# Table of Contents

Message from the Vice Chancellor ................................................................. 5  
Message from the Director ........................................................................ 6  
Research Statistics ....................................................................................... 7  
About LUMS ............................................................................................... 9  
Schools at LUMS ....................................................................................... 10  
  Suleman Dawood School of Business ..................................................... 11  
  Mushtaq Ahmad Gurmani School of Humanities & Social Sciences .... 12  
  Syed Babar Ali School of Science and Engineering .............................. 13  
  Shaikh Ahmad Hassan School Of Law ..................................................... 15  
Institutional Bodies ..................................................................................... 16  
  Office of Sponsored Programmes and Research (OSPR) ...................... 16  
  University Research Council (URC) ....................................................... 16  
  Institutional Review Board (IRB) ............................................................ 16  
LUMS Funding Sources .......................................................................... 17  
  Faculty Initiative Fund (FIF) ................................................................. 17  
  Faculty Travel Grant (FTG) .................................................................. 17  
  Start-up Grants ...................................................................................... 17  
National Funding Opportunities ............................................................... 18  
  Higher Education Commission (HEC) .................................................. 18  
  National ICT R&D Fund ...................................................................... 18  
  Pakistan Science Foundation (PSF) ...................................................... 18  
  Best IT Innovation Awards (BITA) ....................................................... 18  
  President's Programme for Care of Highly Qualified Overseas Pakistanis (PPQP) ................................................................. 18  
SDSB ......................................................................................................... 19  
  Dr. Atif Saeed Chaudry ....................................................................... 20  
  Dr. Choudhry Tanveer Shehzad ......................................................... 21  
  Dr. Farrah Arif .................................................................................... 22  
  Dr. Ferhana Ahmad ............................................................................. 23  
  Dr. Kamran Ali Chattha ...................................................................... 24  
  Dr. Misbah Tanveer Chaudhry .............................................................. 25
<table>
<thead>
<tr>
<th>Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Mohsin Bashir</td>
<td>26</td>
</tr>
<tr>
<td>Dr. Muhammad Ghufan Ahmad</td>
<td>27</td>
</tr>
<tr>
<td>Dr. Muhammad Naiman Jalil</td>
<td>28</td>
</tr>
<tr>
<td>Dr. Muhammad Shakeel Sadiq Jajja</td>
<td>29</td>
</tr>
<tr>
<td>Dr. Muhammad Shehryar Shahid</td>
<td>30</td>
</tr>
<tr>
<td>Dr. Salman Khan</td>
<td>31</td>
</tr>
<tr>
<td>Dr. Samina Quratulain</td>
<td>32</td>
</tr>
<tr>
<td>Dr. Syed Mubashir Ali</td>
<td>33</td>
</tr>
<tr>
<td>Dr. Syed Zahoor Hassan</td>
<td>34</td>
</tr>
<tr>
<td>Dr. Zain ul Abdin Khawaja</td>
<td>35</td>
</tr>
<tr>
<td>MGSHSS</td>
<td>36</td>
</tr>
<tr>
<td>Department of Economics</td>
<td>37</td>
</tr>
<tr>
<td>Dr. Abid Aman Burki</td>
<td>38</td>
</tr>
<tr>
<td>Dr. Hadia Majid</td>
<td>42</td>
</tr>
<tr>
<td>Dr. Imtiaz ul Haq</td>
<td>44</td>
</tr>
<tr>
<td>Dr. Kashif Zaheer Malik</td>
<td>45</td>
</tr>
<tr>
<td>Mr. Mohammad Usman Khan</td>
<td>47</td>
</tr>
<tr>
<td>Dr. Muhammad Farooq Naseer</td>
<td>49</td>
</tr>
<tr>
<td>Dr. Rashid Memon</td>
<td>51</td>
</tr>
<tr>
<td>Dr. S.M. Turab Hussain</td>
<td>53</td>
</tr>
<tr>
<td>Dr. Syed Ali Hasanain</td>
<td>55</td>
</tr>
<tr>
<td>Dr. Syed Muhammad Hussain</td>
<td>57</td>
</tr>
<tr>
<td>Department of Humanities and Social Science</td>
<td>58</td>
</tr>
<tr>
<td>Dr. Ali Khan</td>
<td>59</td>
</tr>
<tr>
<td>Dr. Ali Usman Qasmi</td>
<td>61</td>
</tr>
<tr>
<td>Dr. Hasan H. Karrar</td>
<td>62</td>
</tr>
<tr>
<td>Dr. Mohammad Waseem</td>
<td>63</td>
</tr>
<tr>
<td>Dr. Nida Yasmeen Kirmani</td>
<td>64</td>
</tr>
<tr>
<td>Dr. Rasul Bakhsh Rais</td>
<td>65</td>
</tr>
<tr>
<td>Dr. Waqar Zaidi</td>
<td>66</td>
</tr>
<tr>
<td>SBASSE</td>
<td>67</td>
</tr>
<tr>
<td>Department of Biology</td>
<td>68</td>
</tr>
<tr>
<td>Faculty Name</td>
<td>Page</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Dr. Ahmed Jawaad Afzal</td>
<td>69</td>
</tr>
<tr>
<td>Dr. Aziz Mithani</td>
<td>70</td>
</tr>
<tr>
<td>Dr. Muhammad Tariq</td>
<td>71</td>
</tr>
<tr>
<td>Dr. Safee Ullah Chaudhary</td>
<td>73</td>
</tr>
<tr>
<td>Dr. Syed Shahzad ul Hussan</td>
<td>74</td>
</tr>
<tr>
<td>Department of Chemistry</td>
<td>75</td>
</tr>
<tr>
<td>Dr. Basit Yameen</td>
<td>76</td>
</tr>
<tr>
<td>Dr. Falak Sher</td>
<td>78</td>
</tr>
<tr>
<td>Dr. Ghayoor Abbas Chotana</td>
<td>79</td>
</tr>
<tr>
<td>Dr. Habib Ur Rehman</td>
<td>80</td>
</tr>
<tr>
<td>Dr. Irshad Hussain</td>
<td>81</td>
</tr>
<tr>
<td>Dr. Rahman Shah Zaib Saleem</td>
<td>82</td>
</tr>
<tr>
<td>Department of Computer Science</td>
<td>83</td>
</tr>
<tr>
<td>Dr. Asim Karim</td>
<td>84</td>
</tr>
<tr>
<td>Dr. Basit Shafq</td>
<td>85</td>
</tr>
<tr>
<td>Dr. Hamid Abdul Basit</td>
<td>86</td>
</tr>
<tr>
<td>Dr. Ihsan Ayyub Qazi</td>
<td>87</td>
</tr>
<tr>
<td>Dr. Mian Muhammad Awais</td>
<td>88</td>
</tr>
<tr>
<td>Dr. Muhammad Fareed Zaffar</td>
<td>89</td>
</tr>
<tr>
<td>Dr. Murtaza Taj</td>
<td>90</td>
</tr>
<tr>
<td>Dr. Naveed Arshad</td>
<td>91</td>
</tr>
<tr>
<td>Dr. Shafay Shamail</td>
<td>93</td>
</tr>
<tr>
<td>Dr. Sohaib Ahmad Khan</td>
<td>95</td>
</tr>
<tr>
<td>Department of Electrical Engineering</td>
<td>97</td>
</tr>
<tr>
<td>Dr. Abubakr Muhammad</td>
<td>98</td>
</tr>
<tr>
<td>Dr. Ahmad Kamal Nasir</td>
<td>101</td>
</tr>
<tr>
<td>Dr. Hassan Abbas Khan</td>
<td>102</td>
</tr>
<tr>
<td>Dr. Ijaz Haider Naqvi</td>
<td>103</td>
</tr>
<tr>
<td>Dr. Mohammad Jahangir Ikram</td>
<td>104</td>
</tr>
<tr>
<td>Dr. Momin Ayub Uppal</td>
<td>105</td>
</tr>
<tr>
<td>Dr. Muhammad Adeel Ahmed Pasha</td>
<td>107</td>
</tr>
</tbody>
</table>
Message from the Vice Chancellor

LUMS aspires to achieve excellence through unparalleled teaching and research and seeks to accomplish this mission as a unified institution with cutting-edge research, a modern and rigorous curriculum and socially responsible outreach to the nation and region. The mission is to “to become an internationally acclaimed research university that serves society through excellence in education and research.”

Since its inception in 1985, LUMS has strived to impart world class education while encouraging research and intellectual growth in the country. As a result, the university has played a key role in setting high standards of academics and producing professionals who can compete with counterparts from any university across the world.

LUMS aims to provide and maintain a research-oriented environment and ensure that all exciting opportunities reach its faculty and students. It is known for its outstanding research facilities with advanced libraries, well equipped laboratories and sophisticated information technology.

Research carried out by faculty members at LUMS is both fundamental and applied in nature, with the innovative work having significant potential for income generation as well as creation of intellectual property that has great value in the marketplace. This report presents significant achievements of the LUMS faculty in terms of external grants won, scholarly papers published, research projects, faculty travel grants and consultancy services etc.

With the goal of becoming one of the leading universities in the world where students are given every opportunity to research and explore, LUMS holds a vision to engage in ground-breaking research activities. The university also focuses on producing the best graduates, training them for an excellent future as leaders and innovators. For this purpose, it has the best faculty from local and international market.

Excellence in research is central to the future development of LUMS as the regional centre of excellence. We will continue to focus our activities in the direction where our vision is converted into reality.

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

The Lahore University of Management Sciences (LUMS) is renowned for its excellence and has established itself as a centre of higher learning where students are given a platform to gain knowledge, explore and engage in effective research activities. It has, since its inception, an outstanding record of achievement and is committed to train its students in the best educational environment.

With research as a fundamental part of the university, LUMS seeks to provide a platform for its faculty to reach out and make new discoveries such as finding out health solutions, creating new technologies to increase economic benefits and introducing various management strategies to enhance the efficiency of industries. The faculty is also engaged in research to combat issues such as poverty in order to ensure a better standard of living of people as well as to ascertain the overall economic development of the country.

LUMS seeks to establish itself as a centre where students and faculty members from different schools engage in research for knowledge creation and make cutting edge discoveries that are acknowledged not only in Pakistan but also internationally. The University has been able to establish strong ties at the national as well as the international level with various donor agencies, universities as well as key industries. The Office of Sponsored Programmes and Research (OSPR) established on August 16, 2010 facilitates faculty in seeking and managing their research grants.

LUMS is also proud to have won, in a period of 4 years from 2010 to 2014, 102 external grants of more than PKR 650 Million in total. LUMS has also funded, through its internal grants, 180 research projects worth PKR 74.59 Million to 178 faculty members. In the same period, LUMS faculty has produced over 1,287 scholarly publications at several national and international venues of high repute.

This report highlights the research activities which have taken place at LUMS by the LUMS faculty and have been supported through OSPR in the last 4 years. The objective is to inform the reader regarding the research potential of LUMS and also to provide an opportunity to develop research collaboration activities.

Dr. Shafay Shamail
Director
Office of Sponsored Programmes and Research (OSPR)
Research Statistics

List of all sponsors:

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

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 7 Sociology, BA (Honours) English and BA (Honours) History. He 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 MS programmes in Computer Science and Electrical Engineering. The school also offers PhD programmes in Biology, Chemistry, Computer Science, Electrical Engineering, Mathematics and Physics.

Research at SBASSE
In the “no boundaries spirit” of the school, the faculty at the 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) and Faculty Travel Grant (FTG) and Start-up Grants.

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. More information can be viewed on the following link:
http://lums.edu.pk/osp/page.php/research-council-osp

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:
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 assists 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.
SDSB
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 he 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.

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. Tanveer Shehzad holds a PhD from University of Groningen, the Netherlands and is a Certified Financial Risk Manager from GARP (USA). He specializes 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.

Title: Sovereign Ratings Changes and Karachi Stock Exchange (KSE) Sentiment
PI: Dr. Choudhry Tanveer Shehzad
Co-PI: Dr. Jens Forssbaeck, LUND University, Sweden
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 600,000
Project Initiated in: 2013
Duration: 12 Months
Category: Economic Development

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.

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 pre-condition for flourishing financial markets.
Profile: Dr. Farrah Arif is the Assistant Professor of Marketing in the Suleman Dawood School of Business at the Lahore University of Management Sciences. As a Commonwealth scholar, she obtained a PhD from the University of Cambridge Judge Business School. She is also a certified Associate Fellow of the Higher Education Academy (AFHEA), UK. 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.

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. Muhammad Adeel Zaffar
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 756,000
Project Initiated in: 2014
Duration: 12 Months
Category: Economic Development

Description: This research focuses on 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 utilized in Pakistan.
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.

Title: Mortgage Backed Securities, Evaluation and Modelling
PI: Dr. Ferhana Ahmad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 800,000
Project Initiated in: 2014
Duration: 12 Months
Category: Business & Innovation

Description: The market for Mortgage Backed Securities (MBS) was active and fast growing from the issuance of the first MBS in 1981. This enabled financial firms to transform risky individual mortgages into liquid and tradable market instruments. The subprime mortgage crisis of 2007 shows the need for a better understanding and development of mathematical models for these securities. The aim of this research is to develop models for MBS that are flexible enough to capture both regular and subprime MBS.
Profile: Dr. 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 Organization 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.

Title: An Analysis and Design of Dairy Sector Supply Chain in Pakistan
PI: Dr. Kamran Ali Chatha
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 237,000
Project Initiated in: 2012
Duration: 12 Months
Category: Business & Innovation

Description: This project makes use of value chain analysis techniques for evaluating dairy sector value chain in Pakistan and access the extent of benefits achieved by structural interventions (e.g. establishment of large farms, veterinary clinics, etc.) made in the sector. Hence it provides evidence based policy advice for future structural development to uplift the sector. Secondly, it access the comprehensiveness of the value chain analysis techniques to evaluate chilled value chain of a perishable product (milk) in an emerging economy (Pakistan) and develop the value chain analysis suite to incorporate sector structural analysis.

Title: Internationalization 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 globalization 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 internationalize their manufacturing and innovation capabilities and the strategies deployed for this purpose.
Profile: Dr. Misbah Tanveer 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.

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 ongoing 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, Organizational 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, Decentralization/Devolution, Responsible Business Frameworks, Organizational Effectiveness and Information and Communication Technologies; for organizations such as Nike Inc., Engro Corp., Government of the Punjab, USAID, CIDA, GIZ, SDC, various RSPs and other for-profit and non-for-profit organizations.

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: Dr. Ghufran Ahmad is Assistant Professor and Director of the MBA programme at the Suleman Dawood School of Business (SDSB), Lahore University of Management Sciences (LUMS). He teaches the subjects of leadership and change management in the MBA and executive MBA programmes and has directed many executive education programs at SDSB for private, public, and social sector enterprises. He holds PhD in Management Sciences from IAE Aix, France. He did doctoral research at INSEAD France for three years as a full-time visiting PhD and was later associated with the INSEAD Global Leadership Centre (IGLC) as a senior research fellow. He has received training at IGLC in leadership development and executive coaching. Ghufran has twelve years of experience in managing human resources and quality management functions in the corporate sector in Pakistan.

