and teaching, he is an amateur photographer and an avid badminton and table tennis player.

Recent Publications:
- Essays on auctions and Bayesian games with endogenous expectations HF Ahmad University of Iowa 2014

Title: Urban Informal Livelihood Study
PI: Dr. Husnain Fateh Ahmed
Primary Sponsor: HomeNet
Secondary Sponsor: Oxfam International, Pakistan
Funding Amount: PKR 201,960
Project Initiated in: 2015
Duration: 2 Months
Category: Development Management
Description: The overall purpose of conducting this study is to support Oxfam Pakistan and the Urban Institute in accessing available baseline information (both quantitative and qualitative) on the nature of challenges and conditions that informal wage workers in the domestic work sector face in urban Pakistan. Dr. Husnain was required to provide support for designing and finalising the focus group instrument, conducting the focus groups, and analysing the response of focus group members.
Profile: Dr. Imtiaz ul Haq is an Assistant Professor of Economics at the Lahore University of Management Sciences. He completed his PhD in Finance from the Manchester Business School, University of Manchester (UK). He also holds an MSc in Finance from the Manchester Business School and a BSc. (Hons) in Economics from LUMS. His research interests are Corporate Finance, Financial Intermediaries, Private Equity Investments and Capital Markets. His doctoral research focused on investor behavior in the mutual fund industry in the U.S. and U.K, particularly on investor fund-selection ability, investor behavior over economic cycles and investor reactions to mutual fund name changes. More recently, Dr. Imtiaz has looked at herding in venture capital investments and their effect on economic productivity.

Research Interests:
His research interests are Corporate Finance, Financial Intermediaries, Private Equity Investments and Capital Markets. His doctoral research focused on investor behavior in the mutual fund industry in the U.S. and U.K, particularly on investor fund-selection ability, investor behavior over economic cycles and investor reactions to mutual fund name changes. More recently, Imtiaz has looked at herding in venture capital investments and their effect on economic productivity.

Title: Coordinated Development of Manufacturing Industry with Particular Reference to Building Production Network in South Asia
Pt: Dr. Imtiaz ul Haq
Co-Pt: Dr. Farah Shahid Hassan
Sponsor: South Asia Center for Policy Studies (SACEPS)
Funding Amount: PKR 786,400
External Collaboration: Syed Babar Ali Foundation
Project Initiated in: 2014
Duration: 6 Months
Category: Development Management
Description: This report explores the potential of coordinated production in manufacturing industries across South Asia. It seeks to identify the factors restricting the formation of such regional production networks despite the 1995 SAARC trading agreements. The need for such a report arises from the fact that this region has lagged behind other trade blocs in moving towards true economic integration. Such coordination can open not only an access to wider markets, but also facilitate the distribution of the production process across countries to take the advantage of varying competitive advantages.
Dr. Munir has a PhD in Strategy and Policy from McGill University, Canada. Most recently Dr. Munir was a Professor of Strategy and Policy at Cambridge Judge Business School and Director of the Centre of Markets, Organizations and Society. He has also been the Professor of Strategy at the Suleman Dawood School of Business. Dr. Munir’s research focuses on economic sociology, social change and stability as well as innovation and technological shifts in society. His research also spans economic policy and the competitive advantage of nations. Dr. Munir has published several articles in leading organizational and technology journals, including the Academy of Management Journal, Journal of Management Studies, Organization Studies and Research Policy and presented his work at numerous international conferences.

Selected Publications:

- The birth of the ‘Kodak Moment’: Institutional entrepreneurship and the adoption of new technologies KA Munir, N Phillips Organization studies 26 (11), 1665-1687 2005
- The social construction of events: A study of institutional change in the photographic field KA Munir Organization Studies 26 (1), 93-112 2005

Title: Saida Waheed Gender Studies Initiative
PI: Dr. Kamal Ahmad Munir
Sponsor: Descendants of Late Begum Saida Waheed
Funding Amount: PKR 20,000,000
Project Initiated in: 2015
Duration: 60 Months
Category: Education
Description: The Fund is established for funding research and practical initiatives relating to Gender Studies at LUMS. The income derived from the investment of the Fund can be applied to support research, training and education, and preferably interdisciplinary projects which are related to the area of Gender Studies and to maintain a focal person for the Initiative, to support deserving and high achieving students in undergraduate programs of LUMS who might be interested in working on projects related to Gender Studies, Engage in practical initiatives related to Gender Studies and Engage with civil society organizations to generate and disseminate insights into Gender relations and associated subjects.
Profile: Dr. Kashif Zaheer Malik is an Assistant Professor of Economics at LUMS. He is a Fulbright Scholar and has a Masters and PhD degree in Economics from Florida State University. His area of research ranges from empirical macroeconomics, theoretical macroeconomics and Industrial Organisation. Dr. Malik has conducted various quantitative researches in multiple areas: Trade, Industry and Microfinance. He has consulted for Barclays Bank and Coca-Cola Beverages Pakistan Limited and has also been involved with the International Growth Centre (IGC). He is currently working on a Randomised Evaluation of Micro-Venture Capital. The project aims to study the impact of introducing Sharia compliant micro financing in collaboration with Akhuwat. Dr. Kashif has recently concluded a project that measures the Economic Impact of Coca-Cola Beverages Pakistan Limited (CCBPL). The study employs input-output model and Social Accounting Matrix to measure income and employment effects of CCBPL on the economy. Previously, Kashif has conducted two research studies for IGC, one focusing on the industrial clusters in Punjab and the other focusing on the garment sector. Both projects involved extensive field work and data analysis. His research articles are published in Economic Modelling and Lahore journal of Economics.

Recent Publications:

Title: Encouraging Entrepreneurship: A Randomised Evaluation of Micro-Venture Capital - An Initial Assessment
Pt: Dr. Kashif Zaheer Malik
Co-Pr: Dr. Faisal Bari, Dr. Hammad Siddiqui and Dr. Imtiaz ul Haq
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 780,000
Project Initiated in: 2014
Duration: 12 Months
Category: Business & Innovation
Description: The main contribution of this study is to conduct initial assessment to introduce equity based micro-financing (micro-venture capital or Sharia compliant micro financing) at a much lower level. The long-run objective is to conduct field experiments based on Randomized Controlled Trials (RCT) by offering Modarba micro-finance of up to Rs. 300,000/- to existing clients of Akhuwat (Akhuwat is a microfinance institution operating in Pakistan. It gives out small interest free loans). Since Akhuwat brings together different models, as compared to conventional micro-finance, the spirit of volunteerism and the tradition of giving, which is a cardinal principle of all religions as well as having better knowledge about clients greatly enhances the commitment of clients to abide by the rules of business. The findings of this innovative field experiment may have far reaching consequences and are likely to be of significant interest to policy makers, academia and microfinance professionals.

Title: Equity-based Financing for Microenterprise in Pakistan
Pt: Dr. Kashif Zaheer Malik
Sponsor: LUMS Faculty Initiative Fund (FIF)
Co-Pr: Dr. Faisal Bari, Prof. Simon Quinn, Prof. Muhammad Meki
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Category: Business & Innovation
Description: The main objectives of this research are to design a new equity-based microfinance product and to test its impact on growth of small enterprises, using a field experiment, To test the understanding of and demand for this new equity-based contract by local male and female entrepreneurs; and To test for heterogeneous effects by key characteristics of the participants namely their gender, the type of enterprise, their business and managerial skills, as well as behavioural characteristics (such as time and risk preferences).
Title: An analysis of economic and social impacts of mechanization of brick-kiln in Punjab.
PI: Dr. Kashif Zaheer Malik
Sponsor: The Global Fund to End Slavery
Co-PI: Dr. Syed M. Hassan
Funding Amount: PKR 1,392,858
Project Initiated in: 2015
Duration: 4 Months
Category: Economic Development
Description: The overall objective of this project is to assess the economic benefits and the economic and social impacts of targeted brick kiln mechanization in Punjab. In addition, one of the objectives of the study is to investigate the impact of targeted mechanization on the bonded labor. Furthermore, the study will also compare economic structure and labour arrangements of representative, traditionally operated brick-kiln in Punjab with partly-mechanized brick-kiln to explore a case for adopting new technologies.

Title: Creating and Utilizing Comic Books to Bridge Knowledge Gaps in Child Health in Rural Okara, Punjab
PI: Dr. Kashif Zaheer Malik
Primary Sponsor: Health and Nutrition Innovation Fund (HANIF)
Secondary Sponsor: Department for International Development (DfID)
Co-PI: Dr. Spenta Kaklia
Funding Amount: PKR 5,017,166
Project Initiated in: 2015
Duration: 10 Months
Category: Nutrition
Description: The proposed project will address the four areas of childhood illness that contribute to mortality in children under the age of 5 years in Pakistan. The under-five mortality rate in Pakistan is 87 per 1000 live births, one of the highest in the world. Dr Zaheer’s suggested innovation is to create comic books addressing the gaps in maternal knowledge in these four areas of children’s health. The comics will be designed with graphics and wording that is culturally appropriate to a rural Punjabi setting. Printing half the comics with only graphics, and no written script will appeal to most of the women in the area, especially to those with limited reading ability. The overall goal of the project is to improve maternal knowledge, especially amongst women of child bearing age, addressing the main causes of childhood mortality in Pakistan amongst children less than five years of age.
Profile: Mr. Mohammad Usman Khan started his professional career in banking and investment consulting in London, UK. In the UK, he advised large institutional clients on financial matters including financial strategy, asset allocation, manager selection and corporate governance. After spending 6 years in investment industry in the UK, he moved to Pakistan where he joined Lahore University of Management Sciences (LUMS) as a faculty in the Economics Department. He has been lecturing at LUMS since 2006 and has headed the Development Policy Research Centre (DPRC) at LUMS for two years. His work in Bangladesh comprised of trade analysis within the SAARC region while his work in Nigeria involved working with the State Government of Kano to design a development strategy aiming improvement in key sector value chains mainly agriculture and enhance the role of the private sector. He has also worked with Indian Council for Research and International Economic Relations (ICRIER) on normalising Pakistan India trade. Dr. Khan’s research interests include policy and strategy in development sector.

Recent Publications:

- Situation Analysis of Women & Children in Pakistan
- Global Initiative on Out of School Children, Pakistan Report
- SME Credit Policy: Case Study of Fan Cluster
- Constraints to Industrial Sector in the Punjab

**Title:** Advocacy to Strengthen Demand for Economic Reforms  
**PI:** Mr. Mohammad Usman Khan  
**Co-PI:** Dr. Abid Aman Burki  
**Sponsor:** Adam Smith International (ASI)  
**Funding Amount:** PKR 6,253,200  
**Project Initiated in:** 2015  
**Duration:** 8 Months  
**Category:** Economic Development  
**Description:** This project involves estimation of OOSC table and statistics based on the 5D methodology developed by UNICEF. Various data sets and templates were developed to engage in active dialogue with UIS to obtain accuracy of calculations and to conduct various meetings and presentations to develop the OOSC report for Pakistan and provincial level.

**Title:** Punjab Economic Report (2014-15): A Comprehensive Profile on Socioeconomic Development  
**PI:** Mr. Mohammad Usman Khan  
**Co-PI:** Dr. Abid Aman Burki  
**Sponsor:** UN Women  
**Funding Amount:** PKR 8,100,000  
**Project Initiated in:** 2015  
**Duration:** 12 months  
**Category:** Economic Development  
**Description:** This project is divided into key chapters covering overall economy, its performance and reflection on various strata of society and providing a compendium of economic profiling of the Punjab; socio economic and poverty profiling; sectoral profiling; issues and key public sector programmes; public sector financial management issues, policies and reforms; mega projects and their assessment and a host of policy options.
Dr. Muhammad Farooq Naseer
Department of Economics, MGSHSS
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+924235608073

Profile: Dr. Farooq Naseer joined the Department of Economics at LUMS in September 2006. His research interests lie in the field of development economics and political economy including microeconometric analysis of institutions and their role in the face of information problems. His dissertation work has looked at community-based organisations in the Philippines as well as the pricing structure in the sugarcane markets in Pakistan. In the current academic year, Farooq is teaching econometrics in the undergraduate program along with an econometric theory course for the Masters students. A former LUMS graduate, he continues to enjoy the work environment here.

Selected Publications:

Title: Partnerships for Management: A study of the Adopt-a-School program in Sindh and Punjab
PI: Muhammad Farooq Naseer
Sponsor: Institute of Development and Economic Alternatives (IDEAS)
Funding Amount: PKR 621,600
Project Initiated in: 2014
Duration: 5 months
Category: Education
Description: Dr. Farooq Naseer provided consultancy services to the IDEAS for this project which was related to partnerships for management in Sindh and Punjab.
Profile: Dr. Rashid’s work focuses on the causes and consequences of ethnic and gender inequality in economic outcomes. He is also interested in the economic history of the Indian sub-continent with a particular focus on land tenure arrangements and peasant rebellions.

Selected Publication:
- Determinants and Trends of Internal Migration in Pakistan Rashid Memon 2005

Title: Ethnic Violence and Labour Unrest in Pakistan
Pt: Dr. Rashid Memon
Co-Pt: Dr. Mushtaq Ahmad Khan
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 269,000
Project Initiated in: 2014
Duration: 12 Months
Category: Behavioural Studies
Description: This research is intended to construct a data set that documents the incidence of different kinds of violence in a given district in a given year. Existing data on violence, collected by Dr. Shapiro of Princeton and Dr. Rasul Bakhsh Rais of LUMS appears to underestimate the incidence of violence because it focuses on a national newspaper (DAWN), which might not report incidences in small towns and villages. Under this research, a hypothesis that local newspapers carry more information by focusing on 4 districts, two in Sindh and two in Punjab, is expected to be tested. Research Assistants are expected to be hired to search through these newspapers and create a data base of incidents. After that, a comparison is intended to be made with the Shapiro-Rais data set to see if the approach is indeed useful.

Title: Urbanisation/Migration Nexus project (UM-Np) in South Asia
Pt: Dr. Rashid Memon
Sponsor: London School of Economics and Political Science (LSE)
Funding Amount: PKR 2,681,059
Project Initiated in: 2014
Duration: 16 Months
Category: Economic Development
Description: The main research question of this study is: How exactly is investment in urban construction (in the five south Asian countries) and its concurrent demand for labour giving rise to new and varied temporal forms of migration? The mapping exercise is designed to give us a better understanding of the construction industry/sector in Pakistan and to narrow down the fieldwork sites for the project. The findings from the mapping exercise helps to identify the precise sites where fieldwork takes place.
Title: UNU-WIDER Project on Disadvantaged Groups and Social Mobility
PI: Dr. Rashid Memon
Sponsor: United Nations University (UNU)
Co-PI: Dr. Hadia Majid
Funding Amount: PKR 627,930
Project Initiated in: 2015
Duration: 8 Months
Category: Economic Development
Description: This research initiative, supported under UNU-WIDER’s 2014-2018 research programme, addresses the measurement of horizontal inequalities in developing countries. It focuses on inequalities among ethnic, racial, religious, and communal groups. This work is an integral part of a larger research effort on the politics of group-based inequalities, which considers causes, correlates, and possibilities for change. The project aims to build a comprehensive picture of variation in such group-based inequalities across countries at the national level, as well sub-nationally and diachronically for a selected set of developing countries.
Profile: Dr. Turab Hussain's research interests have ranged from migration theory and policy, poverty and rural development to trade and development. His recently published research is based on industrial policy, migration and remittances, prospects of trade with India and on Pakistan’s experience at dispute settlement within the WTO. His teaching interests include Development Theory, International Trade, Macroeconomics and Trade and Development.

Selected Publications:

Title: Pakistan-India Trade in Agriculture  
PI: Dr. S.M. Turab Hussain  
Co-PI: Mr. Mohammad Usman Khan  
Sponsor: South Asia Network of Economic Research Institutes (SANEI)  
Funding Amount: PKR 987,900  
Project Initiated in: 2014  
Duration: 4 Months  
Category: Trade  
Description: The Key objective of the study is to deepen the understanding of issues revolving around agriculture trade between Pakistan and India. These are expected to be assessed in the light of Pakistan’s intent of granting Non-Discriminatory Access (NDA) to India in the near future. Based on the analysis and findings, the paper is expected to put forward policy recommendations which would inform both the agricultural sector and the government in formulating a strategy for trade in agriculture with India.
Profession: Dr. Ali Hasanain is a 2014-2016 Oxford-Princeton Global Leaders Fellow, and an Assistant Professor of Economics at LUMS, as well as a member of EGAP. His recent research has studied how Information and Communications Technology (ICT) can be applied in underdeveloped countries to improve governance and market outcomes. He has also studied how individuals’ personal characteristics mediate the success of this process. Ali also serves on the Government of Punjab’s Economic Advisory Committee. He received his PhD in Economics from George Mason University in 2010.

Recent Publications:
- The political economy of public employee absence: Experimental evidence from Pakistan MJ Callen, S Gulzar, SA Hasanain, MY Khan

Most Cited Publications:

Title: Quality Testing to Address a Market for Lemons in Pakistan
Pt: Dr. Syed Ali Hasanain
Co-Pt: Dr. Arman Rezaee-University of California, San Diego and Dr. Yasir Khan-International Growth Center
Sponsor: Center for Economic Policy Research
Funding Amount: PKR 1,483,622
Project Initiated in: 2015
Duration: 18 months
Category: Behavioural Studies
Description: In this project, the plan is to first document that there is a lemons market for untreated milk in Lahore, Pakistan, due to informal, self-employed milkmen having asymmetric information about their milk’s quality. Secondly, the study will outline the partial and general equilibrium impacts on milkmen, consumers, and the market as a whole of a simple and cost-effective policy intervention that will provide consumers with credible, real-time milk quality information. Third, it will examine whether milk quality information along one dimension might be supplanted by quality information along a different one (i.e., the watering down of milk versus the addition of harmful adulterants).

Title: Coordinating Farmers with Cell phones: Technology Innovation in Livestock Extension Services in Pakistan
Pt: Dr. Syed Ali Hasanain
Sponsor: University of California, San Diego
Funding Amount: PKR 2,910,663
Project Initiated in: 2014
Duration: 6 Months
Collaborator: University of California
Category: Agriculture
Description: The aim of the study is to understand whether farmers adopt the use of information about better veterinary quality. These programs seek to reduce corruption and improve service delivery using cellular technologies. Dr. Ali Hasanain specialises in the study of service delivery and corruption in underdeveloped countries and agriculture policy.
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
Dr. Ali Khan
Department of Humanities & Social Sciences, MGSHSS
akhan@lums.edu.pk
+924235608060

Profile: Dr. Ali Khan is an Associate Professor of Anthropology and Department Chair at the Department of Humanities & Social Sciences at LUMS. He has an MPhil and a PhD in Social Anthropology from the University of Cambridge in England. Dr. Khan’s research interests vary from labour issues, particularly child and bonded labour to popular culture in Pakistan focusing mainly on cinema and sports. Ali Khan’s book ‘Representing Children: Power, Policy and the Discourse on Child Labour in the Football Manufacturing Industry of Pakistan’ was published in October 2007 by Oxford University Press. He is also the General Editor for a series of books on Sociology and Anthropology in Pakistan.

Selected Publications:
- Khan, A. Discourses on Childhood: Policy-making with regard to Child Labor in the Context of Competing Cultural and Economic Perceptions in History and Anthropology. 21(2), Taylor and Francis.

Title: Growth of Islamic Religiosity in Pakistan: Manifestations and Impact
PI: Dr. Ali Khan
Co-PI: Dr. Laila Bushra
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 838,000
Project Initiated in: 2014
Duration: 12 Months
Category: Behavioural Studies
Description: The rising influence of Islam in the Pakistani state and in wider society has been the topic of much academic and journalistic debate, especially in the last decade. The project aims to contribute to this debate by taking an approach that is both focused and holistic regarding the role of Islam in Pakistan. The project investigates the growth of Islamic religiosity in Pakistan in four specific sectors or arenas of activity: the influence of religious affiliation and practice on the dynamics of the national cricket team over the last decade; the political and electoral trajectory of Islamist political parties since the 1950s; the rise of an Islamist media and civic organisations structure since the 1970s; and the rise of mob violence or targeted attacks by radical Islamist organisations against minority communities (Christians and Shias) over the last three decades.
Profile: Ali Nobil Ahmad is teaching courses in modern comparative history, historiography, cinema and world history at LUMS. His current research interests include journalism, cinema and the media in Pakistan. He has worked as a Research Officer at the Migration Research Unit at University College London, and published articles and chapters on gender, sexuality and migrant labour; his monograph, 'Masculinity, Sexuality and Illegal migration' was published by Ashgate in October 2011. He received his PhD, an inter-disciplinary comparative study of gender and human smuggling from Pakistan to Europe, from the Department of History at the European University Institute in Florence in 2008. He trained as a historian at UCL where he did his BA and MA. In 2009 he was awarded the Scott Trust bursary for journalism and received training at The Guardian and Goldsmiths College in London, where he completed a Masters in Journalism and contributed to various journalistic publications including The Guardian. A former editorial board member of the journal Third Text, in 2010 he edited a special issue on Cinema and the Muslim World. He was co-curator of ‘Winds of Change: Cinema from Muslim Societies’, a festival of films and talks at the Institute of Contemporary Arts in 2011.

Recent Publications:

- Pakistan en Italia: Los escencantos del vivir transactional Ahmad, Ali Nobil Revista CIDOB Afers, Issue 92 Barcelona: CIDOB

Title: The Politics of Resources in Pakistan’s Peripheries
Pt: Dr. Ali Nobil Ahmad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 827,000
Project Initiated in: 2015
Duration: 12 Months
Category: Development Management
Description: The objective of this project is to generate a large data set of qualitative research; an absolute minimum of 20 interviews in three separate field sites of study within Pakistan that will serve as the basis of three academic articles relating to the politics of natural resources. Given the input of diverse perspectives such as policy makers, state officials, business interests and civil society, the data set will include diverse perspectives and serve as a useful basis for developing a new research and teaching field for the study of Pakistan. More broadly, the objective is to deepen and diversify discussions on Pakistani politics beyond the narrow confines of Islam/secularism, democracy and dictatorship and civil-military relations (as understood by Washington and Islamabad-based security analysts).
Profile: Dr. Ali Raza is an Assistant Professor of Economics at LUMS. He obtained a DPhil in Modern South Asian History from St. Antony’s College, University of Oxford, England. His Thesis was based on Interrogating Provincial Politics: The Leftist Movement in Punjab. Prior to that, he graduated with a distinction in Masters in African/Asian History from the School of Oriental and African Studies, University of London, England and Bachelors of Science (Honors) with a major in Computer Science; minor in Social Sciences from Lahore University of Management Sciences. Prior to joining LUMS, he worked as a postdoctoral researcher at the Zentrum Moderner Orient in Berlin. His research interests include the histories of leftist internationalism and fascism in South Asia. He teaches courses related to colonialism, decolonization, and modern South Asia.

Selected Publications:
- ‘Separating the Wheat from the Chaff: Meerut and the Creation of Official Communism in India.’ Comparative Studies of South Asia, Africa, and the Middle East (December 2014)
- ‘An Unfulfilled Dream: The Left in Pakistan ca. 1917-50,’ South Asian History and Culture, Vol.4 No. 4 (October 2013)

Title: Bards, Minstrels, and Outcastes: Oral Narratives and Subordinate Histories
Pi: Dr. Ali Raza
Co-Pi: Prof. Ishtiaq Ahmed
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Education
Description: This project is an attempt in archiving the narratives of subordinate and marginalised groups who have, by and large, been neglected in dominant historiography. The eventual aim is to establish a repository of digitised archival materials at LUMS. Aside from being an invaluable resource to researchers, this archive will also be an important first step in working towards a ‘people’s history’ of Pakistan, the historiography of which has largely tended to privilege the narratives of elite groups.
Profile: Dr. Ali Usman Qasmi is Assistant Professor (History) at the School of Humanities, Social Sciences and Law since January 2012. He received his PhD from the South Asia Institute of Heidelberg University in 2009. Before joining LUMS, he was a Newton Fellow for Post Doctoral research at Royal Holloway College, University of London. He has published extensively in reputed academic journals such as Modern Asian Studies, The Muslim World and The Oxford Journal of Islamic Studies. He is the author of Questioning the Authority of the Past: The Ahl al-Qur’an Movements in the Punjab (Karachi: Oxford University Press, 2011) and The Ahmadis and the Politics of Religious Exclusion in Pakistan (London/New York: Anthem Press, 2014). Besides these, he is the co-editor of Revisioning Iqbal as a Poet and Muslim Political Thinker (Heidelberg: Draupadi, 2010; Karachi: Oxford University Press, 2011) and The Shi’a in Modern South Asia: Religion, History and Politics (New Delhi: Cambridge University Press, 2015). Dr. Qasmi was recently awarded the Karachi Literary Festival Peace Prize for his book on Ahmadis.

