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Message from the Vice Chancellor

With a mission of providing excellent undergraduate and graduate education, Lahore University of Management Sciences (LUMS) has established itself as one of the leading academic institutions in the region. Established in 1985, LUMS strives to become an internationally acclaimed university by engaging in research and by welcoming a diverse community of faculty, staff, students and alumni, together with a distinctive commitment to merit, tolerance and social responsibility.

The diligent faculty and talented students and alumni hold the dedication and perseverance and, together with the university, incessantly aspire to achieve an environment where ideas are acknowledged and innovation flourishes.

While known for setting high academic standards, LUMS is also well reputed for its outstanding research facilities, well-equipped laboratories and state of the art library and computing facilities.

LUMS is home to excellent national and international faculty, who have an accomplished academic record and have, on many occasions, outperformed locally and internationally through their innovative work. This report presents the significant research achievements of the faculty at LUMS, in terms of external & internal grants won, recent & selected scholarly papers, research work carried out and provision of consultancy services.

Being a centre of academic excellence, LUMS plans to maintain its role as a regional academic leader and aims to achieve its vision of international leadership through merit-based approach, intellectual rigour, value addition and character building.

Prof. Dr. Sohail H. Naqi
Vice Chancellor
Message from the Director

I am extremely delighted to present to you the LUMS Research Portfolio 2013-2015, a compilation of the funded research projects endeavours of the faculty at Lahore University of Management Sciences (LUMS) in the past 3 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 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 students and faculty to reach out and make ground-breaking discoveries in the areas of social science, humanities, business, science, technology & law 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.

During the last three years, research accomplishments of the faculty have won 76 external grants of more than PKR 496 Million. Also, one hundred and thirty faculty members have won 230 research projects worth PKR 149 Million 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 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)
# Research Statistics

**Sponsors:**

1. Adam Smith International (ASI)  
2. American University  
3. Association of Management Development Institution in South Asia (AMDISA)  
4. Barclays Bank, Karachi  
5. British Council, Islamabad  
6. British Council, UK  
7. Campaign for Quality Education (CQE)  
8. Center for Economic Research in Pakistan (CERP)  
9. Cleaner Production Institute  
10. Coca Cola Beverages Pakistan Ltd. (CCBPL)  
11. Comstech-Twas  
12. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)  
13. Disney Research, Pittsburg  
14. Environmental Protection Agency (EPA)  
15. Erasmus Mundus  
16. German Pakistani Research Cooperation Programme (DAAD)  
17. Ghulam Ishaq Khan Institute of Engineering Sciences and Technology (GIKI)  
18. Global Development Network (GDN)  
19. Global Development Services International (GDSI)  
20. Google Asia Pacific Pte. Ltd.  
21. Habib University  
22. Higher Education Commission (HEC)  
23. HTSPE International Programme Management  
24. National ICT R&D Fund  
26. Indus Motor Company (IMC)  
27. INRIA Rennes France  
28. Institute of Development and Economic Alternatives (IDEAS)  
29. Institute of Space Technology (IST)  
30. International Food Policy Research Institute (IFPRI)  
31. International Growth Centre (IGC)  
32. International Water Management Institute (IWMI)  
33. Labour Department Punjab  
34. Lahore Electric Supply Company (LESCO)  
35. London School of Economics and Political Sciences (LSE)  
36. LUMS Faculty Initiative Fund (FIF)  
37. Malardalen University  
38. Marvell Technology Group Ltd.  
39. McGill University  
40. Mentor Graphics  
41. Ministry of Commerce, Government of Pakistan (MOC)  
42. Mitsubishi Endowment Fund  
43. MicroTech Industries (Private) Ltd.  
44. National Centre for Physics (NCP)  
45. Nusrat Jahan College, Rabwah  
46. Open Society Institute (OSI)  
47. Oxfam International, Pakistan  
48. Pakistan Microfinance Network (PMN)  
49. Pakistan Strategy Support Program (PSSP)  
50. Preston University  
51. Punjab Skills Development Fund PSDF)  
52. RS Corporate Advisory (Pvt.) Ltd.  
53. SEFAM (Pvt.) Ltd  
54. Sight Savers International(SSI)  
55. Singapore University of Technology and Design (SUTD)  
56. Society for Advancement of Higher Education (SAHE)  
57. South Asia Centre for Policy Studies (SACEPS)  
58. South Asia Network for Economic Research Institutes (SANET)  
59. State Bank of Pakistan  
60. Techlogix  
61. Tetra Pak  
62. The Asia Foundation  
63. The Royal Society  
64. U.S Agency for International Development (USAID)  
66. University of California, San Diego  
67. UN Women  
68. World Bank  
69. World Wide Fund (WWF)  
70. Zameen Media (Pvt) Ltd
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 Sciences
15. Robotics
16. Sciences
17. Technology
18. Telecommunications
19. Trade
20. Water

Project Funding & Duration

Total Funding:
PKR 396,785,659

Average: PKR 3,075,858

Minimum: PKR 89,100

Maximum: PKR 37,234,470

Duration

Minimum 4 Days

Average 12.7 Months

Maximum 60 Months
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 & 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

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 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.