Title: Cultural Influences on the Effectiveness of Organizational Leadership: A study of Pakistan
PI: Dr. Muhammad Ghufran Ahmad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 500,000
Project Initiated in: 2012
Duration: 12 Months
Category: Behavioural Studies
Description: This project aims to determine the differences in leadership styles, requirements and characteristics of organisational culture of Pakistani organisations that are operating in four different sectors including for-profit private sector, public sector, non-profit social sector and military. The aim is to identify the differences within sector in terms of leadership and culture and to explain the interrelationships between leadership styles and requirements and organisational culture characteristics.

Title: Organizational Leadership
PI: Dr. Muhammad Ghufran Ahmad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 500,000
Project Initiated in: 2012
Duration: 12 Months
Category: Behavioural Studies
Description: The performance of groups, organisations, and societies rests upon the decisions of individuals who act under different roles and responsibilities. While the majority knows how individuals make decisions and what heuristics and biases influence their decision making process, many people still know little about the differences in the way individuals decide when they act in various leadership capacities. Leaders have a greater level of responsibility and they approach problems from different directions. If the assumption of leadership responsibility transforms the perspective and level of responsibility of individuals as leaders, this difference is likely to be reflected at large in their decision-making. This research aims at identifying such differences and explaining them through theory development.
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.

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.

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.

Title: SCM and Organisational Performance (SCMOP)
PI: Dr. Muhammad Shakeel Sadiq Jajja
Sponsor: Association of Management Development Institution in South Asia (AMDISA)
Funding Amount: PKR 415,000
Project Initiated in: 2012
Duration: 12 Months
Category: Business & Innovation

Description: In a new century, where competition is between supply chains, supply chain strategy has significant implications on organisations’ performance. This recent competition is demanding organisations to build more cost-effective, quality conscious, innovative, flexible and responsive supply chains. The research framework attempts to partially fill the above research gaps in literature on supply chain management. It is based on data from Pakistan and India’s industry and seeks to create the local supply chain related knowledge and context specific analysis. Further, it attempts to investigate how strategic orientation of organisations regarding supply chain management related constructs influence organisations’ internal operations and their interaction with other organisations, especially with suppliers.
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.

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.
Dr. Salman Khan
SDSB
salman.khan@lums.edu.pk
+924235608220

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.

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 Organizational 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, organizational citizenship behaviours and career oriented self-efficacy. Her work has been published in various academic journals including Journal of Organizational Behaviour, Journal of Business and Psychology, Review of Public Personnel Administration and Public Personnel Management. Dr. Quratulain is actively involved in several professional organizations including the Academy of Management and American Society of Public Administration.

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.

Title: Learning Need Assessment of Punjab Skills Development Fund (PSDF)
PI: Dr. Syed Mubashir Ali
Co-PI: Dr. Zehra Waheed
Sponsor: Punjab Skills Development Fund (PSDF)
Funding Amount: 468,000
Project Initiated in: 2014
Duration: 2 Months
Category: Development Management

Description: The purpose is to identify performance requirement, knowledge, skills and abilities needed by PSDF’s workforce, both in Bahawalpur and Lahore offices in order to achieve organisational goals. This includes development and administration of survey questionnaire for training needs assessment; conduct meetings; focus group discussions; interviews and assess gaps in capacity for PSDF employees.
**Profile:** Dr. Hassan has more than two decades of extensive experience in the higher education sector. At LUMS, he has served in many capacities besides teaching and research, including Associate Dean, Dean, Pro-Vice Chancellor and Vice chancellor (VC) (2002-8). During his six year tenure as VC, LUMS expanded in all dimensions (academic programmes, faculty, schools and infrastructure) and formulated its vision to become a broad-based research university. Launch of the National Outreach Programme (NOP), through which bright students from the under privileged sections of our society are groomed and developed to join LUMS on full financial support, is a key highlight of Dr Hassan’s term as VC. Now almost 20% of students at joining BSc at LUMS are from NOP. Dr. Hassan’s current research interests include management of technology, innovation and entrepreneurship in the global world. Besides consulting for many leading local companies and international organizations, like UNDP and World Bank, he has also served on the boards of organizations 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.

**Title:** Atlas of Islamic World Science and Innovation Project: Pakistan Case Study

**PI:** Dr. Syed Zahoor Hassan

**Co-PI:** Dr. Kamran Ali Chatha

**Sponsor:** The Royal Society

**Funding Amount:** PKR 2,108,000

**Project Initiated in:** 2010

**Duration:** 6 months

**Category:** Business & Innovation

**Description:** The aim of the project is to provide a platform to various stakeholders to speak about science & technology based innovations, share their experiences, learn from each other and thus, contribute to the development of human capital, sustainable business development and a culture of science and technology based innovation in Pakistan. Public organisations, commercial entities as well as social and not-for-profit organisations were included in the scope of interactions and data collection.

**Title:** Understanding Technology Based Innovation Ecosystem of Pakistan and Impact of Innovation on Performance of Pakistani Organisations

**PI:** Dr. Syed Zahoor Hassan

**Co-PI:** Dr. Kamran Ali Chatha

**Sponsor:** LUMS Faculty Initiative Fund (FIF)

**Funding Amount:** PKR 600,000

**Project Initiated in:** 2012

**Duration:** 12 Months

**Category:** Business & Innovation

**Description:** The research aims comprise of the following: i) Technology based innovation ecosystems in various industrial sectors of Pakistan. ii) Capture examples of technology based innovations in those industrial sectors and disseminate them for the benefit of other businesses. iii) To understand linkages between buyer-supplier relationship of organisations and innovations in their product/services in the context of emerging markets.
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.

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.
MGSHSS
Department of Economics
Profile: Dr. Abid Aman Burki is a Professor of Economics at the Lahore University of Management Sciences (LUMS). He was also the Director of the Centre for Management and Economic Research of LUMS from 2003 to 2010. Dr. Burki received his PhD in Economics from Kansas State University. Prior to his appointment at LUMS, he was on the economics faculty of Quaid-i-Azam University (1985-2002) and most recently as Professor and Head of the Economics Department. He serves on several high-level committees and taskforces of the government. His research interests lie in the areas of applied microeconomics; development economics; and production economics. He has also taught courses at Kansas State University and is a referee for numerous academic journals. He has authored or co-authored more than 70 articles, book chapters and professional reports and has supervised three PhD, 18 MPhil and 28 Master's theses. In recognition of his services he was conferred the President of Pakistan’s academic distinction award Izaz-i-Fazeelat in 2001.

Title: Agglomeration Economies and their Effects on Productivity and Efficiency of Manufacturing Firms: Evidence from Pakistan
PI: Dr. Abid Aman Burki
Co-PI: Dr. Mushtaq Ahmad Khan
Sponsor: International Growth Centre (IGC)
Funding Amount: PKR 3,030,000
Project Initiated in: 2011
Duration: 10 Months
Collaborator: London School of Economics and Political Science (LSE)
Category: Economic Development

Description: This project aims at identifying the variables that affect the productivity and efficiency of manufacturing firms in Pakistan in an agglomeration economy. The project provides a spatial mapping of firms, identifying the nature and extent of geographic concentration and discusses their dynamic process overtime. It employs econometric methods on firms and spatial data to examine the impact of agglomeration economies on productivity and efficiency.

Title: Exploring the Link between Polarization and Poverty: Empirical Evidence from Pakistan
PI: Dr. Abid Aman Burki
Sponsor: South Asia Network of Economic Research Institutes (SANEI)
Funding Amount: PKR 839,987
Project Initiated in: 2010
Duration: 12 Months
Collaborator: Global Development Network
Category: Economic Development

Description: The proposed study assesses the sensitivity of measures of inequality and polarization with poverty incidence in Pakistan. It uses a linear probability model on pooled cross-section data of 113,240 households drawn from eight rounds of household surveys (HIES) over the 1990-01 to 2005-06 periods at the individual and household level. The aim is to explore the sensitivity of incidence of headcount poverty with different measures of polarization and income inequality to given levels of income growth.
**Title:** Pakistan Database & Productivity Measurement at the Industry Level  
**PI:** Dr. Abid Aman Burki  
**Co-PI:** Dr. Mushtaq Ahmad Khan and Dr. Syed Muhammad Hussain  
**Sponsor:** International Growth Centre (IGC)  
**Funding Amount:** PKR 3,386,422  
**Project Initiated in:** 2014  
**Duration:** 12 Months  
**Category:** Economic Development

**Description:** The World KLEMS initiative promotes a gradual build-up of industry level database on outputs, inputs and productivity across countries. Based on a growth accounting framework, this new database is comparable across countries due to its consistent definitions, methodology, classifications and standards. This study has the objective of creating Pakistan KLEMS data at the national and industry level on the pattern of EU KLEMS database. It includes growth in output, growth in input and derived measures of total factor productivity.

**Title:** 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: 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.

Title: Industrial Policy Implementation Mechanism
PI: Dr. Abid Aman Burki
Co-PI: Dr. Kamal A Munir
Sponsor: World Bank
Funding Amount: PKR 2,975,000
Project Initiated in: 2010
Duration: 10 Months
Category: Law & Policy

Description: This project is a continuation of the earlier project also funded by the World Bank on "Industrial Policy, its Spatial Aspects and Cluster Development in Pakistan." The project envisages preparation of action plans based on recommendations of the industrial policy and to describe the mechanism for implementation as well as monitoring the measures and structures that are needed to perform these activities.

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.
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
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: 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: Written Test for the Selection of Trade Officers 2012
PI: Dr. Abid Aman Burki
Co-PI: Dr. Shafay Shamail
Sponsor: Ministry of Commerce, Government of Pakistan (MOC)
Funding Amount: PKR 2,691,000
Project Initiated in: 2011
Duration: 7 Months
Category: Trade

Description: The Ministry of Commerce, Government of Pakistan requested LUMS to conduct a written test for selection of trade officers from their CSS cadres, in BPS-1B, 19 and 20, for postings as trade officers in Pakistan’s Foreign Missions. While LUMS signed contract with the Ministry in June 2010, the test could not be conducted earlier on due to a writ petition in the Islamabad High court against the Ministry. Now that the court case has been decided in favour of the Ministry they have requested LUMS to conduct the test.
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.

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.

Description: This research seeks to quantify the causal impact of a reduction in transit cost and time due to an investment in public transport infrastructure on labour market outcomes and human capital acquisition. The study also identifies a more comparable control group than used in previous literature: areas which were slated for potential routes but have not yet received them yet. Using quasi-experimental difference-in-difference approach, in which the treatment group will be areas within a short distance of Metrobus stations, while the control group will be identified on the basis of lines which have been planned but have not yet been built. Answers to these questions will provide evidence-based insights for policymaking in Pakistan’s high priority policy area of urban transportation infrastructure.
Title: Cluster-based Industrialization and its Effect on Productivity of Manufacturing Firms in Pakistan
PI: Dr. Hadia Majid
Sponsor: Pakistan Strategy Support Program (PSSP)
Funding Amount: PKR 882,000
Project Initiated in: 2013
Duration: 11 Months
Category: Development Management

Description: The consultancy provides support to study policy issues in regard to Cluster-based Industrialization 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.

Title: Plan Pakistan Early Childhood Care and Development
PI: Dr. Hadia Majid
Sponsor: HTSPE International Programme Management
Funding Amount: PKR 89,100
Project Initiated in: 2013
Duration: 4 Days
Category: Education

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 Organization. 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 Randomized 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.

Title: Coca Cola Economic Impact Study  
PI: Dr. Kashif Zaheer Malik  
Sponsor: Coca-Cola Beverages Pakistan Ltd (CCBPL)  
Funding Amount: PKR 1,200,000  
Project Initiated in: 2013  
Duration: 4 Months  
Category: Development Management

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.

Title: Trade with Africa  
PI: Dr. Kashif Zaheer Malik  
Co-PI: Mr. Adeel Faheem  
Sponsor: Barclays Bank, Karachi  
Funding Amount: PKR 868,291  
Project Initiated in: 2012  
Duration: 1 Month  
Category: Trade

Description: The research project is about trade relations between Pakistan and African countries. Since Africa has recently become the preferred trading partner of some countries, there has been a lot of interest about this. The study covers key areas regarding opportunities between Pakistan and other trading countries with focus on Africa.
Title: Encouraging Entrepreneurship: A Randomized 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 Trials (RCT) by offering Modarba micro-finance of up to Rs. 300,000/- to existing clients of Akhuwat (Akhuwat is a microfinance institution operating in Pakistan. It gives out small interest free loans). Since Akhuwat brings together different models, as compared to conventional micro-finance, the spirit of volunteerism and the tradition of giving, which is a cardinal principle of all religions as well as having better knowledge about clients greatly enhances the commitment of clients to abide by the rules of business. The findings of this innovative field experiment may have far reaching consequences and are likely to be of significant interest to policy makers, academia and microfinance professionals.
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:** Situation Analysis of Children and Women in Pakistan  
**PI:** Mr. Mohammad Usman Khan  
**Co-PI:** Dr. Abid Aman Burki  
**Sponsor:** United Nations International Children’s Emergency Fund (UNICEF)  
**Funding Amount:** PKR 16,531,250  
**Project Initiated in:** 2011  
**Duration:** 42 months  
**Category:** Economic Development

**Description:** The project aims to generate evidence as to which of the rights of the children and women are unfilled and how? It also determines the causes of these unfilled rights while finding out whose rights are unfulfilled. The purpose is to assess and analyse the situation of the country with respect to the fulfilment and lack of fulfilment of the rights of women and children.

**Title:** SME Cluster Survey Fans Cluster Gujranwala/Gujarat  
**PI:** Mr. Mohammad Usman Khan  
**Co-PI:** Dr. Kamal A Munir  
**Sponsor:** State Bank of Pakistan  
**Funding Amount:** PKR 2,402,500  
**Project Initiated in:** 2010  
**Duration:** 1 month  
**Category:** Economic Development

**Description:** In Pakistan, reliable and credible data on SME clusters is important for the development of effective strategies for SME sectors. The cluster studies provide key information on the size (number of firms, number of employees, investment levels, etc.), growth potentials, key challenges, future outlook, existing and financing future needs, cash flow patterns, accounting practices, utilization of Business Development services and issues faced by each cluster in accessing formal sources of finance. The information derived from the survey not only facilitates commercial banks in aligning their financing strategies more effectively in the targeted clusters but also consequently comes up with sector-specific banking products as well as providing aid to the client in revisiting its regulatory measures in an effective manner.
Title: Out of School Children
PI: Mr. Mohammad Usman Khan
Co-PI: Dr. Abid Aman Burki
Funding Amount: PKR 4,297,471
Project Initiated in: 2012
Duration: 28 months
Category: Education

Description: The purpose of the research is to improve statistical information and analysis on out of school children and to scrutinise factors leading to exclusion from schooling and existing policies related to enhanced participation (addressing data, analysis and policy gaps). The goal is to introduce a more systematic approach to address the problem of out-of-school children and guide concrete education sector reforms in this regard.