Recent Publications:

Most Cited Publications:

Title: Problematising Citizenship in a Postcolonial Nation-State: A Case Study of Pakistan
Pt: Dr. Ali Usman Qasmi
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2014
Duration: 12 Months
Category: Development Management
Description: This research aims to de-centre the concept of citizenship from its European settings and argue for a more nuanced understanding that is cognizant of regional political, social, economic and cultural variations in which it emerged and is practiced in the non-Western world. Thus, the project proposes an interdisciplinary/multi-cultural investigation of the notion of citizenship across time and space. It draws upon theoretical insights from diverse fields such as history, political theory, religious studies, sociology, and postcolonial theory. Apart from its conceptual contributions towards an alternative understanding of the concept of citizenship, the project also explores the contestations of Islam with the idea of nation-state in a postcolonial setting. This requires a study of the interaction between the state and civil society, exploration of debates on nation and nationalism, and influences from transnational religious organisations and ideologues in shaping the contours of debate on such issues in Muslim societies.
Profile: Basit Koshul received his first PhD in 2003 from Drew University, specialising in the sociology of religion. He joined the School of Humanities, Social Sciences and Law at LUMS in 2006. His areas of interests include the relationship between religion and modernity, philosophy of science, philosophy of religion, the sociology of culture and the contemporary Islam-West encounter. He is especially interested in integrating the ideas of Muhammad Iqbal, Charles Peirce and Max Weber. He completed his second PhD in 2011 from the University of Virginia. The title of his dissertation was Max Weber, Charles Peirce and the Integration of the Natur and Geisteswissenschaffen. The dissertation begins with an integration of Max Weber’s methodology of the social sciences and the philosophy of Charles Sanders Perice. It goes on to show that the conversation between Weber and Peirce opens up the possibility of the conceptual integration of science, philosophy and religion.

He has a number of publications to his credit, including a book titled The Postmodern Significance of Max Weber’s Legacy: Disenchanting Disenchantment (Palgrave, 2005). He has co-edited a collection of essays titled Scripture, Reason and the Contemporary Islam-West Encounter: Studying the Other, Understanding the Self (Palgrave, 2007). He has also co-edited a collection of essays titled Muhammad Iqbal: A Contemporary (Iqbal Academy, 2010).

Selected Publications:

Title: Dr. Islamic Analytic Theology Project Phase 1: Building Foundational Analytic Resources
PI: Basit Bilal Koshul
Sponsor: Kalam Reserach and Media
Funding Amount: PKR 1,054,250
Project Initiated in: 2015
Duration: 2 Months
Category: Development Management
Description: Kalam, mantiq, philosophy, and jurisprudence have been important elements in the classical Muslim intellectual traditions. This conference will explore the contribution that modern Pakistani thinkers have made in these areas. The conference will especially focus on the attempts of kalamists, logicians, philosophers and legal thinkers to maintain links with the classical tradition as they interact with and respond to modern developments. Another important aspect of the inquiry will be to explore the relevance (or perhaps irrelevance) that the ideas of these thinkers in the 21st century.
Profile: Dr. Furrukh Khan has been with LUMS since 2001. He has a PhD in Postcolonial Studies from University of Kent at Canterbury, where he taught for two years prior to coming to LUMS. He has also taught English as a Foreign Language in the UK during the summers. His research interests include the Partition of India, Postcolonial Literature, Shakespeare and Oral History. His publications have appeared among others in Index on Censorship, AngloFiles and The International Journal of Punjab Studies as well as a chapter in The Novels of Bapsi Sidhwa and in Gender, Conflict and Migration. He was hosted by The Center for the Study of Developing Societies in Delhi as the ASIA Fellow, funded by a grant from the Asian Scholarship Foundation in 2006. He was selected as the British Academy/ESRC Visiting Fellow from South Asia and the Middle East and affiliated with University of Manchester in 2007. Dr. Furrukh has also directed Stories of the Broken Self, a documentary on the Pakistani women’s narratives of the 1947 Partition.

Selected Publications:


Title: The Walton Refugee Camp Project
 PI: Dr. Furrukh A. Khan
 Co-PI: Dr. Anne Christine Habbard
 Sponsor: LUMS Faculty Initiative Fund (FIF)
 Funding Amount: PKR 340,500
 Project Initiated in: 2015
 Duration: 12 Months
 Category: Development Management
 Description: The Walton Refugee Camp Project aims at studying, documenting and analysing the impact and legacy of the Walton Camp. It is done in active collaboration with the University of St. Andrews, UK. Walton Camp was set up in Lahore in 1947 to cater for the refugees arriving from India. It became an extraordinarily important place, the lieu de passage and main entry point into Pakistan for hundreds of thousands of newcomers and hence the project aims to identify the key agencies concerned with immediate relief granting and to determine the lifespan of their activities in relation to the Camp. Moreover, it also seeks to identify the key agencies involved in facilitating and resettling the refugees and to analyse the refugees’ itineraries to and from the Camp.

Title: Training for Capacity Building under USAID
 PI: Dr. Furrukh A. Khan
 Sponsor: Zeus Consulting
 Funding Amount: PKR 160,000
 Project Initiated in: 2016
 Duration: 4 Months
 Category: Development Management
 Description: Zeus Consulting has been tasked with developing two Research Centers for U.S Agency for International Development USAID Projects at HBPRC and CAPRIL, for which Dr. Furrukh A. Khan, has been appointed as one of the consultants. Under this consultancy, Dr. Furrukh A. Khan, is responsible for assisting in delivering research materials prepared to the Research Center at both HBPRC and CAPRIL, contribution in guiding and answering questions of center members and officials in research methods over the period of 4 face to face engagements, as scheduled by Zeus Consulting.
Profile: Dr. Hasan is an assistant professor of History, specialising in modern Chinese, Central Asian history and political economy. His current research is focused on informal connections across the greater Central Asian region (inclusive of western China and northern Pakistan) since the 1980s. More broadly, his work engages with globalisation and transnationalism in Eurasia, transformations in Central Asian borderlands, foreign relations, twentieth century international history, and war and society. His earlier research, on the development of Sino-Central Asian relations, appeared as The New Silk Road Diplomacy: China’s Central Asian Foreign Policy since the Cold War (Vancouver: University of British Columbia Press, 2009). At LUMS, he has been teaching East Asian and Central Asian history and politics, the Cold War, world history, and ecology.

Selected Publications:


Title: Markets, Merchants and the State: An Exploration of the Informal Mechanism between Sino-Central Asian and Sino-Pakistan Trade
Pt: Dr. Hasan H. Karrar
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2014
Duration: 12 Months
Category: Trade
Description: This research is part of an ongoing inquiry into how, since the Cold War state-led development of market mechanisms in China’s Xinjiang Uighur Autonomous Region (XUAR) has transformed societal and market structures in the countries on its western periphery. This research seeks to understand formal and informal trade, the relationship between them (does informal trade always require Formal trade?) and how this commerce is changing societal structures (increased mobility, new occupational opportunities, decline in traditional vocations, negotiating the state) and market structures (entrepreneurship and agency, wholesale markets for import and re-export; the emergence of Asia’s largest bazaars in a post-Soviet space).
**Profile:** Dr. Nadhra Khan's primary area of research and interest is 19th Century Sikh Art and Architectural Ornament in the Punjab, but she also focuses on Mughal Art and Architecture (16th to 18th century). Her work emphasizes the significance of the Sikh period as the last episode of centuries old indigenous art and architectural tradition before annexation of the Punjab by the British in 1849 that changed, among other things, the visual culture of the Punjab forever. A research project that started with one Sikh funerary monument or samadhi built to honor Maharaja Ranjit Singh has led her to study almost all major monuments dateable to this period, including the Golden Temple Amritsar, Sikh period havelis and various other samadhis. Her current research includes the impact of Sikh architectural vocabulary on subsequent British Raj architecture in the Punjab and the deep impact of British art and craft education on traditional art and craft practices.

**Selected Publications:**
- "Carved Doors of the Gateway to Maharaja Ranjit Singhâ€™s Samadhi" Published in Sikh Arts & Heritage, Sikh Arts Forum, August 4, 2011 Shahbaz Naeem Khan, Nadhra 2011
- Frescoes at Maharaja Ranjit Singh's Samadhi Shahbaz Naeem Khan, Nadhra MARG Vol. 61, No. 4 (June 2010): 72-85.

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**Title:** Documentation, Presentation and Promotion of Picture Wall, Lahore Fort  
**Pf:** Dr. Nadhra Shahbaz Naeem Khan  
**Sponsor:** Aga Khan Cultural Service - Pakistan (AKCS-P)  
**Funding Amount:** PKR 700,000  
**Project Initiated in:** 2016  
**Duration:** 2 Months  
**Category:** History & Art  
**Description:** The consultancy services shall meet the following requirements; Photographic documentation of the northern part of the picture wall not included in AKCSP’s current documentation work, Inventorying of all panels and, if necessary, establishing a panel nomenclature system which will supplement AKTC identifiers of each panel in its respective section of the picture wall. For this purpose, Dr. Nadhra will establish a Classification of decorative elements and themes assigning a title to each individual motif and theme Building up an archive of published and other data on the Picture Wall and translate any epigraphy on the picture wall and its associate architectural elements such as the Hati Pol gate, and of other relevant texts into English, relating them with other epigraphic material and historic references from the Lahore Fort and elsewhere.
Profile: Dr. Nida Kirmani completed her PhD in Sociology in 2007 from the University of Manchester. Since then, she has been working as a Research Fellow with the Religions and Development Research Programme at the University of Birmingham. Dr. Nida has been an Assistant Professor of Sociology at LUMS since January 2011.

Selected Publications:

Title: Understanding the Impact of Urban Conflict on Everyday Lives: Narratives of Insecurity and Marginalisation in Lyari
PI: Dr. Nida Yasmeen Kirmani
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 500,000
Project Initiated in: 2014
Duration: 12 Months
Category: Behavioural Studies
Description: This research project explores the multiple discourses of marginalisation narrated by Lyari’s residents, focusing in particular on those neighbourhoods that are populated largely by Baloch communities and in which the ‘gangsters’ affiliated with the banned People’s Aman Committee (PAC) maintain their hold. The research highlights the diverse ways in which this process of marginalisation is framed, narrated and experienced by residents depending on their age, class, and ethnic background. Furthermore, it places these narratives within the wider socio-political context of Karachi, where the fear of violence increasingly permeates all areas of the city, although this ubiquitous sentiment of insecurity takes different shapes from one residential community to another.

Title: Understanding the Causes and Consequences of Urban Conflict in Lyari, Karachi
PI: Dr. Nida Yasmeen Kirmani
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 605,000
Project Initiated in: 2015
Duration: 12 Months
Category: Behavioural Studies
Description: The current proposal builds on previous research, which explores the multiple discourses of marginalization and insecurity narrated by Lyari’s residents, focusing in particular on those neighbourhoods that are populated largely by Baloch communities. The research highlights the diverse ways in which this process of marginalisation is framed, explained and experienced by residents depending on their age, class, and ethnic background. Furthermore, it places these narratives within the wider socio-political context of Karachi, where the fear of violence increasingly permeates all areas of the city.
Profile: Dr. Rasul Bakhsh Rais is Professor of Political Science in the Department of Humanities and Social Sciences, LUMS, Lahore since 2002. He took time off from LUMS and served at the Institute of Strategic Studies, Islamabad from August 2013 to December 2014. Dr. Rais has Ph.D in Political Science from University of California, Santa Barbara. Before joining LUMS, he remained associated with the Quaid-i-Azam University, Islamabad for nearly 22 years as Professor/Director, Area Study Centre and prior to that as Associate Professor in the Department of International Relations. He was Quaid-i-Azam Distinguished Professor of Pakistan Studies at Columbia University, New York for 3 years, 1991-94. He took Fulbright fellowship at Wake Forest University, Winston-Salem, 1997-98, Social Science Research Fellowship at Harvard, 1989-90, Rockefeller Foundation fellowship in International Relations at the University of California, Berkeley, in 1985-86. He is author of Recovering the Frontier State: War, Ethnicity and State in Afghanistan (Lanham: Lexington Books, 2008), War Without Winners: Afghanistan’s Uncertain Transition after the Cold War (Karachi: Oxford University Press, 1996), Indian Ocean and the Superpowers: Economic, Political and Strategic Perspectives (London: Croom Helm, 1986), editor of State, Society and Democratic Change in Pakistan (Karachi: Oxford University Press, 1997) and with Charles H. Kennedy, Pakistan 1995 (Boulder: Westview Press, 1996). He has published widely in professional journals on political and security issues pertaining to South Asia, Indian Ocean and Afghanistan. His current research interests are: “Modernism, State and Challenge of Radical Islam in Pakistan.”

Recent Publication:

Most Cited Publications:

Title: HEC Distinguished National Professor program - Dr. Rasul Bakhsh Rais  
PI: Dr. Rasul Bakhsh Rais  
Sponsor: Higher Education Commission (HEC)  
Funding Amount: PKR 1,200,000  
Project Initiated in: 2015  
Duration: 24 months  
Category: Education  
Description: Dr. Rasul Bakhsh Rais has been selected as a Distinguished National Professor, a programme launched by The Higher Education Commission known as “HEC Distinguished National Professors” programme in order to use the services of outstanding senior Professors and Scientists in Universities and R&D Organisations with the objective of acknowledging their services.

Title: Junior Fellowship in Peace and Conflict Studies  
PI: Dr. Rasul Bakhsh Rais  
Sponsor: United States Institute of Peace (USIP)  
Funding Amount: PKR 4,310,188  
Project Initiated in: 2016  
Duration: 12 months  
Category: Education  
Description: The aim of the fellowship is to groom and train young scholars in the field of Peace and Conflict Studies and promote innovative, empirical research and fresh approaches to the study of conflicts and peace building. The Department of Humanities and Social Sciences at LUMS will invite research proposals in the fields of new approaches to Peace and Conflict in Pakistan, Contemporary Conflicts in furruk/Pakistan and Contemporary Conflicts in Pakistan, Peace Building and Conflict Resolution.
Profile: Sadaf Ahmad completed her Ph.D in Cultural Anthropology from Syracuse University in the United States in 2006, and has Masters Degrees in Gender, Anthropology and Development from Goldsmiths College, the University of London (2001), and in Psychology, from the National Institute of Psychology, Quaid-e-Azam University (2000). Gender has been a cross cutting theme in all of her research to date - whether it has been exploring the extent to which university students believe in rape myths and understanding the awkward relationship development organizations have had with the issue of gender based violence in her M.A. dissertations, or understanding how its techniques of expansion and pedagogies of persuasion have allowed Al-Huda, an Islamic school for women established in Islamabad in the early 1990s, to turn into a social movement in her doctoral dissertation. Her book, Transforming Faith, is based on her doctoral research, and was published by the Syracuse University Press in the fall of 2009. Her edited book Pakistani Women: Multiple Locations and Competing Narratives, a collection of works done on women in Pakistan was published by the Oxford University Press in 2010. She spent a year teaching at the Hobart and William Smith Colleges in upstate New York in 2005-06, and covered courses such as Gender and Islam, Women and Fundamentalism, and Introduction to Islam, while the courses she has taught at LUMS include Introduction to Cultural Anthropology, Anthropology of Islam, Gender and Power, Food and Culture, and Qualitative Research Methods.

Recent Publication:

Title: Pakistani Police Women-An Ethnography
PI: Dr. Sadaf Ahmad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 691,500
Project Initiated in: 2015
Duration: 12 months
Category: Behavioural Studies
Description: This ethnographic research project aims to use interviews and participant observation to understand women’s experience of working in the police force and the meaning doing so has for them. More specifically, it aims to explore and understand the diverse ways in which women’s experiences (e.g. working with colleagues, the public) may be influenced by a combination of factors that may include gender, age, rank, geographical location, class, caste, ethnicity, etc. As such, it will situate and understand women’s experiences—as understood through direct observation and their personal narratives—in the larger context of the socio-political structures and ideologies which permeate both their specific locality and the larger region. This research also aims to understand what impact working in an occupation that has been traditionally associated with men and ‘manly’ characteristics’ (but which may also be associated with other themes) has had on police women along a range of axes that include but are not limited to their personal life, policing style, identity, etc.
Profile: Dr. Waqar Zaidi is an Assistant Professor of History at the Department of Humanities & Social Sciences at LUMS. He has an MSc and PhD in the History of Science, Technology and Medicine from Imperial College London. Dr. Waqar’s current research interests include early Cold War discourses on atomic energy and the atomic bomb, and internationalist movements in the early Cold War period. More broadly, he is interested in the relationship(s) between technology and international relations in the twentieth century.

Selected Publications:


Title: Discourses and Ideologies of the ‘Atomic Age’: A Cultural Approach to the Atomic Bomb in International Affairs, 1945 - 1960

PI: Dr. Waqar Zaidi

Sponsor: LUMS Faculty Initiative Fund (FIF)

Funding Amount: PKR 300,000

Project Initiated in: 2014

Duration: 12 Months

Category: Development Management

Description: This project aims to investigate and understand the concepts about and discourses around the ‘Atomic Age’ prevalent in international affairs between 1945 and 1960. Although this was a crucial early period in the development of atomic weapons, there has been no historical research on how policymakers, strategists and intellectuals thought about atomic weapons at this time. By looking at how these people envisaged the new ‘Atomic Age’ they lived in, this project allows us to understand, for the very first time, the historical intellectual and cultural context in which atomic weapons were actually developed. Further, this project allows us to understand how and why atomic weapons spread so rapidly in this time period: from the US, USSR and Britain (which had pre-existing nuclear weapons programs) to France, China, and myriad of other countries which began their atomic weapons programs in this time period.
Dr. Ahmed Jawaad Afzal
Department of Biology, SBASSE
ahmed.afzal@lums.edu.pk
+924235608354

Profile: Dr. Ahmed Jawaad is an Associate Professor at the Department of Biology in SBASSE. Plants employ multiple layers of immunity to guard against infection. The first layer responds to structures within conserved microbial molecules. The second layer responds to effector proteins, which are pathogen-encoded virulence factors. These two “branches” of the immune system synergize to provide robust host defense that halts most infections. My current work focuses on understanding the role of the multifunctional protein RIN4, which regulates both branches of the plant immune system. His current work focuses on understanding the role of the multifunctional protein RIN4, which regulates both branches of the plant immune system.

Selected Publications:

Title: Analysis of the RIN4 Proteins in Important Crop Plants using The Nicotiana Benthamiana Heterologous System
PI: Dr. Ahmed Jawaad Afzal
Co-PI: Dr. Aziz Mithani
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2014
Duration: 12 Months
Category: Natural Sciences
Description: This study focuses on a multifunctional protein called RIN4 that regulates both branches of the immune system of the model plant Arabidopsis. The preliminary data indicate that the sub-cellular localisation of RIN4 is correlated with dramatic and distinct effects on its regulation of both branches of plant immunity. These findings lead us to hypothesise that the sub-cellular localization of RIN4 plays a key role in controlling plant immunity.

Title: Identifying the role of the RIN4- NOI domains in plant disease resistance and developmental regulation
PI: Dr. Ahmed Jawaad Afzal
Co-PI: Dr. Jibran Tahir
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Natural Sciences
Description: In this project the aim is to understand the evolution of the interaction of a classical component of plant immune system RIN4. With multifunctional properties, RIN4 regulates immunity at multiple levels and this is surprisingly achieved by the two domains, referred as NOI (Nitrate induced), anchored at both the N and C terminus of this protein. Dr. Jawaad is interested to explore how these domains are regulating molecular interactions with other seemingly crucial components of the bi-layer immune system and hence trying to understand the molecular switches that regulate plant immune responses.
Profile: Dr. Amir Faisal received his PhD in Cell Biology from Friedrich Miescher Institute for Biomedical Research/University of Basel, Switzerland in 2004. During his PhD he identified novel roles for Shc protein, an important adaptor downstream of tyrosine kinases, in insulin signalling and cytoskeletal reorganization. He received his first postdoctoral training (2004-2008) in Protein Phosphorylation Laboratory at London Research Institute where he discovered that another adaptor protein, MyD88, couples Protein Kinase C epsilon to Toll like receptors during innate immunity. From 2008 to 2014, he worked at Cancer Therapeutics Unit of Institute of Cancer Research in Sutton first as postdoctoral fellow and later as senior scientist. He played an important role in progression of several drug discovery projects, one of which resulted in discovery of a pre-clinical development candidate that will undergo phase I clinical trials in 2016. After joining LUMS in August 2014, he has been establishing a cancer therapeutics lab at SBASSE.

Recent Publications:
- Bavetsias, Vassilios, Faisal, Amir, McIntyre, Patrick J., Atrash, Butrus, Kosmopoulou, Magda N. 7-(Pyrazol-4-yl)-3H-imidazo[4,5-b]pyridine-based derivatives for kinase inhibition: Co-crystallisation studies with Aurora-A reveal distinct differences in the orientation of the pyrazole N1-substituent: Bioorganic and Medicinal Chemistry Letters, 10.1016/j.bmcl.2015.08.003

Most Cited Publications:

Title: Development of PTEN knockout isogenic breast cancer cell lines to study the mechanism of resistance to PI3 kinase/Akt inhibitors
PI: Dr. Amir Faisal
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Health
Description: The research focuses on studying the role of PTEN tumour suppressor in sensitivity of isogenic breast cancer cell lines towards PI3 kinase pathway inhibitors and in development of resistance in these cell lines to the inhibitors. The aim is to mimic tumour heterogeneity by creating an in vitro cell line based system, where we will knockout PTEN tumour suppressor in breast cancer cell lines, MDA-MB-361 and MDA-MB-231 to generate two isogenic sets of cell lines with and without PTEN protein expression. This will allow to study the sensitivity of these cell lines to different inhibitors of PI3 Kinase pathway and to develop resistance against these inhibitors in the presence or absence of PTEN. Understanding the mechanism of any differential resistance of PTEN isogenic cell lines to these inhibitors will identify specific role PTEN plays in development of resistance. The findings will help devise better treatment strategies for such tumours.
**Title:** Role of Caspases in the Differentiation of Trophoblast Stem Cells into Polyploid Giant Cells  
**PI:** Dr. Amir Faisal  
**Co-PI:** Dr. Muhammad Tariq  
**Sponsor:** Higher Education Commission (HEC)  
**Funding Amount:** PKR 7,134,638  
**Project Initiated in:** 2013  
**Duration:** 36 Months  
**Category:** Natural Sciences  
**Description:** This project is aimed to investigate the role of Caspases family of proteases in the resistant response of 83olyplody cells. This area of biology remained largely unexplored. Successful use of TS/TO cells as model systems not only answers specific biological questions about differentiated 83olyplody cells, but also helpful in understanding diseases like, Alzheimer’s disease and cancer where the regulation of apoptosis plays an essential role. In addition, the goal is to determine what makes 83olyplody cells resistant to apoptosis. This information is expected to help better understand a fundamental process in human development and diseases like cancer.

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**Title:** Cellular characterization of Aurora A kinase inhibitors for cancer therapeutics and identification of resistance mechanisms  
**PI:** Dr. Amir Faisal  
**Sponsor:** LUMS Faculty Initiative Fund (FIF)  
**Funding Amount:** PKR 1,000,000  
**Project Initiated in:** 2015  
**Duration:** 12 Months  
**Category:** Natural Sciences  
**Description:** The project aims to characterize Aurora A kinase selective inhibitors (co-discovered by PI at the Institute of Cancer Research, UK) in cancer cell lines. This will include studying the effect of inhibitors on activation of Aurora A kinase and its substrate(s) in the cells and consequences of this inhibition in the form of Aurora A specific phenotypes. This research project will also screen a number of cancer cell lines for their “sensitivity” towards these inhibitors in order to determine whether these inhibitors can potently kill or stop the growth of cancer cell lines derived from different tissues.
Profile: Dr. Aziz Mithani started as a computer scientist and received his Masters in Computer Sciences from FAST-NU, Karachi before going to the University of Cambridge, UK where he did MPhil in Computational Biology. In summer 2006, he went to Harvard Medical School for a research internship in Paulsson Lab at Department of Systems Biology. Dr. Mithani received his DPhil in Statistics (Computational Biology) from University of Oxford, UK in November 2009 under the supervision of Prof Jotun Hein and Dr Gail Preston. His dissertation focused on modelling the evolution and analysis of the properties of metabolic networks. Subsequently, Dr. Mithani joined Harberd Lab at the Department of Plant Sciences, University of Oxford, UK as a postdoctoral research associate where he worked for two years on the evolution of bread wheat. His research interests include the application of computational and mathematical methods in the area of modern biology. Specifically, he is interested in the development of computational tools and techniques to model and analyse biological systems and to investigate how different organisms evolve over time.