Assessment and Strengthening Programme (ASP-LUM)
The Assessment and Strengthening Program (ASP-LUMS) is a USAID funded project with the key objective of developing and making the working of public and development sector institutions in Pakistan more effective, efficient and transparent. LUMS is one of the implementing partners of ASP and is responsible for the training component of the programme.
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 multi-disciplinary 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

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 MSc 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 Syed Babar Ali School of Science and Engineering (SBASSE) is involved in multi-disciplinary research, working on various interfaces between biology, chemistry, physics, mathematics and engineering.

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 Syed Babar Ali School of Science and Engineering (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

LUMS has announced plans to launch 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 is currently being designed.

The Shaikh Ahmad Hassan School of Law will grow out of the existing Department of Law & Policy, which has been functioning since 2004, and offers 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 Shaikh Ahmad Hassan School of Law evolves further.

The school will play 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 initiation and 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 (OSP)
The Office of Sponsored Programmes and Research (OSP) 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 OSP also manages internal grants, which are provided by LUMS including Faculty Initiative Fund (FIF), Faculty Travel Grant (FTG) and Start-up Grants.

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: http://lums.edu.pk/osp/page.php/institutional-review-board-irb-osp

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.

University Research Council 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.
- Members inform the convener in advance if they are unable to attend the meeting.

**Research Council Members List 2014-15**
The following is the list of the Research Council members for 2014-15. These members were appointed on July 1, 2014 to 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 and Social Sciences, MGSHSS)
4. Dr. Irshad Hussain (Department of Chemistry, SBASSE)
5. Dr. Laila Bushra (Department of Humanities and 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 Jali (SDSB)
11. Dr. Shafay Shamail – Ex-Officio (Department of Computer Science, SBASSE) — Director OSPR

**Research Council Members List 2013-14**
The following is the list of the URC members for 2013-14, who were appointed on July 1, 2013 till June 30, 2014:

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 and Social Sciences, MGSHSS)
4. Dr. Irshad Hussain (Department of Chemistry, SBASSE)
5. Dr. Laila Bushra (Department of Humanities and Social Sciences, MGSHSS)
6. Dr. Misbah Tanveer Chaudhry (SDSB)
7. Dr. Mohammad Asim (SDSB)
8. Dr. Shafay Shamail — Ex-Officio (Department of Computer Science, SBASSE) — Director OSPR
9. Dr. Shahid Masud (Department of Electrical Engineering, SBASSE)
10. Mr. Sikander Ahmed Shah (Department of Law and Policy, SAHSOL)

More information can be viewed on the following link: [http://lums.edu.pk/osp/page.php/research-council-osp](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 Programs 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 Suleman Dawood School of Business (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 Publication:

- Chaudry, Atif Saeed. (2013). Coexistence of Money and Capital as a Medium of Exchange

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
PI: Dr. Choudhry Tanveer Shehzad
Co-PI: 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 precondition for flourishing financial markets.
Description: This project analyses the effect of sovereign ratings changes on Karachi Stock Exchange (KSE) Movements. It specifically looks at how sovereign ratings (and outlook) changes of Pakistan influence investors’ sentiments in KSE.
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: Understanding of Financial Inclusion through M-banking in Pakistan: A Perspective of Consumer Innovativeness
PI: Dr. Farrah Arif
Co-PI: Dr. Fareena Sultan, Dr. Zartash Afzal Uzmi and Dr. Mohammad Adeel Zafar
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 the understanding of innovation diffusion among consumers in the low-income group in the context of m-banking. M-banking has been considered as one of the catalysts for economic growth due to several reasons. For instance, m-banking helps masses to come into the folds of financial inclusion. It increases penetration of microfinance as it makes the process of microfinance easier for borrowers. Moreover, it helps the government in documenting the unbanked segment (low-income as well as medium income groups) and it is also 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, these services did not pick up as anticipated, owing mainly to the failure of understanding of the target market (the unbanked segment, mainly the low-income segment). This research aims to understand the phenomenon so that the positive implications of m-banking could be utilised in Pakistan.
Dr. Ferhana Ahmad
SDSB
ferhana.ahmad@lums.edu.pk
+924235608044

Profile: Dr Ferhana Ahmad is an Assistant Professor at Suleman Dawood School of Business (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:

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, a researcher and a 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:

Description: The fashion retail industry in Pakistan took off in early 2000s and over the last decade has transformed into a vibrant sector. This sector now entails countless brands both local and international, multiple retail formats and numerous business models. With the evolution some textile manufacturers graduated downstream to enter retail industry while some successful retailers integrated backwards to include manufacturing setups within their domain. Yet some have developed strategic partnerships while some continue to operate within the retail domain. 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.
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:

Description: Technological innovation capability (TIC) is considered a significant determinant of internationalisation performance of SMEs. Where this has been a central topic of a number of studies in recent years the literature does not provide a conclusive evidence of this relationship. On the other hand, anecdotal data from some of the SMEs in Pakistan suggests that their endeavours to develop TICs have paid off in terms of increased international orders. This research work seeks to understand whether there is a relationship between technology innovation capability and internationalisation performance (e.g. export performance) of SMEs in Pakistan, and if not, what conditions would influence the existence of this relationship. Specifically, the paper argues that organisational culture and institutional pressures (e.g. pressures from competitors, customers, and government) may influence this relationship.
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.
Dr. Misbah Tanveer Chaudhry
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+924235608024