Title: Promoting Indo Pak Trade
PI: Mr. Mohammad Usman Khan
Co-PI: Dr. S.M. Turab Hussain
Sponsor: Adam Smith International (ASI)
Funding Amount: PKR 20,391,825
Project Initiated in: 2012
Duration: 22 Months
Category: Trade

Description: This research has been conducted in two phases. It aims to increase awareness regarding the benefits of trade between India and Pakistan among public and private stakeholders for further support of greater cooperation and dialogue between government, public and private sector bilateral trade liberalization. The project also aims to improve the readiness and capacity of the state to engage in bilateral trade with India.
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.

Title: Learning in Punjab: Regional Gaps and School Characteristics  
PI: Dr. Muhammad Farooq Naseer  
Sponsor: Campaign for Quality Education (CQE)  
Funding Amount: PKR 225,500  
Project Initiated in: 2010  
Duration: 4 Months  
Category: Education

Description: Improving the quality of education in Pakistan in an important policy imperative as it is well known that the quality of education in Pakistan is greatly lagging behind academic standards. Dr. Muhammad Farooq Naseer had been approached to develop a comprehensive evaluative program to undertake descriptive research geared towards addressing some fundamental questions underlying the quality of public education Pakistan. This will be done by assessing examination data from the Punjab Examination Commission (PEC) and school inputs data from the Project Management Implementation Unit (PMIU). The research is concerned with, and suggests a work plan for, the descriptive phase.

Title: Teacher Education Project: Second National Research Seminar  
PI: Dr. Muhammad Farooq Naseer  
Co-PI: Mr. Adeel Faheem  
Sponsor: U.S. Agency for International Development (USAID) Education Development Centre  
Funding Amount: PKR 361,620  
Project Initiated in: 2012  
Duration: 1 Week  
Category: Education

Description: The USAID Teacher Education Project is a five-year project supporting the Higher Education Commission (HEC) and provisional departments of education to reform pre-service teacher education. As part of the project, a number of activities were carried out to support 18 research teams from 15 different universities to conduct research in teacher education program. These activities included conducting research proposals, writing workshops, national seminars and follow up meetings to assist teams in designing their data collection instruments.
**Title:** A Primary Care Toolkit to Tackle Child Labour and Promote Health Equity  
**PI:** Dr. Anne Andermann, Department of Family Medicine, McGill University, Canada  
**Co-PI:** Dr. Muhammad Farooq Naseer, Department of Economics, MGS-HSS  
**Sponsor:** McGill University  
**Funding Amount:** PKR 1,495,000  
**Project Initiated in:** 2012  
**Duration:** 22 months  
**Collaborator:** The Royal Institute for the Advancement of Learning  
**Category:** Health  

**Description:** The study aims to lay the groundwork for developing a child labour and health equity toolkit to assist community based primary health care workers in low-resource settings in providing education and care for child labourers who are 5 to 17 years old. In addition, it aims to mobilise larger collective action and social change to promote improved health and safety for children from pre-school to adulthood and, ultimately, result in reduced health inequities.

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**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:** November 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.

Title: Do Migrants Bring Their Castes with Them: Identity and Occupational Mobility in Lahore

PI: Dr. Rashid Memon
Co-PI: 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.

Title: Urbanization/Migration Nexus project (UM-Np) in South Asia

PI: Dr. Rashid Memon
Sponsor: London School of Economics and Political Science (LSE)
Funding Amount: PKR 2,681,059
Project Initiated in: 2014
Duration: 9 Months
Category: Economic Development

Description: The main research question of this study is: How exactly is investment in urban construction (in the five south Asian countries) and its concurrent demand for labour giving rise to new and varied temporal forms of migration? The mapping exercise is designed to give us a better understanding of the construction industry/sector in Pakistan and to narrow down the fieldwork sites for the project. The findings from the mapping exercise helps to identify the precise sites where fieldwork takes place.
Title: Ethnic Violence and Labour Unrest in Pakistan
PI: Dr. Rashid Memon
Co-PI: Dr. Mushtaq Ahmad Khan
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 269,000
Project Initiated in: 2014
Duration: 12 Months
Category: Behavioural Studies

Description: This research is intended to construct a data set that documents the incidence of different kinds of violence in a given district in a given year. Existing data on violence, collected by Dr. Shapiro of Princeton and Dr. Rasul Bakhsh Rais of LUMS appears to underestimate the incidence of violence because it focuses on a national newspaper (DAWN), which might not report incidences in small towns and villages. Under this research, a hypothesis that local newspapers carry more information by focusing on 4 districts, two in Sindh and two in Punjab, is expected to be tested. Research Assistants are expected to be hired to search through these newspapers and create a data base of incidents. After that, a comparison is intended to be made with the Shapiro-Rais data set to see if the approach is indeed useful.
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.

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.

Title: Strengthening Research and Promoting Multi-level Dialogue for Trade Normalisation between India and Pakistan
PI: Dr. S.M. Turab Hussain
Sponsor: Indian Council for Research on International Economic Relations (ICRIER)
Funding Amount: PKR 735,351
Project Initiated in: 2012
Duration: 12 Months
Category: Trade

Description: The objective of this project is to better inform key stakeholders in business and policy establishment through targeted research and to make India-Pakistan trade normalisation policy process more participatory through creation of multilevel dialogue platforms for interface between policy makers, business persons and academics. The endeavour hopes to catalyze and inform a more participatory policy debate through targeted and practical research and by fostering multi-level dialogue platforms.
Title: Indo-Pak Trade Promotion  
PI: Dr. S.M. Turab Hussain  
Sponsor: Adam Smith International (ASI)  
Funding Amount: PKR 343,977  
Project Initiated in: 2011  
Duration: 2 months  
Category: Trade

Description: ASI has been engaged by the UK Conflict Pool to undertake an Indo-Pakistan trade promotion intervention. Strengthening economic ties between the two countries through trade is intended to help build mutual inter-dependence and help establish a trust dividend. This may also improve the environment for making progress on outstanding political, security and territorial disputes.

Title: Critical Issues in Pakistan's Industry  
PI: Dr. S.M. Turab Hussain  
Co-PI: Dr. Abid Aman Burki, Dr. Mushtaq Ahmad Khan & Mr. Mohammad Usman Khan  
Sponsor: LUMS Faculty Initiative Fund (FIF)  
Funding Amount: PKR 450,000  
Project Initiated in: 2010  
Duration: 12 Months  
Category: Economic Development

Description: This project is aimed to develop a new industrial policy for Pakistan in form of a book which can serve as a ready reference to industrialists, corporate manager, policy makers, as well as students. Researchers have done extensive research in this area and compiled a book using solid publication records. Scholars have periodically examined Pakistan's industry but good scholarship (e.g., Papanek, 1967; Nabi, 1984; Noman, 1991) has been forthcoming only rarely. For the last several years, no serious examination has been undertaken of Pakistan's industry, so the researchers filled this gap.

Title: Industrial Policy, its Spatial Aspects and Cluster Development in Pakistan  
PI: Dr. S.M. Turab Hussain  
Co-PI: Dr. Abid Aman Burki  
Sponsor: World Bank  
Funding Amount: PKR 8,439,500  
Project Initiated in: 2010  
Duration: 8 Months  
Category: Economic Development

Description: This research constitutes a comprehensive analysis of Pakistan's manufacturing sector aimed at deriving policy recommendations for Industrial growth and development. The report is structured to provide a three tiered analysis of Pakistan’s industry. First tier is a macro level analysis of industrial structure and performance to help identify major constraints hindering structural change in the country. The second tier of analysis presents a detailed look at the manufacturing sector through firm/sector analysis. Lastly, the third tier of analysis takes a more telescopic view of the industrial sector where the focus is on the spatial aspects of industrialisation — economic geography, covering issues such as inter and intra provincial inequalities in infrastructural provision and its resultant impact on the income inequality, poverty and industrial cluster formation.
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.

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 specializes in the study of service delivery and corruption in underdeveloped countries and agriculture policy.

Title: Supporting Policy Research to Inform Agricultural Policy in Sub-Saharan Africa and South Asia
PI: Dr. Syed Ali Hasanain
Sponsor: Global Development Network (GDN)
Funding Amount: PKR 3,472,000
Project Initiated in: 2011
Duration: 18 months
Category: Agriculture

Description: The study attempts to analyze various research questions about water management in different countries. The questions include a) how have different countries responded to challenges of water management? b) What are the obstacles to private and public irrigation development? c) How does the pricing of water affect the efficiency of use? d) What have been the impacts of the water markets on agricultural production? And e) what have been the distributional consequences?
Title: Monitoring the Monitors: Using ICT to Improve Government Monitoring in Punjab, Pakistan
PI: Dr. Syed Ali Hasanain
Sponsor: International Growth Centre (IGC)
Funding Amount: PKR 6,527,000
Project Initiated in: 2011
Collaborators: London School of Economics and Political Science (LSE), University of Oxford, DECO Associates and Government of Punjab, Pakistan
Duration: 12 Months
Category: Health

Description: The aim of this project is to improve health services in Punjab with the help of Deputy District Officers (DDO’s) and Government of Punjab Ministry of Health (MoH). It emphasizes on questions such as: a) Do monitoring government monitors work using technology such as smart phones? b) Do intensity of supervision by DDO’s lead to better service deliveries? c) Is the effect sustained for longer periods? And d) does reduced negligence from supervisory monitoring lead to better outcomes?
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.

Title: Technical Training for Labour Department Punjab staff
PI: Dr. Syed Muhammad Hussain
Sponsor: Labour Department Punjab
Funding Amount: PKR 270,000
Project Initiated in: 2013
Duration: 1 Month
Category: Development Management

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.
Department of Humanities and Social Science
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.

Title: Access to Social Services and Child Labour in Cotton Growing Districts of Pakistan
PI: Dr. Ali Khan
Co-PI: Mr. Mohammad Usman Khan
Funding Amount: PKR 2,112,000
Project Initiated in: 2011
Duration: 3 Months
Category: Law & Policy

Description: UNICEF and IKEA (a multinational company) are in negotiation for long-term programmatic interventions in eight of Pakistan’s largest cotton producing district (Rahim Yar Khan, Bahawalpur, Bahawalnagar, Rajanpur, Khairpur, Ghotki, Lasbela and Khuzdar) from 2005-2009. The project interventions are to target 1,625 villages benefiting 477,237 children directly involved in cotton farming and 794,955 children indirectly. The project is expected to be implemented through financial support from IKEA in 4 phases starting with four districts (Rahim Yar Khan, Bahawalpur, Khairpur and Lasbela). The second and third phases would expand to 8 districts and the last phase would involve a project evaluation and handover to the Government of Pakistan.

Title: Cinema and Society: Project on a History of the Pakistani Film Industry
PI: Dr. Ali Khan
Co-PI: Dr. Ali Nobil Ahmad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 430,000
Project Initiated in: 2010
Duration: 12 Months
Category: Behavioural Studies

Description: The objective of this book is; a) to serve as source of much needed reliable information about the cinematic heritage of Pakistan for academics and the wider public; b) to provide critical analyses of the strengths and weaknesses, achievements and failures of the industry as a whole, as well as its relationship with Pakistani society and history; c) To raise concern among cultural policy makers and those involved in cultural heritage about the plight facing Pakistan’s film industry which, despite its remarkable achievements since the 1950s, is in crisis; and d) To stand alone as an excellently laid out, aesthetically pleasing work of literature and visual art that integrates film art and rare film stills with a highly readable and thought provoking narrative about a much-neglected aspect of Pakistani history.
Title: Growth of Islamic Religiosity in Pakistan: Manifestations and Impact
PI: Dr. Ali Khan
Co-PI: Dr. Laila Bushra
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 838,000
Project Initiated in: 2014
Duration: 12 Months
Category: Behavioural Studies

Description: The rising influence of Islam in the Pakistani state and in wider society has been the topic of much academic and journalistic debate, especially in the last decade. The project aims to contribute to this debate by taking an approach that is both focused and holistic regarding the role of Islam in Pakistan. The project investigates the growth of Islamic religiosity in Pakistan in four specific sectors or arenas of activity: the influence of religious affiliation and practice on the dynamics of the national cricket team over the last decade; the political and electoral trajectory of Islamist political parties since the 1950s; the rise of an Islamist media and civic organizations structure since the 1970s; and the rise of mob violence or targeted attacks by radical Islamist organizations against minority communities (Christians and Shias) 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.

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 organizations and ideologues in shaping the contours of debate on such issues in Muslim societies.
Profile: Dr. Hasan is an assistant professor of History, specializing 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 globalization 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.

Title: Markets, Merchants and the State: An Exploration of the Informal Mechanism between Sino-Central Asian and Sino-Pakistan Trade
PI: Dr. Hasan H. Karrar
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2014
Duration: 12 Months
Category: Trade

Description: This research is part of an ongoing inquiry into how, since the Cold War state-led development of market mechanisms in China’s Xinjiang Uighur Autonomous Region (XUAR) has transformed societal and market structures in the countries on its western periphery. This research seeks to understand formal and informal trade, the relationship between them (does informal trade always require formal trade?) and how this commerce is changing societal structures (increased mobility, new occupational opportunities, decline in traditional vocations, negotiating the state) and market structures (entrepreneurship and agency, wholesale markets for import and re-export; the emergence of Asia’s largest bazaars in a post-Soviet space).
Profile: Dr. Mohammad Waseem is Professor of Political Science at Department of Social Sciences, Lahore University of Management Sciences. He was Chairman of the International Relations Department, Quaid-e-Azam University, Islamabad. Dr. Waseem has written on ethnic, Islamic, constitutional, electoral and sectarian politics of Pakistan and his books include: Politics and the State in Pakistan (1989), The 1993 Elections in Pakistan (1994) and Strengthening of Democracy in Pakistan (co-authored with S.J. Burki) (2002). He also edited the book Electoral Reform in Pakistan (2002). Professor Waseem was Pakistan Chair at St. Antony’s College Oxford from 1995-1999. He has been a visiting professor in Sciences Po Paris; a visiting scholar in the International Programme for Advanced Studies MSH, Paris; Fulbright Fellow in the New Century Scholars Programme at The Brookings Institution, Washington DC; Fellow of the Ford Foundation at Oxford; DAAD Fellow at the University of Heidelberg; Fulbright Fellow at Columbia University, New York; Fellow of the Indian Historical Research Council, New Delhi; Fellow of the British Council in London; and Fellow of the American Political Science Association in Washington DC. Professor Waseem has been on the editorial boards of international academic journals; Ethnicities (Bristol), Contemporary South Asia (Bradford) and International Studies (New Delhi). He was the team leader of research projects sponsored by DFID London and UNDP Islamabad. He was the country coordinator for Pakistan for a survey project on South Asia sponsored by Ford Foundation.