Selected Publications:

Title: Mango ripening in the post-genomic era
PI: Dr. Aziz Mithani
Co-PI: Dr. Muhammad Tariq and Dr. Ahmed Jawaad Afzal
Sponsor: Confidential
Funding Amount: PKR 37,234,470
Project Initiated in: 2014
Duration: 60 Months
External Collaboration: University of Agriculture Faisalabad (UAF), Bahauddin Zakariya University
Category: Natural Sciences
Description: Mango is one of the world’s major fruit crop. In Pakistan, mango is the most abundant fruit crop with 1.9 million tons of mangoes produced in 2011. This proposal takes a multidisciplinary approach involving genomics, systems biology and bioinformatics to understand the genomic architecture of mango (Mangifera indica). It proposes to exploit the recent advances in genomic science, particularly high-throughput DNA sequencing, to identify the genes involved in the ripening of mango fruit.
Title: Rahnuma: a Hypergraph Based Tool for Comparative and Evolutionary Analysis of Metabolic Networks  
*PI:* Dr. Aziz Mithani  
*Sponsor:* Higher Education Commission (HEC)  
*Funding Amount:* PKR 2,971,600  
*Project Initiated in:* 2014  
*Duration:* 36 Months  
*Category:* Natural Sciences  
*Description:* Comparative and evolutionary analyses of metabolic networks have a wide range of applications, ranging from research into metabolic evolution through to practical applications in drug development, synthetic biology and biodegradation. This project aims to develop a software tool called Rahnuma that will contain a variety of tools that can be used to study the evolution and function of metabolic networks. Rahnuma will provide a unique and powerful web-based tool for comparative and evolutionary analysis of metabolic networks, which can be used to address a wide variety of biological questions. This project will open doors for further research in comparative and evolutionary analyses of metabolic networks ranging from research into metabolic evolution through to practical applications in drug development, synthetic biology and biodegradation.

Title: Understanding the genetic architecture of wheat using next-generation sequencing analysis  
*PI:* Dr. Aziz Mithani  
*Sponsor:* Higher Education Commission (HEC)  
*Funding Amount:* PKR 2,116,000  
*Project Initiated in:* 2015  
*Duration:* 36 months  
*Category:* Natural Sciences  
*Description:* This project aims to use a multidisciplinary approach consisting of the latest genomic science including high-throughput sequencing analysis, comparative genomics and associated computational analyses to understand of the complex genome architecture of wheat and to determine the precise nature and extent of the genetic variation that confers additional salt-tolerance in these wild relatives thus providing insights into the pressures of domestication on cultivated wheat during the last 10,000-15,000. Results obtained from this project will help in the long run in the development of strains of wheat that have increased resistance to salt stress through the incorporation of natural genetic variance into wheat lines.
Profile: Dr. Muhammad Tariq received his PhD in Molecular Cell Biology from Friedrich Miescher Institute for Biomedical Research, Switzerland. During his PhD, he worked in Jerzy Paszkowski’s lab specializing in epigenetic gene silencing in Arabidopsis. In 2003, he joined Renato Paro’s lab as a postdoctoral fellow at Zentrum für Molekulare Biologie Heidelberg (ZMBH). He was awarded EMBO long term fellowship for his postdoctoral studies elucidating a link between molecular chaperones, in particular Hsp90 (Heat shock protein 90), and epigenetics in Drosophila. He joined ETH Zurich as an Oberassistent (Senior Researcher) in 2006 where he continued his work on Hsp90 and Epigenetics in Department of Biosystems Science and Engineering (D-BSSE), Basel. In 2009, he joined the Department of Biology at the Syed Babar Ali School of Science and Engineering (SSE) in LUMS as an Associate Professor where he is actively involved in developing biology research and teaching programs at undergraduate and graduate levels. He has developed the first epigenetic research lab in Pakistan which uses Drosophila to teach basic concepts of genetics, epigenetics and development. His research interests include molecular link between epigenetic cell memory and cell signalling during development and the epigenetic basis of diseases. To pursue his research interests, he primarily focuses on a paradigm based on Polycomb group (PcG) and Trithorax group (TrxG) proteins using the Drosophila and mammalian cultured cells.

Recent Publications:

Most Cited Publications:
- Tariq, M., & Paszkowski, J. (2004). DNA and histone methylation in plants. TRENDS in Genetics, 20(6), 244-251.
Title: Quest for Identification of Novel Epigenetic Cell Memory Factors: Establishing a Cell-based Reporter Assay in Flies
PI: Dr. Muhammad Tariq
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 2,000,000
Project Initiated in: 2014
Duration: 12 Months
Category: Natural Sciences
Description: This particular proposal aims to construct the PRE based reporter which involves cloning of a well characterised PRE with GFP and LUC in specific DNA based plasmids which are engineered to have antibiotic resistance gene along with PRE-GFP or LUC reporter. GFP and luciferase reporters under PRE are expected to mimic regulation by PcG/TrxG proteins which are intended to be validated by generating fly cells transiently expressing member of PcG proteins and monitoring expression of GFP/LUC. Cell-based studies performs either by over-expression or knockdown of PcG and TrxG proteins in fly S2 cells to validate PcG/TrxG mediated behaviour of reporter system.

Title: Aberrant DNA methylation as signature for breast cancer patients in Pakistani population
PI: Dr. Muhammad Tariq
Co-PI: Dr. Sohail Asif Qureshi, Dr. Shafaat Rabani (Professor, Department of Medicine, Physiology and Oncology McGill University (Health Centre, Canada)
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Natural Sciences
Description: The goal of this proposal is to develop innovative, non-invasive blood based diagnostic markers that will allow early prediction and monitor prognosis with high accuracy and specificity. Dr. Tariq in this project has proposed that the coating of genes by chemical marks termed "DNA methylation" is disrupted in cancer which correlates with clinical factors. Due to the important role of immune system in cancer our proposals is to focus on mapping "DNA methylation" T cells rather than breast cancer cells. He aims to isolate T cells from blood of a prospective cohort of different stages of breast cancer patients. Using these samples the "DNA methylation signature" will be customized as non-invasive exquisite biomarkers of breast cancer that will, potentially, diagnose, stratify for therapy and follow up the progression of the disease. These studies will help in understanding the involvement of the immune system in breast cancer leading to new therapeutic concepts targeting the immune system.
Profile: Dr. Sadia Ashraf completed her MSc with distinction in microbiology and molecular genetics from University of Punjab in 2006. After that, she completed a one year research degree course on the subject of nucleotide transporters in C. trachomatis from the University of Leeds, UK. Later, she joined University of Padua, Italy in 2011 to complete her PhD. Dr. Sadia’s PhD work mainly focused on molecular mechanism of bacterial and scorpion neurotoxins and its action in various models. She is now an Assistant Professor at the SBASSE at LUMS.

Selected Publications:

- Ashraf, S. Different botulinum serotypes translocate at different rates in primary neuronal cell cultures.

Selected Publications:

- Ashraf, S. Different botulinum serotypes translocate at different rates in primary neuronal cell cultures.

Title: Production of soluble CCR5 receptor protein and identification of new CCR5 antagonists from natural sources as potential anti-HIV and anti-cancer agents.

PI: Dr. Sadia Ashraf
Co-PI: Dr. Syed Shahzad ul Hussan
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 442,750
Project Initiated in: 2015
Duration: 9 months
Category: Natural Sciences
Description: This study is highly significant in order to identify new CCR5 antagonists from natural sources which will present new potential anti-HIV and anti-cancer agents to devise novel therapies. Furthermore it seeks to facilitate other future projects such as solving the solution structure of the V3 domain of HIV gp120 in CCR5 bound conformation that will in turn provide a lead for rational design of HIV entry inhibitors. Development of protocols to produce soluble CCR5 will facilitate such associated future studies in the laboratory. The objectives of this research include the following: To produce biologically active water-soluble CCR5 by expressing only its extracellular domains connected through flexible linkers in prokaryotic system as well as in mammalian system; To produce biologically active full length CCR5 with few mutations and solubilizing it with detergents after expressing the full-length gene according to the method described by Tan et al.(7); To develop a CCR5 probe by covalently linking the CCR5 protein to agarose resin and constructing an affinity chromatographic column; To identify new CCR5 binding molecules by screening algal extracts through the designed affinity column (CCR5 probe); To test the anti-HIV and anti-cancer activities of the identified molecules in a single round HIV infectivity assay and cancer cell lines based cell culture assays, respectively.
Profile: Dr. Sadia Hamera completed her BSc in Agriculture (Food technology), MPhil in Microbiology from Quaid-e-Azam University and PhD in Genetics from Institute of Microbiology at Chinese Academy of Sciences, Beijing, China. After her PhD, she acquired a postdoc opportunity at Institute of Genetics Chinese Academy of Sciences Beijing, and another postdoc research opportunity funded by US Govt. NSF project at Univ. of Arkansas Little Rock. She is an Assistant Professor at the SBASSE at LUMS.

Selected Publications:

Title: Deciphering the potential intervention of RNA virus Cucumber Mosaic suppressor protein 2b in plant immunity and epigenetic signal
PI: Dr. Sadia Hamera
Co-PI: Dr. Muhammad Tariq
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 353,940
Project Initiated in: 2015
Duration: 9 months
Category: Natural Sciences
Description: The research is aiming at the functional analysis of pathogenicity determinants of plant viruses and their interaction with host defense systems with the focus on functional perspectives of virus-encoded protein, especially the pathogenicity determinant, and virus-plant host interactions. Cucumber Mosaic Virus is a sense RNA virus with the widest host range among known plant RNA viruses. It spreads both through vectors and mechanically. Hence, the major aim is to get insights and control the damages spread through RNA viruses.

Title: Dissecting the role of tomato AGO4 in plant innate immunity
PI: Dr. Sadia Hamera
Co-PI: Dr. Muhammad Tariq
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Natural Sciences
Description: In both plants and animals, a multi-protein complex known as RISC is responsible to do silencing of gene expression through methylation. AGO4 protein is a major component of this RISC complex. It binds with small interfering RNAs and causes silencing of cognate sequences through methylation. Methylation is crucial for genome defense from foreign pathogens as well as from endogenous repeat loci like transposons. This study proposes to use the Virus induced gene silencing (VIGS) system to dissect the AGO4 resistance against PST and its key effectors then exploit them to further decipher the mechanism of resistance. AGO4d will be used to explore its role in methylation and small RNA binding too. The next goal of this study will be to investigate the AGO4 interacting partners and their potential contributions in host immunity in coordination with AGO4.
Profile: Safee Ullah Chaudhary received his Ph.D. in 2013 from the Department of Bio. & Brain Engineering, Korea Advanced Institute of Science and Technology (KAIST), South Korea. His research was focussed on the computational modelling of multiscale cancer systems biology. He took an agents-based (multi-agent) approach to model tumorigenesis as described in the Warburg Effect. His work also led to the development of Electronic Cancer System (ELECANS), which is a next-generation modelling platform for applications in cancer systems biology. In 2014, he joined the Department of Biology at LUMS where he is involved in the development of a GPU-based cancer modelling and simulation pipeline by leveraging the CUDA Toolkit. He is also keenly interested in investigating the oncological manifestations of the Warburg Effect during cell death.

Selected Publications:


Title: LUMSPROT 2.0 – A High Performance MATLAB Toolbox for Searching Protein Mass Spectra using NVIDIA’s Graphical Processing Unit Arrays

PI: Dr. Safee Ullah Chaudhary
Co-PI: Dr. Sadia Hamera
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Technology

Description: In this project, the aim is to develop such a high-performance version of this toolbox ‘LUMSPROT 2.0’, by using the popular and affordable NVIDIA GPU clusters.

The proposed toolbox aims to provide a high performance computing (HPC) environment for searching and identifying proteins from dense proteomics data obtained by using high resolution mass spectrometers. Upon implementation, this toolbox will act as an open and scalable platform for further development, optimization, testing and benchmarking of high throughput top down proteomics algorithms. The project will act to seed and stir high performance proteomics research in Pakistan. It is envisaged that this project will create several collaboration avenues for academia and industry, where by industrial partners can leverage the software to quickly analyze their MS data and provide valuable feedback towards an improved protein identification.
Title: Development of a MATLAB-based High Performance Computing Toolbox for Top-down Proteomics
PI: Dr. Safee Ullah Chaudhary
Sponsor: Comstech-Twas
Funding Amount: PKR 203,590
Project Initiated in: 2015
Duration: 12 Months
Category: Technology
Description: In this project, the aim is to develop a top-down proteomics toolbox using a popular mathematical computing platform MATLAB. The toolbox aims to provide a richly featured environment for searching and identifying proteins from top down proteomics data obtained by using high resolution mass spectrometers. Upon implementation, this toolbox will act as an open and scalable platform for further development, testing and benchmarking of novel top down proteomics algorithms. Additionally, the proposed toolbox will be very useful for proteomics instructors in their educational and training endeavors. The project will act to seed and stir computational proteomics research in Pakistan. It is envisaged that this project will also create collaboration avenues for academia and industry, where by industrial partners can leverage the software to analyze their MS data and provide valuable feedback towards developing newer algorithms for an improved protein identification.

Title: Design and development of the mesh partitioning algorithm for a distributed numerical estimation of partial differential equation models of extra cellular environments using CUDA graphical processing unit arrays
PI: Dr. Safee Ullah Chaudhary
Co-PI: Aziz Mithani
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 480,125
Project Initiated in: 2015
Duration: 9 Months
Category: Technology
Description: Cancer is a complex pathological disorder involving biological elements spanning across multiple spatiotemporal scales (e.g. genetic, metabolic, cellular and tissue level). In order to systematically investigate the initiation, development and metastasis of cancer, the aforementioned multiscale biological components need to be integrated into a systematic and unified model. To that effect, Dr. Saffee Ullah in his project has designed and developed a multiscale modeling platform, termed ‘ELECANS’, which aims to couple and model the multiple biological components underlying oncogenesis.

Title: Design a nd Development of a Multi-User Web Platform for Integrative Modelling and Simulation of Cancer Systems Biology
PI: Dr. Safee Ullah Chaudhary
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2016
Duration: 12 Months
Category: Technology
Description: The proposed multiscale cancer modelling platform will be the state of the art software in cancer modelling which will stand to deliver major advantages to the cancer patients, researchers and the pharmaceutical industry. The patients will be benefited by the personalized medicines and therapeutics developed by modelling and analysis of their pathological data using the proposed platform. The cancer researchers stand to gain by obtaining a computational modelling framework using which they can save precious wet-lab materials and resources. The pharmaceutical industry can use this platform to investigate novel drug targets from personalized patient data and design newer drugs for treatment of cancer.
Title: Design and Development of a Top-down Protein Sequence Search Engine for High Resolution Mass Spectra
PI: Dr. Safee Ullah Chaudhary
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 5,662,600
Project Initiated in: 2016
Duration: 36 Months
Category: Technology
Description: In this project, the objective is to develop a next generation protein sequence search engine and the associated algorithms that can optimally leverage this high resolution spectral data and act as a platform to seed and stir computational top-down (whole protein) and bottom-up (peptides) proteomics research in Pakistan. We propose to design and develop a web-based software architecture that will make this search engine available, free of cost, to the experimental and in silico biologists across the country. Moreover, this project will act as a collaboration avenue between academia and industry, where in industrial partners can also leverage the software to analyze their data and provide valuable feedback towards developing intelligent algorithms geared towards an improved biomolecular identification and characterization.

Title: Design and Development of a Next-Generation Modelling and Simulation Platform for Cancer Systems Biology
PI: Dr. Safee Ullah Chaudhary
Co-PI: Dr. Sameer Ahmad
Sponsor: National ICT R&D Fund
Funding Amount: PKR 14,987,180
Project Initiated in: 2016
Duration: 36 Months
Category: Technology
Description: The proposed project outlines the design and development of a next generation multiscale modelling platform for applications in cancer systems biology. This modelling platform envisages a seamless integration of next generation sequencing and quantitation data from the wet labs and its onward usage for investigating the roles of known oncological factors. A powerful HPC enabled simulation engine will be developed and coupled with an intuitive and customizable GUI. To facilitate in the modelling of complex oncological phenomenon, a programmable interface to the engine and GUI will also be developed. The resulting software and case study model will be made available to the laboratories, research centers, universities as well as the pharmaceutical companies which are aiming to develop or evaluate therapeutic targets as well as drugs for treatment of cancer patients.
Profile: Dr. Shaper Mirza holds a BSc (Hon) degree from University of Karachi and a doctorate from The University of Alabama at Birmingham (UAB). Her PhD studies involved understanding mechanisms of nasal colonisation by a Gram-positive pathogen Streptococcus pneumoniae. More specifically, the work was focused on understanding the interaction of a human mucosal protein lactoferrin with pneumococcal surface proteins and its downstream effects on colonisation by Streptococcus pneumoniae. Dr. Mirza received several awards and honours during her PhD which included a student travel grant award for Gordon Conference on Structure and Functions of Lactoferrin, held in Hawaii 2005; Gail Castle award for best poster presentation as PhD student and Gail Castel Award for best post-doctoral presentation. Prior to joining LUMS in 2015, Dr. Mirza served as an Assistant Professor since 2008, at The University of Texas – Houston Health Science Center in the Division of Epidemiology Human Genetics and Environmental Health. While working at the Brownsville (Texas) regional campus Dr. Mirza started elucidating the relationship between immune impairments in type-2 diabetes and their impact on pneumococcal infections in individuals with type-2 diabetes. Her studies are the first to demonstrate impairments in immune mechanisms in type-2 diabetes that are critical for protection against pneumococcal infections. Dr. Mirza joined LUMS as an Associate Professor in the Department of Biology at Syed Babar Ali School of Science and Engineering. Dr. Mirza’s specialised areas of teaching at LUMS include immunology and bacterial pathogenesis, where she continues to develop her studies on association of immune impairments in diabetes with pneumococcal infections.

Selected Publications:

- Combined effects of lactoferrin and lysozyme on Streptococcus pneumoniae killing GO André, WR Politano, S Mirza, TR Converso, LFC Ferraz, LCC Leite, Microbial pathogenesis 89, 7-17
- Seckel Syndrome: In a Two and a Half Months Old Male Presenting at Tertiary Care Hospital in Karachi. M Kazmi, S Aslam, S Mirza, S Aziz ANNALS ABBASI SHAHEED HOSPITAL & KARACHI MEDICAL & DENTAL COLLEGE 21 (1), 54-57
- Impaired CD4+ and T-helper 17 cell memory response to Streptococcus pneumoniae is associated with elevated glucose and percent glycated hemoglobin A1c in Mexican Americans with type 2 diabetes mellitus PJ Martinez, C Mathews, JK Actor, SA Hwang, EL Brown, HK De Santiago, Translational Research 163 (1), 53-63

Title: Off-site Quality Assurance Test for Products from Packages Limited
PI: Dr. Shaper Mirza
Co-PI: Dr. Muhammad Tariq
Sponsor: Packages Limited
Funding Amount: PKR 2,920,000
Project Initiated in: 2016
Duration: 12 Months
Category: Health
Description: The main purpose of this proposed collaboration is to provide consultancy for setting up quality control standards for paper products from Packages limited. The products include Facial tissues, Toilet rolls and party tissues. Although paper products have lower risk of human infections than for example meat, dairy, fruits or vegetables, nonetheless they can still become contaminated with potentially hazardous materials that can cause anything from mild skin irritation to severe skin infections. For quality assurance, the activities which will be performed in the collaborative project include Identifying the potential hazard to assess the level of risk, designing and implementing procedures for, monitoring and controlling hazard and Suggesting corrective actions.
Profile: Dr. Kahkeshan Hijazi received her Bachelor's degree in Bioinformatics from Mohammad Ali Jinnah University, Islamabad, Pakistan in 2006. In 2009, she was awarded the J. William Fulbright Doctoral Award from the United States Educational Foundation (USEFP), Pakistan. She received her Master's degree and a PhD in Bioinformatics from Boston University, Massachusetts, USA in 2014. Her research during her PhD was focused on developing predictors of tobacco-induced airway epithelial cell damage and the risk for having or developing tobacco-associated lung disease in humans at the Boston University Medical Center (BUMC) under the supervision of Dr. Avrum Spira. Prior to joining LUMS she served at the Research Center for Modeling and Simulation, National University of Sciences and Technology (NUST), Islamabad as Assistant Professor of Bioinformatics.

Dr. Hijazi's expertise in Bioinformatics gives her great experience in the application of techniques from computer science and statistics to identify and understand patterns in the ever-more complex datasets produced by genome-wide profiling technologies. Her long terms goals are to apply post-genomic technologies and computational tools for translational research into human disease and to train graduate students who can apply these tools in a clinical setting.

Research Interests
- Transcriptomics, Genomics
- Translational Bioinformatics

Title: Identifying Nasal Epithelial MicroRNA Regulators of the Gene-expression Response to Smoking Cessation
PI: Dr. Syeda Kahkeshan Hijazi
Co-PI: Dr. Aziz Mithani
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 308,000
Project Initiated in: 2016
Duration: 9 Months
Category: Natural Sciences
Description: The goal in this project is to identify the physiological response to smoking-cessation using microRNA sequencing on specimens collected longitudinally from the nasal epithelium. The results will provide insights into the regulation of smoking-associated processes.
Profile: Dr. Shahzad ul Hussan joined the Department of Biology at Syed Babar Ali School of Science and Engineering (SSE) in LUMS in December 2013 as an Associate Professor. He earned his PhD. in Bioorganic Chemistry from the University of Luebeck, Germany in 2005. In 2005, he obtained the Postdoctoral Visiting Fellowship Award from the National Institutes of Health (NIH), USA and joined the Laboratory of Bioorganic Chemistry at NIDDK, NIH. During the postdoctoral training his research was focused on NMR structural studies of anti-HIV lectins and understanding the sub-molecular level basis of HIV entry inhibition by those lectins. In 2010, Dr. Hussan joined the Vaccine Research Center of NIAID at NIH as a research fellow where the focus of his research was to study the atomic level details of HIV-surface-displayed-glycan recognition by HIV-1 neutralising antibodies using methodologies such as NMR, surface plasmon resonance (Biacore), isothermal calorimetry (ITC) and HIV neutralisation assays. His research during last 10 years has resulted in several publications in high-ranking journals namely, Nature, Science, Nature Structural and Molecular Biology, Journal of the American Chemical Society, Journal of Biological Chemistry, Chembiochem and Journal of Virology. His research interests, in general, include understanding the structural properties of ligands in their macromolecular-bound state, the solution structure of proteins and biophysical characterisation of recognition phenomenon involving glycans.

Selected Publications:

Title: Solution structure of the V3 domain of HIV-1 gp120 in CCR5 co-receptor bound conformation to better understand the viral entry process
PI: Dr. Syed Shahzad ul Hussan
Co-PI: Dr. Thomas Peters
Sponsor: German Pakistani Research Cooperation Programme (DAAD)
Funding Amount: PKR 10,654,782
Project Initiated in: 2014
Duration: 12 Months
Category: Health
Description: The aim of this study is to understand the atomic level details of CCR5 recognition by the V3 domain of HIV-1 gp120, to understand the HIV-1 cellular entry process, by solving the NMR based solution structure of V3 in CCR5 bound conformation and by investigating the kinetic and thermodynamic aspects of the recognition.
Title: Development of Hepatitis C Viral and Human Immunodeficiency Viral Cellular Infectivity Assays to Identify New Potential Therapeutics
PI: Dr. Syed Shahzad ul Hussan
Co-PI: Dr. Zakir Ullah
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2014
Duration: 12 Months
Category: Health
Description: This project aims to develop HCV and HIV cellular infectivity assays using viral constructs that are not infectious to humans and are routinely used for such assays. A fluorescence activated cell sorting (FACS) based quantitative assay is also expected to be developed to evaluate viral neutralisation by potential therapeutic molecules. Once the assays are established, researcher is expected to identify new entry inhibitors in extracts from different Algae which are known to contain carbohydrate binding proteins (lectins) that can inhibit viral entry into human cells. To facilitate these experiments researchers have started growing liver-derived Huh-7.5 cells that are used to test HCV infection in experimental systems and TZMbl cells having HIV receptors to study the viral neutralisation by the potential viral entry inhibitors.

Title: Discovery of New HCV Entry Inhibitor Lectins and Design of an Anti-HIV Lectin as a Better Potential Therapeutic
PI: Dr. Syed Shahzad ul Hussan
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 5,987,705
Project Initiated in: 2015
Duration: 36 months
Category: Health
Description: This study has two main aims. To begin with, it aims to identify new HIV and HCV cellular-entry inhibitor lectins from different algal strains. Based on the observation that most of the antiviral lectins have been identified from different algal strains, it has been hypothesised that by using specific probes consisting of envelope glycoproteins of HIV and HCV new anti-HIV and anti-HCV lectins can be identified from algal extracts. Envelope glycoprotein, gp120 of HIV and E2 of HCV have already been produced in the laboratory. In this project, these glycoproteins will be covalently linked to an appropriate resin to develop a specific affinity column to identify new anti-HIV and anti-HCV lectins by screening extracts of various algal strains and characterise their atomic level details of viral entry inhibition by using NMR, viral neutralisation assays, isothermal calorimetry titrations (ITC) and surface plasmon resonance (SPR). Seondly, the study also aims to construct a smaller sized MVN lectin to make it better drug like molecule. As potential therapeutics larger protein molecules have very limited oral availability, less membrane permeability and potential immunogenicity.