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 Suleman Dawood School of Business (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:

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: Women’s Economic Empowerment through Entrepreneurship  
PI: Dr. Misbah Tanveer Chaudhry  
Co-PI: Mr. 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: Labour Market Participation Decisions in Pakistan: A Gender Perspective  
PI: Dr. Misbah Tanveer Chaudhry  
Co-PI: Dr. Enrico Marelli, University of Brescia, Italy  
Sponsor: LUMS Faculty Initiative Fund (FIF)  
Funding Amount: PKR 650,000  
Project Initiated in: 2013  
Duration: 12 Months  
Category: Economic Development

Description: The objective of this study is to analyse the factors affecting labour market participation decision of women in Pakistan. To achieve the Millennium Development Goals (MDG), there is a need to understand the current situation that is prevalent in the labour markets and highlight the potential socioeconomic factors which can help realise this goal.
Profile: Dr. Mohsin Bashir is an Assistant Professor at the Suleman Dawood School of Business (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.

Recent Publications:

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.
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, 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: 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.

Recent Publications:

- 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: Economic Development

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.
Profile: Dr. Muhammad Shehryar Shahid is an Assistant Professor of Entrepreneurship at Suleman Dawood School of Business (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:

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.
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:

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.
Profile: Dr. Salman Khan is an Assistant Professor of Finance at LUMS. He received his PhD in Finance from I.A.E Graduate School of Business, University Aix Marseille, France in June 2011. Dr. Khan is an active researcher and his research interests primarily focus on investment and portfolio management. He has published in Quarterly Review of Economics and Finance, Journal of Finance Economic Policy, Decisions. He has taught to BSc, MBA, PHD and number of executive programs at both national as well as international level. His earlier professional experience spans over a period of 5 years in the field of banking and finance. He worked for two years in investment bank i.e. Pakistan Industrial Credit and Investment Corporation (c/o NIB). Dr. Khan worked for three years in Securities & Exchange Commission where he was rigorously involved in stock market and intermediaries’ analysis and regulation. He has extensively worked on Corporate Governance, IFRS and private pension as well.

Selected Publications:
- Khan, S. (2012). Are US REITs capable to invoke shocks in foreign REITs markets?

Title: Impact of Access to Finance on the Growth of SME’s in Pakistan
PI: Dr. Salman Khan
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 300,000
Project Initiated in: 2013
Duration: 12 Months
Category: Behavioural Studies

Description: The research aims at finding the impact of lending behaviour of financial institutions on the growth of Small and Medium Enterprises (SME’s) in Pakistan. It explores the magnitude of loss in growth which is attributable to lack of access to finance/credit over a period of time, especially during the financial crisis.
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:

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:

Title: Facilitation of the Strategic Plan formulation process at IGI
PI: Dr. Syed Zahoor Hassan
Sponsor: IGI Insurance Limited
Funding Amount: PKR 1000000
Project Initiated in: 2015
Duration: 1 Month
Category: Development Management
Description: Development Management

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: Business & Innovation
Profile: Dr. Zain ul Abdin Khawaja is an Assistant Professor at the Suleman Dawood School of business (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
PI: Dr. Zain ul Abdin Khawaja
Co-PI: 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: Behavioural Studies

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.
Dr. Abid Aman Burki  
Department of Economics, MGSUSS  
burki@lums.edu.pk  
+924235608076

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 Publication:

Most Cited Publications:

Title: Impact Assessment of Microfinance in Pakistan  
PI: Dr. Abid Aman Burki  
Co-PI: 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: Registration and Conduct of Written Test for Selection of Trade Officers Abroad, 2015
PI: Dr. Abid Aman Burki
Co-PI: Dr. Shafay Shamail
Sponsor: Ministry of Commerce, Government of Pakistan (MOC)
Funding Amount: PKR 8,000,000
Project Initiated in: 2015
Duration: 3 Months
Category: Trade

Description: This consulting project registered candidates for taking a Written Test for Selection of Trade Officers, to commence the selection process of 40 trade offices in BS-19, BS-19 and BS-20 for postings in Pakistani missions abroad. Collaboration with the Ministry led to the preparation of a written test to assess the readiness of the candidates and a testing format was also agreed between the two parties.

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: 9 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 Pakistan
Funding Amount: PKR 2,000,000
Project Initiated in: 2014
Duration: 6 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:** Mr. Mohammad Usman Khan  
**Sponsor:** United Nations International Children’s Emergency Fund (UNICEF)  
**Funding Amount:** PKR 19,229,100  
**Project Initiated in:** 2014  
**Duration:** 12 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 OOSC survey include gathering relevant data on OOSC in GB and AJK. To this end, it needs to be ensured that the survey covers all the relevant elements and is carried out in a credible manner; the survey data is analysed through a robust methodology to develop summary statistics identifying volume and characteristics of OOSC. 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. 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:** 4 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.