Title: Supporting Transparency, Accountability and Electoral Processes Programme (STAEP)
PI: Dr. Mohammad Waseem
Sponsor: The Asia Foundation
Funding Amount: PKR 19,123,000
Project Initiated in: 2012
Duration: 12 Months
Category: Political Sciences

Description: STAEP aims to build relationships between citizens and the state to improve accountability of state institutions and elected representatives. Current STAEP activities, implemented through the Free and Fair Elections Network (FAFEN), operate at various levels to monitor state performance through Constituency Relations Groups (CRGs) and FAFEN member organizations. The scope of this study is to look at the development of parties from both a historical and contemporary perspective. The output is expected to be a single, comprehensive report, mapping and analyzing the historical development, performance and power structures of the main political parties at federal and provincial levels (which included nationalist parties in Baluchistan and Sindh, ethnic and religious parties and alliances.
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.

Title: Understanding the Impact of Urban Conflict on Everyday Lives: Narratives of Insecurity and Marginalisation in Lyari
PI: Dr. Nida Yasmeen Kirmani
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 500,000
Project Initiated in: 2014
Duration: 12 Months
Category: Behavioural Studies

Description: This research project explores the multiple discourses of marginalisation narrated by Lyari’s residents, focusing in particular on those neighbourhoods that are populated largely by Baloch communities and in which the ‘gangsters’ affiliated with the banned People’s Aman Committee (PAC) maintain their hold. The research highlights the diverse ways in which this process of marginalisation is framed, narrated and experienced by residents depending on their age, class, and ethnic background. Furthermore, it places these narratives within the wider socio-political context of Karachi, where the fear of violence increasingly permeates all areas of the city, although this ubiquitous sentiment of insecurity takes different shapes from one residential community to another.

Title: Exploring the Role of Religion in Women’s Rights Advocacy in Punjab and Sindh: Possibilities and Pitfalls
PI: Dr. Nida Yasmeen Kirmani
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 500,000
Project Initiated in: 2012
Duration: 12 Months
Category: Behavioural Studies

Description: The main objective of the research is to analyse the relationship of the Pakistani women’s movement with religion both historically and in relation to particular programmes and projects. The research also examines the projects of women’s organizations, including Shirkat Gah and the Aurat Foundation, focusing on their programmes in Punjab and Sindh in particular. It analyses the nature of these organisations’ partnerships with religious actors and utilisation of religious discourses.
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, 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: Groom 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".

Title: Pakistan’s Disputed Destiny: Modernism, State & Challenge of Radical Islam
PI: Dr. Rasul Baksh Rais
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 781,061
Project Initiated in: 2012
Duration: 12 Months
Category: Political Sciences

Description: The project aims to analyze various resources such as constituent assembly debates, papers of the founder fathers, their speeches and statements, to understand their vision of Pakistan. The research involves interviewing a wide range of thinking politicians, ethnic nationalists, religious leaders and public intellectuals in four provinces and Gilgit-Baltistan to analyze why the original idea of Pakistan as a modern, nation state has become contested.

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 responds 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 realized.
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.

Title: Discourses and Ideologies of the ‘Atomic Age’: A Cultural Approach to the Atomic Bomb in International Affairs, 1945 - 1960
PL: 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.
SBASSE
Profile: Plants employ multiple layers of immunity to guard against infection. The first layer responds to structures within conserved microbial molecules. The second layer responds to effector proteins, which are pathogen-encoded virulence factors. These two “branches” of the immune system synergize to provide robust host defence that halts most infections. 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.

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 localization of RIN4 is correlated with dramatic and distinct effects on its regulation of both branches of plant immunity. These findings lead us to hypothesize that the sub-cellular localization of RIN4 plays a key role in controlling plant immunity.
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.

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.

Title: Mango ripening in the post-genomic era
PI: Dr. Aziz Mithani
Co-PI: Dr. Muhammad Tariq and Dr. Ahmed Jawaad Afzal
Sponsor: Confidential
Funding Amount: PKR 37,234,470
Project Initiated in: 2014
Duration: 60 Months
Category: Sciences

Description: Mango is one of the world’s major fruit crop. In Pakistan, mango is the most abundant fruit crop with 1.9 million tons of mangoes produced in 2011. This proposal takes a multidisciplinary approach involving genomics, systems biology and bioinformatics to understand the genomic architecture of mango (Mangifera indica). It proposes to exploit the recent advances in genomic science, particularly high-throughput DNA sequencing, to identify the genes involved in the ripening of mango fruit.
**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.

**Title:** Molecular Characterization 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 in:** 2014
**Duration:** 36 Months
**Category:** Sciences

**Description:** The study aims to characterize Drosophila melanogaster (fruit fly) MLL5 homologue, the functionally uncharacterized gene CG9007 (hereafter referred to as DmMLL5), encoding a predicted protein with virtually identical domain structure and 40% sequence similarity to human MLL5.

**Title:** Molecular Characterization of Drosophila Polycomb Protein Phosphorylation and Sumoylation Sites
**PI:** Dr. Muhammad Tariq
**Sponsor:** Higher Education Commission (HEC)
**Funding Amount:** PKR 5,133,346
**Project Initiated in:** 2011
**Duration:** 24 months
**Category:** Health

**Description:** The project aims to decipher effect of phosphorylation and sumoylation, two post-translational modifications (PTMs) at specific amino acid residues in PC protein. Characterization of these PTMs in the context of PC function is expected to be enabled to link specific signalling pathway to cell fate maintenance by PC.
Title: Molecular Characterization of Threonine Phosphorylation in Enhancer of Zeste Involved in Maintenance of Cell Memory
PI: Dr. Muhammad Tariq
Co-PI: Dr. Saima Anwar
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 750,000
Project Initiated in: 2010
Duration: 12 Months
Category: Sciences

Description: The project is aimed to characterize the role of threonine phosphorylation of E(z) at molecular level and correlate it with the process to cellular memory. The researchers propose that characterization of evolutionary conserved phosphorylation sites in E (z) will decipher how this protein acts in changing environment and how dynamic gene regulation by E (z) is maintained. Researchers have started to characterize a conserved threonine residue in E (z) protein which is shown to be phosphorylated. This study is intended to yield novel insights in the dynamic function of E (z) which may eventually act as a therapeutic target for treatment of cancer.

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 characterized PRE with GFP and LUC in specific DNA based plasmids which are engineered to have antibiotic resistance gene along with PRE-GFP or LUC reporter. GFP and luciferase reporters under PRE are expected to mimic regulation by PcG/TrxG proteins which are intended to be validated by generating fly cells transiently expressing member of PcG proteins and monitoring expression of GFP/LUC. Cell-based studies performs either by over-expression or knockdown of PcG and TrxG proteins in fly S2 cells to validate PcG/TrxG mediated behaviour of reporter system.

Title: Role of Caspases in the Differentiation of Trophoblast Stem Cells into Polyploid Giant Cells
PI: Dr. Zakir Ullah, King Abdullah University of Science and Technology (KAUST)
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 polyploid 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 polyploid 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 polyploid cells resistant to apoptosis. This information is expected to help better understand a fundamental process in human development and diseases like cancer.
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.

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 significantly large scale. The results may potentially be used to develop a combination vaccine against the virus.
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 neutralizing antibodies using methodologies such as NMR, surface plasmon resonance (Biacore), isothermal calorimetry (ITC) and HIV neutralization 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 characterization of recognition phenomenon involving glycans.

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 neutralization 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 neutralization 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: December 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.
Department of Chemistry
**Profile:** Dr. Basit Yameen received his MSc degree (1998-2000) in the subject of Chemistry with distinction (awarded a gold medal and an academic roll of honour) from Government College University, Lahore, Pakistan. During early 2001, he moved to the Department of Chemistry, Quaid-e-Azam University, Islamabad, Pakistan, where he completed his MPhil degree (2001-2003) with a specialization in Organic Chemistry while carrying out his one year thesis research in the field of Polymer Chemistry. It was during this period where he developed an interest in the field of Polymer Science. He was later awarded a Ph.D. scholarship from the Higher Education Commission of Pakistan and received his Ph.D. degree (2004-2008) from Johannes Gutenberg University, Mainz, Germany for his research work which was carried out under the supervision of Prof. Dr. Wolfgang Knoll in the Materials Science Research Group of the Max Planck Institute for Polymer Research, Mainz, Germany. During his Ph.D., he had been working in close collaboration with Siemens AG (Medical Solutions and Vacuum Technology, Erlangen, Germany). After his Ph.D., he stayed at Max Planck Institute for Polymer Research as a post doctoral research fellow. During this time he worked for Bríg & Bergmeister GmbH, Niklasdorf, Austria, who sponsored his stay for a project concerning modification of paper surface properties. Also, during his Ph.D. and post doctoral stay at Max Planck Institute for Polymer Research, he published several research articles in peer reviewed journals. Before joining SSE Dr. Basit Yameen has worked as Assistant Professor at the Faculty of Materials Science and Engineering, GIK Institute of Engineering Sciences and Technology.

**Title:** Development of Protogenic Groups Containing Polymer Brush Modified Additives to Improve the Proton Conductivity of Polyelectrolyte Membranes for Fuel Cell Application

**PI:** Dr. Basit Yameen

**Co-PI:** Dr. Muhammad Sabieh Anwar

**Sponsor:** Higher Education Commission (HEC)

**Funding Amount:** PKR 6,146,074

**Project Initiated in:** 2011

**Duration:** 36 months

**Category:** Sciences

**Description:** The proton conductivity of a PEM is a very important factor in determining the overall efficiency of a fuel cell and its current status is still far from making any revolutionary real life impact. The objective of this study is to develop proof of concept realization of novel unexplored polymer-brush/oxide-additives based strategies for improving the proton conducting characteristic of existing PEM like Nafion for fuel cell applications.

**Title:** A combination of Magnetic Nanoparticles and Polymer Brushed: towards Development of Magnetically Assisted, High Capacity and Efficient Metal Ion Contaminated Water Remediation Adsorbent

**PI:** Dr. Basit Yameen

**Sponsor:** Higher Education Commission (HEC)

**Funding Amount:** PKR 5,172,338

**Project Initiated in:** 2011

**Duration:** 24 Months

**Category:** Water

**Description:** The project concerns the development of a method for removal of inorganic pollutants represented by metal ions. Specifically it is intended to develop an efficient magnetic nanoparticles based metal-ion-adsorbent with relatively higher ion up-taking capacity.
Title: Development of Polymer Functionalized Nanoparticles Based Adsorbents for High Capacity and Efficient Removal of Hazardous Metal Ions from Contaminated Water

PI: Dr. Basit Yameen

Sponsor: Comstech - Twas

Funding Amount: PKR 1,290,000

Project Initiated in: 2011

Duration: 17 Months

Category: Water

Description: In Pakistan water contamination is a grave concern that has caused severe problems such as health issues, crops productivity of soil, livestock reserves/production and the country’s economy. This project aims to develop a novel absorbent system that acts as remediation treatment to maintain the quality of water by removal of hazardous metal ions and hence avoid the contamination and its effects on the country’s environment.
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.

**Title:** UK Researcher Links program  
**PI:** Dr. Falak Sher  
**Sponsor:** British Council, UK  
**Funding Amount:** PKR 1,346,625  
**Project Initiated in:** 2014  
**Duration:** 6 Months  
**Collaborator(s):** University of Edinburgh, UK  
**Category:** Sciences

**Description:** The aim of this study is to significantly increase thermopower (or Seebeck coefficient) of transition metal oxides so that they become competitive with other known TE materials. Use of good and reliable TEoxide materials in thermoelectric devices makes an impact in reducing our dependence, to some extent, on fossil fuels.

**Title:** Synthesis and Properties of Thermoelectric Oxides for Renewable Energy Conversion Technologies  
**PI:** Dr. Falak Sher  
**Sponsor:** Higher Education Commission (HEC)  
**Funding Amount:** PKR 11,820,850  
**Project Initiated in:** 2013  
**Duration:** 36 Months  
**Category:** Sciences

**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.

**Title:** Development of Thermoelectric Oxides for Renewable Energy Conversion Technologies  
**PI:** Dr. Falak Sher  
**Co-PI:** Dr. Irshad Hussain and Dr. Muhammad Sabieh Anwar  
**Sponsor:** LUMS Faculty Initiative Fund (FIF)  
**Funding Amount:** PKR 750,000  
**Project Initiated in:** 2010  
**Duration:** 12 Months  
**Category:** Sciences

**Description:** This project plans to synthesize various thermoelectric oxide materials using both conventional solid state methods and sol gel chemistry. Substitution of different cations with variable oxidation states and sizes are intended to be carried out in order to manipulate and control the transport properties of these materials. Researchers are interested in the transition metal oxides with perovskite structures which can offer a huge diversity and possibility of substituting large number of cations with different oxidation states and sizes.
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 a couple of years, he went to the Michigan State University, USA for his PhD studies. At MSU, he worked on the applications of iridium catalyzed 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 catalyzed 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.

Title: Design and Synthesis of Novel Functionalized 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 synthesized and completely characterized. The project is based upon Green Chemistry synthetic technology.

Title: Rapid and Convenient Synthesis of Biologically Active Aryl/Heteroaryl Indole Alkaloids

PI: Dr. Ghayoor Abbas Chotana

Sponsor: LUMS Faculty Initiative Fund (FIF)

Funding Amount: PKR 990,000

Project Initiated in: 2014

Duration: 12 Months

Category: Sciences

Description: The study is based on a new synthetic route which bypasses the need to synthesize haloindoles in the first step, by using iridium catalyzed direct C-H borylation reaction, and thus yielding the desired product in only two steps. 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.
Profile: Dr. Habib Ur Rehman holds an MPhil degree in physical/polymer chemistry from QAU, Islamabad and Ph.D. in Materials Engineering Degree from the Institute for New Materials, Saarbrucken, Germany. He is currently working as an Assistant Professor of Chemistry. Before joining Syed Babar Ali School of Science and Engineering (SSE), LUMS, he served as Head of Optical Materials, R & D Group at Exxelis Limited, U.K. There, he developed a number of new materials for optical displays and optimized innovative processes for making LED backlights and light management films. He previously worked for Terahertz Photonics, UK, and was responsible for the development of low loss optical materials for data-comm and groundbreaking sol-gel based silica on silicon deposition technology.