Title: Designing the specific antibody-selecting probes consisting of the conserved regions of the Hepatitis C envelope in the native conformation
PI: Dr. Dr. Syed Shahzad ul Hussan
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Health
Description: HCV infections are the major threat to the healthcare all over the world. In Pakistan roughly 5% of the population is infected with HCV. In the current project the aim is to design antibody-selecting probes consisting of HCV envelope variants with exposed conserved regions and truncated variable regions so that these probes can be used to fish out only the conserved-region specific antibodies from the sera of patients. Understanding the fundamental details of how these antibodies bind to the virus will provide the basis for rational immunogen design as potential vaccine as the long-term goal.
DEPARTMENT OF CHEMISTRY
Profile: Dr. Basit Yameen received his M.Sc. degree (1998-2000) in the subject of Chemistry with distinction (awarded a gold medal and an academic roll of honor) from Government College University, Lahore, Pakistan. During early 2001, he moved to the Department of Chemistry, Quaid-e-Azam University, Islamabad Pakistan, where he completed his M.Phil. Degree (2001-2003) with a specialization in Organic Chemistry while carrying out his one year thesis research in the field of Polymer Chemistry. He was later awarded a Ph.D. scholarship from the Higher Education Commission of Pakistan and received his Ph.D. degree (2004-2008) from Johannes Gutenberg University, Mainz, Germany for his research work which was carried out under the supervision of Prof. Dr. Wolfgang Knoll in the Materials Science Research Group of the Max Planck Institute for Polymer Research, Mainz, Germany. During his Ph.D. and post doctoral stay at Max Planck Institute for Polymer Research, he published several research articles in peer reviewed journals and chapter contributions to two books titled as "Surface Design: Applications in Bioscience and Nanotechnology" published by Wiley-VCH, Weinheim, Germany, and "Electroactive Polymers, Materials and Devices" published by Rajiv Beri for Macmillan Publishers India Ltd. Before joining SSE Dr. Basit Yameen has worked as Assistant Professor at the Faculty of Materials Science and Engineering, GIK Institute of Engineering Sciences and Technology.

Recent Publications:

Title: Summer Internship in Science and Engineering (RISE) for Young Community — RISE Community
Pt: Dr. Basit Yameen
Co-PI: Dr. Irshad Hussain, Dr. Falak Sher
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 200,000
Project Initiated in: 2016
Duration: 1 Month
Description: This proposal aims at developing a 4-week training program named as “Summer Internship in Science and Engineering (RISE) for Young Community — RISE Community where students (matric/intermediate) and teachers from the public schools in our less developed neighborhood will spend one month in different research groups engaging in cutting-edge research at various departments at SBA SSE at LUMS. Students will be engaged in the research and training activities of research groups and departments focusing on understanding and resolving the issues of national relevance. Besides, they will attend research seminars at research group, at respective department, at SSE, and at LUMS level. Seminars will be organized on specific topics where speakers from LUMS and from other local institutions will be invited to deliver lectures on current developments in science and engineering in a manner understandable to the RISE audience.
Profile: Dr. Falak Sher is working as an Assistant Professor of Chemistry at the School of Science and Engineering (SSE), LUMS. Before this, he worked in the same capacity for three years at the Department of Chemical and Materials Engineering, PIEAS, Islamabad. He obtained his PhD degree in Chemistry from the University of Cambridge, UK. His research interests are in the field of synthesis and properties of interesting magnetic and electronic metal oxides. He has a number of publications in the journals of international repute.

Recent Publications:
- Wildman, E. J., Sher, F., & Mclaughlin, A. C. (2015). Absence of Colossal Magnetoresistance in the Oxypnictide PrMnAsO0.95F0.05. Inorganic chemistry, 54(6), 2536-2542.
- Chen, W. T., Sher, F., Mathur, N. D., Kavanagh, C. M., Morrison, F. D., & Attfield, J. P. (2012). Structural, magnetic, and electrical properties of Bi 1-xLa xMnO 3 (x = 0.0, 0.1, and 0.2) solid solutions. Chemistry of Materials, 24(1), 199-208.

Most Cited Publications:

Title: UK Researcher Links program
PI: Dr. Falak Sher
Sponsor: British Council, UK
Funding Amount: PKR 1,346,625
Project Initiated in: 2014
Duration: 6 Months
External Collaborator: University of Edinburgh, UK
Category: Natural Sciences
Description: The aim of this study is to significantly increase thermopower (or Seebeck coefficient) of transition metal oxides so that they become competitive with other known TE materials. Use of good and reliable TEoxide materials in thermoelectric devices makes an impact in reducing our dependence, to some extent, on fossil fuels.
Profile: Dr. Ghayoor Abbas obtained his MSc in Chemistry from Quaid-i-Azam University, Islamabad, Pakistan. After serving as lecturer in chemistry in the Punjab Education Department/GCU Lahore for couple of years, he went to the Michigan State University, USA for his PhD studies. At MSU, he worked on the applications of iridium catalysed aromatic C-H borylation in organic synthesis, and completed his PhD in Chemistry in 2008. He later worked as a Postdoctoral Associate at Indiana University, Bloomington, USA, before joining Syed Babar Ali School of Science and Engineering (SSE), LUMS in fall 2009. Dr. Ghayoor Abbas has presented his research work in various international conferences including the meetings of the American Chemical Society, the US National Organic Symposium, and the Gordon Organometallic Conference. He has a number of research publications in peer reviewed international journals as well as several patents to his credit. His current research interests include synthesis and study of new ligands for transition metal catalysed cross coupling reactions, development of new synthetic methodologies and their applications in the synthesis of medicinally active small organic molecules, design and synthesis of new aromatic building blocks for applications in material science.

Recent Publications:

Title: Design and Synthesis of New Boscalid Analogs
PI: Dr. Ghayoor Abbas Chotana
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2016
Duration: 12 Months
Category: Natural Sciences
Description: Boscalid is an important fungicide belonging to the class of carboxamides. It was introduced in 2003 in US and now its worldwide annual production exceeds 1000 Metric Ton per year. Boscalid is used in the agricultural fields of various horticultural crops, such as green beans, spring onions, strawberries, grapes, blueberries, tomatoes, and raspberries etc. Boscalid protects crops from gray mold, powdery mildew and other fungus. Boscalid acts by inhibiting spore germination, germ tube elongation and is also effective on all other stages of fungal development. The current proposal aims to design and synthesize new analogs of Boscalid.

Title: Rapid & Convenient Synthesis of Biologically Active Aryl/Heteroaryl Indole Alkaloids
PI: Dr. Ghayoor Abbas Chotana
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 990,000
Project Initiated in: 2014
Duration: 12 Months
Category: Natural Sciences
Description: This research proposal is based on a new synthetic route which bypasses the need to synthesize haloindoles in the first step, by using iridium catalyzed direct C-H borylation reaction, and thus yielding the desired product in only two steps. The new proposed route will provide rapid & convenient access to these important classes of molecules which are known to possess antimicrobial, antiprotozoal, antimalarial, antifungal, and anticancer activities.
Profile: Dr. Habib Ur Rehman holds an MPhil degree in physical/polymer chemistry from QAU, Islamabad and Ph.D. in Materials Engineering Degree from the Institute for New Materials, Saarbrucken, Germany. He is currently working as an Assistant Professor of Chemistry. Before joining Syed Babar Ali School of Science and Engineering (SSE), LUMS, he served as Head of Optical Materials, R & D Group at Exxelis Limited, U.K. There, he developed a number of new materials for optical displays and optimised innovative processes for making LED backlights and light management films. He previously worked for Terahertz Photonics, UK, and was responsible for the development of low loss optical materials for data-comm and groundbreaking sol-gel based silica on silicon deposition technology.

Selected Publications:

Title: Development of Novel Optically Clear High Refractive Index Photo-Curable Nano-Composites for Flat Panel Displays
Pt: Dr. Habib Ur Rehman
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2014
Duration: 12 Months
Category: Natural Sciences
Description: This research aims to utilize polymer brushing technique to synthesize functionalized Nano-particles of different metal oxides having very high refractive indices, and prepare novel high refractive index acrylate-nanocomposites based photocurable materials. These materials are expected then to be tested for optical displays by making brightness enhancement films through UV embossing.

Title: Development of Optically Clear Novel High Refractive Index Photo-polymerizable Nano-composites for Light Management Films and their Applications in Flat Panel Display
Pt: Dr. Habib Ur Rehman
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 13,786,200
Project Initiated in: 2015
Duration: 36 Months
Category: Natural Sciences
Description: This proposal aims to, utilize polymer brushing technique to synthesize functionalized metal oxide nanoparticles, preferably acrylate functionalized nanoparticles of different metal oxides having high refractive indices, to prepare novel high refractive index acrylate-nano-composites based photo-polymerizable materials. These materials will then be tested for their light management potential in optical displays by making prismatic as well as microlens-based micro-structured brightness enhancement films through UV embossing. Finally recycling efficiencies of these films will be compared with the ones available in market.
Profile: Dr. Hussain is among the founding members of SBA School of Science & Engineering (SSE), LUMS and has played a key role to lead the development of the Chemistry Department. Prior to joining LUMS, Dr. Hussain spearheaded research and development program in Nanobiotechnology at National Institute for Biotechnology & Genetic Engineering (NIBGE), Faisalabad, Pakistan, and developed a Nanobiotech group/facility for the synthesis of metal nanoparticles and explored their applications in biotechnology and advanced materials fabrication, which is now among the few best facilities in Pakistan. He has published more than 50 research articles in prominent journals including Nature Materials, Angewandte Chemie - Int. Ed., Advanced Materials, and Journal of the American Chemical Society, Small, ChemCommun, Langmuir, and Nanoscale. Dr. Hussain has developed several effective research collaborations with the leading research groups in USA, Europe, China (HUST), Saudi Arabia (KAUST) and several National Institutions in Pakistan. He has got several competitive National/International research grants to explore the applications of metal nanoparticles/nanoclusters in Chemical/Biomedical Sciences and Renewable Energy Technologies.

Recent Publications:


Title: Development of Ultrasensitive, Robust and Affordable Nanoparticle-Based Test Strips for Detecting Bacteria
Pt: Dr. Irshad Hussain
Co-PI: Dr. Sohail Asif Qureshi
Sponsor: Higher Education Commission (HEC) and U.S. Agency for International Development (USAID)
Funding Amount: PKR 33,080,474
Project Initiated in: 2013
Duration: 36 Months
Category: Health
Description: The goals of the research are to develop an ultrasensitive, robust and affordable method that can be used for detecting bacteria in drinking water. A key attribute of the programme is the porting of nanotechnology to an inkjet platform, facilitating both small-scale innovation and large-scale manufacturing of these systems. The test strips may be used to rapidly and effectively detect contaminated water and serve as a first step towards preventing outbreak of diseases.
Title: Synthesis and Characterization of Metal Nanoparticles Chemicals and Consunmables  
PI: Dr. Irshad Hussain  
Co-PI: Dr. Najeeb Ullah (UET Peshawar)  
Sponsor: UET, Peshawar  
Funding Amount: PKR 1,000,000  
Project Initiated in: 2015  
Duration: 24 Months  
Category: Health  
Description: Dr. Irshad Hussain received funding for Synthesis and Characterization of Metal nanoparticles Chemicals and consunmables from UET Peshawar.

Title: Development of Nanoparticles-Based Sensitive Method for the Detection of Bacteria in Drinking Water  
PI: Dr. Irshad Hussain  
Co-PI: Shaper Mirza  
Sponsor: LUMS Faculty Initiative Fund (FIF)  
Funding Amount: PKR 990,000  
Project Initiated in: 2016  
Duration: 12 Months  
Category: Health  
Description: It is extremely important to have proper domestic, municipal and industrial wastewater disposal and effective treatment plants for drinking water with appropriate maintenance and monitoring at all times. In particular, the bacterial detection assay needs to be sensitive and accessible to common man for on-site monitoring of drinking water for bacterial contamination. The monitoring of microbial contamination of drinking water is of paramount importance for public health and food safety to minimize the risk of outbreak of waterborne diseases. The purpose of this proposal is, therefore, to supplement the funds for the purchase of chemicals and consumables to enable clean drinking water. Furthermore the proposal will also help us better understand the interaction of bacteria with nanoparticles. This information will later be harnessed for developing projects to combat multidrug resistance in pathogenic bacteria.
Profile: Dr. Saeed is an Associate Professor at the Department of Chemistry/SBASSE, LUMS. He received his M.Sc. in chemistry from the University of the Punjab, Lahore, Pakistan with distinction (Punjab University topper with Gold Medal) in 1996. Before his PhD research, he served as Research Assistant/Research Officer at H.E.J. Research Institute of Chemistry, University of Karachi. During this time, he was awarded DAAD fellowship to conduct PhD research at the University of Tübingen, Germany under the supervision of Prof. Dr. h.c. (mult.) Wolfgang Voelter. In 2000, he was selected by the DAAD to represent its students in the 50th Annual Nobel Laureate Meeting at Lindau, Germany. By 2001, he was able to synthesize several natural products and their unnatural analogs, which earned him a PhD degree from the University of Tübingen in the span of less than three years. From 2001 to 2009, Dr. Saeed conducted post-doctorate research in the area of chemical carcinogenesis and cancer biology, by investigating the metabolism of estrogen, formation of genotoxic metabolites and their reactions with DNA to induce cancer-specific mutations, and the initiation of cancer. He has published more than 40 peer-reviewed articles in reputed international journals, such as Journal of Biological Chemistry, International Journal of Cancer, Free Radical Biology and Medicine, Chemical Research in Toxicology, and Tetrahedron Letters and has presented his research in several National and International meetings and conferences.

Recent Publications:

Most Cited Publications:

Title: Isolation, purification and characterization of protein(s) that are modulated by estrogen-DNA depurinating adducts to induce cancer-specific mutations and drug resistance
PI: Dr. Muhammad Saeed
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Health
Description: This project is focused on the isolation, purification and characterisation of the protein(s) involved in generation of mutations by the estrogen-DNA depurinating adducts. In this regard we aim to synthesize modified depurinating estrogen-DNA adducts containing linkers, which will be utilised to prepare an affinity-based solid support (beads or resin) to furnish affinity-columns for selective retention of the proteins of interest from a complex cellular protein extract. Purified protein(s) will be structurally and functionally characterised by several spectroscopic methods. Discovery of these proteins will be a big step toward unravelling the mechanism of the induction of mutations and cancer initiation by estrogens and will provide new targets for biomarkers development and therapeutic targets for breast cancer intervention.
Title: Antiviral Drug Design by Targeting Viral Specific Proteases
PI: Dr. Muhammad Saeed
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2016
Duration: 12 Months
Category: Health
Description: Dengue Fever (DF) is a clinical manifestation of infection by dengue virus (DENV), which, in most cases, is very mild and self-healing ailment. Nevertheless, development of DF to dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) can be fatal and life threatening. Currently, there is no therapeutic treatment or vaccine against DENV infection. Conventional practice to tackle DENV infection involves extensive use of insecticides to curb the transmitting mosquitos. This approach has many negative effects, both on the ecosystem, as well as on the environment. Thus, an alternative approach based on the development of specific drugs against DENV infections is highly desired. Viral specific protease enzyme is a promising drug target. The DENV protease is essential for the maturation and proliferation the virus. Recently, several X-ray co-crystal structures of DENV protease with the substrate have been solved and provided details on the interactions of the substrate for its catalytic activity. The chemical environment of the active site can be exploited for designing small organic molecules as inhibitors of the protease. Therefore, the main objective of this pilot project is to structurally characterize the DENV protease, followed by designing and synthesizing potent inhibitors.
Profile: Dr. Muhammad Zaheer earned his MPhil degree from Quaid-i-Azam University. In 2009, he was awarded with HEC Overseas Scholarship for PhD studies in Germany. He completed his degree under the supervision of Prof. Dr. Rhett Kempe from the University of Bayreuth. During his PhD, he worked on the development of robust heterogeneous catalysts for sustainable chemistry applications including biomass transformation into fuels and chemicals. Dr. Zaheer has got published papers in the scientific journals of high impact like Chemical Society Reviews and Chemistry of Materials. He was a post-doctoral fellow at the Department of Inorganic Chemistry, University of Bayreuth before joining LUMS as an assistant professor. His research interests include the development of heterogeneous catalysts for the conversion of biomass to obtain fuels/chemicals, renewable energy generation/storage and green chemistry.

Recent Publications:

Most Cited Publications:

Title: Green Catalytic Conversion of Waste Paper to Fuels and Chemicals
PI: Dr. Muhammad Zaheer
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 860,000
Project Initiated in: 2015
Duration: 12 Months
Category: Environment
Description: Current project aims to design robust heterogenous catalysts based on polymer derived SiCN ceramics with catalytically active metal (Ni, Pd and Ni/Pd) nanoparticles (NPs) on surface. The beauty of the design lies in the fact that Si-C-N network can stabilize very small NPs (which would provide high activity) firmly so that metal leaching is avoided. Basicity of the support and synergetic catalysis (in the case of the bimetallic Ni/Pd catalyst) may be helpful in the selective cleavage of ether and glycosidic bonds of the solid biomass (using waste paper as a model) leading to the depolymerization of it into soluble sugar compounds which would be upgraded catalytically to produce chemical and fuels. The project would not only be helpful in the solid waste management of the local industry (sugar, paper) but could also contribute significantly in the global effort for scaling up and commercialization of biomass conversion processes.
Title: Catalytic Conversion of Agricultural Waste into Potential Fuels and Chemicals
PI: Dr. Muhammad Zaheer
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 9,401,250
Project Initiated in: 2015
Duration: 36 Months
Category: Environment
Description: This project focuses on the utilization of chemical methods in order to derive chemicals from rice husk and potentially gears about its selective degradation to simple molecules, playing with these simple molecules to prepare chemicals of industrial importance including solvents, fuels (e.g., ethanol) building blocks of polymers (e.g., nylon, PET) and finally preparation of the materials by which the aforementioned processes can be achieved.
Profile: Dr. Saleem joined LUMS in 2012 and since then he has been actively developing his drug discovery research group. He is interested in the synthesis of the libraries of novel molecules that could modulate various cellular proteins involved in the cell cycle (notably kinases (Aurora kinases), centrosome clustering, Phosphohistonase 3P, MDM2-p53, AAA+ ATPase & 12-TM), development of new methodologies to access novel scaffolds, novel ligands for nanoparticle and the isolation, characterisation & synthesis of the natural products of biological importance and food & toxicology. Dr. Saleem is also actively involved in the collaborative research across various departments in different universities to advance the scientific output and help the students with his expertise. Earlier, he obtained his MSc in Chemistry from GC University, Lahore, Pakistan with distinction (Gold Medal and Academic Role of Honor) in 2002 and MPhil in Chemistry in 2004. He was awarded Orient Dr. Ata-ur-Rehman Chemistry Award & XIVth Star Award and was selected to present Pakistan in the 56th Meeting with Nobel Laureates in Lindau, Germany. in 2006, he obtained Fulbright scholarship for PhD in Chemistry at Michigan State University, USA and completed it in 2011. There, he worked at the interface of chemistry and biology and focused on various research projects aimed towards cancer research. During his PhD, Dr. Saleem synthesized natural products and their analogs aimed at inhibiting check point kinase 2 and imidazoline based inhibitors of NF-κB pathway to study their binding interaction with proteasome 26s, developed the methodology for the synthesis of 1, 2, 4-triazoline and 1, 2, 4-triazoles via [2+3]-cycloaddition reactions of oxazolones and prepared photoaffinity labelled molecules to study the drug protein interaction.

Recent Publications:

Most Cited Publications:

Title: Synthesis of tethered biaryls and their evaluation to selectively kill the cancer cells with supernumery centrosomes
PI: Dr. Rahman Shah Zaib Saleem
Co-PI: Dr. Amir Faisal
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Natural Sciences
Description: Centrosome is an important organelle that plays role in the cell cycle proliferation. The centrosomal amplification is observed in various tumors and provides a basis of selectively targeting the cancer cells. In the current project, the aim is to explore this area by synthesizing a novel library of organic compounds and evaluating it against cancer cells lines and normal cells lines to assess the selectivity in killing the cancer cells and avoid side effects on the normal cells.
Profile: Dr. Salman Noshear Arshad is an Assistant Professor of Chemistry in SBASSE, LUMS. He did his BS in Metallurgy and Materials Engineering from GIK Institute of Engineering Sciences and Technology, Pakistan. He then went to South Korea for Masters in Materials Science and Engineering from Korea Advanced Institute of Science and Technology (KAIST) under Korea Science and Engineering (KOSEF) fellowship. At KAIST he developed novel bottom-up methods to synthesize carbon nanotubes reinforced metal and ceramic nanocomposite materials with enhanced mechanical and multifunctional properties. His work was published twice in Advanced Materials (Impact Factor 14.8) with ~300 citations to date. On his return to Pakistan, he joined GIK Institute as Research Associate where he taught undergraduate courses in materials science and engineering and continued his research on carbon nanotubes reinforced nanocomposites. Dr. Arshad was awarded with Fulbright fellowship for graduate studies in University of Illinois at Urbana-Champaign (UIUC, USA). While at UIUC he did another Masters in Aerospace Engineering and PhD in Materials Science and Engineering. He developed optimised polymer and carbon nanofibers with modulated surfaces for enhanced strengthening and toughening for structural composite materials. This work earned him a US Patent. He also worked on developing bulk nanostructured alloys using severe plastic deformation with grain and second phase precipitate sizes on the order of 10 nm. His research work at UIUC was supported by grants from National Science Foundation and Office of Naval Research and got published in Carbon, Polymer, Scripta Materialia, Acta Materialia, and Journal of Materials Research.

Recent Publications:

Most Cited Publications:

Title: Self-Cleaning Water Filter Based on Polymer Nanofibers for Bacterial and Viruses' Removal from Drinking Water
PI: Dr. Salman Noshear Arshad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 981,090
Project Initiated in: 2015
Duration: 12 Months
Category: Water
Description: This interdisciplinary project is focused on developing materials chemistry based strategies for bacterial and viral removal from water. A technologically mature process, electro spinning, will be utilised to obtain filters that can discriminate nanoscale species in the water. These filters are actually commercially available. Electro spinning process will be developed in which nanofibers of relevant polymer or polymer blends will be doped with tailored bandgap oxide nanoparticles. The electro spun polymer mesh will carry out the filtering part, isolating bacteria and most viruses, whereas the oxide nanoparticles, through photo catalysis, will oxidize these species with the final product of the oxidation being CO2 and H2O.
Title: Surface Modulated Carbon Nanofibers for Enhanced Toughening in Nano-Composites
PI: Dr. Salman Noshear Arshad
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 13,587,209
Project Initiated in: 2015
Duration: 36 Months
Category: Water
Description: This research proposal aims to investigate the performance of carbon nanofiber reinforced polymer nanocomposites where the surface of the carbon nanofiber will be tailored to maximize its performance. These large scale nanocomposites will find applications as structural material, in automotive indust, and as sensors etc.
DEPARTMENT OF COMPUTER SCIENCE
Profile: Dr. Arif Zaman was a member of the Statistics Department at Purdue University and later at Florida State University for 12 years before he joined LUMS in 1994. He has also published papers on generalizations of Markov chains, and on using computers to solve various theoretical problems in mathematics and statistics. His publications have been in various journals including: The Annals of Probability, Mathematics of Computation, Journal of Applied Probability, and Journal of Statistical Computation.

Selected Publications:

- A new class of random number generators G Marsaglia, A. Zaman the Annals of Applied Probability,
- Toward a universal random number generator G Marsaglia, A Zaman, WW Tsang Statistics & Probability Letters 9 (1), 35-39
- Monkey tests for random number generators, G Marsaglia, A. Zaman, Computers & mathematics with applications 26 (9), 1-10
- A random number generator for PC's, G Marsaglia, B Narasimhan, A. Zaman Computer Physics Communications 60 (3), 345-349
- Some portable very-long-period random number generators, G Marsaglia, A. Zaman Computers in physics 8 (1), 117-12

Title: Analysis of winning probabilities in Pakistan Prize Bonds
Pl: Dr. Arif Zaman
Sponsor: K Legal Solicitors
Funding Amount: PKR 1,362,019
Project Initiated in: 2016
Duration: 12 Months
Category: Computer Vision
Description: The aim of this project is to deliver an expert witness report on the analysis of the probabilities of winning multiple lotteries in Pakistan Prize Bonds and an associated software used in computing the above mentioned probabilities.
Profile: Dr. Karim holds a B.Sc. degree from UET Lahore and a doctorate from The Ohio State University (OSU). Before joining LUMS in 2002, he worked as a research associate in the Knowledge Engineering Lab at OSU. Dr. Karim is an internationally recognized researcher in the areas of data mining, machine learning, and applied artificial intelligence. He has authored over 50 articles at leading venues including two books and 19 journal articles. At LUMS, Dr. Karim has been instrumental in developing and strengthening the graduate program in data mining and machine learning. He is founding director of the Knowledge and Data Engineering Lab, which is the center of his research activities. The lab’s recent publication venues include ICDM, CIKM, PAKDD, and COLING. Dr. Karim has supervised four PhD graduates in the data mining/machine learning area.

Recent Publications:

Title: Modeling and Normalizing Roman-Urdu Text for Automatic Processing
PI: Dr. Asim Karim
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 930,000
Project Initiated in: 2016
Duration: 12 Months
Category: Technology
Description: Roman-Urdu is widely used in online textual communications in Pakistan. From SMS messages to Twitter tweets users compose predominantly Urdu content using English alphabets. This writing style has developed to the extent that serious communications like public service messages and advertisements are also being done in Roman-Urdu. Currently, there is no acceptable standard for Roman-Urdu writing, nor is there a reliable way of processing Roman-Urdu text for applications like event detection, topic modeling, and sentiment analysis. The goal of this project is to identify variants of the same word and map all those variants to its normal form. The prime objective is to focus on statistical natural language processing techniques to model and normalize Roman-Urdu text.