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**Title:** Consumer Preferences for Sales and Service Operations  
**PI:** Dr. Abid Aman Burki  
**Sponsor:** Indus Motor Company  
**Funding Amount:** PKR 12,715,350  
**Project Initiated in:** 2012 | 2013 | 2014  
**Duration:** 11 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 three 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.
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 farmer productivity, rural connectivity and its effect on health outcomes, and an evaluation of Pak-India trade potential within the health industry.

Selected Publications:

Title: Electricity and Rural Development: Insights from a Natural Experiment in Punjab, Pakistan
PI: Lauge N. Skovgaard Poulsen, University College London
Co-PI: Dr. Hadia Majid and Dr. Mahvish Shami (London School of Economics and Political Science)
Sponsor: International Growth Centre (IGC)
Funding Amount: PKR 689,937
Project Initiated in: 2015
Duration: 24 months
Collaborator: University College London
Category: Development Management

Description: Pakistan has suffered extreme electricity shortages for almost a decade. The crisis has been particularly devastating in poor rural communities, where rolling blackouts (load-shedding) have left some villages with less than one hour of electricity a day during summers. Using Pakistan as a case-study, this project seeks to understand the implications of electricity shortages for rural economies, particularly with respect to water provision and consumption. The specific focus of the study is Punjab — the most important agricultural region in Pakistan. The first part of the paper will assess the implications of this increase input costs for agricultural production caused by the electricity crisis. The second part of the paper will focus on the role of electricity of water used in household consumption. Overall, the project seeks to provide important policy lessons regarding the role of electricity in rural production and consumption in developing countries.
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: Mr. Ammar Anees Malik
Sponsor: International Food Policy Research Institute (IFPRI)
Funding Amount: PKR 2,949,000
Project Initiated in: 2014
Duration: 12 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: Mr. Ammar Anees Malik and Dr. Katherine Vyborny
Sponsor: International Growth Centre (IGC)
Funding Amount: PKR 11,731,198
Project Initiated in: 2014
Duration: 12 Months
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.
Description: The consultancy provides support to study policy issues in regard to Cluster-based Industrialisation and its Effect on Productivity of Manufacturing Firms in Pakistan. The work involves collection of literature, digging down into official files, collection of primary and secondary data, conducting analyses and report writing.

Description: The research requires a complete review of the relevant literature and secondary data on Early Childhood Education Policies and Practices Internationally as well as in Pakistan. It also involves conducting meetings with stakeholders at national level i.e. National and Provincial Education Departments and Ministries, International organisations and donor agencies and local civil society organisations that have ongoing interventions in the early childhood education sector.
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 behaviour in the mutual fund industry in the U.S. and U.K, particularly on investor fund-selection ability, investor behaviour 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.

Title: Coordinated Development of Manufacturing Industry with Particular Reference to Building Production Network in South Asia
PI: Dr. Imtiaz ul Haq
Sponsor: South Asia Center for Policy Studies (SACEPS)
Funding Amount: PKR 786,400
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.
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
PI: Dr. Kashif Zaheer Malik
Co-PI: 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 Trails (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.
Description: The objective of this study is to explore and measure the economic impact of Coca-Cola beverages on Pakistan’s economy in terms of income, job creation, tax contributions etc. The study assesses the direct, indirect as well as induced effects Coca-Cola has produced in the economy.
Profile: Dr. Muhammad 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. He won research studies over US$1,000,000 in the inception stage of the centre. 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.

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: 3 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 presentation to develop the OOSC report for Pakistan and also at provincial level. It was able to successfully complete and agree with UIS on the calculations of number by fully implementing the 5 D model.

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: 8 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.
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:

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.

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: Do Migrants Bring Their Castes with Them: Identity and Occupational Mobility in Lahore
Pl: Dr. Rashid Memon
Co-Pl: Dr. Hadia Majid
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 600,000
Project Initiated in: 2013
Duration: 12 Months
Category: Behavioural Studies

Description: This project examines the occupational mobility of migrants living in Lahore. Poor Pakistanis view migration as an instrument of poverty alleviation and economic mobility. In particular, low-caste workers are thought to escape rural caste-based marginalisation by moving to the anonymity of urban markets where the expectation is that migrants of different identities eventually meld into a homogenous urban population. The project seeks to test this expectation by studying the occupational outcomes of migrants and their children to identify the extent of socio-economic mobility.
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.
Profile: 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:

Most Cited Publications:

Title: Quality Testing to Address a Market for Lemons in Pakistan
PI: Dr. Syed Ali Hasanain
Co-PI: 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
PI: 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.
Profile: Dr. Hussain graduated from LUMS in 2006 and went for his PhD on a Fulbright Scholarship in 2007. He graduated from the University of Rochester, NY in 2012. His broad areas of research include macroeconomics, macro-labour, and international economics. Moreover, Dr. Hussain’s current research is about the asymmetric effects of different policy changes, in particular fiscal policy changes. He is also interested in looking at effects of different policies on productivity of an economy.