**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 arylate-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.

Title: Bioimaging and Catalysis with Metal Nanoclusters  
PI: Dr. Irshad Hussain  
Sponsor: German Pakistani Research Cooperation Program (DAAD)  
Funding Amount: PKR 5,776,000  
Project Initiated in: 2011  
Duration: 24 Months  
Collaborator: Philipps University, Marburg (Professor Wolfgang J. Parak)  
Category: Sciences  
Description: The objectives of the study are to develop highly fluorescent metal nanoclusters, functionalization and purification of metal nano clusters and to explore applications in bio-imaging, drug delivery, and electro catalytic applications. The proposed project has enormous applications in bio-imaging and has great potential to develop highly efficient catalysts for a variety of processes, especially electro catalytic oxidation of methanol for fuel cell applications.

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. Saleem joined LUMS in 2012 and since then he has been actively developing his drug discovery research group. He is interested in the synthesis of the libraries of novel molecules that could modulate various cellular proteins involved in the cell cycle (notably kinases (Aurora kinases), centrosome clustering, Phosphohistonase 3P, MDM2-p53, AAA+ ATPase & 12-TM), development of new methodologies to access novel scaffolds, novel ligands for nanoparticle and the isolation, characterization & synthesis of the natural products of biological importance and food & toxicology. Dr. Saleem is also actively involved in the collaborative research across various departments in different universities to advance the scientific output and help the students with his expertise. Earlier, he obtained his MSc in Chemistry from GC University, Lahore, Pakistan with distinction (Gold Medal and Academic Role of Honor) in 2002 and MPhil in Chemistry in 2004. He was awarded Orient Dr. Ata-ur-Rehman Chemistry Award & XIVth Star Award and was selected to present Pakistan in the 56th Meeting with Nobel Laureates in Lindau, Germany. In 2006, he obtained Fulbright scholarship for PhD in Chemistry at Michigan State University, USA and completed it in 2011. There, he worked at the interface of chemistry and biology and focused on various research projects aimed towards cancer research. During his PhD, Dr. Saleem synthesized natural products and their analogs aimed at inhibiting check point kinase 2 and imidazoline based inhibitors of NF-κB pathway to study their binding interaction with proteasome 26s, developed the methodology for the synthesis of 1,2,4-triazoline and 1,2,4-triazoles via [2+3]-cycloaddition reactions of oxazolones and prepared photoaffinity labelled molecules to study the drug protein interaction.

Title: Understanding the Drug-Protein Interaction - Synthesis of New Dibromo Hymenialdisine Analog  
Pl: Dr. Rahman Shah Zaib Saleem  
Sponsor: Higher Education Commission (HEC)  
Funding Amount: PKR 381,780  
Project Initiated in: 2012  
Duration: 6 months  
Category: Health

Description: Dibromo Hymenialdisine (DBH) is a natural product known to inhibit checkpoint kinase 2 (Chk2), which has potential applications in improving the cancer therapy. The new analogue of the natural product synthesized and the evaluation of the compounds helped in furthering the understanding of the Chk2-natural product interaction and hence in developing better inhibitor.

Title: Synthesis of New Aromatically Decorated Chemotype Targeting Mdm2-P53 Interaction, With Potential Applications in Cancer Treatment  
Pl: 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 optimize the synthetic route, synthesize the combinatorial library and characterize all the compounds for their chemical structure.
Department of Computer Science
Profile: Dr. Karim holds a BSc degree from UET Lahore and a doctorate from The Ohio State University (OSU). Before joining LUMS in 2002, he worked as a Research Associate in the Knowledge Engineering Lab at OSU. Dr. Karim is an internationally recognized researcher in the areas of data mining, machine learning, and applied artificial intelligence. He has authored over 50 articles at leading venues including two books and 19 journal articles. At LUMS, Dr. Karim has been instrumental in developing and strengthening the graduate program in data mining and machine learning. He is the founding director of the Knowledge and Data Engineering Lab, which is the center of his research activities. The lab’s recent publication venues include ICDM, CIKM, PAKDD, and COLING. Dr. Karim has supervised four PhD graduates in the data mining/machine learning area.

Title: Disability services, resource, and training centre at LUMS
PI: Dr. Asim Karim
Sponsor: Sight Savers International (SSI)
Funding Amount: PKR 1,110,000
Project Initiated in: 2008
Duration: 36 Months
Category: Technology

Description: The primary purpose of this project is to develop ALAP, an integrated Accessible Latex-based Authoring and Presentation software for PVIs. ALAP provides advanced math-to-speech and (initially) basic math-to-Braille capabilities. ALAP is developed with open-source technologies to enable its widespread usability. As part of this project, existing technologies for accessible math had also been evaluated.
**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.

**Title:** TPI World Bank: Provision of Technical Advisory & Research Services for Application of IoT & 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 smart phones 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.

**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 organizations to compose an executable business process of a given organization based on its requirements and design specifications.
Dr. Hamid Abdul Basit
Department of Computer Science, SBASSE
hamidb@lums.edu.pk
+924235608194

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.

Title: Design and Implementation of a Language-Independent Software Clone Management Tool Suite for Single and Multiple Systems
PI: Dr. Hamid Abdul Basit
Co-PI: Dr. Shafay Shamail
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 1,000,000
Project Initiated in: 2014
Duration: 12 Months
Category: Technology

Description: The goal of this project is to develop a prototype tool for complete clone management capability. This includes an integrated environment where developers can locate and mark clones, track them across the different versions of a software system, create a generic representation of a group of clones automatically, and generate new variants of a given clone using the generic representation.

Title: Research Collaboration Visit
PI: Dr. Hamid Abdul Basit
Sponsor: Erasmus Mundus
Collaborating Partner: Eindhoven University of Technology, Eindhoven, the Netherlands
Collaborating Professor: Prof. Mark Brand, Prof. Jarke Van Wijk
Project Initiated in: 2013
Duration: 3 Months
Category: Technology

Main Purpose: The research collaboration visit by Dr. Hamid Abdul Basit with Professor Mark Brand and Professor Jarke Van Wijk in Eindhoven University of Technology, the Netherlands focused on the variability management of SIMULINK automotive models with Variant Configuration Language (VCL).
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.

Title: Centres Using Software-defined Networks
PI: Dr. Ihsan Ayyub Qazi
Co-PI: Dr. Daniel Mosse, University of Pittsburgh, United States
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 450,000
Project Initiated in: 2013
Duration: 12 Months
Category: Technology

Description: 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 centralization 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.

Title: Automated Control Programming of Robot through Imitation
PI: Dr. Mian Muhammad Awais
Co-PI: Dr. Shafay Shamail and Dr. Asim Karim
Sponsor: National ICT R&D Fund
Funding Amount: PKR 4,355,632
Project Initiated in: 2007
Duration: 60 Months
Category: Robotics

Description: The objectives of the project are (i) to make robot programming competitive through automation; (ii) to establish robotics and machine learning fields in the country and (iii) to promote awareness and appreciation of robots and automation. Learning is essential in robotics, especially for modern autonomous robots with social and/or dynamic orientation. In the study Dr. Mian Muhammad Awais researched on automation that is achieved through imitative framework.

Title: Intelligent Fault and Performance Management in Telecommunication Networks
PI: Dr. Mian Muhammad Awais
Sponsor: National ICT R&D Fund
Funding Amount: PKR 13,027,620
Project Initiated in: 2012
Duration: 18 Months
Collaboration: FAST NU and Ebryx SMC-Pvt. Ltd
Category: Telecommunication

Description: The proposed project is aimed at developing a low-cost intelligent solution to manage network faults and performance degradation emanating from telecommunication networks. The conducted research would culminate in an intelligent network management system, which would help in understanding issues relating to the suitable adoption of artificial intelligence techniques in the telecommunication network management domain.

Title: Research Collaboration Visit
PI: Dr. Mian Muhammad Awais
Sponsor: Erasmus Mundus
Collaborating Partner: University of Limerick/Limerick/Ireland
Collaborating Professor: Dr. Babar Ali
Project Initiated in: 2008
Duration: 3 Months
Category: Technology

Main Purpose: Dr. Mian Muhammad Awais visited the University of Limerick, Ireland in 2008 on a collaboration visit which had the purpose of enhancing research collaboration between LUMS and University of Limerick regarding faculty exchange and student exchange.
**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.

**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).

Title: Digital Preservation Pakistan’s Heritage
PI: Dr. Murtaza Taj
Sponsor: U.S. Agency for International Development (USAID) Ambassador Fund | LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 18,382,000
Project Initiated in: 2014
Duration: 11 Months
Category: Computer Vision

Description: This project aims to Digitally Preserve Pakistan’s Heritage in the form of 3D models with high resolution images of frescos and artwork. This study enables us to have a portal or repository of our rich cultural heritage that can be used as a source of virtual tourism that can eventually promote actual tourism, present a soft image of Pakistan to the outside world and preserve the history for our future generation.
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.

Title: Reliable Failure Recovery in Self-Managing System  
Pl: Dr. Naveed Arshad  
Sponsor: Higher Education Commission (HEC)  
Funding Amount: PKR 1,109,535  
Project Initiated in: 2007  
Duration: 36 Months  
Category: Energy

Description: The aim of the study is to identify self-recovery from failures in the autonomic system. Self-recovery can be achieved through sensing failures, planning for recovery and executing the recovery plan to bring the system back to a normal state. Handling such secondary failures is important because they can cause the original recovery plan to fail and can leave the system in a complicated state that is worse than before. In this project, techniques are identified to preserve consistency while dealing with such failures that occur during failure recovery.

Title: Towards Self-Managing Energy Systems in Buildings  
Pl: Dr. Naveed Arshad  
Co-Pl: Dr. Mohammad Jahangir Ikram  
Sponsor: National ICT R&D Fund  
Funding Amount: PKR 12,958,581  
Project Initiated in: 2011  
Duration: 26 months  
Category: Energy

Description: The aim of the project is to investigate energy efficiency and renewable energy integration in the existing electricity systems of common buildings such as houses or offices. In order to conserve energy, the energy supply and usage in buildings must be treated as a self-managing system. The specific goal is to develop low cost solutions for energy efficiency and maximal utilization of renewable energy through hardware/software interfaces.

Title: Low Cost Ultrasound Training Stimulator  
Pl: Dr. Naveed Arshad  
Sponsor: National ICT R&D Fund  
Funding Amount: PKR 14,991,200  
Project Initiated in: 2007  
Duration: 36 Months  
Category: Health

Description: The current ultrasound training strategies for doctors include classroom teaching supplemented by hands-on sessions on normal subjects and patients. The aim of this project is to develop an ultrasound simulator to augment ultrasound training and do away the necessities of hands on sessions with patients.
**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.

**Title:** Research Collaboration Visit  
**PI:** Dr. Naveed Arshad  
**Sponsor:** Erasmus Mundus  
**Collaborating Partner:** Malardalen University (MDH)/ Vasteras/ Sweden  
**Collaborating Professor:** Prof. Erik Dahlquist  
**Project Initiated in:** 2009  
**Duration:** 36 Months  
**Category:** Energy

**Main Purpose:** The research collaboration visit by Dr. Naveed Arshad with Professor Erik Dahlquist in Malardalen University, Sweden, focused on forecasting Electrical Loads in Houses.
Profile: Dr. Shafay Shamail completed his BSc Electrical Engineering from UET Lahore, MSc Electronics from University of Wales, UK and PhD degree in Electrical Engineering from University of Bath U.K. Before joining LUMS, Dr Shamail worked in both the software industry as well as in the academia. During his stay at SoftNet Systems, he gained experience in e-commerce technologies, especially those from Microsoft. Dr. Shamail has taught at UET, Lahore as well as at Pak-AIMS, and has a vast experience of curriculum design and implementation. He was Chair Department of Computer Science, LUMS from 2004 to 2009. He has worked as Vice Provost LUMS from 2010 to 2012. Since 2012, he is working as Director Office of Sponsored Programmes and Research (OSPR). He is also a Senior Member of IEEE and has chaired IEEE Lahore Section for the session 2010-2011.

Title: IT Restructuring and Capacity Building  
PI: Dr. Shafay Shamail  
Sponsor: SEFAM (Pvt) Ltd.  
Funding Amount: PKR 340,427  
Project Initiated in: 2011  
Duration: 4 Months  
Category: Development Management

Description: The objective of this assignment is to provide services to build the capacity of the IT Staff in accordance with the vision of the organisation as identified by the management. The scope of this exercise is limited to evaluation and capacity building of the helpdesk staff through training titled “High Performance IT Service Delivery in a High Growth Challenging Environment”.

Title: LUMS-MDH Collaboration Program  
PI: Dr. Shafay Shamail  
Sponsor: Linnaeus-Palme, Sweden  
Funding Amount: PKR 130,050  
Project Initiated in: 2011  
Duration: 12 Months  
Collaborator(s): Prof. Sasikumar Punnekkat, Malardalen University  
Category: Education

Description: During the academic year 2011-2012, Linneasus-Palme Program, Sweden funded for the planning visit to establish collaboration between MDU, Vasteras, Sweden and LUMS, Lahore, Pakistan. The planning visit was performed during spring 2012. During this visit, discussions were held to start the student/staff mobility during the year 2012-2013 in order to keep the momentum in the collaboration activities.
Title: IDEAS – Innovation and Design for Euro-Asian Scholars
PI: Dr. Shafay Shamail
Sponsor: Erasmus Mundus
Funding Amount: PKR 880,661
Project Initiated in: 2012
Duration: 60 Months
Category: Education
Description: The project partners include 7 European universities and 5 Asian universities. The objective is to exchange excellence in research and education in relevant disciplines such as innovation, design, engineering and environmental science. It also promotes higher education as well as mutual enrichment and better understanding of partner nations from Europe and Asia to provide long-lasting value to students and faculty involved who will benefit from a study/research period abroad.
**Profile:** Dr. Khan earned his PhD degree in Computer Science in 2002 from University of Central Florida, Orlando, specializing 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 organizations in Pakistan, and his lab at LUMS has received significant funding for research on computer vision problems.

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**Title:** Efficient Representation for 3D point clouds  
**PI:** Dr. Sohaib Ahmad Khan  
**Sponsor:** Disney Research, Pittsburg  
**Funding Amount:** PKR 900,000  
**Project Initiated in:** 2012  
**Duration:** 3 Months  
**Category:** Computer Vision

**Description:** This a "Broad Review" type of assignment. The research conducted with the senior researcher Dr. Lain Mathews at Disney Research Pittsburg. The broad area of this study is to propose more efficient models for representation of 3D point clouds, for applications in animation industry. This model is patented in United States Patent and Trademark Office (USPTO) in 2012 and title of the patent is "System and Method for Generating Bilinear Spatiotemporal Basis Models".

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**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.