Title: An Open-Source Project for Accessible LaTeX-based Authoring and Presentation of Mathematical Documents
PI: Dr. Asim Karim
Sponsor: ICT R&D Fund
Funding Amount: PKR 12,525,099
Project Initiated in: 2015
Duration: 28 Months
Category: Computer Vision
Description: The primary purpose of this project is to develop ALAP, an integrated Accessible LaTeX-based Authoring and Presentation software for PVIs. ALAP will provide advanced math-to-speech and basic math-to-Braille capabilities. ALAP will be developed with open-source technologies to enable its widespread usability. As part of this project, existing technologies for accessible math will also be evaluated. The primary beneficiaries of this project are PVIs in general and those in Pakistan specifically, and educational and business organizations dealing with mathematical content.
Profile: Basit Shafiq received his BS degree in Electronic Engineering from GIIT Institute of Engineering Sciences and Technology, Pakistan, MS and PhD degrees in Electrical and Computer Engineering from Purdue University, USA. He is currently an Assistant Professor in the Computer Science Department at LUMS. Prior to joining LUMS, he was a Research Assistant Professor at the Centre for Information Management, Integration and Connectivity (CIMIC), Rutgers University, USA. Dr. Shafiq’s interests include information systems security and privacy, access-control management in distributed systems, Web services composition and verification, ontologies, and distributed multimedia systems. His research work resulted in several publications in well-renowned journals, including, IEEE Transactions on Knowledge and Data Engineering, ACM Transactions on Information and System Security, IEEE Transactions on Multimedia, IEEE Transactions on Service Computing, IEEE Computer, IEEE Communications Magazine, and Journal on Information and Computer Systems.

Recent Publications


Title: Codec: Composition and Management of E-Government Processes in the Cloud of Public Services

PI: Dr. Basit Shafiq

Sponsor: LUMS Faculty Initiative Fund (FIF)

Funding Amount: PKR 960,000

Project Initiated in: 2015

Duration: 12 Months

Category: Technology

Description: Governments are increasingly investing in their information technology (IT) for provisioning of e-government services. These e-government services can be composed as workflow for realization of intra-departmental or inter-departmental information exchange between different government departments with electronic information exchange. To address the IT infrastructure ownership and management issues, governments are increasingly adopting cloud infrastructure for hosting and deployment of their e-government services. This project addresses the issue of collaborative business process composition through research and development. Specifically, the objective is to develop a framework that enables generation of an executable business process from the high level design specification in an automated manner. The basic idea is to exploit the knowledge of the existing business processes of related organisations to compose an executable business process of a given organisation based on its requirements and design specifications.
Title: Codec: Composition and Management of E Government Processes in the Cloud of Public Services
PI: Dr. Basit Shafiq
Co-PI: Dr. Shafay Shamail, Prof. Nabil Adam (Rutgers University)
Sponsor: Higher Education Commission (HEC)
External Collaboration: Rutgers University
Funding Amount: PKR 20,136,738
Project Initiated in: 2015
Duration: 36 Months
Category: Technology
Description: The objective of the proposed work is to develop a middleware based system (called Codec) to support composition and management of e-government processes by utilizing the services available in the Government Cloud or Public Cloud. The term Government Cloud is used to refer to the cloud infrastructure that hosts the e-government services provided by different government departments but managed by a single cloud service provider which may be a government department. Whereas, Public Cloud infrastructure hosts services provided by commercial or non-governmental service providers (e.g., Amazon, Google). Together, both Government Cloud and Public Cloud form the “Cloud of Public Services.” The proposed Codec system will provide the modeling of the e-government process requirement specifications; composition of an executable e-government process from eservices available in the “Cloud of Public Services” and the process of re-engineering.

Title: A Privacy-Preserving Framework for Collaborative Business Process Composition
PI: Dr. Basit Shafiq
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 450,000
Project Initiated in: 2013
Duration: 12 Months
Category: Development Management
Description: This project addresses the issue of collaborative business process composition through research and development. Specifically, the objective is to develop a framework that enables generation of an executable business process from the high level design specification in an automated manner. The basic idea is to exploit the knowledge of the existing business processes of related organisations to compose an executable business process of a given organisation based on its requirements and design specifications.

Title: Information Sharing and Integration and Framework for Emergency Management and Response
PI: Dr. Basit Shafiq
Co-PI: Prof. Sohaib Ahmad Khan, Prof. Shahab M. Baqai
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 3,278,705
Project Initiated in: 2015
Duration: 24 Months
Category: Technology
Description: The objective of the proposed work is to address the research and development challenges for development of a decision support system for emergency response planning and management. Such a system will enable shared situational awareness (SSA) and common operating picture (COP) among the relevant organizations (governmental, NGOs, private) for the purpose of providing effective decision support concepts at the operational and strategic levels during different phases of an emergency situation (prevention, response, and recovery).
Title: End-to-End Solution for Business Process Composition and Management (BP-Com)
Pl: Dr. Basit Shafiq
Co-Pl: Naveed Arshad, Dr. Shafay Shamail, Prof. Abdul Aziz
Sponsor: ICT R&D Fund
Funding Amount: PKR 12,764,045
Project Initiated in: 2014
Duration: 24 Months
Category: Technology
Description: The project aims at improving efficiency and reducing cost for development, deployment, and management of business processes (BPs) for small and medium enterprises (SMEs). Specifically, the objective is to utilize the cloud-based services and resources for rapid development and deployment of BPs for SME organizations that cannot bear with the high cost of personnel and software/hardware resources for coding, administration, and hosting of their business processes.
Profile: Dr. Hamid Abdul Basit did his bachelor’s from Ghulam Ishaq Khan Institute of Engineering Sciences and Technology (GIKI) in 2000 and his PhD from National University of Singapore in 2007 on the analysis and semi-automated detection of similarity patterns in software. He worked as a post-doctoral researcher in the Software Engineering Lab at NUS in 2006-2007 on the extraction of software design from software similarities. Dr. Hamid developed a tool called Clone Miner for recovering higher-level similarity patterns in software using state-of-the-art string algorithms and data mining techniques. The results were presented at top software engineering conferences.

Recent Publications:

**Title:** Design and Implementation of a Language-Independent Software Clone Management Tool Suite for Single and Multiple Systems  
**PI:** Dr. Hamid Abdul Basit  
**Co-PI:** Dr. Shafay Shamail  
**Sponsor:** LUMS Faculty Initiative Fund (FIF)  
**Funding Amount:** PKR 1,000,000  
**Project Initiated in:** 2014  
**Duration:** 12 Months  
**Category:** Technology  
**Description:** The goal of this project is to develop a prototype tool for complete clone management capability. This includes an integrated environment where developers can locate and mark clones, track them across the different versions of a software system, create a generic representation of a group of clones automatically, and generate new variants of a given clone using the generic representation.

**Title:** Research and Development of a Cloud-based Systematic Code Reuse Platform for Public Administration Web Services  
**PI:** Dr. Hamid Abdul Basit  
**Co-PI:** Dr. Basit Shafiq  
**Sponsor:** LUMS Faculty Initiative Fund (FIF)  
**Funding Amount:** PKR 1,000,000  
**Project Initiated in:** 2015  
**Duration:** 12 Months  
**Category:** Technology  
**Description:** The overall goal of our proposed cloud-based reuse platform for Public Administration (PA) systems is to enable the development of new PA systems using reusable artifacts extracted from existing e-government systems and services. These artifacts will be searched using simple keywords, which would provide the developer with appropriate reusable code artifacts to implement and integrate desired functionality in a time and effort efficient manner. The basis of this research is the integration of solutions offered by independent research areas from software engineering, data mining and service oriented architecture to provide a robust multifaceted solution. The major areas of research include code reuse, code mining, reusable code repositories, keyword based code search, and cloud computing.
Title: Design and Implementation of a Language Independent Software Clone Management Tool Suite for Single and Multiple Systems
PI: Dr. Hamid Abdul Basit
Co-PI: Dr. Shafay Shamail, Dr. Basit Shafiq
Sponsor: National ICT R&D Fund
External Collaboration: Softech Systems
Funding Amount: PKR 17,099,617
Project Initiated in: 2015
Duration: 24 Months
Category: Technology
Description: Pakistan has a growing software industry with revenues exceeding couple of billion dollars. This project proposal aims to design and develop the prototype of a software engineering tool to be used by the software development organizations. The tool will capitalize on the untapped potential of software similarities (code clones) that abound in existing software systems, helping our software industry to increase its efficiency in software development, and to enhance its potential to capture new customers and new market segments globally.
Profile: Ihsan Ayyub Qazi received his BSc (Hons) degree from the Lahore University of Management Sciences (LUMS), Pakistan with a double major in Computer Science and Mathematics, in 2005, and the PhD degree in Computer Science from the University of Pittsburgh, PA, in 2010. From 2010 to 2011, he was a Postdoctoral Research Fellow with the Centre for Advanced Internet Architectures, Australia. In 2009, he worked at BBN Technologies, Cambridge, MA USA on the Global Environment for Network Innovations (GENI) project. His research interests are in computer networks and distributed systems and span cloud computing and data centres, high speed wireless networks, smart grids, and performance modelling of networked systems. He has published in top-tier networking journals, such as IEEE/ACM Transactions on Networking, as well as top-tier conferences (e.g., ACM SIGCOMM and IEEE INFOCOM). He is the recipient of the Andrew Mellon Fellowship and the Best Graduate Student Research Award from the University of Pittsburgh in 2009. His research has been sponsored by the United States National Science Foundation (NSF), Australian Research Council (ARC), University of Pittsburgh, and LUMS. He is a member of ACM and IEEE.

Recent Publications:

Title: A High Performance Cloud Data Center Architecture Using Software-Defined Networks
PI: Dr. Ihsan Ayyub Qazi
Co-PI: Dr. Zartash Afzal Uzmi
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 5,612,842
Project Initiated in: 2015
Duration: 24 Months
Category: Technology
Description: The goals of this paper are to: (i) design and analyse a high performance cloud data centre network architecture using Software-Defined Networks (SDNs) to address critical challenges of performance and efficiency in such environments; (ii) design and analyse a scalable and low-complexity framework (including protocols and algorithms) for monitoring and managing cloud data centre resources, and (iii) implement a prototype and demonstrate the efficacy of the proposed scheme in achieving high performance. The proposed architecture has many advantages, including high performance due to its ability to manage cloud resources using a distributed control framework for the SDN traffic, scalable monitoring by using a framework that collects statistics from network devices in an efficient manner, as well as scalability of SDN management, leveraging the hierarchical structure of data centre topologies and the use of low-complexity algorithms for coordination.
Title: Towards Predictable and Resilient Multi-Tenant Cloud Datacenters  
PI: Dr. Ihsan Ayyub Qazi  
Co-PI: Dr. Zartash Afzal Uzmi, Dr. Fahad Rafique Dogar (Assistant Professor, Computer Science Department, Tufts University, USA)  
Sponsor: LUMS Faculty Initiative Fund (FIF)  
Funding Amount: PKR 960,000  
Project Initiated in: 2015  
Duration: 12 Months  
Category: Technology  
Description: Users increasingly rely on cloud computing services for managing their computation, storage and communication requirements. Thus, a key goal for cloud datacentres is to provide predictable performance to tenants. Unpredictable performance in not only a key hindrance to cloud adoption but also hurts application performance and causes provider loss. While prior works improve predictability by guaranteeing each tenant a certain minimum network bandwidth, they ignore an important reality of datacentres: failures. The goals of this project are as follows: (i) to analyse the resilience properties of existing data centre topologies (e.g. FatTree and Jellyfish) under realistic datacentre workloads; (ii) to design, analyse and implement resource management techniques for providing resilience (including design of the control plane and the data plant) in datacentre architecture; (iii) to quantify the cost of providing resilience on datacentre topologies (the cost is usually in terms of cloud resources such as replicas of VMs and backup network bandwidth reservations); (iv) to design new datacentres topologies with predictable performance and resilience to failures as first order goals.

Title: Joint Congestion Control and Load Balancing in Cloud Data Centers Using SON  
PI: Dr. Ihsan Ayyub Qazi  
Sponsor: National ICT R&D Fund  
Funding Amount: PKR 79,500  
Project Initiated in: 2015  
Duration: 8 Months  
Category: Technology  
Description: By using end-host SDN controllers at the end hosts, the project aims to vastly improve the performance of data center networks. The objective is to conduct a thorough analysis of the designed protocol on a real test bed as well as in simulations and reach a working deployable implementation of the SDN-based protocol and a detailed measurement study. The intent is to build efficient and low cost data centers for developing regions like Pakistan. Improved management of data center resources will allow for high performance at low costs. Moreover, it will allow dynamic power management techniques for reducing electricity costs in such data centers. This will benefit the Governments, NGOs, and Universities.

Title: RoWiFi: Long Distance WiFi with Rotating Antennas  
PI: Dr. Ihsan Ayyub Qazi  
Sponsor: National ICT R&D Fund  
Funding Amount: PKR 86,250  
Project Initiated in: 2015  
Duration: 8 Months  
Category: Technology  
Description: This project aims to implement a wireless rate-adaptation scheme suitable for a rotating system that suffers from disconnections at large distances when the antenna faces away. The experimentation involves generating sample network traffic using the iPerf traffic generator. This will involve sending traffic from the central rotating node to receiving devices at long distances and study the effect on connectivity.
In Wireless Local Area Networks (WLANs) access points operate independently and the lack of coordination among them affects network performance in several ways. The goal of this project is to design and implement a centralized controller for WLANs which knows the overall network state and can configure parameters of all the access points in a network to maximize performance gains. In a centralized WLAN system, there are many opportunities to enhance the throughput of the network. A centralized controller which is aware of the global state, knows the network topology, and can differentiate between different traffic types has the potential to significantly increase the performance of a WLAN.

The aim of this project is to produce a working real test bed implementation of efficient and resilient datacenter as well as a flow-level simulator that will be able to reserve more primary bandwidth than previous implementation while keeping the probability of service level agreement (SLA) violations low. This project is that data centers would be able to accommodate more customers at the end of this project. As a result, hopefully, we should see more support and infrastructure available for users in Pakistan such that they would be able to avail the facility of cloud computing more easily. Especially as more customers could be accommodated with less requirements.
Profile: Dr. Awais received his PhD from Imperial College, University of London. Prior to joining LUMS, Dr Awais conducted European Union research and development projects for a UK based SME. His PhD work was related to the development of online models for parametric estimation of solid fuel-fired industrial boilers. Dr Awais has also conducted research work on a class of iterative methods pertinent to Krylov subspaces for optimisation, such as the oblique projection and implicitly restarted model reduction methodologies.

Recent Publications:

Title: Knowledge Management for All - Tool (KMAT)
PI: Dr. Mian Muhammad Awais
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 2,429,067
Project Initiated in: 2015
Duration: 16 months
Category: Technology
Description: Knowledge is considered a broad concept and in the decade interest in treating and processing knowledge has grown tremendously. This importance has arisen due to the emphasis on knowledge economy. The interest in KM and KM systems has given a thrust to formalizing the domain of KM. In the recent past the competitive edge which the application of KM systems has provided to organisations has further strengthened the belief in developing such systems. KM is a multi-dimensional and faceted concept. This project aims at developing a generic knowledge management system, Knowledge Management for All Tool (K-MAT) that would have the following features: (i) readily integrable to most common existing DIMS, and legacy systems; (ii) Adaptable for any SME sector with complete KM control; (iii) Easily manageable by SMEs without incurring specialised human resource cost.
Profile: Dr. Muhammad Fareed Zaffar is an Assistant Professor of Computer Science at the School of Science and Engineering (SBASSE) at LUMS. He holds a PhD in Computer Science from Duke University, with specialisation in network and distributed systems security. Prior to joining LUMS, Dr. Zaffar worked at IBM and SRI International. He has provided technical assistance to the National Judicial Automation Commission (NJAC) in finding technology based interventions in order to facilitate transport and efficient management of the judicial system in Pakistan. Dr. Zaffar’s research interests include Network and Distributed Systems Security as well as in networking, storage systems, computer architecture, as well as performance evaluation and distribution systems.

Selected Publications:

Title: Access to Justice for Poor and Vulnerable Groups through Support to Legal and Civil Society Organisations and Judiciary in Punjab, Pakistan
PI: Dr. Muhammad Fareed Zaffar
Sponsor: Global Development Services International (GDSI)
Funding Amount: PKR 3,079,560
Project Initiated in: 2015
Duration: 10 months
Category: Law & Policy
Description: The proposed scope of work for this project includes documentation of up to date statistics and the preparation of flow-charts to understand existing processes in courts of Multan, Bahawalpur and Muzaffargarh. It will also include analysis of the documented material with an aim to streamline laws and procedures to highlight service delivery gaps which can serve as foundation for any future interventions. More specifically, proposed scope of our project can be divided into the following parts: Documentation of up-to-date statistics as well as the parallel assessment of caseload and case processing rimes in prosecutor office.

Title: Learn While You Teach
PI: Dr. Muhammad Fareed Zaffar
Sponsor: Society for Advancement of Higher Education (SAHE)
Funding Amount: PKR 2,620,365
Project Initiated in: 2015
Duration: 13 months
Category: Education
Description: The project seeks to develop an android based application which will allow record attendance of teachers per visit as well as provide a video browsing menu for DTE to videos filtered by school, teachers and class. In addition to this, the android application will provide the facility to update videos to the tablet using cards, submit data from the application to a central server and collect data in a manageable format. The android application will contain both English and Urdu Language support.
**Title:** Development of Software for Punjab Prosecution Department- SPPS Project  
**PI:** Dr. Muhammad Fareed Zaffar  
**Co-PI:** Dr. Sohaib Ahmad Khan  
**Sponsor:** Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)  
**Funding Amount:** PKR 2,865,651  
**Project Initiated in:** 2014  
**Duration:** 12 Months  
**Category:** Law & Policy  
**Description:** The major problem lies in the tracking of files at different stages in the prosecution process. Dr. Muhammad Fareed Zaffar addresses the problem in four stages. Firstly, a detailed study of the business processes is expected to be conducted including identification of existing and potential bottlenecks. Secondly, an online software prototype is expected to be developed to capture data at each entry and transition point in the lifecycle of a case. The aim is to make the interface as simple as possible so it does not add to the workload of prosecutors and junior staff. A minimum viable product is intended to be quickly developed and launched in the model prosecution branch. Thirdly, based on the feedback of users, the entry forms are considered to be enhanced and streamlined. Fourthly, the final version of the software and the lessons learned are expected to be documented and shared in the form of a report.

**Title:** Re-development of software (Prosecution Case Flow Management System) for public criminal prosecution services (PCPS) in Punjab.  
**PI:** Dr. Muhammad Fareed Zaffar  
**Co-PI:** Dr. Sohaib Ahmad Khan  
**Sponsor:** Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)  
**Funding Amount:** PKR 2,924,995  
**Project Initiated in:** 2015  
**Duration:** 12 Months  
**Category:** Law & Policy  
**Description:** In order to propose a model to improve the overall prosecution process, Prosecution department facilitated a pilot effort in 2014 supported by GIZ to automate the process flow to encourage maintenance of a live database to address these dated challenges. The technical support was provided by Technology for People Initiative at Lahore University of Management Sciences. The initiative was successful in highlighting the importance of IT-based systems in the department and the rollout in the field provided necessary lessons learnt by exposing shortcomings and challenges in its adoption in daily prosecutorial work. The steep learning curve during the pilot implementation provides a foundation for a redesign of the system, while incorporating the up-dated needs and requirements of the reforming prosecution department. This proposal highlights the Scope of Engagement by Technology for People Initiative, the technology partner, in the next phase of implementation, which concentrates on redesign and adaptation on current redefined needs based on lessons during first phase of pilot implementation.

**Title:** STATISTAN  
**PI:** Dr. Muhammad Fareed Zaffar  
**Co-PI:** Dr. Tariq Mahmood Jadoon, Dr. Suleman Shahid  
**Sponsor:** United States Institute of Peace (USIP)  
**Funding Amount:** PKR 7,858,630  
**Project Initiated in:** 2016  
**Duration:** 16 Months  
**Category:** Development Management  
**Description:** In this project Dr. Muhammad Fareed Zaffar under Technology for People Initiative (TPI), propose to develop an innovative data platform called Statistan: an open-access web tool that would allow users to visualize structured datasets using maps and charts along with a sub-platform that aims to stimulate a culture of civic engagement with data and research by tracking the mood of the country across different times and after historic events.
Title: STATISTAN and MOODISTAN
PI: Dr. Muhammad Fareed Zaffar
Co-PI: Dr. Suleman Shahid
Sponsor: Center for Economic Research in Pakistan (CERP)
Funding Amount: PKR 1,885,410
Project Initiated in: 2016
Duration: 12 Months
Category: Development Management
Description: Dr. Fareed Zaffar along with TPI-LUMS will be developing a two-part data innovation platform that aims to expose policymakers, young researchers, NGOs and the public to high quality data and research in useful, interesting and compelling ways as a means of increasing the demand and ability to use this information. The first platform, called Statistan, targets policymakers, researchers, journalists and NGOs to increase the availability of meaningful data and research on the specific issue areas in which they work. The second platform a mood analyzer, Moodistan, which will be able to evaluate how different media agencies report same news items and how the citizens’ mood can be gauged from it.

Title: Improve Efficiency, reliability and trenchancy of the school education department by automating HR processes
PI: Dr. Muhammad Fareed Zaffar
Sponsor: Adam Smith International (ASI)
Funding Amount: PKR 5,344,979
Project Initiated in: 2015
Duration: 10 Months
Category: Development Management
Description: The overall objective of the project is to improve efficiency, reliability and transparency of the school education department by automating the HR processes. This system will enable the authorities to make informed decisions based on reliable information, in a timely manner.
Dr. Muhammad Hamad Alizai
Department of Computer Science, SBASSE
hamad.alizai@lums.edu.pk
+924235608479

Profile: Dr. Muhammad Hamad Alizai completed his BSc Computer Engineering from UET Peshawar, and his MSc in Software Systems Engineering and PhD in EE and CS from RWTH Aachen University, Germany. Dr. Alizai has over 10 years of experience in Germany and Pakistan as a researcher, software engineer, and technical lead both in industrial and academic settings. He has authored book, book chapters and published numerous scientific papers, while abroad and indigenously from Pakistan, several of them in top flight ACM SIG sponsored venues. He is experienced in leading innovative research projects in pervasive computing technologies such as Internet of things, sensor and delay tolerant networks, ICT4D, and mobile computing. He was employed as a software engineer in several European Union projects and has a wealth of experience in teaching/training cutting edge technologies and courses in theoretical and practical computer sciences at grad, post grad and professional level. He is also a visiting researcher at alma mater - ComSys, RWTH Aachen, Germany - due to his post graduate research excellence.

Most Cited Publications:

Title: iCompute
PI: Muhammad Hamad Alizai
Co-PI: Prof. Klaus Wehrle, RWTH Aachen University
Sponsor: German Pakistani Research Cooperation Programme (DAAD)
External Collaboration: RWTH Aachen University
Funding Amount: PKR 8,945,976
Project Initiated in: 2015
Duration: 24 Months
Category: Technology
Description: Miniaturized self powered devices are transforming the way we interact with everyday physical objects. These devices, as part of the Internet of Things (IoT), embed computing in the physical world and deliver their data over a low-power, wireless mesh network. As these devices become smaller and more numerous, possibly the next billion, plugging them in to provide power is unfeasible. Computing at such scales is thus difficult to realize until these devices either find their own energy, possibly by harvesting ambient sources or charged wirelessly from a remote location, excluding the need for intrusive power infrastructure. However, ambient and wireless energy sources are both intermittent and unpredictable. Thus there is a need to adapt computing and communication to this new constraint of unpredictable and intermittent supply of energy. This requires revisiting basic assumptions about system startup, state checkpointing across activation cycles, discovering and communicating with neighbors, predicting future energy availability, and scheduling operations under energy uncertainty. The key idea of this proposal is to develop a new computing paradigm that will enable IoT devices to resume their operation, not restart from scratch, across different activation cycles.
**Title:** Intermittent Computing for the Intermittently Powered Internet of Things  
**PI:** Dr. Muhammad Hamad Alizai  
**Co-PI:** Dr. Tariq Mahmood Jadoon  
**Sponsor:** LUMS Faculty Initiative Fund (FIF)  
**Funding Amount:** PKR 1,000,000  
**Project Initiated in:** 2015  
**Duration:** 12 Months  
**Category:** Technology  
**Description:** The scope of this project is to investigate the challenges and implement a prototypical solution along the first dimension (system software) of IoT operation. The objective is to start a new research initiative at LUMS in this area, ultimately seeking funds from national and international funding agencies for further investigations along the other two dimensions.