Selected Publications:

Description: Dr. Syed Muhammad Hussain provided the services to the Human Resource Development Network (HRDN) for the training of labour department Punjab Staff on computation of key indicators of labour market by using STATA.
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.

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 Shi’as) over the last three decades.
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
PI: 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: 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 (Edited by R.K. Dhawan and Novy Kapadia) and in Gender, Conflict and Migration (Edited by Navnita Chadha Behera). 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. In addition to this, the project aims to understand the role of volunteers and the extent of facilitation provided by them as well as the possible locations of archives in order to excavate old memos, demographic records, documents and schedules that would assist in recreating the physical, demographic or chronological dimensions of the Camp.
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:

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. 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:

- Kirmani, N. (2012). The role of religious values and beliefs in charitable and development organisations in Karachi and Sindh, Pakistan. Development in Practice, 22(5-6), 735-748.

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.
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 1985-85. 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:
• Rais, R. B. (1994). War without winners: Afghanistan’s Uncertain Transition after the Cold war. Oxford University Press, USA.

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: Next Generation Election  
PI: Dr. Rasul Bakhsh Rais  
Sponsor: British Council, Islamabad  
Funding Amount: PKR 308,000  
Project Initiated in: 2013  
Duration: 2 Months  
Category: Political Sciences

Description: The British Council has initiated a new research programme which builds on its Pakistan: The Next Generation report. The research is being carried out under the British Council Pakistan’s Active Citizens Programme, part of a worldwide initiative supporting young people to become effective leaders and social activists through capacity building, institutional development, and local and global networking. It explores how young people understand, experience, and respond to the challenges of contemporary Pakistan. Insights from the research assist Pakistan’s policy makers and the international community as they work to ensure the vast potential of the next generation is realised.
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.
DEPARTMENT OF BIOLOGY
Profile: Dr. Ahmed Jawaad’s current work focuses on understanding the role of the multifunctional protein RIN4, which regulates both branches of the plant immune system. He is an Associate Professor at the Department of Biology in SBASSE.

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: 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.
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:


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 paper 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. We aim 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 us 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. Our findings will contribute to the knowledge that 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: Sciences

Description: This project is aimed to investigate the role of Caspases family of proteases in the resistant response of 75olyplody 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 75olyplody 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 of this project is to determine what makes 75olyplody cells resistant to apoptosis. This information is expected to help better understand a fundamental process in human development and diseases like cancer.
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:

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: 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.
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 fur 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:

Title: Molecular Characterisation of Mixed Lineage Leukemia 5 (MLL5) Gene in Drosophila
PI: Dr. Muhammad Tariq
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 6,754,333
Project Initiated: 2014
Duration: 36 Months
Category: Sciences

Description: The study aims to characterise Drosophila melanogaster (fruit fly) MLL5 homologue, the functionally uncharacterised gene CG9007 (hereafter referred to as DmMLL5), encoding a predicted protein with virtually identical domain structure and 40% sequence similarity to human MLL5.
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: 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.
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 Syed Babar Ali School of Science and Engineering (SBASSE) at LUMS.

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: 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: 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: 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: The overall objective of the proposed project is to design and develop an HPC MATLAB toolbox for implementing next generation proteomics algorithms. Within this scope, the first objective will be to design a multi-core algorithm for estimating whole protein molecular weight. In the next step, the plan is to survey the legacy expressed sequence tag ladders extraction algorithms and evaluate ways for their parallelization. Towards the later part of this project, a multi core algorithm will be designed for identification of post-translational modifications and their ranking.
Title: An integrated Computational-Experimental Study of Hepatitis-C Virus Sequence Heterogeneity, Protein-Drug Interactions and Immune Response
PI: Dr. Safee Ullah Chaudhary
Co-PI: Dr. Sohail Qureshi
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 4,169,592
Project Initiated in: 2013
Duration: 24 months
Category: Health

Description: An exploratory research project that aims to comprehensively study the NS3 serine protease from the Hepatitis-C Virus (HCV) genotype-3a circulating in Pakistan from an evolutionary, therapeutic as well as immunological standpoint. The study attempts to understand the genetic heterogeneity, drug interactions and immune response of HCV (genotype-3a) encoded NS3 region in Pakistan at a large scale. The results may potentially be used to develop combination vaccine against the virus.
Dr. Syed Shahzad ul Hussan
Department of Biology, SBASSE
shahzad.hussan@lums.edu.pk
+924235608351

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: Discovery of New HCV Entry Inhibitor Lectins and Design of an Anti-HIV Lectin as a Better Potential Therapeutic
PI: 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). Secondly, 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: 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: 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. Thomas Peters
Co-PI: Dr. Syed Shahzad ul Hussan
Sponsor: German Pakistani Research Cooperation Program (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.
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.

Most Cited Publications:

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.