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**Title:** Mapping the Grid: Jumpstarting Electricity Consumption GIS  
**PI:** Dr. Sohaib Ahmad Khan  
**Co-PI:** Dr. Syed Ijial 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: Mapping Rural Pakistan: From Colonial-Era Village Maps to Modern GIS System for Mapping of Socio-Economic and Demographic Data  
PI: Dr. Sohaib Ahmad Khan  
Co-PI: Dr. Thomas Breuel, Germany  
Sponsor: German Pakistani Research Cooperation Program (DAAD)  
Funding Amount: PKR 9,397,908  
Project Initiated in: 2011  
Duration: 24 months  
Collaborator: University of Kaiserslautern, Germany  
Category: GIS

Description: To promote research collaboration and scientific exchange between Pakistan and Germany, LUMS School of Science and Engineering, Lahore, Pakistan and University of Kaiserslautern, Kaiserslautern, Germany, have developed partnership in the field of socio-economic mapping for rural Pakistan. This innovative collaboration resulted in student exchange, faculty visits and exchange of ideas, and changed the state of visualization of demographic and socio-economic datasets in Pakistan, through application of latest trends in document processing and image understanding to old colonial era village maps archived in District Record Rooms across the province of Punjab.

Title: Development of Property Tax Visualization Tool  
PI: Dr. Sohaib Ahmad Khan  
Sponsor: Center for Economic Research in Pakistan (CERP)  
Funding Amount: PKR 450,000  
Project Initiated in: 2014  
Duration: 1 Month  
Category: Technology

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 visualization tool for CERP using the data and guidelines provided by the Property Tax Project Team of CERP.

Title: Technology for People Initiative  
PI: Dr. Sohaib Ahmad Khan  
Sponsor: Google Asia  
Funding Amount: PKR 4,500,000  
Project Initiated in: 2012  
Duration: 20 Months  
Category: Technology

Description: This project proposed a new center at LUMS dedicated to using technology to create solutions relevant to the socio-economic context of Pakistan. This center, named “Technology for the People Initiative” or TPI, focuses on leveraging technology in the domains of public policy, governance, poverty alleviation and improvement in quality of life.
Department of Electrical Engineering
Profile: Dr. Abubakr received his PhD in Electrical Engineering from Georgia Institute of Technology (2005). As a graduate student, he also got a Masters degree in Mathematics (2005) and a Masters degree in Electrical Engineering (2002) from Georgia Tech. He completed his BSc in Electrical Engineering from the University of Engineering & Technology Lahore, Pakistan (2000). Before joining LUMS, he has taught and done research as a postdoctoral fellow at McGill University, Canada (2007-2008) and at the University of Pennsylvania, USA (2006-2007). Dr. Abubakr Muhammad does fundamental research at the interface of systems engineering, applied mathematics and applied physics, on various problems in robotics, and distributed sensing, network dynamics and quantum information sciences. His interests span the study of connections and complexity in large-scale distributed networks; topological methods for information discovery in massive data sets; and communication, computation & control issues in the physics of information. He has also worked and consulted for the industry on the design of air traffic control systems, radar & sonar systems, communication equipments and medical instrumentation. His current research focuses on the development of cyber-physical systems for development and critical infrastructures in Pakistan, in particular issues related to water.

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 Localization & Mapping) are expected to be deployed to process sensor data from 3D laser scanners and RGB-D cameras to create precise 3D terrain profiles of the canals. The profiles help in identifying defects in canal linings, locate and estimate silt accumulations and help the human operator continuously monitor the excavation operation.

Title: Control Strategies for Autonomous Off Road Robotics in Agriculture and Demining
PI: Dr. Abubakr Muhammad
Co-PI: Dr. Mian Muhammad Awais
Sponsor: German Pakistani Research Cooperation Program (DAAD)
Funding Amount: PKR 6,521,000
Project Initiated in: 2011
Duration: 36 months
Collaborator: University of Kaiserslautern, Germany
Category: Robotics
Description: The research aims to develop control strategies for mapping and navigation of an autonomous mobile robot for use in agriculture, demining and similar outdoor applications using low-cost sensors. The aim is to develop key navigational capabilities related to obstacle detection, terrain classification and path planning, which are required for operation of autonomous outdoor robots in rough terrain.
Title: Indus River Dolphin Bio-acoustic Signal Processing
PI: Dr. Abubakr Muhammad
Sponsor: World Wide Fund (WWF)
Funding Amount: PKR 800,000
Project Initiated in: 2010
Duration: 24 Months
Category: Technology

Description: It is a joint collaborative effort of LUMS and WWF to research using hydrophones to study acoustics of the Indus river dolphin. The parties agree to promote joint research activities of the Indus River Dolphin (Platanista Gangetica minor) particularly focusing on the acoustics.

Title: LUMS Mine-Detector: An Affordable and Scalable Robotic Swarm for Landmine Detection
PI: Dr. Abubakr Muhammad
Co-PI: Dr. Mian Muhammad Awais
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 750,000
Project Initiated in: 2011
Duration: 12 Months
Category: Robotics

Description: The project was completed with overwhelming success meeting all objectives set at the beginning. Three robotic platforms were built, programmed and tested. The main robot won an international competition in Lebanon (NI Mine Detection Robot Design contest 2011) creating great excitement and goodwill for LUMS and Pakistan.

Title: LUMS Testbed for Demonstrating Canal Automation in Smart Water Grids
PI: Dr. Abubakr Muhammad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 600,000
Project Initiated in: 2011
Duration: 12 Months
Category: Water

Description: This project proposes to test the theory and software developed in previous studies in a real-life scenario. The project intends to culminate in field trials of the proposed system on an actual irrigation network to answer questions of feasibility, scalability, cost and performance. The research is also expected to give a concrete answer to how much efficiency improvement can be expected from this approach and what would be the technical challenges in deploying such a system on a provincial or national scale. More importantly, a real world deployment is intended to help in understanding the public policy, governance, social and economic implications of such a scheme.
**Title: Revitalizing IIASA-Pakistan Collaboration (2012-17)**

**PI:** Dr. Abubakr Muhammad  
**Co-PI:** Dr. Adil Najam  
**Sponsor:** National Centre for Physics (NCP)  
**Funding Amount:** PKR 12,000,000  
**Project Initiated in:** 2012  
**Duration:** 26 Months  
**Category:** Water

**Description:** The objective of this project is to renew and strengthen the existing collaboration between IIASA (International Institute for Applied Systems Analysis) and the scientific & academic community in Pakistan on policy oriented scientific studies, mathematical models, systems analysis and decision support systems to help solve Pakistan’s grand developmental problems that are too complex to be taken up by a single academic discipline. Sectors in need of such studies include energy, water, environment, food, natural resources, poverty and equity.

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**Title: Revitalizing Irrigation in Pakistan**

**PI:** Dr. Abubakr Muhammad  
**Sponsor:** International Water Management Institute (IWMI)  
**Funding Amount:** PKR 9,894,759  
**Project Initiated in:** 2012  
**Duration:** 34 months  
**Category:** Agriculture

**Description:** The project aims to contribute to agricultural development in Pakistan through the efficient management of surface water and the sustainable use of groundwater in selected canals within the Indus Basin Irrigation System to enhance food security, reduce poverty, and adapt to uncertainties brought about by climate change. LUMS developed and deployed hardware and software for a 17-node smart water metering system to study equity in a warabandi based irrigation delivery system in Hakra Branch canal command, Bahawalnagar over full Rabi and Kharif seasons in 2014.

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**Title: RoPWAT: Robotic Profiling for Clearing Waterways**

**PI:** Dr. Abubakr Muhammad  
**Sponsor:** German Academic Exchange (DAAD)  
**Funding Amount:** PKR 794,160  
**Project Initiated in:** 2014  
**Duration:** 24 Months  
**Collaborator:** Robotics Research Lab, TU Kaiserslautern  
**Category:** Robotics

**Description:** Every year a forced closure of the canals is inevitable for canal cleaning, entailing a very large scale and costly operation. The extent and precision of silt removal is prone to inefficiencies due to subjective decision making in the cleaning process, shortage of time and lack of verification. This proposal is aimed at developing a semi-autonomous robotic profiling system to increase the efficiency of this process. We propose to develop a 3D perception system, which can be deployed on a commercial agricultural machine (excavator or a tractor) or on board a micro aerial vehicle to assist the human operator in cleaning the canal effectively. The proposed system envisages efficient cost effective cleaning, reduced water discharge variability, and enhanced agricultural productivity.
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.

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: December 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 characterization 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 optimized 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.

Title: Power Flow Control for Optimized 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 utilization 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 utilization. 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 optimization and network management issues in wireless mobile networks. He has published several refereed papers in international journals and peer reviewed international conferences.

Title: Design and Development of Wireless Sensor Networks in Industrial Monitoring and Control
PI: Dr. Ijaz Haider Naqvi
Co-PI: Mr. Nauman Ahmad Zaffar
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 500,000
Project Initiated in: 2013
Duration: 12 Months
Category: Technology

Description: This project aims to develop a Wireless Sensor Network in the industry which would monitor the key stress points in the plant. The network of sensor nodes measures various parameters of plant and the readings of these individual sensor nodes communicate to a centralized sink node. The aim is to build the sensor nodes indigenously in order to control the design parameters and tailor them for optimizations suitable for the environment.

Title: Safety Assurance in High Stress Environments (SAHSE)
PI: Dr. Saad Qaiser SEECS, National University of Sciences & Technology (NUST)
Co-PI: Dr. Ijaz Haider Naqvi
Sponsor: National ICT R&D Fund
Funding Amount: PKR 14,599,660
Project Initiated in: 2012
Duration: 36 Months
Category: Technology

Description: The project has been funded by National ICT R&D Fund, where AdCom lab at LUMS and Connekt lab at SEECS successfully developed a safety assurance system for harsh environments with a wireless sensor network. It is a complete hardware/software system for mine and miner safety in underground mines built as per the needs of local mining community. All the inference algorithms including event detection algorithms, miner localisation algorithm and miner free fall detection algorithms have been developed at LUMS. The developed test bed will be used for monitoring the concentration of toxic gases, monitoring structural integrity, temperature etc. in an underground mine environment. The aim is to prevent accidents and collapses and if they do occur, to localise the event and miners to expedite the rescue operations. The project won several awards at Punjab Youth Festival held by Ministry of Science and Technology (MOST) at Expo Centre Lahore in 2014. The prizes include Best Idea, Best Demonstration and Best ICT Project awards. The project also won the prestigious P@SHA ICT R&D award for the year 2014.
Profile: Dr. Jahangir Ikram received his PhD in Electrical Engineering from the University of Manchester, UK in March 1992. Before joining LUMS in 2000, Dr Ikram was a consultant in Asian Development Bank assisted Technical Education Project, developing curricula for Computer Technology and Information Technology. Dr Ikram has also taught in the Electrical Engineering Department at the University of Engineering & Technology, Lahore for several years where he was involved in many funded research projects by different organizations and companies, including a project by Philips TriMedia Division, USA, working on implementation of a Speech algorithm in their TrimEdia processor. In winter 2002, he visited University of Illinois at Chicago (UIC) as Visiting Scholar to do research in Multimedia Communication Laboratory.

Title: Technical Support in Computer Architecture
PI: Dr. Mohammad Jahangir Ikram
Sponsor: Mentor Graphics
Funding Amount: PKR 870,000
Project Initiated in: 2007
Duration: 30 Months
Category: Development Management

Description: The study aimed at developing procedures for coordination within group of company, technical support, appraisals, assessing training needs of employers and capacity building for mentor graphics Pakistan. The client is one of the leading companies of the world in the areas of embedded systems.

Title: Volunteer Internet based Environmental Watch (VIEW)
PI: Dr. Mohammad Jahangir Ikram
Sponsor: Environmental Protection Agency (EPA)
Funding Amount: PKR 3,607,700
Project Initiated in: 2008
Duration: 36 months
Category: Environment

Description: The project is an urban environmental pollution monitoring system and assists in tracking the issue of environmental degradation by providing the real time and geographically comprehensive monitoring capabilities. It provides comprehensive pollution information to communities and government, so that they may keep a check on the levels of pollution in their local environment. The scope of this internal audit included an assessment of internal controls within the management framework for each of stages in management of the subject project. The management control framework includes the management, financial, administrative and operational processes and system in place to ensure the timely disbursement of funds and effective and efficient utilization of funds according to the terms and conditions of the project.
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.

**Title:** A Cost-effective EEG based Non-invasive Brain-Computer Interface  
**PI:** Dr. Momin Ayub Uppal  
**Sponsor:** LUMS Faculty Initiative Fund (FIF)  
**Funding Amount:** PKR 300,000  
**Project Initiated in:** 2012  
**Duration:** 12 Months  
**Category:** Technology

**Description:** The project aims to design and develop cost-effective hardware that acquires electroencephalography (EEG) signals from the scalp through non-invasive methods and transfers them to the computer for analysis. It also aims to develop software capable of analyzing and decoding EEG patterns associated with external stimuli which lead to development of an application that lets a subject operate a PC in real-time using only the EEG signals recorded from the brain.

**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:** Telecommunication

**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.
Title: Projectile Tracking using Acoustic Localization
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 localization capability to estimate the trajectory of a projectile that generates a specific acoustic signature. As important applications of the localization 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.
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 specialization & electronic design automation tools, LED-based optical communication & localization, and smart power grid (algorithms and hardware development).

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 utilizes preinstalled LED ceiling lights (like Wi-Fi based schemes) but provides better localization accuracy. Current LED-based IPS either requires expensive cameras and image-based transformation methods or relatively inexpensive photodiodes. However, photodiode-based IPS needs perfect synchronization 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 synchronization errors on localization accuracy. Furthermore, design of asynchronous LED-based IPS is expected to be studies.

Title: Research Collaboration Visit
PI: Dr. Muhammad Adeel Pasha
Sponsor: INRIA Rennes France
Collaborating Partner: University of Rennes-1 and INRIA Rennes, France
Collaborating Professors: Prof. Olivier Sentieys and Prof. Steven Derrien
Project Initiated in: 2012
Duration: 1.5 Months
Category: Technology

Main Purpose: Dr. Adeel Pasha, in his research collaboration visit to INRIA Rennes, France in 2012, with Prof. Olivier Sentieys and Prof. Steven Derrien focused on continued research and development of "LoMiTa: an EDA Tool for High Level Synthesis of Ultra Low Power WSN Node Controllers". The collaborated work got published in a prestigious conference on Digital System Design.
Main Purpose: Dr. Adeel Pasha, in a research collaboration visit to HS Offenburg, Germany in 2014 funded by DAAD gave an invited talk at the International Workshop on Water Monitoring (IWMM’14) held at HS Offenburg. The visit also enabled a paper presentation at the German Embedded Symposium held in Munich Germany.
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 Optimization Committee and is working on establishing a research base at SSE 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.

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.