**Title:** Extending the Cyberphysical Systems R&D Paradigm using Energy Transference  
**PI:** Dr. Muhammad Hamad Alizai  
**Co-PI:** Dr. Syed Affan Ahmed – Director Engineering, PLUMgrid Inc.  
**Sponsor:** Higher Education Commission (HEC)  
**Funding Amount:** PKR 5,207,031  
**Project Initiated in:** 2016  
**Duration:** 21 Months  
**Category:** Technology  
**Description:** The main objective of this project is to develop the world’s first energy transference system to route energy from energy-abundant locations within a deployment to where the energy is most needed. An equally important objective is to quantify the benefit of such an architecture, thereby convincing the academic, research and industrial communities of the viability of new and ground-breaking idea. Another objective is to identify and enable new and interesting, both to academia and the industry, applications that are enabled on through our proposed architecture. Due to the cutting-edge nature of this project, successful completion of this project will result in a number of highly visible research (conference and journal) publications. These publications can make Pakistan visible as a credible partner in the worldwide systems research community. This will bring positive visibility to the emerging research culture in Pakistani universities.
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Profile: Dr. Taj earned his PhD and MSc degrees in electronic engineering and computer science from Queen Mary University of London (QMUL), United Kingdom, in 2009 and 2005, respectively. He received his BE (IT) degree (with distinction) in Engineering from Hamdard University, Pakistan, in 2003. Currently, he is holding the position of Visiting Assistant Professor at Lahore University of Management Sciences, Pakistan. His research interests are object detection and tracking using multimodal sensors. He has served as a reviewer for the IEEE Transactions on Circuits and Systems for Video Technology and the International Workshop on Content-Based Multimedia Indexing. He has also served as the Electronic Media Chair of IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS 2007).

Recent Publications:

Most Cited Publications:

Title: Digital Preservation Pakistan’s Heritage
PI: Dr. Murtaza Taj
Co-PI: Dr. Sohaib Ahmad Khan, Nadhra Shahbaz Naeem Khan
Sponsor: U.S Agency for International Development (USAID) | LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 18,382,000
Project Initiated in: 2014
Duration: 12 Months
Category: Computer Vision
Description: Pakistan has inherited several prestigious significant monuments and historical sites. On every step is a magnificent cultural heritage site that captivates the attention of many and is a striking contrast against the sky-high buildings and malls which surround it today. This project, funded by Ambassador’s Fund Program which is a 1 year project of U.S. Agency for International Development (USAID), seeks to preserve several sites and monuments using 3D models with high resolution images of frescos and artwork. One of the aim of this project is to promote virtual tourism which will ultimately promote actual tourism and portray a soft image of Pakistan in the outside while simultaneously preserving the history for future generations. To carry out digital preservation, laser scanners will be used. At present, the three historic sites are planned to be digitally preserved which include the beautiful Masjid Wazir Khan in Punjab, the majestic Kot Diji Fort in Sindh with its 50 bastions and the aesthetic Shah Jahan Masjid which stands, in all its glory, in Sindh. In future, the plan is to extend this project to cover other heritage sites as well.
Title: Augmented Reality Enabled by Scalable, Adaptive Projector Kinect Units  
Pl: Dr. Murtaza Taj  
Sponsor: National ICT R&D Fund  
Funding Amount: PKR 82,500  
Project Initiated in: 2015  
Duration: 15 Months  
Category: Computer Vision  
Description: The project is an extension and refinement of the RoomAlive project of Microsoft where an immersive, augmented reality experience for a user is generated inside any room. The user can interact with virtual objects that co-exist with his or her physical existing environment. The Project is divided into 3 phases. Phase 1 involves generating a 3D model of a static scene in a room with the help of 4 kinects using kinect fusion. Phase 2 involves projecting images/animations on the walls/floors of the room with the help of 4 projectors, attached alongside each kinect. Phase 3 involves human interaction with the projected images/animations.
Dr. Naveed Arshad
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Profile: Dr Naveed Arshad completed his PhD from University of Colorado at Boulder, USA. Before joining LUMS, he has worked with ABN AMRO Global IT Systems, Pakistan International Airline. He is a part of the Software Engineering Research Group (SERG) at LUMS which undertakes research in various areas of software engineering such as engineering of autonomic systems, conceptual modelling, large scale systems development, etc.

Recent Publications:

Title: GreenSMS: A Low-cost and Non-invasive System to Reduce Load Shedding
Pl: Dr. Naveed Arshad
Co-Pl: Dr. Mohammad Jahangir Ikram
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 580,000
Project Initiated in: 2014
Duration: 12 Months
Category: Energy
Description: This project presents an idea of an SMS based energy notification system to reduce electricity usage. The system is called as GreenSMS. The goal of GreenSMS system is to provide a low-cost and non-invasive capability of avoiding power shutdowns as much as possible. This notification system monitors the demand and supply of the electricity. As soon as the demand is surpassing the supply it sends out SMS notification to the people in the community. The SMS warns the community of an imminent load shedding and urges them to reduce electricity usage by turning off extra electric appliances, lights, fans etc. It is believed that even if a small part of the community responds to the call of energy conservation it could result in avoiding load shedding.

Title: Attaining Maximum Solar Energy through Fine Grained Clustering in Home Area Networks
Pl: Dr. Naveed Arshad
Co-Pl: Dr. Mohammad Jahangir Ikram
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2014
Duration: 12 Months
Category: Energy
Description: In this proposal, the aim is to discuss the design and development of a standalone PV system that intelligently utilizes maximal PV energy during daytime with minimal batteries. This system is mostly targeted towards small-scale commercial consumers but could be installed on any building where most consumption is during daylight hours such as schools. To reap maximum benefits from solar energy this system is primarily developed and designed for tropical regions where daylight is available during official working hours throughout the year.
Title: Simulation Modeling, Analysis and Forecasting of Electricity generation and consumption in Pakistan using System Dynamics approach
Pl: Dr. Imran Mahmood- National University of Sciences and Technology (NUST)
Co-Pl: Dr. Naveed Arshad
Primary Sponsor: U.S Agency for International Development (USAID)
Secondary Sponsor: National University of Sciences and Technology (NUST)
Funding Amount: PKR 2,980,200
Project Initiated in: 2016
Duration: 12 Months
Category: Energy
Description: Electricity usage planning is a main concern for electricity stakeholders in a country. To meet the compelling demand for electricity and to deal with different uncertainties involved in this process, development of sustainable policies through proper planning is becoming increasingly challenging. The current project proposes development of a macro level, multi-scale, multi-resolution, hierarchical simulation model of nationwide energy generation and consumption using System Dynamics approach. The SD based simulation will provide a conceptual modeling framework and a tool for simulation, visualization and analysis of the future demand and supply of electricity energy in Pakistan. Furthermore various influencing factors including prices, tariffs, policies, regulations, available resources and the environment will be coupled with the simulation model to study their sensitivity. The proposed simulation framework will be used by analysts to answer different energy related research questions, which further will lead the decision makers to adopt optimal choices for future electricity energy planning in the country.
DEPARTMENT OF ELECTRICAL ENGINEERING
Profile: Dr. Abubakr received his PhD in Electrical Engineering from Georgia Institute of Technology (2005). As a graduate student, he also got a Masters degree in Mathematics (2005) and a Masters degree in Electrical Engineering (2002) from Georgia Tech. He completed his BSc in Electrical Engineering from the University of Engineering & Technology Lahore, Pakistan (2000). Before joining LUMS, he has taught and done research as a postdoctoral fellow at McGill University Canada (2007-2008) and at the University of Pennsylvania, USA (2006-2007). Dr. Abubakr Muhammad does fundamental research at the interface of systems engineering, applied mathematics and applied physics, on various problems in robotics, and distributed sensing, network dynamics and quantum information sciences. His interests span the study of connections and complexity in large-scale distributed networks; topological methods for information discovery in massive data sets; and communication, computation & control issues in the physics of information. He has also worked and consulted for the industry on the design of air traffic control systems, radar & sonar systems, communication equipments and medical instrumentation. His current research focuses on the development of cyber-physical systems for development and critical infrastructures in Pakistan, in particular issues related to water.

Recent Publications:

Title: Canal Drones: Precise 3D Profiling of Siltation in Waterways
PI: Dr. Abubakr Muhammad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 792,000
Project Initiated in: 2014
Duration: 12 Months
Collaborator: Robotics Research Lab, TU Kaiserslautern
Category: Robotics
Description: The study proposes to develop a 3D perception system, which can be deployed on a commercial agricultural machine (excavator or a tractor) or on board a micro aerial vehicle to assist the human operator in cleaning the canal effectively. State of the art techniques from field robotics and visual mapping algorithms such as SLAM (Simultaneous Localisation & Mapping) are expected to be deployed to process sensor data from 3D laser scanners and RGB-D cameras to create precise 3D terrain profiles of the canals. The profiles help in identifying defects in canal linings, locate and estimate silt accumulations and help the human operator continuously monitor the excavation operation.
Title: RoPWAT: Robotic Profiling for Clearing Waterways  
PI: Dr. Abubakr Muhammad  
Sponsor: German Pakistani Research Cooperation Programme (DAAD)  
Funding Amount: PKR 794,160  
Project Initiated in: 2014  
Duration: 36 Months  
Collaborator: Robotics Research Lab, TU Kaiserslautern  
Category: Robotics  
Description: Every year a forced closure of the canals is inevitable for canal cleaning, entailing a very large scale and costly operation. The extent and precision of silt removal is prone to inefficiencies due to subjective decision making in the cleaning process, shortage of time and lack of verification. This proposal is aimed at developing a semi-autonomous robotic profiling system to increase the efficiency of this process. We propose to develop a 3D perception system, which can be deployed on a commercial agricultural machine (excavator or a tractor) or on board a micro aerial vehicle to assist the human operator in cleaning the canal effectively. The proposed system envisages efficient cost effective cleaning, reduced water discharge variability, and enhanced agricultural productivity.

Title: Real Time Control of Irrigation Network  
PI: Dr. Abubakr Muhammad  
Sponsor: National ICT R&D Fund  
Funding Amount: PKR 53,613  
Project Initiated in: 2014  
Duration: 12 Months  
Category: Water  
Description: This project aims to automate the control of water flow in irrigation canals especially in the context of Pakistan’s Irrigation network and provide the appropriate demand response catering to the needs of the end user. This will not only improve the efficiency of the system as compared to the current setup used for water supply but also provide a deployable and scalable solution to control water supply with minimum involvement of active labor. The final objective of the project is to develop an autonomous closed-loop feedback control system that is capable of maintaining the water level of the canal at a particular reference level.

Title: Development of Water Resources Management Information System (WRMIS) and Decision Support System (DSS) For Efficient Irrigation Water Management in Punjab  
PI: Dr. Abubakr Muhammad  
Sponsor: National Engineering Services Pakistan (NESPAK)  
Funding Amount: PKR 1,611,500  
Duration: 4 Months  
Project Initiated in: 2015  
Category: Development Management  
Description: The overall scope of this consultancy is to assist Water Resources Management Information System (WRMIS) in the Modeling, Development of system-wide flow routing model through rivers and link canals based on water availability in the basin, irrigation water requirements and other constraints and the optimization, Developing optimal routes of river reaches and link canals to meet the demands at system nodes (barrages) keeping in view the lag times and complexity of the system.
Title: Safe Roadmaps: Vehicle-specific Traversability & Safety Verification of Broken-Roads and Off-Road Pathways  
PI: Dr. Abubakr Muhammad  
Co-PI: Dr. Haider Ali, German Aerospace Center (DLR), Munich, Germany  
Sponsor: LUMS Faculty Initiative Fund (FIF)  
Funding Amount: PKR 963,000  
Project Initiated in: 2015  
Duration: 12 Months  
Category: Development Management  
Description: The need to build and improve on transportation facilities and road networks is an important pillar of Pakistan's development strategy and a prime driving force for industrial development, agricultural productivity and improvements in education, healthcare and other services. In Pakistan, roads undergo rapid deterioration due to various economic, social and technical reasons. The uncertainty and unavailability of road safety information has become a major issue in reliably transporting agricultural produce to markets, movement of heavy machinery and oversized cargo to remote localities, transport of people and materials to/from disaster areas and in even giving plain guarantees for safe traversability of a road that is good on paper. In this project the aim is to propose a revolutionary approach towards reducing this uncertainty. Instead of asking qualitative questions about whether a road network is generally traversable for a general class of vehicles, the focus is on providing a solution that will give precise quantitative answers as a distance modulated roadmap and confirm whether a particular segment of the road is traversable for a particular type of vehicle.

Title: Water Informatics & Technology - Center of Water Research at LUMS  
PI: Dr. Abubakr Muhammad  
Sponsor: Nestle  
Funding Amount: PKR 10,000,000  
Project Initiated in: 2015  
Duration: 60 Months  
Category: Development Management  
Description: Pakistan is facing rapid large-scale environmental changes unleashed by climate change; historical forces driven by social, political and demographic changes; and global transitions triggered by new technologies and changes in living style. The impact of these changes is felt most in the water sector in poor management of irrigation networks, depleting groundwater, deterioration in water quality, poor sanitation and difficulties in preservation of eco-systems. Engineers, scientists, economists and policy makers must pay attention to understanding these issues in developing new technologies, solutions and institutions under integrated frameworks for tackling the governance issues of participatory management, water entitlements and accountability. In this context, the aim of this project is to establish an interdisciplinary center for research on water at LUMS with a particular focus on areas of systems analysis and hydro-informatics.
Profile: Dr. Ahmad Kamal Nasir is director of Engineering Laboratory at LUMS and he is an assistant professor (IPFP) of electrical engineering at LUMS. He received his PhD in Mobile Robotics in 2014 from University of Siegen, Germany on Cooperative SLAM. As a graduate student, he also obtained two masters degrees in Mechatronics from Uni-Siegen and UET Lahore. Before that, he completed his BSc in Mechanical Engineering from UET Lahore, Pakistan. He has also worked in industry as product development manager at research and development department of MicroTech Industries, Lahore, Pakistan. In 2014, he joined LUMS and affiliated with CYPHYNETS, the Laboratory for Cyber Physical Networks and Systems at LUMS. He does research in mobile ics, computer vision and embedded control systems. Dr. Nasir’s students are developing visual-inertial navigation devices and control systems for aerial robots.

Selected Publications:

- Ahmad Kamal Nasir, Hubert Roth. (2012). Pose Estimation by Multisensor Data Fusion of Wheel encoders, Gyroscope, Accelerometer and Electronic Compass. 1st IFAC Conference on Embedded Systems, Computational Intelligence and Telematics in Control.
- Ahmad Kamal Nasir, Aiman Hsino, Klaus Hartmann, Cheng Chen, Hubert Roth. Heterogeneous Capability Multi-Robots Cooperative Framework. 1st IFAC Conference on Embedded Systems, Computational Intelligence and Telematics in Control, 2012 Würzburg, Germany.

Title: Embedded 6 DOF Visual-Inertial Odometry for Aerial and Ground Robots

PI: Dr. Ahmad Kamal Nasir
Co-PI: Dr. Abubakr Muhammad
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 500,000
Project Initiated in: 2014
Duration: 12 Months
Category: Robotics

Description: This research aims to create an inexpensive solution based on mobile devices which can be used as standalone navigation device by aerial and ground mobile robots. The project seeks to use a cheap android based tablet, which nowadays has enough computational power, to perform real time navigation for aerial and ground mobile robots. The proposed solution helps to reduce the unbounded IMU pose drift errors and therefore makes it possible to use the mobile platform as standalone device for mobile robot applications. This proposed inexpensive navigation solution will assist humans and mobile robotics platforms to accurately determine their 6 DOF pose in the absence of external localising systems.
**Title:** Precision Forestry: GreenDrone - Deforestation and Forest Degradation Estimation using an Unmanned Aerial Vehicle  
**PI:** Dr. Ahmad Kamal Nasir  
**Co-PI:** Dr. Mian Muhammad Awais, Prof. Hubert Roth - University of Siegen, Germany  
**Sponsor:** German Pakistani Research Cooperation Programme (DAAD)  
**External Collaboration:** University of Siegen, Germany  
**Funding Amount:** PKR 9,016,218  
**Project Initiated in:** 2015  
**Duration:** 24 Months  
**Category:** Robotics  
**Description:** This research cooperation focuses on the installation of a long-term research cooperation between the University of Siegen and the Lahore University of Management Sciences. The joint research collaboration will explore the possibilities of development of low-cost robotic systems for aerial mapping of forests using Unmanned Aerial Vehicles (UAV(s)) in order to estimate carbon sink and/or stock in forest vegetation.

**Title:** Development of a low cost high resolution aerial mapping system for carbon sequestration: Potential of trees in and around Lahore city  
**PI:** Dr. Ahmad Kamal Nasir  
**Co-PI:** Dr. Mian Muhammad Awais  
**Sponsor:** LUMS Faculty Initiative Fund (FIF)  
**Funding Amount:** PKR 965,000  
**Project Initiated in:** 2015  
**Duration:** 12 Months  
**Category:** Robotics  
**Description:** The proposed research project will explore the possibilities of development of low-cost robotic systems for aerial mapping of areas using Unmanned Aerial Vehicles (UAV(s)) in order to estimate carbon sink and/or stock and vegetation. The system can be used as a monitoring, reporting and verification tool for Reducing carbon Emission of Deforestation and forest Degradation (REDD). Since the research topic has a big impact on the environmental sustainable development, therefore, we focus of the project would also be to evaluate the possibilities to apply it for bigger funds such as United Nation REDD+ Program.

**Title:** Autonomous Control of unmanned ground vehicle  
**PI:** Dr. Ahmad Kamal Nasir  
**Co-PI:** Dr. Abubakr Muhammad  
**Sponsor:** National ICT R&D Fund  
**Funding Amount:** PKR 83,000  
**Project Initiated in:** 2014  
**Duration:** 8 Months  
**Category:** Robotics  
**Description:** Cutting grass with traditional lawn mowers is a hectic and menial task. The automated lawn mowers available in the market requires the user to setup a border around the lawn that defines the area to be mowed. The aim of this research project at CYPHYNETS lab at LUMS-SSE is to develop a lawn mower that works in any unknown environment without any human intervention.
Profile: Dr. Farasat Munir received his B.S. in electrical engineering from University of Engineering and Technology, Lahore, Pakistan. Following that he worked in the industry in the field of Image processing, Machine vision, and Communication system design. He later received Fulbright scholarship and went to Georgia Institute of Technology, Atlanta, USA, where he earned his Masters and Ph.D in electrical engineering. His Ph.D. work focused on the design of highly sensitive and selective biosensors for cancer diagnosis and prognosis. After Ph.D, he joined Emory University, USA as a Post-Doctoral Fellow where he worked on the design of a biomedical system for radiation compatible ultrasonic image acquisition and processing. Since 2014 he is working as an Assistant Professor in the department of electrical engineering at SBA School of Science and Engineering LUMS, Pakistan. At LUMS his focus is on multidisciplinary experimental research involving areas of Physics, Electrical engineering and Biomedical engineering. His research interests include biosensors, biomedical instrumentation, MEMS, RF and Microwave circuits and Microelectronic fabrication. He has published in several peer reviewed international journals and conferences.

Selected Publications:
- A Novel Technology for Automatically Obtaining Digital Facial Photographs Near-Simultaneously with Portable Radiographs
  Ramamurthy, P Bhatti, F Munir, T Ng, K Applegate, S Tridandapani
- Multi-mode bulk-acoustic-wave resonators
- Thin-film bulk acoustic wave delay line

Title: Development of an ultrasonic test bed for biomedical and detection applications.
P: Dr. Dr. Farasat Munir
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Technology
Description: The purpose of this project is to develop a test bed that can be used to train students and develop an understanding of various aspects of the ultrasonic system design. Our approach in the design of this platform is the development of modular software and hardware components. Moreover we are aiming to have the hardware system in particular to be configurable and will explore the approach of software defined radio (as in communication systems). This platform will allow us to develop and test not only novel algorithms but also develop ultrasonic systems for a variety of applications due to the configurability of the hardware.
Profile: Dr. Khan received a BEng degree in electronic engineering from GIKI, Pakistan in 2005. From 2005 to 2010, he was with School of Electrical Engineering, The University of Manchester, UK where he first received his MSc (with distinction) and then PhD in electrical and electronic engineering. His doctorate thesis was on characterisation of GaAs and InP based devices for optoelectronic applications. His current work is on the research and development of solar cells through low cost techniques and optimised conversion and transmission of the generated energy to diversify power systems. His research work has been published in top tier journals such as IEEE Quantum Electronics, IEEE Electron Device Letters, Journal of Applied Physics, IET Optoelectronics, European Physical Journal and Renewable & Sustainable energy reviews.

Selected Publications:


Title: Power Flow Control for Optimised Solar PV Systems
Pt: Dr. Hassan Abbas Khan
Co-Pt: Mr. Nauman Ahmad Zaffar
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 940,000
Project Initiated in: 2014
Duration: 12 Months
Category: Energy
Description: The basic goal of this research is to develop system to allow maximum utilisation of PV through indigenous design from fundamental blocks to gain complete control over all design parameters in the development and deployment phase. Solar inherently produces DC and generally it is converted into AC which is subsequently converted to DC for most of our electronic loads such as laptops, computers, LED lights etc. This conversion process generally results in more than 20% of the overall power loss. In order to limit the size and in turn the overall cost of the system, it is imperative to have efficient DC converters working with a DC grid, with PV panels attached, for most optimum utilisation . This can result in an overall decrease in the panel sizing resulting in the reduction of overall cost making PV investment more viable.
Title: Optimized solar PV energy integration to Weak-Grids for Developing Countries
Pl: Dr. Hassan Abbas Khan
Co-Pl: Dr. Mohammad Jahangir Ikram
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Energy
Description: The current project proposes an optimum hardware architecture which allows efficient self-generation (solar PV resource), efficient power processing (through power electronic converters and interconnects) and Monitoring (internet based) to integrate produced power into the energy mix of the country. The Prime beneficiaries of this technology will be domestic consumers and small/medium scale enterprises who are disproportionately affected from the current electricity shortage. This project will also lay foundation through intelligent electronic infrastructure for future smart grid deployments with emphasis on indigenous development power electronics for solar PV based systems in the country. Dr. Hassan Abbas Khan will also implement low-cost Irradiance (to measure sunlight potential) and wind speed to assess performance of local systems with emphasis on long term monitoring for net-metering and feed-in-tariffs when allowed by the government.

Title: Decentralized electric power delivery model for rural electrification in Pakistan
Pl: Dr. Hassan Abbas Khan
Co-Pl: Mr. Nauman Ahmad Zaffar, Dr.Husnain Fateh Ahmed
Sponsor: International Growth Centre (IGC)
Funding Amount: PKR 2,331,034
Project Initiated in: 2015
Duration: 18 Months
Category: Energy
Description: The main objectives of this project are to study both the feasibility of DC microgrids in Pakistan and to study the dynamics of the take-up of new technology and its effects on the socio-economic wellbeing and aspirations of off-grid communities. A solar microgrid in the context of Pakistan, will present a completely novel disruption to traditional behaviour. The prime focus of the project is to study both its direct socioeconomic impact in rural communities, its rate of take up, based on interventions on pricing mechanisms and by making the design schematics open source, the effect of lowered RnD fixed costs on market viability.

Title: DC Microgrids for Rural Electrification
Pl: Dr. Hassan Abbas Khan
Sponsor: National ICT R&D Fund
Funding Amount: PKR 100,000
Project Initiated in: 2015
Duration: 9 Months
Category: Energy
Description: The aim of this project is to Design and implementation of a modular, scalable and viable architecture for a DC Microgrid to supply electrical power to off-grid communities, particularly for rural regions of Pakistan where grid electricity is unavailable or is largely intermittent. The purpose of this project also is to provide a low cost, environmental friendly solution to energy crisis that our country is going through.
Profile: Dr. Ijaz Haider Naqvi received his BSc Electrical Engineering from University of Engineering & Technology Lahore (2003), Masters in Radio Communications degree from SUPELEC Paris (2006) and PhD degree in Electronics and Telecommunications from IETR-INSRennes, France (2009). He has been a recipient of prestigious ministerial scholarship of French Ministry of Research to pursue his PhD and HEC overseas scholarship for his Masters. Dr. Ijaz has several years of research experience in the wireless communications and wireless sensor networks. His current research focuses on ultra wideband communications, system level aspects in wireless sensor networks and RF optimisation and network management issues in wireless mobile networks. He has published several refereed papers in international journals and peer reviewed international conferences.

Recent Publications:

Most Cited Publications:

Title: Design and Development of Wireless Sensor Networks in Industrial Monitoring and Control
PI: Dr. Ijaz Haider Naqvi
Co-PI: Mr. Nauman Ahmad Zaffar
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 500,000
Project Initiated in: 2013
Duration: 12 Months
Category: Technology
Description: This project aims to develop a Wireless Sensor Network in the industry which would monitor the key stress points in the plant. The network of sensor nodes measures various parameters of plant and the readings of these individual sensor nodes communicate to a centralised sink node. The aim is to build the sensor nodes indigenously in order to control the design parameters and tailor them for optimisations suitable for the environment.
**Title:** Indoor Localization: Improvements in Accuracy and Range  
**PI:** Dr. Ijaz Haider Naqvi  
**Sponsor:** Umm Al Qura University  
**Funding Amount:** PKR 832,661  
**Project Initiated in:** 2015  
**Category:** Technology  
**Description:** The aim of this consultancy is to provide independent advisory services to the Company for Research and Innovation of projects at GISTIC-Um Al Qura University. The tasks of the Consultant shall consist of collaboration with regards to the Navi Bees project for localization of mobile node using beacon signals of BLE radios, an improved accuracy of this localization solution, an improved robustness of this localization solution with regards to multi paths which results in large fluctuations in the received signal strength over very small distances and thus result in arbitrary location of mobile nodes, a reduced node density with satisfactory performance and an improved accuracy even with large number of localization nodes.