Description: There is a renewed interest in investigation of thermoelectric materials due to their ability to convert heat gradient into electricity and vice versa. This project proposes to investigate new compositions of transition metal oxides in a search for better thermoelectric materials. It also expects to gain deeper insight and understanding of the underlying principles of thermoelectric properties in these functional materials.
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:

Most Cited Publications:

Description: The study is based on a new synthetic route which bypasses the need to synthesize haloindoles in the first step, by using iridium catalysed direct C-H borylation reaction, and thus yielding the desired product in only two steps. While the research can synthesize a wide range of arylindoles via this new route, the study is intended to be more focused on synthesis of two important classes of naturally occurring bioactive arylindoles i.e. Meridianins & Camalexins. The new proposed route provides rapid & convenient access to these important classes of molecules which are known to possess antimicrobial, antiprotozoal, antimalarial, antifungal, and anticancer activities.
Title: Design and Synthesis of Novel Functionalised Polycyclic Aromatics for Potential Applications in Organic Electronics
PI: Dr. Ghayoor Abbas Chotana
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 700,000
Project Initiated in: 2013
Duration: 12 Months
Category: Sciences

Description: The project aims to design and synthesize novel aromatic building blocks which are highly sought in the fields of optical/electronic organic materials and organic polymers. Specifically new structural patterns of fused polycyclic aromatics such as naphthalene, anthracene, pyrene and perylene synthesised and completely characterised. The project is based upon Green Chemistry synthetic technology.
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 Excelis 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-comms and groundbreaking sol-gel based silica on silicon deposition technology.

Selected Publications:
- Farrukh, Aleeza; Akram, Attia; Ghaffar, Abdul; Tuncel, El; Oluz, Zehra; Duran, Hatice; ur Rehman, Habib; Yameen, Basit. (2015) Surface functionalized silica gel adsorbents for efficient remediation of cationic dyes.

Title: Development of Novel Optically Clear High Refractive Index Photo-Curable Nano-Composites for Flat Panel Displays

PI: Dr. Habib Ur Rehman

Sponsor: LUMS Faculty Initiative Fund (FIF)

Funding Amount: PKR 1,000,000

Project Initiated in: 2014

Duration: 12 Months

Category: 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 arylic-nanocomposites based photocurable materials. These materials are expected then to be tested for optical displays by making brightness enhancement films through UV embossing.
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:

Most Cited Publications:

Title: Development of Ultrasensitive, Robust and Affordable Nanoparticle-Based Test Strips for Detecting Bacteria
PI: Dr. Irshad Hussain
Co-PI: Dr. Sohail Qureshi
Sponsor: Higher Education Commission (HEC) and U.S. Agency for International Development (USAID)
Funding Amount: PKR 33,080,474
Project Initiated in: 2014
Duration: 36 Months
Collaborator: University of Massachusetts (Professor Vincent M. Rotello)
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.
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 at 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 estrogens, 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 unraveling 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.
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 heterogeneous 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 synergic 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.
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, Phosphohistonease 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 checkpoint kinase 2 and imidazoline based inhibitors of NF-kB 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 New Aromatically Decorated Chemotype Targeting Mdm2-P53 Interaction, With Potential Applications in Cancer Treatment  
**PI:** Dr. Rehman Shah Zaib Saleem  
**Sponsor:** LUMS Faculty Initiative Fund (FIF)  
**Funding Amount:** PKR 950,000  
**Project Initiated in:** 2013  
**Duration:** 12 Months  
**Category:** Sciences

**Description:** The effectiveness of chemotherapeutic technique, to treat cancer, lies in its ability to damage the DNA of cancer cells. The project is interested in developing a programme to unearth new chemotypes of inhibitors that can conform to drug-like properties and show good inhibitory activities of this protein-protein interaction. The specific aims of this project are to develop and optimise the synthetic route, synthesize the combinatorial library and characterise all the compounds for their chemical structure.
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.
DEPARTMENT OF
COMPUTER SCIENCE
Profile: Basit Shafiq received his BS degree in Electronic Engineering from GIK 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

Most Cited 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 government processes replacing the paper-based 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: 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: TPI World Bank: Provision of Technical Advisory & Research Services for Application of iIoT & Big Data Sets for Governance Reforms in Punjab  
PI: Dr. Basit Shafiq  
Co-PI: Dr. Shafay Shamail, Dr. Ihsan Ayyub Qazi, Dr. Muhammad Fareed Zaffar and Dr. Murtaza Taj  
Sponsor: World Bank  
Funding Amount: PKR 19,857,063  
Project Initiated in: 2013  
Duration: 23 Months  
Category: Economic Development

Description: In this project, LUMS is required to research possible applications of satellite imagery and telecommunication data in determining socio economic indicators for the region. Simultaneously, it is required to explore possibilities of using smartphones for attendance monitoring and lead their deployment in the field for targeted staff. The work is involved close involvement and guidance of Punjab government agencies including Punjab Information Technology Board, Punjab Resource Management Program, Implementation and Coordination Department and The Urban Unit.
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:

Most Cited Publications:

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.
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:

Most Cited 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.
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 is 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 datacentre 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 datacentre topologies with predictable performance and resilience to failures as first order goals.

The purpose of the research is to explore ways in which Software-Defined Networks (SDN) can help in improving performance of cloud data Centres by changing the way they are managed by transport protocols. The study covers a range of transport protocols and explores how their performance can be improved by centralisation of network control by SDN-enabled cloud data Centres. In particular, the focus is on investigating which end-host and network functionality can be centralized for realizing different kinds of transport protocols.
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 on-line 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.