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 (LESCO)
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 iddferent 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: LUMS Smart Meters and Meter Data Management PoC
PI: Mr. Nauman Ahmad Zaffar
Sponsor: Techlogix, MicroTech Industries (Private) Ltd. & Mitsubishi Endowment Fund
Funding Amount: PKR 1,340,050
Project Initiated in: 2010
Duration: 9 months
Category: Energy

Description: “Smart Meter” is an advanced meter (usually an electrical meter) that records consumption in intervals of an hour or less and communicates that information at least daily via some communications network back to the utility for monitoring and billing purposes. This research serves as the basis to outline enhancements for rolling-out a proof of concept project to setup a smart metering infrastructure at LUMS for carrying out a study of operational control and benefits of Advanced Metering Infrastructure. This setup used to establish a smart meter infrastructure to monitor and control the utilization of electrical power within LUMS campus. It helps carry out studies and research in areas of peak demand management and smart load curtailment to address the needs within Pakistan and extend the general ideas to a global audience. This setup is anticipated to be with 20 smart meters, mostly 3-phase and few at distribution transformer level. It is anticipated that this initial effort may well act as a PoC for different distribution companies in Pakistan for adoption of a similar infrastructure on a larger commercial scale.

Title: Study on Integration of Renewable and Energy Optimization Solutions in Local Industry
PI: Mr. Nauman Ahmad Zaffar
Sponsor: Cleaner Prod. Institute
Funding Amount: PKR 4,334,375
Project Initiated in: 2012
Duration: 5 Months
Category: Energy

Description: The objective of this project is to perform a detailed study on PV backup systems based on various components such as solar panels, charge controllers, storage system and inventors. A PV system capacity is carefully analyzed on the balance between solar energy striking on the modules, electrical load requirements and efficiencies of PV system components. Several performance parameters are taken into account for detailed study to evaluate the overall yield of the PV system.
Profile: Dr. Naveed Ul Hassan received the BE degree in avionics engineering from the College of Aeronautical Engineering, Risalpur, Pakistan, in 2002. In 2006 and 2010, he received MS and PhD degrees both in electrical engineering with specialisation in digital and wireless communications from Ecole Superieure d’Electricite (Supelec), France. Since 2011, he has been an Assistant Professor in the Department of Electrical Engineering at Lahore University of Management Sciences (LUMS), Pakistan. He was a visiting Assistant Professor at Singapore University of Technology and Design (SUTD) in 2012 and 2013. Dr. Hassan has several years of research experience and has authored/co-authored several research papers in refereed international journals and conferences. His major research interests include cross layer design and resource optimisation in wireless networks, demand response management in smart grids, indoor localization and heterogeneous networks.

Title: Research Collaboration Visit  
PI: Dr. Naveed Ul Hassan  
Sponsor: Singapore University of Technology and Design (SUTD), Singapore  
Collaborating Partner: Singapore University of Technology & Design (SUTD), Singapore  
Collaborating Professor: Prof. Yuen Chau (Engineering Product Development)  
Project Initiated in: 2012  
Duration: 2 Months  
Category: Technology

Main Purpose: Dr. Naveed Ul Hassan, in his research collaboration visit to Singapore University of Technology & Design (SUTD), Singapore in 2012, with Professor Yuen Chau of SUTD’s Engineering Product Development focused on the wireless Communications and Radio Resource Allocation.

Title: Research Collaboration Visit  
PI: Dr. Naveed Ul Hassan  
Sponsor: Singapore University of Technology and Design (SUTD), Singapore  
Collaborating Partner: Singapore University of Technology & Design (SUTD), Singapore  
Collaborating Professor: Prof. Yuen Chau (Engineering Product Development)  
Project Initiated in: 2013  
Duration: 2 Months  
Category: Technology

Main Purpose: Dr. Hassan, along with Professor Yuen Chau, in Singapore University of Technology & Design in 2013 looked into the demand side management in smart grids.

Title: Research Collaboration Visit  
PI: Dr. Naveed Ul Hassan  
Sponsor: Singapore University of Technology and Design (SUTD), Singapore  
Collaborating Partner: Singapore University of Technology & Design (SUTD), Singapore  
Collaborating Professor: Prof. Yuen Chau (Engineering Product Development)  
Project Initiated in: 2014  
Duration: 2 Months  
Category: Technology

Main Purpose: The purpose of the research collaboration visit of Dr. Hassan in 2014, in Singapore University of Technology & Design, with Professor Yuen Chau was to examine and explore smart grids.
Dr. Shahid Masud
Department of Electrical Engineering, SBASSE
smasud@lums.edu.pk
+924235608199

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.

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.

Title: Investigating Wavelet Video Coding Conferencing Application
PI: Dr. Shahid Masud
Co-PI: Dr. Nadeem Ahmad Khan
Sponsor: National ICT R&D Fund
Funding Amount: PKR 7,223,625
Project Initiated in: 2008
Duration: 24 Months
Category: Telecommunication

Description: The primary goal of the project is the development of a proprietary and secure audio/video codec hereafter, referred to as CODEC only. This CODEC is meant for videoconferencing application and is able to cope with poor network conditions as well. The CODEC developed on the PC platform and ported to a dedicated hardware platform for use in an embedded videoconferencing system. This embedded solution is proposed to be built around a suitably selected off-the-shelf board based on a programmable VLW processor running the developed proprietary CODEC. The project executed in two phases each of one year duration. In the first phase of the project, the CODEC itself developed and optimized for the PC platform and integrated in the video conferencing system running on PC platform. In the second phase of the project the aforementioned solution ported to a dedicated embedded system.
Main Purpose: The purpose of this collaboration visit was the development, understanding and usage of different tools and techniques for Mixed Signal System on Chip Design using Microsemi SoC chips. In this regard, Dr. Shahid Masud collaborated with Professor Sara Blanc Clavero.
Profile: Dr. Syed Azer Reza completed his BSc in Electronic Engineering from the Ghulam Ishaq Khan Institute of Engineering in 2003. He completed his MSc in Electrical Engineering from Darmstadt University of Applied Sciences in Germany with a specialization in microwave ceramic filter designs. He received his masters and PhD in Optics from the University of Central Florida specializing in Photonic Signal Processing applications for communication and sensing applications. Dr. Reza worked as a post-doctoral research associate at the Laser Interferometer Space Antenna (LISA) Labs at the University of Florida worked on the ementation of a test-bench to verify the relative phase performance of photodetectors that would be used in the LISA space mission. His works have appeared in more than 20 international conferences and journals.

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.
Dr. Waqas Majeed
Department of Electrical Engineering, SBASSE
waqas.majeed@lums.edu.pk
+924235603532

Profile: Waqas Majeed received BS in Electrical Engineering from GIK Institute, Pakistan (2000-2004, gold medalist). During his PhD in bioengineering at Georgia Tech, USA (2005-2010), his research involved fMRI-based functional connectivity, manganese-enhanced MRI for neuronal tract-tracing and diffusion-tensor imaging. The focus of his thesis work was detection and characterization 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.

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. Zulfikar 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.

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 minimizing damage to healthy brain areas responsible for critical functions such as voluntary movements, speech/language, somatosensation and vision [i]. Damage to these areas would result in functional deficits, thereby severely affecting patient’s quality of life. These brain areas are collectively referred to as “eloquent cortex” [ii]. Brain surgeries are planned so as to minimize 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 reorganization during progression of the disease [iii]. Therefore, location of eloquent cortex cannot be determined using stereotactic coordinates of different brain areas, and has to be identified before/during surgery using functional mapping techniques.
Profile: 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.

Title: Design, Development and Integration Testing of FlowIXP: An Open Flow based Route Server for Internet Exchange Points (IXPs) based on Marvell xCAT/LION Platform
PI: Dr. Zartash Afzal Uzmi
Sponsor: Marvell Technology Group Ltd.
Funding Amount: PKR 3,440,000
Project Initiated in: 2011
Duration: 42 months
Collaborator: University Research Centre (URC)
Category: Technology

Description: The project aims to build a Flow IXP, an Open Flow enabled Route server for Internet exchange points. This allows establishing an IXP without requiring hardware that may be too expensive to deploy. The project intends to use Marvell’s Lion/xCAT platforms as the target hardware.

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: 2012
Duration: 18 Months
Collaborator: Cloud BPO Pvt Ltd
Category: Telecommunication

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.
Department of Mathematics
Profile: Dr. Adnan Khan was awarded his PhD from Rensselaer Polytechnic Institute in NY in 2007. His thesis was titled 'Parameterization for Some Multiscale Problems in Biology and Turbulence'. The work involved studying approaches to coarse graining of multiscale systems with applications to turbulent diffusion and protein dynamics. Prior to his doctoral work, he obtained a BE in Electrical Engineering from NED University of Engineering & Technology, Karachi in 1998 and an MS in Applied Mathematics from the University of Delaware in 2002. His current research interests involve modelling and analysis of biological systems, multiscale modelling and asymptotic analysis. Prior to joining LUMS, Dr. Khan has taught at the Rensselaer Polytechnic Institute and University of Delaware. Besides his usual academic interests, he is also interested in reading on a variety of topics including economics, philosophy, history and world literature.

Title: Developing Image Processing Algorithms for Molecular Diagnostics & Radiology Projects with SKMCH
PI: Dr. Adnan Khan
Co-PI: Dr. Usman Qazi, Dr. Sultan Muhammad Khan Sial, Dr. Natasha Anwar and Mr. Najmuddin
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 750,000
Project Initiated in: 2010
Duration: 12 Months
Category: Health

Description: In collaboration with the Molecular Pathology and Radiology Departments at Shaukat Khanum Memorial Cancer Hospital (SKMCH), the study plans to utilize expertise in informatics, biology, computation, imaging and medicine in order to improve the reliability, increase the speed and reduce the cost of several diagnostics assays used in the Molecular Pathology Lab at SKMCC; and develop Computer Aided Diagnostic (CAD) tools or automated detection of pulmonary nodules, both of which are at present done manually at SKMCC.

Title: Control of Bacterial Growth in a Biofilm
PI: Dr. Adnan Khan
Co-PI: Dr. Sultan Muhammad Khan Sial and Dr. Mudassar Imran
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 960,000
Project Initiated in: 2014
Duration: 12 Months
Category: Health

Description: This study plans on developing a deterministic model for bacterial growth in a biofilm and suggesting optimal antibiotic regimen for its control. The project intends to study the conditions under which antibiotic treatment successfully eradicates the microbial population from a biofilm and the surrounding fluid compartment. The study addresses the problem of finding a course of treatment which reduces active bacteria at the end while also minimizing 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.

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.

Title: Optimal Control of the Transmission Dynamics of the Hepatitis C with Quarantine
PI: Dr. Imran Naeem
Co-PI: Dr. Mudassar Imran
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 972,000
Project Initiated in: 2014
Duration: 12 Months
Category: Health

Description: In this research, a rigorous mathematical analysis of a deterministic model for the transmission dynamics of Hepatitis C, using a standard incidence function, are expected to be performed. The infected population is divided into three distinct compartments featuring two distinct infection stages (acute and chronic) along with a quarantine compartment. The study intends that the disease free equilibrium is locally and globally asymptotically stable for basic reproduction number (R0). The model reveals that for R0 > 1, the endemic equilibrium exists and researchers will show stability properties local as well as global. Two different optimal control strategies (vaccination and quarantine) are planned to be designed to control the disease and reduce the infected population. The analysis is intended to be carried out by using Pontryagin’s Maximum Principle in order to illustrate the optimal controls with respect to an optimality system numerically.
Department of Physics
Profile: 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.

Title: S-Duality, N=2* Gauge Theories and Topological Strings
PI: Dr. Amer Iqbal
Co-PI: Dr. Irfan Chaudhry
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 3,775,335
Project Initiated in: 2012
Duration: 36 months
Category: Sciences

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) Realizing 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.

Title: Knot/Link Invariants and Topological String
PI: Dr. Amer Iqbal
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 866,600
Project Initiated in: 2012
Duration: 12 Months
Category: Sciences

Description: Knot/Link invariants are mathematical functions (usually polynomials) which distinguish knots/links. If knot invariants of two knots are different then these two knots cannot be deformed into each other without breaking them. Obtaining new knot invariants which distinguish a larger class of knots is a very important problem in knot theory. Recently Mikhail Khovanov defined new invariants of knots now known as Khovanov invariants or Homological invariants. The project intends to study the properties of these operators and extend the class of links and knots for which such a physical system can be found.
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 Univeristy 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.

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.

Title: Optical Detection of Spin Phenomena
PI: Dr. Muhammad Sabieh Anwar
Sponsor: Higher Education Commission (HEC)
Funding Amount: PKR 19,969,560
Project Initiated in: 2012
Duration: 36 months
Category: Technology
Description: The experimental project is centred on the detection of spin polarization and spin voltage, through purely optical means. The project involves the growth and fabrication of samples, and the appropriate sample mounting devices for the experiment.
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: GIKI Technology Transfer Project
PI: Dr. Muhammad Sabieh Anwar
Sponsor: Ghulam Ishaq Khan Institute of Engineering Sciences & Technology (GIKI)
Funding Amount: PKR 960,000
Project Initiated in: 2011
Duration: 2 months
Category: Technology

Description: In September 2011, the Physics Lab of Syed Babar Ali School of Science and Engineering at LUMS organised fresh experiments in the undergraduate physics laboratory at Ghulam Ishaq Khan Institute of Engineering Sciences and Technology. Equipment and materials designed and built at LUMS, with accompanying monographs, software and instructor resources were transferred demonstrating a rare happening in Pakistan where one university shared its technology and learning resources with another university. The goal of this project was to initiate resource sharing and to germinate seeds of quality education in physics experimentation throughout Pakistan.

Title: Development of Physics Laboratories and Technology Transfer
PI: Dr. Muhammad Sabieh Anwar
Sponsor: Institute of Space Technology (IST)
Funding Amount: PKR 1,675,000
Project Initiated in: 2010
Duration: 4 months
Category: Technology

Description: The SSE Physics Lab, led by Dr. Sabieh Anwar, set up a freshman laboratory at the Institute of Space Technology (IST) in Islamabad, the educational face of the Pakistan Space and Upper Atmosphere Commission (SUPARCO). In this venture, seven experiments — covering an interesting variety of fields of physics — were deployed at the IST campus. This project not only generated valuable revenue for the Physics Lab but also contributed to the lab’s mission of initiating a paradigm shift in the education of physics experimentation in the country.
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 (NJC) through a joint work. The technical expertise from both organisations were used in this collaboration and allowed for a more effective and efficient utilisation of resources made available by both the Parties.

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.
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.

Title: Super-resolution Confocal Microscopy through Wavefront Control in Complex Media
Pl: Dr. Mumtaz Ali Sheikh
Co-Pl: Dr. Syed Azer Reza
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 948,000
Project Initiated in: 2014
Duration: 12 Months
Category: Technology

Description: The primary aim of the research is to work on the problem of breaking the classical diffraction limit on the resolution of optical instruments with particular emphasis on confocal microscopes. The idea is to use a random scattering medium in conjunction with a spatial phase light modulator to focus the illuminating laser light to a smaller spot on the sample than is otherwise permitted by the classical diffraction limit. Besides the obvious utility of this framework in microscopes especially for non-fluorescent samples, it can also potentially be used for optical tweezers in strongly scattering media, to improve sensitivity in spectroscopy and for lithography.