**Title:** Design and Development of an RF Coverage Optimization System using Spatio-Temporal Mobile User Densities and Autonomic Network Management Approach  
**PI:** Dr. Ijaz Haider Naqvi  
**Co-PI:** Ahmad Shabbar Kazmi  
**Sponsor:** LUMS Faculty Initiative Fund (FIF) | National ICT R&D Fund  
**Funding Amount:** PKR 9,080,000  
**Project Initiated in:** 2015  
**Duration:** 12 Months  
**Category:** Technology  
**Description:** The aim of this project is to develop a prototype SW application for data measurement, transmission, storage and analysis of the spatio-temporal user information for system capacity enhancement purposes in mobile networks, to test the developed prototype application in the field and to motivate industry to use this system for performance enhancement of call and network services through industrial partners.
Profile: Dr. Momin Uppal received his BS degree in electronic engineering with highest distinction from GIK Institute of Engineering Sciences and Technology, Pakistan, in 2002. He then received his MS and PhD degrees in electrical engineering from Texas A&M University, College Station, in 2006 and 2010, respectively. Dr. Uppal spent the summers of 2009 at NEC Labs of America, Inc., Princeton, New Jersey as a Research Assistant, and the summers of 2012 at Texas A&M University Qatar as a Visiting Researcher and has been associated with the LUMS School of Science and Engineering (SSE) since October 2010.

Recent Publications:


Title: Projectile Tracking using Acoustic Localisation
Pt: Dr. Momin Ayub Uppal
Co-Pt: Dr. Abubakr Muhammad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 826,000
Project Initiated in: 2014
Duration: 12 Months
Category: Technology
Description: The proposed project aims to build a low-cost embedded system capable of (a) locating the origin of a specific acoustic event, and (b) using the localisation capability to estimate the trajectory of a projectile that generates a specific acoustic signature. As important applications of the localisation functionality, the technology thus developed could be used (a) to determine the exact location from which law-enforcement personnel are being fired upon by criminal elements, and (b) to track the trajectory of artillery shells fired from behind enemy lines, leading to pinpointing the location of their artillery batteries.

Pt: Dr. Momin Ayub Uppal
Co-Pt: Dr. Safee Ullah Chaudhary, Dr. Salman Noshear Arshad, Dr. Zahir Bashir - Shalamar Medical and Dental College
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 835,000
Project Initiated in: 2015
Duration: 12 Months
Category: Telecommunications
Description: In this project the aim is to improve antenatal healthcare access in LMICs by developing a mobile antenatal diagnostics platform powered by an intelligent and automated decision support system (DSS) that is supplemented by clinical data seamlessly acquired from a wide range of portable healthcare sensors. The proposed platform is envisaged to be deployable in rural areas through local healthcare workers, thus constituting a mobile pointofcare diagnostics system for pregnant women in LMIC settings. The salient objective of this project is to develop a technology demonstration platform for providing antenatal health care in rural settings of Pakistan.
Profile: Dr. Muhammad Adeel Pasha received his BSc Electrical Engineering degree from UET Lahore in 2004 and his M.S. Research in Embedded Systems degree from University of Nice Sophia-Antipolis in 2007. He then received a merit scholarship from government of France to continue his research work and received his PhD degree from University of Rennes-1 in 2010. His research interests include low-power micro-architecture, energy-efficient WSN node platforms, hardware specialisation & electronic design automation tools, LED-based optical communication & localisation, and smart power grid (algorithms and hardware development).

Recent Publications:


Title: Indoor Positioning System Using Visible Led Lights
PI: Dr. Muhammad Adeel Ahmed Pasha
Co-PI: Dr. Naveed Ul Hassan and Dr. Tariq Mahmood Jadoon
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 480,000
Project Initiated in: 2014
Duration: 12 Months
Category: Energy
Description: Light Emitting Diodes (LEDs) due to their numerous advantages over other lighting methods are generally expected to become the most widely used indoor lighting technology in future. LED lighting can save up to 85% and 50% of the energy consumed by incandescent and fluorescent lights respectively. Keeping these aspects in mind, researchers study their use in developing an Indoor Positioning System (IPS). The positioning information obtained through IPS can be used to provide indoor location based services (LBS) or navigation support application for robots, humans, etc. Some methods of indoor positioning have been looked at and positioning using Wi-Fi, Bluetooth, RFID, Infrared, and Ultrasound have been suggested. However, all these methods have their limitations and none of them can be considered as a definitive solution in indoor environment. Positioning using LEDs is a relatively novel concept and may prove to be a better choice for indoor positioning since it also utilises preinstalled LED ceiling lights (like Wi-Fi based schemes) but provides better localisation accuracy. Current LED-based IPS either requires expensive cameras and image-based transformation methods or relatively inexpensive photodiodes. However, photodiode-based IPS needs perfect synchronisation among all the transmitting LEDs which increases the complexity of the system design and hinders its practical implementation. In this project, researchers study the effects of synchronisation errors on localisation accuracy. Furthermore, design of asynchronous LED-based IPS is expected to be studies.
computational subsystem has shown great promise in bringing down the overall system energy. The same idea should be explored in a relatively less explored area of IoT where computational challenges are more severe than simple WSN. But they could lead to larger power/energy savings through dedicated hardware. The prime objective of the project is to eventually be an important step towards developing energy-efficient platforms for future IoT-enabled devices (such as embedded industrial sensors, actuators, smart-phones, tablets, personal health-monitoring devices, etc. Hence, the project will contribute towards forming the future technologically more-connected society into an energy-efficient (green) society.
Profile: Dr. Muhammad Tahir received the Bachelor of Science in Electrical Engineering in 2007 from University of Engineering and Technology, Lahore and the Master of Science in Electronic Engineering in 2009 from Politecnico di Torino, Italy. In April 2013, he obtained his Ph.D. degree also from Politecnico di Torino, Italy in the field of Electronics and Telecommunication. His research activity is focused on the development of novel algorithms for satellite navigation receiver technology. His research interests include receiver baseband signal processing algorithm design and development, Bayesian signal processing, detection and estimation theory, channel coding in communication networks, machine learning and sequential Monte Carlo methods.

Recent Publications:

Most Cited Publications:

Title: Development of a Software Defined Radio Test-bed utilising GPS Signals for Navigation Applications
 PI: Dr. Muhammad Tahir
 Sponsor: LUMS Faculty Initiative Fund (FIF)
 Funding Amount: PKR 990,000
 Project Initiated in: 2015
 Duration: 12 Months
 Category: Telecommunications
 Description: Global navigation satellite system (GNSS) provides position, velocity and time information in all weather conditions, anywhere on or near the earth, where there is an unobstructed line of sight to four or more GNSS satellites. This research project deals with the design and development of a basic software GNSS receiver. The main objectives of the research are to develop a basic GNSS fully reprogrammable receiver prototyping platform based on the software radio technology, which would provide basic foundation for future research activities. Moreover, digital signal processing involved within GNSS receiver is a mixture of signal detection, estimation and optimisation problems. During this research activity, novel algorithms within these domains will be explored which will provide a deep understanding in the theoretical and fundamental research problems in this domain.
Profile: Nadeem Khan received his Ph.D. from the Eindhoven University of Technology. Dr. Khan joined LUMS in May 2002. Earlier, he worked at Streaming Networks (Pvt) Ltd, Islamabad where he performed several projects related to image processing and video compression in the context of multimedia products. His Ph.D. research work was on minimal training dependent and robust text recognition systems. This research work and rest of his graduate study have been in close association with Philips especially with its facilities of Philips Research Lab (LEP), France, Centre for Manufacturing Technology, The Netherlands and Philips International Institute, The Netherlands. In between his degrees he had worked both locally and abroad including teaching at University of Engineering and Technology, Lahore and working as a Hardware Design Engineer at Philips Industrial Automation Systems, Eindhoven, the Netherlands.

Recent Publications:


Title: Enabling EEG Signal Technology for Home Health Care
PI: Dr. Nadeem Ahmad Khan
Co-PI: Dr. Mumtaz Ali Sheikh
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 878,000
Project Initiated in: 2015
Duration: 12 Months
Category: Technology
Description: To investigate and develop techniques for multichannel EEG signal enabling its use from the perspective of home health care through the use of portable and wearable (preferably wireless) headsets for the purpose of diagnose, prediction and early detection of important neurological disorders like epilepsy, autism etc. Aspects on specific focus will be (i) R&D on real-time compression methods (both lossless and lossy) for multichannel EEG with quality acceptable for use in prediction and detection tasks like epilepsy and autism (ii) to explore and extend earlier collaboration with local health care sector (like Punjab Institute of Mental Health on epilepsy detection to cover epileptic seizure prediction for mobile and rehabilitated patients at home; (iii) to explore collaboration with Technical University of Madrid (UPM) in their ongoing project on linguistic disorder screening in children with special focus on autism cases.
Mr. Nauman Ahmad Zaffar
Department of Electrical Engineering, SBASSE
nauman.zaffar@lums.edu.pk
+924235608311

Profile: Mr. Nauman Ahmad Zaffar received his BS (1990) and MS (1991) in Electrical Engineering from University of Pennsylvania. He then continued his work at the Electro-Optic / Magneto-Optic Labs at the University on development of a high resolution frequency swept microwave diversity imaging system in multiple simultaneous bands from 2GHz-60GHz. His areas of work include understanding business needs, proposing and designing solutions and carrying out development, rollout and support lifecycle of the solutions in the domains of Electric Utilities, Telecom and Manufacturing. He has worked with Techlogix to establish and extend practice areas of Business Process Management, ERP implementation, Enterprise Architecture and Software Product Engineering. Mr. Nauman joined LUMS School of Science and Engineering (SSE) in 2010 as full-time faculty member in the department of Electrical Engineering. He is now part of LUMS Energy Optimisation Committee and is working on establishing a research base at SBASSE in the area of Power Electronics, Smart Grids and Renewable Energy. His current areas of interest include dc/dc converters for Solar PV applications, dc/ac inverters for grid-tie distributed energy sources and VFDs for industrial, off-grid and automotive applications. He has also worked with Pepco and various Distribution Companies in Pakistan to propose solutions for Power Distribution management and smart solutions for load management.

Recent Publications:

Title: Measurement of noise levels in LT distribution network of LESCO to assess viability of narrowband over power line communication in 95kHz – 500kHz bands
PI: Mr. Nauman Ahmad Zaffar
Co-PI: Dr. Asim Loan
Sponsor: Lahore Electric Supply Company (LESCO)
Funding Amount: PKR 1,800,000
Project Initiated in: 2015
Duration: 2 Months
Collaborator: University of Engineering and Technology, Lahore
Category: Energy
Description: This project seeks to undertake the assessment of noise level and signal propagation on the LT network at carefully sampled and selected locations on the distribution network that will cover the diversity of load, operating conditions and variations in the network. The work will be divided into two phases. First phase will cover the measurement of noise levels under ambient and different load conditions. The scope of load conditions to be created on the network will be finalised with LESCO once the project is initiated. The second phase will work with a subset of locations to insert modulated PLC signal conforming to the power level output of the standard transmitter. It will then be observed on the neighboring locations of the network to tabulate signal to noise ratio and understand signal propagation.
Title: Design and Development of a 1000W Solar Charge Controller
PI: Mr. Nauman Ahmad Zaffar
Co-PI: Dr. Hassan Abbas Khan
Sponsor: PakShine
Funding Amount: PKR 885,000
Project Initiated in: 2015
Duration: 4 Months
Category: Energy
Description: The aim of this project is to develop the solution of the Solar UPS to not only charge the backup battery unit but also to provide direct power for the AC appliance to reduce grid electricity cost of the end customer. This engagement is considered to be the first of other R&D initiatives that PakShine plans to undertake in Pakistan with the collaboration of LUMS.

Title: Strategic Consulting
PI: Mr. Nauman Ahmad Zaffar
Sponsor: Microtech Industries Pvt. Ltd
Funding Amount: PKR 300,000
Project Initiated in: 2015
Duration: 2 Months
Category: Energy
Description: The project involves holding weekly discussions between Microtech and Mr. Nauman Ahmad Zaffar on Smart grids, Advanced Metering Infrastructure, structuring of the comp for hardware, firmware and software requirements of AMI and on dealings and discussions with strategic clients of MICROTECH as and when the need arises.

Title: High Power Density Inverter for intermittent grid and electrical drives with enhanced efficiency and low switch stresses.
PI: Mr. Nauman Ahmad Zaffar
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Energy
Description: The proposed work aims to develop power electronic topologies for a high power density, reliable and efficient DC-AC inverter, operating at a very high switching frequency. The input voltage is 450 VDC with a 50Hz, 220 Vrms sinusoidal output to drive 2kVA AC-loads. As the size of the inverter becomes smaller and the frequency becomes higher, a number of problems arise in the design of the inverter that have to be addressed. An additional design objective will be to design the inverter with a control over output voltage and frequency to drive motor loads from power constrained systems.

Title: Strategic Consulting Phase 2
PI: Mr. Nauman Ahmad Zaffar
Sponsor: Microtech Industries Pvt. Ltd
Funding Amount: PKR 600,000
Project Initiated in: 2016
Duration: 5 Months
Category: Energy
Description: The project involves holding regular discussions between Microtech and Mr. Nauman Ahmad Zaffar on Smart grids, Advanced Metering Infrastructure, structuring of the company for hardware, firmware and software requirements of AMI and on dealings and discussions with strategic clients of MICROTECH as and when the need arises.
Title: Solar Assisted Electric Vehicle with single phase induction motor and regenerative braking
PI: Mr. Nauman Ahmad Zaffar
Sponsor: National ICT R&D Fund
Funding Amount: PKR 91,250
Project Initiated in: 2015
Duration: 10 Months
Category: Energy
Description: The current energy crisis in Pakistan and a long term energy solution for the country require a high focus in research & development of renewable energy sources. Solar energy in theory is sufficient to meet all of humanity’s energy needs, the challenge however is to make the cost of solar energy generation compatible with the conventional energy generation that is where innovations in materials and technology can play a significant role. The current project aims to establish a comprehensive framework of investigating the emerging low cost solar cell technologies which will explore methods of fabrication, efficiency optimization through computational modeling, and stability/reliability of the technology through electrical characterization. The findings will be applied to optimize the cell design and to bridge the gap of efficiency loss going from cell to the panel.

Title: Measurement of Noise Levels in Lt Network of Lesco to Assess Viability of Broadband Over Plc (BPL)
PI: Mr. Nauman Ahmad Zaffar
Sponsor: National ICT R&D Fund
Funding Amount: PKR 70,000
Project Initiated in: 2014
Duration: 12 Months
Category: Energy
Description: This work is a logical extension of the first phase of this project where LUMS carried out the feasibility analysis for LESCO LT Distribution Network on Narrow Band PLC (NB-PLC) communication for AMI. The process to be adopted in this phase will be the same as the first phase and BPL modems shall be utilized for the measurements to assess the working and performance of the technology. Huawei Broadband PLC modems that are designed as embedded communication modules of smart meters for AMI communications in FAN (Field Area Network), along with associated control and monitoring software and logistical support will be provided by Huawei for this study.

Title: Efficient Storage Less of Motor Lads with Intermittent Energy Source
PI: Mr. Nauman Ahmad Zaffar
Sponsor: National ICT R&D Fund
Funding Amount: PKR 70,000
Project Initiated in: 2014
Duration: 12 Months
Category: Energy
Description: Variable Frequency Drives (VFDs) have gained a wide spread use in the industry for both energy conservation and a finer process control. They not only improve the operational efficiency, but also protect against heavy currents at the startup and under varying load operation. This project aimed to establish local expertise in this area as the facilities in Pakistan to manufacture VFDs indigenously do not currently exist. The imported VFDs are both expensive and lack local maintenance support and support contracts are both expensive and time consuming. This project introduced custom designed VFDs in Pakistan to allow low cost local manufacturing to enable their wide spread use in industrial sector for finer process control and energy conservation initiatives.
Profile: Nauman Z. Butt did his Ph.D. in Electrical Engineering from Purdue University in 2008 and B.S. in the same field from University of Engineering & Technology, Lahore in 2002. From 2008 to 2012, he was a member of technical staff in Semiconductor Research & Development Center (SRDC) in IBM Microelectronics Division, Hopewell Junction, New York. Dr. Butt’s research interests include investigating physics and technology of microelectronic and optoelectronic devices through theory, compact modeling, simulations and experiments. His Ph.D. thesis was on computational study of scaling and radiation damage in nanoscale memory devices. In IBM, he has been involved in the development of embedded DRAM and dense SRAM devices in 32nm and 14nm SOI technology.

Recent Publications:

Title: Optimization of Contacts for Silicon Solar Cell Technology For Efficiency Enhancement
PI: Nauman Zafar Butt
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 727,000
Project Initiated in: 2015
Duration: 12 Months
Category: Technology
Description: This project aims to design the contacts that eliminate the aforementioned problems by exploring alternate materials such as emerging transparent conducting oxides. An optimal cell structure with alternate contacts will be demonstrated for commercial silicon solar cells. The project involves physics based modeling to identify the material/physical requirements for an optimal contact. The model based design will then be fabricated using the equipment available at SBASSE, LUMS. Finally, the fabricated solar cells will be characterized using optical and electrical measurements and the results will be compared with the benchmark commercial solar cell.
Dr. Naveed Ul Hassan
Department of Electrical Engineering, SBASSE
Naveed.hassan@lums.edu.pk
+924235608331

Profile: Dr. Naveed Ul Hassan received his B.E. degree in avionics engineering from the College of Aeronautical Engineering (CAE), Risalpur, Pakistan, in 2002 and his M.S. and Ph.D. degrees in electrical engineering, with specialization in digital and wireless communications, from the Ecole Superieure d'Electricite (Supelec), Gif-sur-Yvette, France, in 2006 and 2010, respectively. In 2011, he joined as an Assistant Professor at the Department of Electrical Engineering, Lahore University of Management Sciences (LUMS), Lahore, Pakistan. Since 2012, he has also been a visiting Assistant Professor at Singapore University of Technology and Design (SUTD), Singapore during the months of June-August. He has several years of research experience and has authored/co-authored numerous research papers published in refereed international journals and conference proceedings. His major research interests include cross layer design and resource optimization in wireless networks, demand response management and integration of renewable energy sources in smart grids, indoor localization and heterogeneous networks. He is a senior member of the IEEE.

Recent Publications:


Title: Experimental Validation of Smart Grid Technologies by Building a Test Bed at LUMS
PI: Dr. Naveed Ul Hassan
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 920,000
Project Initiated in: 2015
Duration: 12 Months
Category: Technology
Description: The objective of this project is to develop a scalable test bed for residential smart grids, equipped with necessary automation and communication capabilities. The test bed will mainly consist of a software simulator and a single actual ‘home’ environment created inside the lab (referred as a lab-home). The lab-home will consist of physical appliances (loads), e.g., lights, fans etc., which will be connected to a Home Control Center (HCC); responsible for controlling and monitoring their electricity consumption. HCCs of the simulated homes and lab-home will be connected to the grid operator, modeled in our test bed as a Grid Control Center (GCC). Due to interactive nature of the smart grid, an efficient and reliable communication infrastructure with low latency will be established for bi-directional communication between various nodes. The test bed will enable experimental validation of various smart grid technologies and would also be helpful in identifying and suggesting cost effective pathways and guidelines for smart grid transition in Pakistan.
Title: Smart Grid Test Bed
PI: Dr. Naveed Ul Hassan
Sponsor: National ICT R&D Fund
Funding Amount: PKR 62,500
Project Initiated in: 2014
Duration: 12 Months
Category: Technology
Description: The aim of this project is to develop a Smart grid, an emerging modern electrical grid system which incorporates two way communications between power suppliers and consumers. Smart algorithms will employed to monitor power flow and control appliances at the consumer level. This will save energy, reduce costs and increases reliability and transparency.
Profile: Dr. Shahid Masud received BSc Electrical Engineering from EME College, Rawalpindi, Pakistan in 1990, MSc in Electronics from the University of New South Wales, Sydney, Australia in 1992 and PhD in Electrical Engineering from Queen's University, Belfast, UK in 1999. He has been a recipient of prestigious AIDAB EMSS scholarship (Australia) and Commonwealth scholarship (UK). He was a Senior Design Engineer at Amphion Semiconductor Ltd. (later Conexant / NXP Semiconductor) before joining LUMS in 2002. His research interests include design and implementation of DSP Systems and computer architecture. Dr. Masud has published over fifty refereed papers in major international journals and conferences and holds three patents in VLSI design. He is also a Senior Member of IEEE, Member of IET and a Chartered Engineer.

Recent Publications:

Most Cited Publications:

**Title:** DAAD En²AS²W² Project  
**PI:** Dr. Shahid Masud  
**Co-PI:** Dr. Abubakr Muhammad, Prof. Dr.-Ing. Axel Sikora, University of Offenburg  
**Sponsor:** German Pakistani Research Cooperation Programme (DAAD)  
**Funding Amount:** PKR 3,063,326  
**Project Initiated in:** 2013  
**Duration:** 30 Months  
**Collaborator:** University of Offenburg  
**Category:** Technology  
**Description:** The proposed research focuses on the development and the prototype application of energy-autarkic and autonomous wireless sensor nodes for the real time monitoring of large scale sparsely distributed waterways. Embedded system hardware and software is being developed for water flow sensing and control applications. The new platforms will be tested on the Offenburg WSN-testbed. It is expected to have available a very low cost, but however robust and powerful platform for distributed WSN based monitoring.
Description: In Pakistan, the world's largest irrigation system which covers 90,000 km of channels needs to be monitored and managed on different levels. The irrigated agriculture of Pakistan mainly depends on Indus River System and its tributaries. The need for improvement in efficiency and productivity of the irrigation water has become one of key issues for the irrigation and the agriculture sector. Monitoring of the waterways is a key element for efficient and fair water distribution. After specific prototypes in hardware and software for energy efficient wireless sensor nodes have been developed in the project EnA²S²W² (funded by DAAD 2013 - 2015) for the channel monitoring, these systems now need extensive testing. The current project shall address the automated regression test of spatially distributed wireless nodes both in the labs of HS Offenburg (HSO) and in Pakistan in a structured approach, which allows scientific advances and close integration of the two research groups.
Profile: Dr. Syed Azer Reza completed his BSc in Electronic Engineering from the Ghulam Ishaq Khan Institute of Engineering in 2003. He completed his MSc in Electrical Engineering from Darmstadt University of Applied Sciences in Germany with a specialization in microwave ceramic filter designs. He received his masters and PhD in Optics from the University of Central Florida specializing in Photonic Signal Processing applications for communication and sensing applications. Dr. Reza worked as a post-doctoral research associate at the Laser Interferometer Space Antenna (LISA) Labs at the University of Florida worked on the ementation of a test-bench to verify the relative phase performance of photodetectors that would be used in the LISA space mission. His works have appeared in more than 20 international conferences and journals.

Recent Publications:

Most Cited Publications:

Title: Fiber-Optic Applications using Agile and Tunable Photonics
PI: Dr. Syed Azer Reza
Co-PI: Dr. Mumtaz Ali Sheikh
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 900,000
Project Initiated in: 2014
Duration: 12 Months
Category: Technology
Description: The primary objective of this research is to explore the various advantages that the tunable/agile optics technology offers. The use of agile optics in fiber-optics has been very limited. The applied optics research group aims to expand the horizons in this regard and perform vital research beneficial to the worldwide optics community in general. The project aims to put to use the agile optics technology and demonstrate with experimental evidence its use in fiber-optic communication and sensing devices and techniques.
Profile: Waqas Majeed received BS in Electrical Engineering from GIK Institute, Pakistan (2000-2004, gold medalist). During his PhD in bioengineering at Georgia Tech, USA (2005-2010), his research involved fMRI-based functional connectivity, manganese-enhanced MRI for neuronal tract-tracing and diffusion-tensor imaging. The focus of his thesis work was detection and characterisation of propagating waves of spontaneous activity in humans and rats using fMRI. His postdoctoral research at Vanderbilt University, USA (Department of Radiology) involved data-driven analysis of noisy fMRI data to isolate weak and focal patterns of neural activity. Dr. Majeed’s goals are to establish a career in academia, promote multidisciplinary medical imaging research and develop links between academia and clinicians.