Selected Publications:


Title: Knowledge Management for All - Tool (KMAT)
PI: Dr. Mian Muhammad Awais
Sponsor: Higher Education Commission
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 integratable 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: 4 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 times 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.
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
Sponsor: U.S. Agency for International Development (USAID) Ambassador’s Fund Program | LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 18,382,000
Project Initiated in: 2014
Duration: 11 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.
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:

Most Cited Publications:

Title: GreenSMS: A Low-cost and Non-invasive System to Reduce Load Shedding
PI: Dr. Naveed Arshad
Co-PI: 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.
Profile: Dr. Khan earned his PhD degree in Computer Science in 2002 from University of Central Florida, Orlando, specialising in computer vision. He received BE degree in Electronics Engineering from GIK Institute of Engineering Sciences and Technology, Pakistan, in 1997. He was the recipient of two graduate merit fellowships from University of Central Florida and the Hillman Award for excellence in his PhD research. Currently, he is holding the position of Associate Professor at LUMS, Pakistan. He is also an Associate Editor of Machine Vision and Applications journal and has served on the committees of IEEE Workshop on Motion and Video Computing (2002 and 2007), British Machine Vision Conference (2007) and Workshop on Frontiers of Information Technology (2005-2007). He has also served as an image-processing consultant for public and private sector organisations in Pakistan, and his lab at LUMS has received significant funding for research on computer vision problems.

Recent Publications:

Most Cited Publications:

Description: Technology for People Initiative (TPI) is an applied research center at LUMS designing solutions for the public sector. In this Project, TPI works with the Center for Economic Research (CERP) to plan, design and implement an online data visualisation tool for CERP using the data and guidelines provided by the Property Tax Project Team of CERP.
Title: Mapping the Grid: Jumpstarting Electricity Consumption GIS
PI: Dr. Sohaib Ahmad Khan
Co-PI: Dr. Syed Iljaj Hussain Naqvi
Sponsor: International Growth Centre (IGC)
Funding Amount: PKR 3,262,891
Project Initiated in: 2014
Duration: 18 Months
Category: GIS

Description: The research demonstrates that how can one generate a map to show the amount of electricity being consumed in each neighbourhood. Such a map would be fundamental not only in understanding spatial patterns of access to electricity, but also for inferring the economic status of an area.

Title: Punjab Governance Reforms for Service Delivery
PI: Dr. Sohaib Ahmad Khan
Sponsor: World Bank
Funding Amount: PKR 1,190,000
Project Initiated in: 2013
Duration: 4 Months
Category: Development Management

Description: The project involves studying the problem of property tax assessment, billing, collection, performance, management and enforcement. The work involves implementation of the Punjab Governance Reforms for service delivery by assisting and reviewing ICT innovations in tax reforms under the programme and introduces further ideas for the same.
Dr. Abubakr Muhammad  
Department of Electrical Engineering, SBASSE  
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+924235608132

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 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:

Most Cited 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.
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.
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: HEC
Funding Amount: PKR 500,000
Project Initiated in: 2014
Duration: 23 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.
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
PI: Dr. Hassan Abbas Khan
Co-PI: 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.
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-INSARennes, 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
Pl: 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.
Dr. Momin Ayub Uppal
Department of Electrical Engineering, SBASSE
momin.uppal@lums.edu.pk
+924235608112

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:

Most Cited Publications:

Title: Projectile Tracking using Acoustic Localisation
PI: Dr. Momin Ayub Uppal
Co-PI: 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.
Title: Design & Implementation of an Experimental Platform for Cooperative Cognitive Communication Networks
PI: Dr. Momin Ayub Uppal
Sponsor: National ICT R&D Fund
Funding Amount: PKR 11,794,837
Project Initiated in: 2013
Duration: 30 Months
Category: Telecommunications

Description: The project explores how cognitive cooperation could efficiently be incorporated into the next-generation wireless industrial standards, as well as for emerging applications such as wireless sensor networks and smart-grids. The research aims at devising novel, effective, and practically feasible system-level cognitive cooperation protocols with the help of a hardware/software experimental protocol.
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:

Most Cited 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.
Dr. Muhammad Tahir
Department of Electrical Engineering, SBASSE
tahir@lums.edu.pk
+924235608423

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:

Most Cited Publications:

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.
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.

Selected 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
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:** 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-PO:** Dr. Asim Loan, University of Engineering & Technology  
**Sponsor:** Lahore Electric Supply Company (LESOCO)  
**Funding Amount:** PKR 1,800,000  
**Project Initiated in:** 2014  
**Duration:** 2 Months  
**Category:** Energy  

**Description:** The study proposes 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: Firstly, the noise levels under ambient and different load conditions will be measured. 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 neighbouring locations of the network to tabulate signal to noise ratio and understand signal propagation.