Title: Smart 3-D Terrain Mapping with Laser Ranging and Agile Optics for Use with Robots
Pl: Dr. Mumtaz Ali Sheikh
Co-Pl: Dr. Abubakr Muhammad
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 750,000
Project Initiated in: 2010
Duration: 12 Months
Category: Robotics

Description: This study presents a novel technique for the sampling and reconstruction of Three-Dimensional terrain. A comparison is drawn by simulating and comparing the proposed method with another relatively new technique, which uses Single Pixel LIDAR (Laser Radar) with compressive sensing to reconstruct 3-d objects.
SAHSOL

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.

Title: Clinical Legal Education Program
PI: Dr. Ali Mohsin Qazilbash
Sponsor: Open Society Institute (OSI)
Funding Amount: PKR 2,222,735
Project Initiated in: 2012
Duration: 40 Months
Category: Law & Policy

Description: This project is to set up a clinical legal education program to provide socially relevant clinical training for law students through a rigorous clinical legal curriculum geared towards provision of pro bono legal advices and services to the poor and other marginalized groups.
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.
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.

Title: Rent-Seeking in Pakistan-India Trade under GATT
PI: Mr. Sikander Ahmed Shah
Co-PI: Mr. Uzair J. Kayani
Sponsor: LUMS Faculty Initiative Fund (FIF)
Funding Amount: PKR 650,000
Project Initiated in: 2014
Duration: 12 Months
Category: Law & Policy

Description: While international trade law encourages countries to lower restrictions on imports from all their trading partners, it allows for significant exceptions to this principle. In particular, under the General Agreement on Tariffs and Trade (GATT), a country may impose special restrictions on imports if it can justify these restrictions as: (i) anti-dumping measures; (ii) countervailing duties; (iii) emergency protection for local industry; or (iv) measures for economic development in a developing state. These legal trade restrictions are known as “safeguards.” Since these GATT safeguards are legal, countries can use them to harm a trading partner without incurring liability. Legally sophisticated countries can use these safeguards more effectively to secure economic rents for their local industries. The research is expected to analyze 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.
Index

A
Abid Aman Burki, 38, 39, 40, 41, 47, 54
Abubakr Muhammad, 98, 99, 100, 106, 119, 126
Adam Smith International (ASI), 48, 54
AdCom lab, 103
Adeel Faheem, 45, 49
Adli Najam, 100
Adnan Khan, 118
Agriculture, 18, 39, 53, 55, 98, 100
Ahmad Kamal Nasir, 101
Ahmed Jawaad Afzal, 69
Ali Khan, 59, 60
Ali Mohsin Qazilbash, 128, 129
Ali Nobil Ahmad, 59
Ali Usman Qasmi, 61
Amer Iqbal, 122
Ammar Anees Malik, 42
Anne Andermann, 50
Asim Karim, 84, 88
Association of Management Development Institution in South Asia (AMDISA), 29
Atif Saeed Chaudry, 20
Aziz Mithani, 69, 70

B
Babar Ali, 88
Barclays Bank, Karachi, 7
Basit Shafiq, 85
Basit Yameen, 76, 77
Behavioural Studies, 27, 30, 31, 32, 35, 51, 52, 59, 60, 64
Best IT Innovation Awards (BITA), 18
Biology, 69, 70, 71, 73, 74, 118
British Council, Islamabad, 7
British Council, UK, 7
Business & Innovation, 20, 23, 24, 29, 34, 46

C
Campaign for Quality, 49
Case Research Centre (CRC), 11
Center for Earthquake Studies (CES), 100
Center for Economic Research in Pakistan (CERP), 96
Centre for Advanced Studies in Mathematics (CASM), 13
Centre for High Performance Computing (CHPC), 13
Chemistry, 74, 76, 78, 79, 80, 81, 82, 123
Choudhry Tanveer Shehzad, 21
Cleaner Production Institute, 7
Coca Cola Beverages Pakistan Ltd. (CCBPL), 7
Computer Science, 26, 84, 85, 86, 87, 88, 89, 90, 91, 93, 95, 126
Computer Vision, 90, 95
Comtech -Twas, 77
Connekt lab, 103

D
Daniel Mosse, 87
DECO Associates and Government of Punjab, 56
Department of Biology, 69, 70, 71, 73, 74
Department of Chemistry, 76, 78, 79, 80, 81, 82
Department of Computer Science, 84, 85, 86, 87, 88, 89, 90, 91, 93, 95
Department of Economics, 38, 42, 44, 45, 47, 49, 50, 51, 53, 55
Department of Electrical Engineering, 98, 101, 102, 103, 104, 105,
107, 109, 111, 112, 114, 115, 116
Department of Humanities & Social Sciences, 12, 59, 61, 62, 63, 64,
65, 66
Department of Law and Policy, 128, 130
Department of Mathematics, 118, 119, 120
Department of Physics, 122, 123, 126
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), 40, 89
Development Management, 26, 28, 33, 42, 43, 44, 45, 57, 61, 66,
85, 93, 95, 104
Development Policy Research Centre, 12
Disney Research, Pittsburg, 95

E
Ebryx SMC-Pvt. Ltd., 88
Economic Development, 21, 22, 25, 29, 38, 39, 47, 51, 54, 85
Education, 41, 43, 48, 49, 65, 70, 71, 72, 73, 76, 81, 82, 91,
119, 122, 123, 128
Electrical Engineering, 93, 98, 101, 102, 103, 104, 105, 107, 109,
111, 112, 114, 115, 116, 118
Energy, 76, 81, 91, 92, 102, 107, 109, 110, 119
Enrico Marelli, 25
Entrepreneurship, 25, 46
Environment, 93, 104
Environmental Protection Agency (EPA), 104
Erasmus Mundus, 86, 88, 92, 94, 113
Erik Dahlquist, 92

F
Faculty Travel Grant (FTG), 16, 17
Faisal Bari, 46
Falak Sher, 78
Faqir Muhammad Bhatti, 119
Fareena Sultan, 22
Farrah Arif, 22
FAST NU, 88
Ferhana Ahmad, 23

G

German Pakistani Research Cooperation Program (DAAD), 81, 96, 98, 112
Ghayoor Abbas Chotana, 79
GIKI, 124
GIS, 95, 96
Global Development Network, 38, 55
Global Development Network (GDN), 55
Google Asia Pacific Pte. Ltd., 7
Gurmani Centre for Languages and Literature (GCLL), 12

H

Habib University, Karachi, 124
Habib Ur Rehman, 80
Hadia Majid, 42, 43, 51
Hamid Abdul Basit, 86
Hammad Siddiqui, 46
Hasan H. Karrar, 62
Hassan Abbas Khan, 102
Health, 35, 50, 56, 71, 73, 74, 81, 82, 91, 115, 118, 120
HEC, 49, 65, 70, 71, 72, 73, 76, 78, 81, 82, 91, 119, 122, 123
HTSPE International Programme Management, 43

I

Ihsan Ayyub Qazi, 87
Ijaz Haider Naqvi, 103
Imran Naeem, 120
Imtiaz ul Haq, 44, 46
Indian Council for Research on International Economic Relations (ICRIER), 53
Indus Motor Company (IMC), 40
Institute of Development and Economic Alternatives (IDEAS), 50
Institute of Space Technology, 124
Institutional Review Board (IRB), 16
International Food Policy Research Institute (IFPRI), 39, 42
International Growth Centre (IGC), 38, 39, 56, 95
International Water Management Institute (IWMI), 100
IRB, 16
Irfan Chaudhry, 122
Irshad Hussain, 78, 81

J

Jarke Van Wijk, 86
Jens Forssbaeck, 21

K

Kamal A Munir, 40, 47
Kamran Ali Chatha, 24, 29, 34
Kashif Zaheer Malik, 45, 46
Katherine Vyborny, 42
Khalid Mir, 41
King Abdullah University of Science and Technology (KAUST), 72
KLEMS, 39

L

L.I.R. Scholtens, 21
Labour Department Punjab, 57
Laila Bushra, 60
Law & Policy, 40, 41, 59, 89, 128, 129, 130
LESCO, 109
Lineaus-Palme Program, 93
London School of Economics and Political Science (LSE), 38, 51, 56
LUMS Faculty Initiative Fund (FIF), 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 34, 35, 36, 46, 51, 52, 54, 59, 60, 61, 62, 64, 66, 69, 72, 74, 78, 79, 80, 82, 85, 86, 87, 92, 98, 99, 102, 105, 106, 107, 114, 115, 118, 120, 123, 126, 129, 130
LUMS Funding Sources, 17

M

Malardalen University, 92, 93
Marcello Signorelli, 25
Manilis Vahe, 35
Mark Brand, 86
Marvell, 116
Mentor Graphics, 104
MGSHSS, 36, 38, 42, 44, 45, 47, 49, 50, 53, 55, 59, 61, 62, 63, 64, 65, 66
Mian Muhammad Awais, 88, 98, 99
MicroTech Industries (Private) Ltd., 7, 110
Ministry of Commerce, Government of Pakistan (MOC), 41
Misbah Tanveer Chaudhry, 25
Mitsubishi, 110
Mohammad Jahangir Ikram, 91, 92, 104
Mohammad Usman Khan, 41, 47, 48, 53, 54, 59
Mohammad Waseem, 63
Mohsin Bashir, 26
Momin Ayub Uppal, 105, 106
Mudassar Imran, 118, 120
Muhammad Adeel Ahmed Pasha, 107
Muhammad Adeel Zaffar, 22
Muhammad Azam Rooni, 30
Muhammad Fareed Zaffar, 85, 89
Muhammad Farooq Naseer, 49, 50
Muhammad Ghufran Ahmad, 27
Muhammad Naiman Jall, 28
Muhammad Sabieh Anwar, 76, 78, 123, 124, 125
Muhammad Shakeel Sadiq Jaja, 29
Muhammad Shehryar Shahid, 30
N
Nadeem Ahmad Khan, 115
Najmuddin, 118
Natasha Anwar, 118
National Funding Opportunities, 18
National ICT R&D Fund, 17, 18
National Outreach Programme, 34
National University of Sciences and Technology, 103
Nauman Ahmad Zaffar, 102, 109, 110
Naveed Arshad, 91, 92
Naveed Ul Hassan, 107, 111
Nida Kirmani, 64
Nida Yasmeen Kirmani, 64

O
Office of Sponsored Programmes and Research (OSPR), 6, 16, 93
Open Society Institute (OSI), 128
Operations Management, 29, 40
Oxfam International, Pakistan, 7

P
Pakistan Science Foundation (PSF), 18
Pakistan Strategy Support Program (PSSP), 43
PepsiCo, 70
Philipps University, 81
Physics, 100, 102, 122, 123, 124, 125, 126
Political Sciences, 63, 65
President’s Programme for Care of Highly Qualified Overseas Pakistanis (PPQP), 18
Preston University, 124
Punjab Skills Development Fund (PSDF), 33

R
Rahman Shah Zaib Saleem, 82
Rashid Memon, 41, 51, 52
Rasul Bakhsh Rais, 52, 65
Raising Executive Development Centre (REDC), 11
Research Collaboration Visit, 86, 88, 92, 111, 113
Research Statistics, 7
Robotics, 88, 98, 99, 100, 101, 119, 126
Robotics Research Lab, TU Kaiserslautern, 98, 100
RS Corporate Advisory (Pvt.) Ltd., 128

S
S.M. Turab Hussain, 48, 53, 54, 112
Saad Azmat, 28
Safeeq Ullah Chaudhary, 73
Saima Anwar, 72
Salman Khan, 31
Samina Quratulain, 32
Sara Blanc Clavero, 111, 113
Saskumar Punnekkat, 93
Sciences, 12, 22, 27, 29, 38, 42, 44, 59, 61, 62, 63, 64, 65, 66, 69, 70, 71, 72, 76, 78, 79, 80, 81, 82, 85, 86, 87, 90, 95, 105, 111, 114, 122, 123, 124
SDSB, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35
SEecs, 103
SEFAM (Pvt) Ltd, 93
Shafay Shamsi, 6, 85, 86, 88, 93
Shahid Masud, 112, 113
Shaiq Ahmad Hassan School of Law, 130
Sight Savers International (SSI), 84
Sikander Ahmed Shah, 130
Small and Medium Enterprises, 31
Social Enterprise Development Centre (SEDC), 11
Sohai Ahram Khan, 89, 95, 96
Sohail H. Naqvi, 5
Sohail Qureshi, 73, 81
South Asia Center for Policy Studies (SACEPS), 44
South Asia Network of Economic Research Institutes (SANEI), 38, 53
Start-up Grants, 17
State Bank of Pakistan, 47
Strategic Sectors Research Centre (SSRC), 11
Suleman Dawood School of Business, 11, 20, 22, 25, 26, 27
Sultan Muhammad Khan Sial, 118
Syed Ali Hasanain, 55, 56
Syed Azer Reza, 114, 126
Syed Babar Ali School of Science and Engineering, 13, 71, 74, 79, 80, 124
Syed Ijaz Hussain Naqvi, 95
Syed Musharif Ali, 33
Syed Muhammad Hussain, 39, 40, 57
Syed Shahzad ul Hassan, 74
Syed Zahoor Hassan, 34

T
Tariq Mahmood Jadoo, 107
Technologia, 109
Technical University of Valencia, 113
Technology for People Initiative (TPI), 96
Telecommunication, 88, 105, 112, 116
Tetra Pak, 39
The Asia Foundation, 63
The Royal Institute for the Advancement of Learning, 50
The Royal Society, 34
Thomas Breuel, 96
Trade, 41, 45, 48, 50, 53, 54, 62, 130

U
U.S. Agency for International Development (USAID), 49, 81, 90
United Nations International Children’s Emergency Fund (UNICEF), 41, 47, 48, 59
University of California, San Diego, 55
University of Edinburgh, UK, 78
University of Engineering & Technology, 98, 104, 109
University of Limerick, 88
University of Massachusetts, 81
University of Offenburg, 112
University of Oxford, 56, 70
University of Pittsburgh, 87
University Research Council (URC), 16
Usman Qazi, 118
Uzair J. Kayani, 130

V
Vincent M. Rotello, 81

W
Waqar Zaidi, 66
Waqas Majeed, 115
Water, 76, 77, 89, 100
Wolfgang I. Parak, 81
World Bank, 34, 40, 54, 85, 95
World Wide Fund (WWF), 99

Y
Yasin Altaf, 116
Yuen Chau, 111

Z
Zaffar Sajjad, 115
Zain ul Abidin Khawaja, 35
Zakir Ullah, 72, 74
Zameen Media (Pvt) Ltd, 28
Zartash Afzal Uzmi, 22, 116
Zehra Waheed, 33
Zulfiqar Ali Rizvi, 115