Recent Publications:

Most Cited Publications:

Title: Pre-surgical Mapping Using Task-Driven And Resting State FMRI: a Collaborative Project with Aga Khan University Hospital
Pt: Dr. Waqas Majeed
Co-Pt: Dr. Zaffar Sajjad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 996,000
Project Initiated in: 2014
Duration: 12 Months
Category: Health
Description: The aim of surgical resection for treatment of brain tumours is to remove as much malignant tissue as possible while minimising damage to healthy brain areas responsible for critical functions such as voluntary movements, speech/language, somatosensation and vision. Damage to these areas would result in functional deficits, thereby severely affecting patient’s quality of life. Brain surgeries are planned so as to minimise unnecessary damage to the eloquent cortex. Location of eloquent brain regions varies from patient to patient due to subject-to-subject variation in size/shape of the brain, tumour-induced physical displacement of cortical areas and functional reorganisation during progression of the disease. Therefore, location of eloquent cortex cannot be determined using stereotactic coordinates of different brain areas, and has to be identified before/during surgery using functional mapping techniques.
Profile: Wasif Tanveer Khan received the B.Sc. degree in electrical engineering from the University of Engineering and Technology, Lahore, Pakistan, in 2005, the M.S. and Ph.D. degrees in electrical and computer engineering from the Georgia Institute of Technology, Atlanta, USA in 2010 and 2014, respectively. From January 2006 to December 2008, he was a Lecturer with the National University of Computer and Emerging Sciences-FAST, Lahore, Pakistan. He was awarded M.S. Leading to Ph.D. Fulbright scholarship, in 2008. In 2009, he joined Professor John Papapolymereou’s research group “Microwave Circuit Technology” at the Georgia Institute of Technology. During his Ph.D. He authored/co-authored more than 30 research papers in peer-reviewed conferences and journals. Since January 2015, he has been working as an Assistant Professor at the department of Electrical Engineering of the Lahore University of Managements Sciences (LUMS), Pakistan.

Recent Publications:


Title: MM-wave integration and embedded antennas in System-in-Package –Work Package 2
Pt: Dr. Wasif Tanveer Khan
Sponsor: SONY
Funding Amount: PKR 1,757,171
Project Initiated in: 2015
Duration: 5 Months
Category: Technology
Description: The aim of this consultancy project is to conduct and supervise research activities related to the mm-wave integration and embedded antennas System-in-Package planned within the framework of the mm-wave System-in-Package project. In particular, the focus of the consultancy is simulation and evaluation of proposed novel antenna / integration designs using a full-wave EM simulator and organization of weekly-based video conference meetings.

Title: Design and Development of RF front-end of a UHF Band Software Defined Radio
Pt: Dr. Wasif Tanveer Khan
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2016
Duration: 12 Months
Category: Technology
Description: The objective of the proposed research is to indigenously develop an RF-frontend of a Software Defined Radio in the UHF band and develop the research base to carry out research in the area of RF and Microwave front-end design in the future. Since RF and microwave is an elusive research area in Pakistan, given the complexity of the task to be undertaken, the professional development of students, which are well versed with the electronic design and hardware prototyping, is a foreseeable outcome of this project. At the very basic infrastructure level, this project will set a precedent for carrying out hardware electronics development in related areas of digital, analog, RF integrated circuit design in Pakistan.
Title: MM-wave integration and embedded antennas in System-in-Package — Work Package 3  
**PI:** Dr. Wasif Tanveer Khan  
**Sponsor:** SONY  
**Funding Amount:** PKR 1,713,733  
**Project Initiated in:** 2016  
**Duration:** 3 Months  
**Category:** Technology  
**Description:** The aim of this consultancy project is to conduct and supervise research activities related to the mm-wave integration and embedded antennas System-in-Package planned within the framework of the mm-wave System-in-Package project. In particular, the focus of the consultancy is simulation and evaluation of proposed novel antenna / integration designs using a full-wave EM simulator and organization of weekly-based video conference meetings.

Title: Design a Miniaturized Spiral Antenna for Ultra-wideband (2-18 GHz) Applications  
**PI:** Dr. Wasif Tanveer Khan  
**Sponsor:** Re-engineering With Research (RWR) Private Ltd  
**Funding Amount:** PKR 1,000,000  
**Project Initiated in:** 2016  
**Duration:** 6 Months  
**Category:** Technology  
**Description:** The aim of this project is to explore the implementation of many techniques to miniaturise the spiral antenna. Due to rapid progress in computer and personal communication systems, the need for integration of more than one communication systems into a single compact module has increased. Considering the limited space available, the future antenna must be miniaturised and wideband to cover the possible operating frequency bands. Designing a miniaturised and ultra-wideband antenna is a big challenge and has gained research attention of the many antenna engineers. For certain applications miniaturisation of the spiral antenna is needed, Dr. Khan in his project will explore the implementation of many techniques to miniaturise the spiral antenna.
Profile: Dr. Zartash Uzmi received his PhD in Electrical Engineering from Stanford University, California in 2002. His graduate research focused on Multi-user Detection for CDMA systems in which he devised schemes and algorithms for practical implementation of multi-user detectors. He has held positions at Nokia Research Centre, Bell Laboratories, and Hewlett Packard Company. He is a part of the LUMS faculty since 2002. At LUMS, his research is focused on scalable network design for wide-area deployments and wireless applications.

Recent Publications:

Most Cited Publications:

Title: A Scalable Platform for Internet Censorship Measurements
PI: Dr. Zartash Afzal Uzmi
Co-PI: Dr. Ihsan Ayyub Qazi, Prof. Vern Paxson
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 960,000
Project Initiated in: 2016
Duration: 12 Months
Category: Telecommunications
Description: The aim of the project is to carry out three important tasks related to C-Saw:
(a) To design and implement C-Saw and carry out a public release of the built software,
(b) Design techniques to analyze censorship data from the C-Saw platform to detect different types of censorship and improve C-Saw’s design, and
(c) Collect Internet censorship measurements from C-Saw users and carry out a longitudinal study of Internet censorship and its impact on various stakeholders.
DEPARTMENT OF MATHEMATICS
Profile: Dr. Adnan Khan was awarded his PhD from Rensselaer Polytechnic Institute in NY in 2007. His thesis was titled 'Parameterization for Some Multiscale Problems in Biology and Turbulence'. The work involved studying approaches to coarse graining of multiscale systems with applications to turbulent diffusion and protein dynamics. Prior to his doctoral work, he obtained a BE in Electrical Engineering from NED University of Engineering & Technology, Karachi in 1998 and an MS in Applied Mathematics from the University of Delaware in 2002. His current research interests involve modelling and analysis of biological systems, multiscale modelling and asymptotic analysis. Prior to joining LUMS, Dr. Khan has taught at the Rensselaer Polytechnic Institute and University of Delaware. Besides his usual academic interests, he is also interested in reading on a variety of topics including economics, philosophy, and history and world literature.

Recent Publications:


Most Cited Publications:


Title: Control of Bacterial Growth in a Biofilm
PI: Dr. Adnan Khan
Co-PI: Dr. Sultan Sial, Dr. Mudassar Imran
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 960,000
Project Initiated in: 2014
Duration: 12 Months
Category: Health
Description: This study plans on developing a deterministic model for bacterial growth in a biofilm and suggesting optimal antibiotic regimen for its control. The project intends to study the conditions under which antibiotic treatment successfully eradicates the microbial population from a biofilm and the surrounding fluid compartment. It addresses the problem of finding a course of treatment which reduces active bacteria at the end while also minimising the total antibiotic applied. Several studies have indicated the counter-productive effects of over-deployment of antibiotics. Indeed, it has also been suggested that this may even increase the susceptibility to infection by increasing the effective resistance. The high costs of antibiotics are another factor in the motivation to decrease their use. At the same time, the dilution rate, low relative to the maximum growth rate, is unable to flush out the bacteria on its own. Antibiotic application therefore becomes imperative. The study also focuses on optimal strategy of antibiotic application that eliminates bacteria while at the same time ensuring that antibiotic deployment is at a minimum.
Profile: Dr Imran Naeem received his MPhil Applied Mathematics degree from Quaid-e-Azam University, Islamabad and a PhD degree from University of the Witwatersrand, South Africa in 2004 and 2008, respectively. He did the Post Doctoral Fellowship from University of the Witwatersrand, South Africa and has also been teaching at the University of the Witwatersrand prior to joining LUMS. Dr Naeem has several publications in leading international journals.

Recent Publications:

Most Cited Publications:

Title: Optimal Control of the Transmission Dynamics of the Hepatitis C with Quarantine

PI: Dr. Imran Naeem
Co-PI: Dr. Mudassar Imran
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 972,000
Project Initiated In: 2014
Duration: 12 Months
Category: Health

Description: In this research, a rigorous mathematical analysis of a deterministic model for the transmission dynamics of Hepatitis C, using a standard incidence function, are expected to be performed. The infected population is divided into three distinct compartments featuring two distinct infection stages (acute and chronic) along with a quarantine compartment. The study intends that the disease free equilibrium is locally and globally asymptotically stable for basic reproduction number (R0). The model reveals that for R0 > 1, the endemic equilibrium exists and researchers will show stability properties local as well as global. Two different optimal control strategies (vaccination and quarantine) are planned to be designed to control the disease and reduce the infected population. The analysis is intended to be carried out by using Pontryagin’s Maximum Principle in order to illustrate the optimal controls with respect to an optimality system numerically.
DEPARTMENT OF PHYSICS
Profile: Dr. Muhammad Sabieh Anwar completed his DPhil from the Department of Physics, Oxford University (UK) in 2004, where he studied as a Rhodes Scholar from Pakistan. His dissertation was titled, “Quantum Information Processing using Para-Hydrogen NMR” and revolved around the preparation of pure quantum states for quantum computing. This work also constituted the first demonstration of quantum entanglement in the liquid state. His post-doctoral experience at the University of California, Berkeley (USA) involved the demonstration of hyperpolarized NMR using heterogeneous catalytic systems, microfluidic and “lab-on-a-chip” NMR, synthesis of precise magnetic fields for ex-situ NMR, algorithmic cooling, polarization lifetime studies and hypersensitive nanoparticle MRI. Prior to his doctoral studies, Sabieh received his BSc (Honours) degree in electrical engineering (electronics and communications) from University of Engineering and Technology, Lahore. Sabieh’s current research interests include quantum control, spin mechanisms in nanomagnetic materials, nanotechnology, spintronics, magnetic resonance and physics education. His research has been published in various journals notably the Science, Proceedings of the National Academy of Science (PNAS), Physical Review Letters, A and B, Chemical Physics Letters, Analytical Chemistry, Journal of the American Chemical Society, Angewandte Chemie, Magnetic Resonance in Chemistry, Daltons Transactions and the American Journal of Physics.

Recent Publications:

Most Cited Publications:

Title: Development of Physics Laboratory at Habib University, Karachi
PI: Dr. Muhammad Sabieh Anwar
Sponsor: Habib University, Karachi
Funding Amount: PKR 3,318,000
Project Initiated in: 2014
Duration: 7 Months
Category: Technology
Description: The project fostered a new episode in sharing cutting-edge tools and techniques in modern, research-inspired science education and also promoted the development and transfer of indigenous instructional systems developed at the Physics Lab of the Syed Babar Ali School of Science and Engineering, LUMS. Through modernisation and technical advancement, the motive was to establish a technology driven culture and to focus more on innovation.
Title: Development of Physics Laboratory for Nusrat Jahan College, Rabwah  
PI: Dr. Muhammad Sabieh Anwar  
Sponsor: Nusrat Jahan College, Rabwah  
Funding Amount: PKR 1,675,000  
Project Initiated in: 2014  
Duration: 8 months  
Category: Technology  
Description: The purpose of this project was to establish the general terms and conditions under which the Parties collaborated to achieve the objectives set out below for both LUMS and Nusrat Jahan College (NJC) through a joint work. The technical expertise from both organisations were used in this collaboration and allowed for a more efficient utilisation of resources.

Title: Fabrication of Physics Experiment on determination of Planck’s constant using a light bulb  
PI: Dr. Muhammad Sabieh Anwar  
Sponsor: Preston University  
Funding Amount: PKR 200,000  
Project Initiated in: 2013  
Duration: 1 month  
Category: Technology  
Description: In November 2013, the Physlab developed an introductory experiment on Measurement of Planck's constant using a light bulb for the undergraduate program at Preston University in Islamabad. Two setups of this innovative experiment were designed at LUMS and the equipment along with learning material was transferred to Preston University.

Title: Observing Magnetization Dynamics of Single Molecule Magnets Using Polarized Light  
PI: Dr. Muhammad Sabieh Anwar  
Sponsor: LUMS Faculty Initiative Fund (FIF)  
Funding Amount: PKR 450,000  
Project Initiated in: 2013  
Duration: 12 Months  
Category: Natural Sciences  
Description: The project starts with the synthesis of SMM’s with high blocking temperature (TB) and thin film preparation by binding to functionalized surfaces, without disturbing the native crystal structure and hence preserving its macroscopic quantum properties. The experimental investigations is complemented by detailed theoretical investigations on (b) Effect of the nuclear spin on magnetization dynamics, (c) Proposals on the possibility of quantum computing using electron and nuclear spin double resonance (ENDOR), (d) Quantum mechanical and semi-classical descriptions of the interaction of polarized harmonic electric fields with giant magnetic moments.

Title: Fine Tuning of an In-house Developed Atomic Force Microscope  
PI: Dr. Muhammad Sabieh Anwar  
Sponsor: LUMS Faculty Initiative Fund (FIF)  
Funding Amount: PKR 1,000,000  
Project Initiated in: 2015  
Duration: 12 Months  
Category: Natural Sciences  
Description: The proposed project aims at designing a close loop feedback control system, improvement, fine-tuning, testing, and calibration of a home-made atomic force microscope already developed in Dr. Sabieh’s group. The microscope has demonstrated basic imaging capabilities and a proof-of-principle, being able to detect longitudinal features on the order of 20-30 nm on area of 50 × 50 micron². This project not only harbors immense potential for research and teaching, but can also be commercialized in the near future.
Title: Fog monitoring in the Indo-Ganges Plain
PI: Dr. Muhammad Sabieh Anwar
Sponsor: National University of Sciences and Technology (NUST)
Funding Amount: PKR 200,000
Project Initiated in: 2016
Duration: 5 Months
Category: Natural Sciences
Description: The Consultancy Services to the Client will include, Sample collection on 12 hour basis as per provided protocols, Proper maintenance and care of the deployed instruments, provision of logistic support and electricity and working space and Indigenous design and manufacture of fog monitoring station for future usage.
Profile: Mumtaz Ali Sheikh completed his BSc (Honours) degree in Computer Science from LUMS in 2004, graduating on the Dean’s Honour List. He then joined the College of Optics and Photonics (CREOL), University of Central Florida from where he completed his PhD degree in Optics in 2009. His PhD work was in the area of extreme environment high temperature optical sensors in which he demonstrated novel temperature sensing techniques using Silicon Carbide. His technical contributions have been reported in several international journals and conference proceedings in the areas of optical sensors, confocal microscopy and laser beam analysis. His academic achievements include receiving the Society of Photo-technique Engineers (SPIE) Scholarship in 2009, LUMS Merit Scholarship from 2001-2004 and world distinction in A-Level Mathematics.

Recent Publications:

Most Cited Publications:

Title: Super-resolution Confocal Microscopy through Wavefront Control in Complex Media
PI: Dr. Mumtaz Ali Sheikh
Co-PI: Dr. Syed Azer Reza
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 948,000
Project Initiated in: 2014
Duration: 12 Months
Category: Technology
Description: The primary aim of the research is to work on the problem of breaking the classical diffraction limit on the resolution of optical instruments with particular emphasis on confocal microscopes. The idea is to use a random scattering medium in conjunction with a spatial phase light modulator to focus the illuminating laser light to a smaller spot on the sample than is otherwise permitted by the classical diffraction limit. Besides the obvious utility of this framework in microscopes especially for non-fluorescent samples, it can also potentially be used for optical tweezers in strongly scattering media, to improve sensitivity in spectroscopy and for lithography.

Title: The Supreme Court of Pakistan's Landmark Decisions & Legal Lexicon Project
PI: Dr. Ali Mohsin Qazilbash
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 500,000
Project Initiated in: 2013
Duration: 12 Months
Category: Law & Policy
Description: The goal of the project is to publish a series of edited texts of a select body of the Supreme Court of Pakistan landmark decisions, taking into consideration the full range of decisions since the time the Court assumed its contemporary independent identity in 1956. In addition, to be published along with the edited texts are readable and rigorous Urdu translations of the texts. This ground-breaking project will have far-reaching implications not only for legal, conceptual and sociological scholarship, but also for a very wide dissemination of the working records of the apex court of Pakistan and towards a general public understanding of the judicial nature in the country. The project aims to serve both LUMS and the society at large.

Title: Urdu Translation of Supreme Court Judgments
PI: Dr. Ali Mohsin Qazilbash
Sponsor: RS Corporate Advisory (Pvt.) Ltd
Funding Amount: PKR 200,000
Project Initiated in: 2013
Duration: 12 Months
Category: Law & Policy
Description: The goal of the project is to publish a series of edited texts of a select body of the Supreme Court of Pakistan landmark decisions, taking into consideration the full range of decisions since the time the Court assumed its contemporary independent identity in 1956. In addition, what are perhaps of prime importance, to be published along with the edited texts are readable and rigorous Urdu translations of the texts. Once the texts are available, themes were indentified that were manifested with some frequency in the decisions, and in this thematic context study the evolution of the Court's approach to certain particular issues of legal, procedural, and philosophical kinds. Finally there is a compilation of an English/Latin to Urdu lexicon, a lexicon which will grow out of the translation process.
Profile: Professor Sikander Shah is a pioneering member of the SAHSOL, LUMS. He obtained a BA in Economics and a Juris Doctorate (Cum Laude) from the University of Michigan, Ann Arbor. He has been a visiting research faculty at Temple Law School, Wayne State Law School and the University of Michigan Law School. Professor Shah served as the Legal Advisor to the Ministry of Foreign Affairs while he was on sabbatical in 2012-2013. He teaches several advanced public international law and commercial law subjects. His research focuses on International Human Rights, International Humanitarian Law, International Trade Law, Ethics and Corporate Governance.

Selected Publications:

- Sikander A. S. (2009). River Boundary Delimitation and the Resolution of the Sir Creek Dispute between Pakistan and India. 34 Vt. L. Rev. 357.

Title: Rent-Seeking in Pakistan-India Trade under GATT
Pt: Mr. Sikander Ahmed Shah
Co- Pt: Mr. Uzair Kayani
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 650,000
Project Initiated in: 2014
Duration: 12 Months
Category: Law & Policy
Description: While international trade law encourages countries to lower restrictions on imports from all their trading partners, it allows for significant exceptions to this principle. In particular, under the General Agreement on Tariffs and Trade (GATT), a country may impose special restrictions on imports if it can justify these restrictions as: (i) anti-dumping measures; (ii) countervailing duties; (iii) emergency protection for local industry; or (iv) measures for economic development in a developing state. These legal trade restrictions are known as “safeguards.” Since these GATT safeguards are legal, countries can use them to harm a trading partner without incurring liability. Legally sophisticated countries can use these safeguards more effectively to secure economic rents for their local industries. The research is expected to analyse the use of these safeguards in trade between Pakistan and India since 2000. Specifically the study examines the impetus for their adoption, the legal arguments for their use, the industries affected by them, and the implications of their continued use for Pakistan-India trade in the future. The goal of the research project is to compare the extent to which Pakistan and India are using GATT provisions to legally shelter their own industries from competition from across the border.
Mr. Uzair Kayani
Department of Law and Policy, SAHSOL
uzair.kayani@lums.edu.pk
+924235608000

Profile: Professor Uzair teaches Torts, Commercial Law, and Law & Economics. Tort liability distributes the costs of social and economic harms to those parties that can best prevent, bear, or insure against them. Commercial law sets default rules for market exchange (sales, negotiable instruments, and securities), and market participants (partnerships, corporations, and hybrid forms). Economic analysis of law applies microeconomic insights (primarily price theory, game theory, and social choice) to study the incentives created by law and other forms of regulation.

Mr. Uzair studied social choice and game theory with Professors Elizabeth M. Penn and John W. Patty at Washington University in St. Louis. He studied law and economics with Professor Richard Epstein, Judge Richard Posner, Professor William Landes, and Professor Douglas Baird at the University of Chicago. Earlier, Uz studied political philosophy, literature, and the Classics at Middlebury College (Vermont) and Deep Springs College (California).

Research Interests:
- Law & Economics
- Commercial Law
- Corporate Finance
- Game Theory
- Social Choice
- R Statistical programming

Title: International Human Rights Law Clinic for Law Students
PI: Mr. Uzair Kayani
Co-PI: Mr. Sikander Ahmed Shah
Sponsor: American Bar Association (ABA)
Funding Amount: PKR 1,526,325
Project Initiated in: 2016
Duration: 9 Months
Category: Law & Policy
Description: This initiative will be headed by Professor Sikander Shah and Uzair Kayani. A dedicated team of students will work under their tutelage. In recent years, the Punjab Bar Council, which is required to make provisions for free legal aid for underprivileged litigants under its constitution, has been woefully inadequate in taking adequate measures to realize this goal, especially in matters of human rights abuse. Over the past few years, students at LUMS have taken an active interest in doing pro-bono work, both as a way of giving back to the community and in order to hone their newly developed skills as lawyers. There is a two-part class taught at LUMS titled ‘Legal Aid’ which aims to train law students in litigation by encouraging them to aid underprivileged litigants in their legal matters. Furthermore, many law students from LUMS take up clerkships with Supreme Court justices upon graduation, often in the interest of receiving exposure to constitutional and human-rights related matters.
Dr. Zubair Abbasi
Department of Law and Policy, SAHSOL
zubair.abbasi@lums.edu.pk
+924235608067

Profile: Dr. Zubair Abbasi completed his doctorate from the Faculty of Law, Oxford University. The focus of his doctoral thesis was on the transplantation of English legal system in colonial India and the interaction between Islamic law (Fiqh) and English law in this process. He conducted a case study of the developments in Islamic waqf law under the British legal system by analysing the jurisprudence developed in the judgments of the Judicial Committee of the Privy Council and various Indian High Courts. His research revealed the crucial role played by Muslim lawyers, judges, ‘ulama’, and politicians in the formation of Anglo-Muhammadan Law (later called Muslim Personal Law). It showed how they simultaneously negotiated and collaborated with, and resisted the colonial administrators in the making and operation of the new Indian legal system.

Dr Abbasi is currently exploring the legal process of the ‘judicial islamisation’ of laws in Pakistan in the historical context of the convergence of the principles of Islamic law and English law in colonial India. He is also examining the relationship between Sharia and the modern state in the larger context of the scholarship that explores the relationship between different legal systems and their impact on economic and political development of a country.

Selected Publications:

- Abbasi, Muhammad Zubair, Sharia and State Law: Relevance of Islamic Legal History for the Application of Muslim Family Law in the West, Journal of Law, Religion and State, 2(3) 2015, 124-38

Title: Sharia and the Modern State: Judiciary and the Application of Islamic Jurisprudence in Pakistan
PI: Dr. Zubair Abbasi
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2015
Duration: 12 Months
Category: Law & Policy
Description: This project proposes to evaluate the contribution of the Shariat Courts in Pakistan in the application and development of Islamic law (Fiqh/Shari'a) by analysing the judgments of the Federal Shariat Court and the Shariat Appellate Bench of the Supreme Court of Pakistan. This project will assess the way Islamic Jurisprudence (Usul al-Fiqh) is applied in Pakistan by the Federal Shariat Court and the Shariat Appellate Bench of the Supreme Court of Pakistan. It will critically analyse the contribution of case law produced by these courts in the application and development of Islamic Jurisprudence while dealing with various issues relating to property law, commercial law, contract law, penal law, labour law and family law.
Title: The Contribution of the Judiciary in the Application and Development of Islamic Jurisprudence in Pakistan
PI: Dr. Zubair Abbasi
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 819,539
Project Initiated in: 2015
Duration: 24 Months
Category: Law & Policy
Description: In Pakistan, judicial organ of the state is employed to islamise the existing laws. This is a unique approach adopted in a Muslim country in order to indigenise transplanted colonial laws and/or to replace them with Islamic law. In this respect, the jurisprudence produced in the judgments of the Federal Shariat Court and the Shariat Appellate Bench of the Supreme Court provides valuable material for assessing the mechanism of applying Islamic law in a modern nation state. This project proposes to assess the way Islamic Jurisprudence (Usul al-Fiqh) is applied in Pakistan by the Federal Shariat Court and the Shariat Appellate Bench of the Supreme Court of Pakistan since 1980. It will critically analyse the contribution of case law produced by these courts in the application and development of Islamic Jurisprudence while dealing with various issues relating to commercial law, contract law, penal law, labour law and family law.

Title: The Role of Judiciary in Protection of Women’s Rights: A Case Study of Divorce Law (Khul’)
PI: Dr. Zubair Abbasi
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 2,623,320
Project Initiated in: 2016
Duration: 12 Months
Category: Law & Policy
Description: This study has a dual objective, firstly it explores how Pakistani judiciary justified extension in women’s unilateral right to divorce? And secondly what is the impact of this legal change on the institution of family. The first part of the study will be based on a comprehensive analysis of all reported case law produced by the Lahore High Court and the Supreme Court of Pakistan. The second part will be based on the selected unreported judgments of family courts in the Punjab. Interviews of litigants, judges, lawyers and local council officials will also be conducted to analyse the issue in detail.
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