**Title:** Consulting Services for Techlogix China  
**PI:** Mr. Nauman Ahmad Zaffar  
**Sponsor:** Techlogix  
**Funding Amount:** PKR 186,000  
**Project Initiated in:** 2013  
**Duration:** 1 Week  
**Category:** Energy  

**Description:** Techlogix is an IT Services, Consulting, and Business Solutions Company that has helped its clients achieve enterprise transformation by harmonizing people, process, and technology. Mr. Nauman Ahmad Zaffar served Techlogix as Centre Director and Head of Professional Services before joining LUMS. The Consulting assignment was in continuation of the services that Mr. Nauman had been providing to Techlogix Pakistan. In this week-long assignment, Mr. Nauman formally closed the projects & contract and completed the legal & administrative processes for Techlogix Beijing Software Company (Pvt.) Ltd.
Profile: Dr. Shahid Masud received BSc Electrical Engineering from EME College, Rawalpindi, Pakistan in 1990, MEngSc 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 En²A²S²W² Project
PI: Dr. Shahid Masud
Co-PI: Dr. Abubakr Muhammad
Sponsor: German Pakistani Research Cooperation Program (DAAD)
Funding Amount: PKR 1,499,565
Project Initiated in: 2013
Duration: 18 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.
**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 specialising 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 medallist). 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
PI: Dr. Waqas Majeed
Co-PI: 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.
Title: Automatic Detection of Epileptic Events in Clinical Data: A Collaborative Project with Punjab Institute of Mental Health
PI: Dr. Waqas Majeed
Co-PI: Dr. Nadeem Ahmad Khan and Dr. Zulfiqar Ali Rizvi
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 600,000
Project Initiated in: 2013
Duration: 12 Months
Category: Health

Description: The fundamental objective of the proposed research is to combine signal and image processing techniques with pattern classification to develop low-cost and user-friendly tools that could assist the clinicians in detecting epileptogenic events in clinical data. To achieve this objective the project aims to design and implement software for detection of epileptic discharges in electroencephalography (EEG) data.
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: Intelligent Routing in Inter-Carrier (class 4) Operation Support Systems-OSS
PI: Dr. Zartash Afzal Uzmi
Co-PI: Dr. Yasin Altaf
Sponsor: National ICT R&D Fund
Funding Amount: PKR 29,886,323
Project Initiated in: 2013
Duration: 18 Months
Collaborator: Cloud BPO Pvt Ltd
Category: Telecommunications

Description: The research aims to build an Intelligent Routing Module (IRM) that can enable operators to minimize revenue leaks due to routing errors or less than optimized routing. The IRM shall act as the decision support system for routing in real-time, thus ensuring revenue and profit maximization, premium call quality and high availability on the system, which are essential ingredients of doing successful long distance communication business.
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:

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. The study 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 our 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. This work 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. Faqir Bhatti received his PhD degree in Applied/Computational Mathematics in 1986 and had a first class in BSc and MSc, throughout. Prior to joining LUMS, he has been teaching at Multimedia University Malaysia, and University of Brunei Darussalam. He was the National Director for Australian Mathematics Competition in Brunei for several years. He has also been a short-term visiting fellow with Queen Mary University of London, Chiang Mai University, Chuo University, and Pohang University of Science & Technology, SKKU, University of London, and Doppler Institute. Dr Bhatti has several publications and book chapters in leading international journals. Dr. Bhatti is also the Scientific Director of Centre for Advanced Studies in Mathematics in SBASSE.

Recent Publications:

Most Cited Publications:

Title: Spectral Graph Theory for Self-Assembly of Hexagonal Structures (SGT)
PI: Dr. Faqir Muhammad Bhatti
Co-PI: Dr. Abubakr Muhammad
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 1,546,902
Project Initiated in: 2014
Duration: 24 Months
Category: Technology

Description: This project concerns fundamental research in spectral graph theory with applications in Graph Theory, The Matrix, Laplacian Energy, Expanders, Distributed Robotics, Motion Planning, Metamorphic Robot Chains and Self Assembly, Laplacian Growth and other Growth Phenomenon. The research proposes to develop new computational methods in Spectral Graph Theory with application to important areas in sciences and engineering.
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 (RO). The model reveals that for RO > 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.
Profile: Amer Iqbal is a theoretical physicist with a doctorate from the Massachusetts Institute of Technology. He was a postdoctoral fellow at University of Texas at Austin and at Harvard University. He is interested in exploring connections between physics and mathematics.

Recent Publications:

Most Cited Publications:

Description: The objectives of the research are to a) Calculate the partition function of N=2* theory using topological vertex formalism. b) Expand the partition function in terms of the mass parameter m and expressing the coefficients in terms of modular forms thus making S-duality manifest. c) Realising the S-duality in terms of the geometry of the Calabi-Yau threefold X. d) obtaining the product representation of the partition function and understanding it in the context of Borcherd’s lift of modular forms.
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: 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: Sciences
Description: The project starts with the synthesis of SMM's with high blocking temperature (TB) and thin film preparation by binding to functionalised 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:** 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:** 2013  
**Duration:** 2 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 (NIC) 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:** 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.
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- Instrumentation 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.
SAHSOL

DEPARTMENT OF LAW & POLICY
Dr. Ali Mohsin Qazilbash
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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: This ground-breaking project contains 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. The goal 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.

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 Shaikh Ahmad Hassan School of Law, 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.

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.